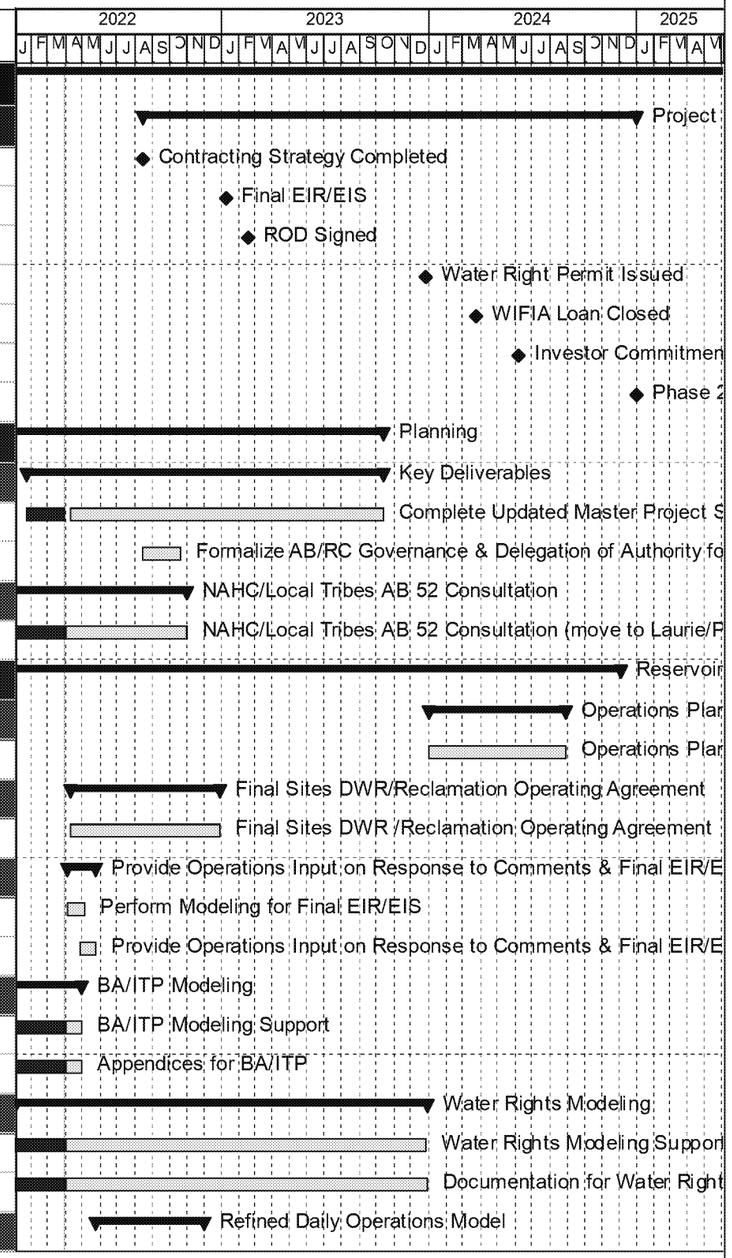
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
1	**Sites Reservoir Project**				1771	01-Sep-20 A	14-Feb-29
2	**Project Milestones**				599	16-Aug-22	31-Dec-24
3	MS-1100	Contracting Strategy Completed			0		16-Aug-22
4	MS-1200	Final EIR/EIS			0		10-Jan-23
5	MS-1300	ROD Signed			0		17-Feb-23
6	MS-1400	Water Right Permit Issued	GEO	INV	0		28-Dec-23
7	MS-1600	WIFIA Loan Closed			0		25-Mar-24
8	MS-1500	Investor Commitment (needs Predecessors)	GEO	INV	0		06-Jun-24
9	MS-5000	Phase 2 Amendment 3 Complete			0		31-Dec-24*
10	**Planning**				386	01-Sep-20 A	13-Oct-23
11	**Key Deliverables**				380	24-Jan-22 A	13-Oct-23
12	KD-1130	Complete Updated Master Project Schedule (Baseline Established)			380	24-Jan-22 A	13-Oct-23
13	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3			45	17-Aug-22	20-Oct-22
14	**NAHC/Local Tribes AB 52 Consultation**				148	01-Sep-20 A	31-Oct-22
15	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)			148	01-Sep-20 A	31-Oct-22
16	**Reservoir Operations & Modeling**				677	01-Nov-20 A	05-Dec-24
17	**Operations Plan - Version 2**				173	03-Jan-24	30-Aug-24
18	KD-1510	Operations Plan, Version 2			173	03-Jan-24	30-Aug-24
19	**Final Sites DWR/Reclamation Operating Agreement**				182	11-Apr-22	30-Dec-22
20	OP-1005	Final Sites DWR /Reclamation Operating Agreement			182	11-Apr-22*	30-Dec-22
21	**Provide Operations Input on Response to Comments & Final EIR/EIS**				36	04-Apr-22	23-May-22
22	FO-1110	Perform Modeling for Final EIR/EIS			25	04-Apr-22*	06-May-22
23	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS			20	26-Apr-22	23-May-22
24	**BA/ITP Modeling**				21	01-Nov-20 A	29-Apr-22
25	OP-450	BA/ITP Modeling Support			21	01-Nov-20 A	29-Apr-22
26	OP-360	Appendices for BA/ITP			21	01-Apr-21 A	29-Apr-22
27	**Water Rights Modeling**				437	03-Jan-22 A	29-Dec-23
28	A1200	Water Rights Modeling Support			436	03-Jan-22 A	28-Dec-23
29	A1210	Documentation for Water Rights			437	03-Jan-22 A	29-Dec-23
30	**Refined Daily Operations Model**				130	24-May-22	30-Nov-22



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

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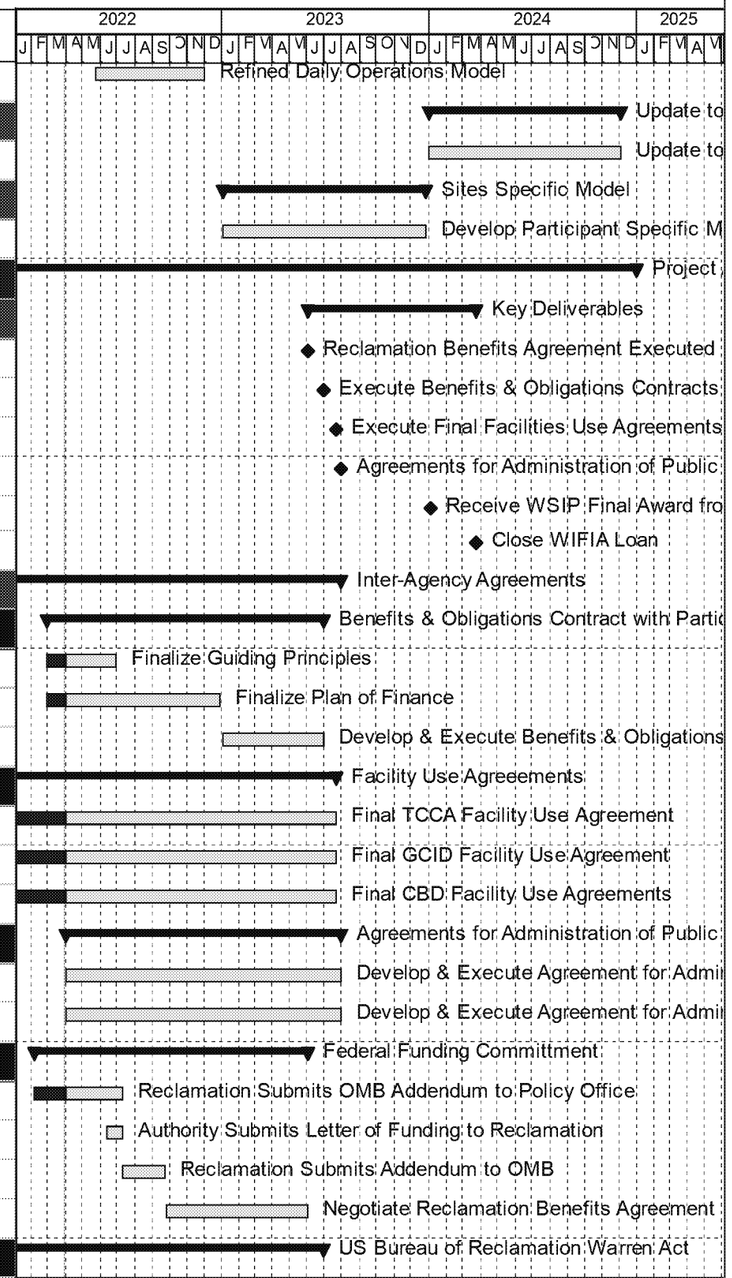
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
31	A1220	Refined Daily Operations Model			130	24-May-22	30-Nov-22
32	**Update to CalSim 3**				240	02-Jan-24	05-Dec-24
33	A1230	Update to CalSim 3			240	02-Jan-24	05-Dec-24
34	**Sites Specific Model**				258	03-Jan-23	28-Dec-23
35	OS-1150	Develop Participant Specific Model			258	03-Jan-23	28-Dec-23
36	**Project Agreements & Funding**				695	01-Jun-21 A	31-Dec-24
37	**Key Deliverables**				202	01-Jun-23	25-Mar-24
38	KD-1260	Reclamation Benefits Agreement Executed		INV	0		01-Jun-23
39	KD-1300	Execute Benefits & Obligations Contracts with Participants		INV	0		29-Jun-23
40	KD-1230	Execute Final Facilities Use Agreements		INV	0		21-Jul-23
41	KD-1520	Agreements for Administration of Public Benefits Executed		INV	0		31-Jul-23
42	KD-1310	Receive WSIP Final Award from CWC		INV	0		05-Jan-24
43	KD-2600	Close WIFIA Loan		INV	0		25-Mar-24
44	**Inter-Agency Agreements**				334	01-Jun-21 A	31-Jul-23
45	**Benefits & Obligations Contract with Participants**				313	01-Mar-22 A	29-Jun-23
46	BO-1100	Finalize Guiding Principles			64	01-Mar-22 A	30-Jun-22
47	BO-1200	Finalize Plan of Finance			188	01-Mar-22 A	30-Dec-22
48	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants			125	03-Jan-23	29-Jun-23
49	**Facility Use Agreeements**				328	27-Aug-21 A	21-Jul-23
50	FO-1020	Final TCCA Facility Use Agreement			328	27-Aug-21 A	21-Jul-23
51	FO-1030	Final GCID Facility Use Agreement			328	27-Aug-21 A	21-Jul-23
52	FO-1040	Final CBD Facility Use Agreements			328	27-Aug-21 A	21-Jul-23
53	**Agreements for Administration of Public Benefits**				334	01-Apr-22	31-Jul-23
54	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)			334	01-Apr-22	31-Jul-23
55	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)			334	01-Apr-22	31-Jul-23
56	**Federal Funding Committment**				293	07-Feb-22 A	01-Jun-23
57	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office			70	07-Feb-22 A	11-Jul-22
58	WIIN-1160	Authority Submits Letter of Funding to Reclamation			20	13-Jun-22	11-Jul-22
59	WIIN-1180	Reclamation Submits Addendum to OMB			53	12-Jul-22	23-Sep-22
60	WIIN-1170	Negotiate Reclamation Benefits Agreement			170	26-Sep-22	01-Jun-23
61	**US Bureau of Reclamation Warren Act**				314	01-Jun-21 A	30-Jun-23



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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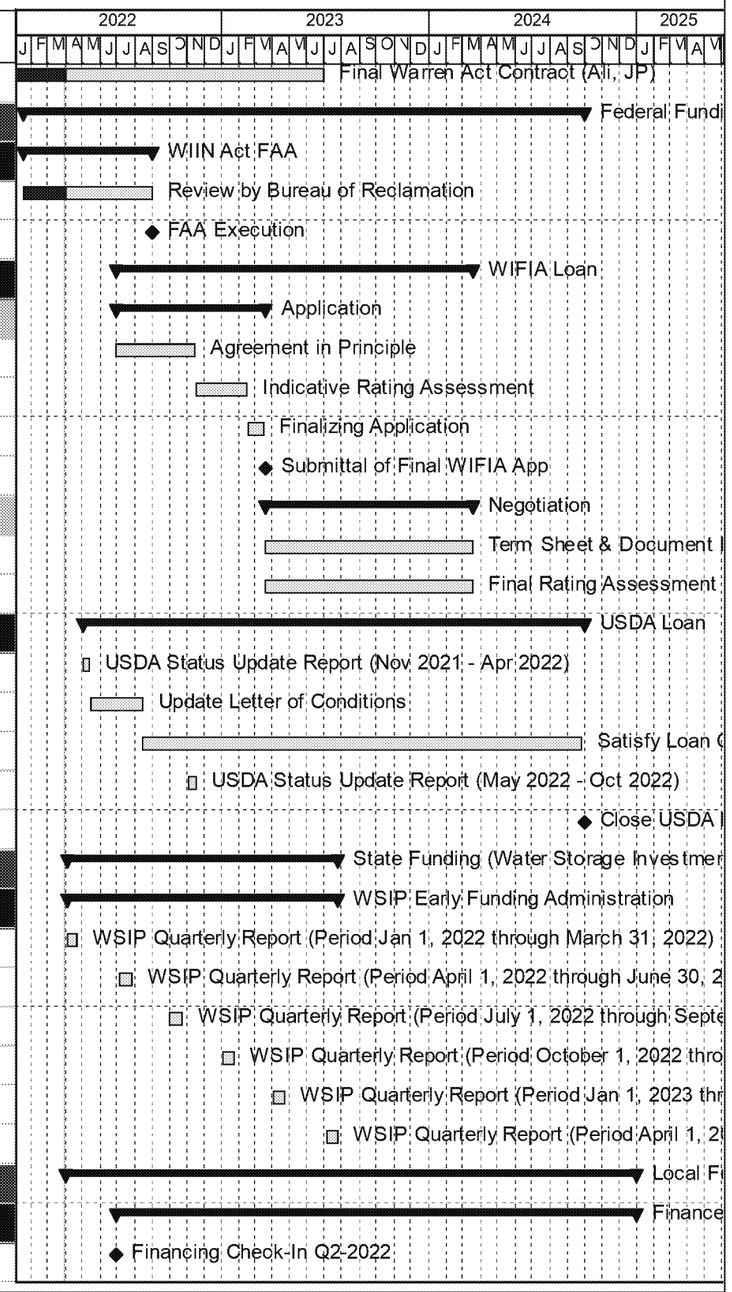
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
62	FED-090	Final Warren Act Contract (Ali, JP)			314	01-Jun-21 A	30-Jun-23
63	**Federal Funding**				631	17-Jan-22 A	02-Oct-24
64	**WIIN Act FAA**				107	17-Jan-22 A	31-Aug-22
65	WIIN-1120	Review by Bureau of Reclamation			107	17-Jan-22 A	31-Aug-22
66	WIIN-1140	FAA Execution			0		31-Aug-22
67	**WIFIA Loan**				426	01-Jul-22	18-Mar-24
68	**Application**				176	01-Jul-22	20-Mar-23
69	WIFIA-110	Agreement in Principle		INV	95	01-Jul-22	16-Nov-22
70	WIFIA-120	Indicative Rating Assessment			60	17-Nov-22	15-Feb-23
71	WIFIA-130	Finalizing Application			30	16-Feb-23	17-Mar-23
72	WIFIA-140	Submittal of Final WIFIA App		INV	0		20-Mar-23
73	**Negotiation**				250	20-Mar-23	18-Mar-24
74	WIFIA-210	Term Sheet & Document Development			250	20-Mar-23	18-Mar-24
75	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)			250	20-Mar-23	18-Mar-24
76	**USDA Loan**				610	02-May-22	02-Oct-24
77	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)			10	02-May-22	13-May-22
78	USDA-1050	Update Letter of Conditions			65	16-May-22	16-Aug-22
79	USDA-1060	Satisfy Loan Conditions			530	17-Aug-22	25-Sep-24
80	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)			10	04-Nov-22	18-Nov-22
81	USDA-1070	Close USDA Loan			0		02-Oct-24
82	**State Funding (Water Storage Investment Program, WSIP)**				329	04-Apr-22	25-Jul-23
83	**WSIP Early Funding Administration**				329	04-Apr-22	25-Jul-23
84	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)			15	04-Apr-22	22-Apr-22
85	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)			15	06-Jul-22	26-Jul-22
86	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)			15	03-Oct-22	24-Oct-22
87	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)			15	03-Jan-23	24-Jan-23
88	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)			15	03-Apr-23	21-Apr-23
89	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)			15	05-Jul-23	25-Jul-23
90	**Local Funding**				695	01-Apr-22	31-Dec-24
91	**Finance Check-Ins**				631	30-Jun-22	31-Dec-24
92	FC-1250	Financing Check-In Q2-2022			0		30-Jun-22*



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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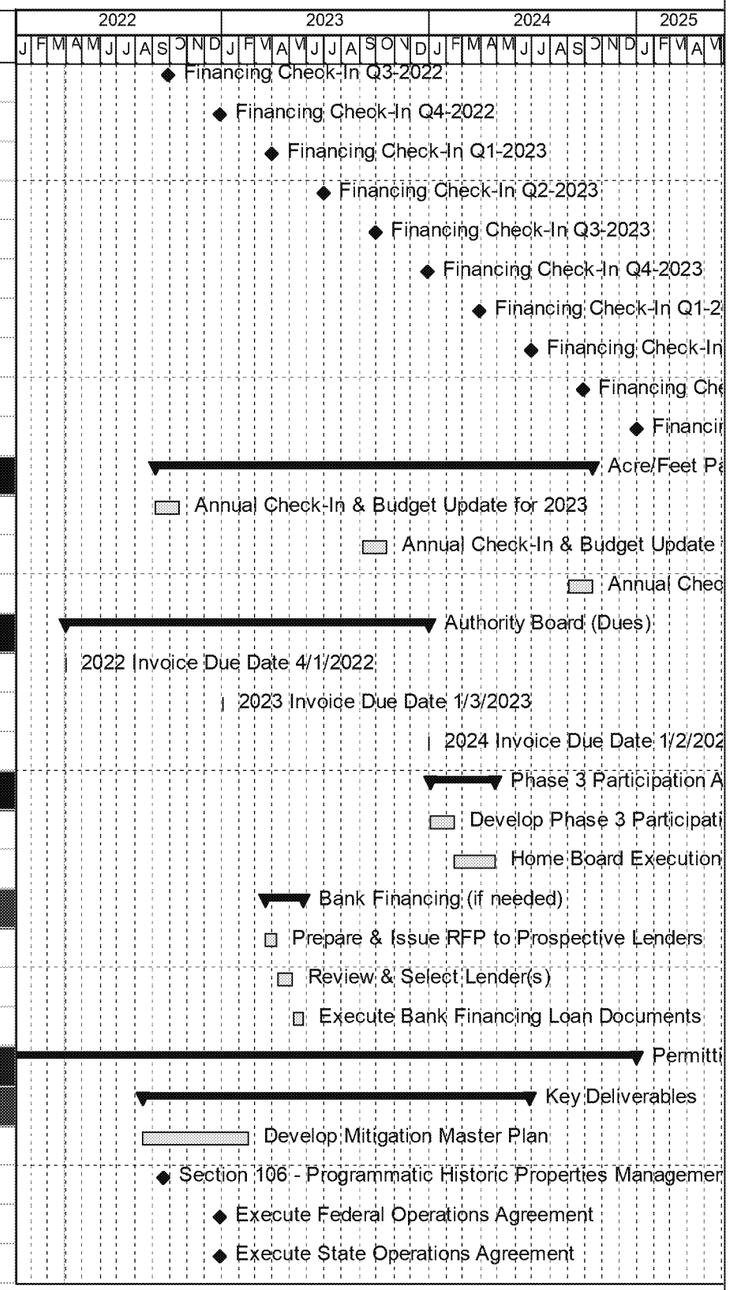
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
93	FC-1260	Financing Check-In Q3-2022			0		30-Sep-22
94	FC-1270	Financing Check-In Q4-2022			0		30-Dec-22
95	FC-1280	Financing Check-In Q1-2023			0		31-Mar-23
96	FC-1290	Financing Check-In Q2-2023			0		30-Jun-23
97	FC-1300	Financing Check-In Q3-2023			0		29-Sep-23
98	FC-1310	Financing Check-In Q4-2023			0		29-Dec-23
99	FC-1320	Financing Check-In Q1-2024			0		29-Mar-24
100	FC-1330	Financing Check-In Q2-2024			0		28-Jun-24
101	FC-1340	Financing Check-In Q3-2024			0		30-Sep-24
102	FC-1350	Financing Check-In Q4-2024			0		31-Dec-24
103	**Acre/Feet Participation (Reservoir Committee Cash Calls)**				530	06-Sep-22	14-Oct-24
104	AF-1100	Annual Check-In & Budget Update for 2023		INV	30	06-Sep-22	18-Oct-22
105	AF-1200	Annual Check-In & Budget Update for 2024		INV	30	06-Sep-23	18-Oct-23
106	AF-1300	Annual Check-In & Budget Update for 2025		INV	30	03-Sep-24	14-Oct-24
107	**Authority Board (Dues)**				438	01-Apr-22	02-Jan-24
108	AB-2100	2022 Invoice Due Date 4/1/2022			1	01-Apr-22	01-Apr-22
109	AB-2200	2023 Invoice Due Date 1/3/2023			1	03-Jan-23	03-Jan-23*
110	AB-2300	2024 Invoice Due Date 1/2/2024			1	02-Jan-24	02-Jan-24*
111	**Phase 3 Participation Agreement (if needed)**				80	04-Jan-24	26-Apr-24
112	PA-1100	Develop Phase 3 Participation Agreement			30	04-Jan-24	15-Feb-24
113	PA-1200	Home Board Execution & Final Rebalancing			50	16-Feb-24	26-Apr-24
114	**Bank Financing (if needed)**				50	20-Mar-23	26-May-23
115	BF-1100	Prepare & Issue RFP to Prospective Lenders			15	20-Mar-23	07-Apr-23
116	BF-1200	Review & Select Lender(s)			20	10-Apr-23	05-May-23
117	BF-1300	Execute Bank Financing Loan Documents			15	08-May-23	26-May-23
118	**Permitting (Ali, John, Jelica)**				695	04-Jan-21 A	31-Dec-24
119	**Key Deliverables**				466	17-Aug-22	27-Jun-24
120	KD-1460	Develop Mitigation Master Plan			125	17-Aug-22	17-Feb-23
121	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development			0		19-Sep-22
122	KD-1240	Execute Federal Operations Agreement			0		30-Dec-22
123	KD-1250	Execute State Operations Agreement			0		30-Dec-22



Remaining Level of Effort
Actual Level of Effort
Actual Work
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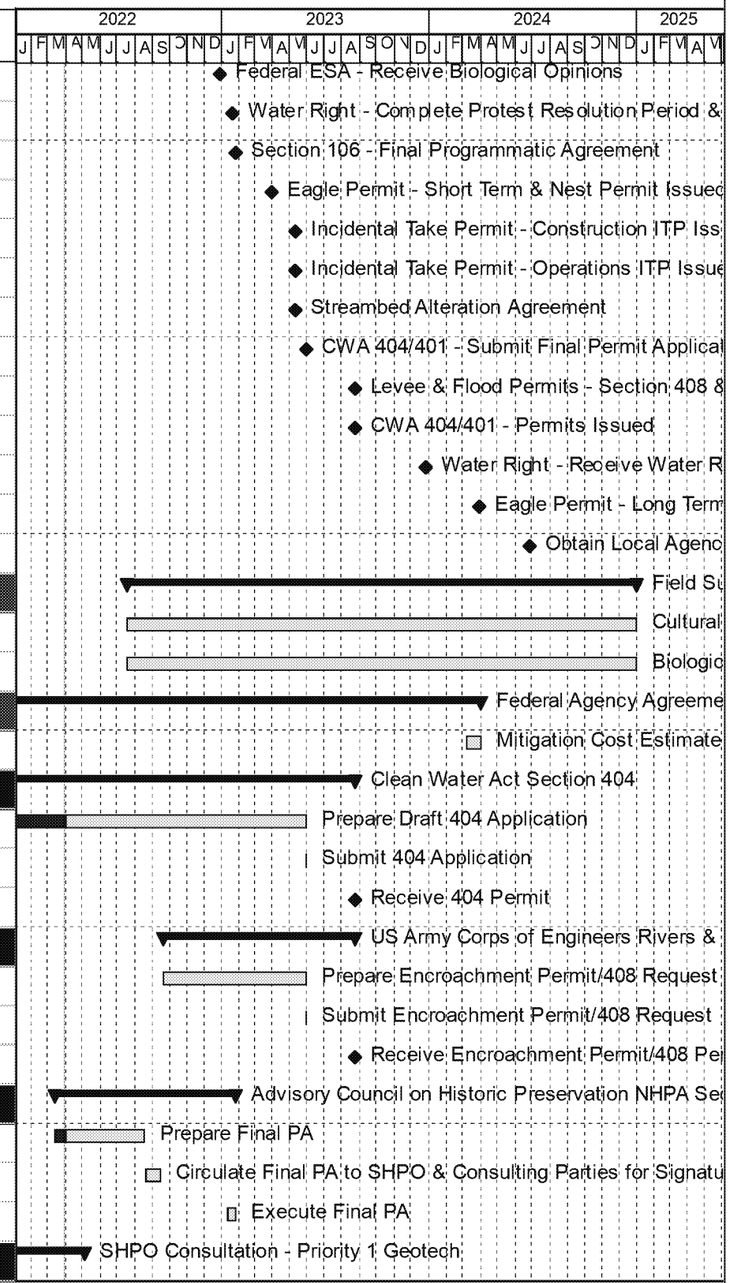
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
124	KD-1340	Federal ESA - Receive Biological Opinions		INV	0		30-Dec-22
125	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible			0		20-Jan-23
126	KD-1350	Section 106 - Final Programmatic Agreement			0		25-Jan-23
127	KD-1430	Eagle Permit - Short Term & Nest Permit Issued			0		31-Mar-23
128	KD-1370	Incidental Take Permit - Construction ITP Issued		INV	0		11-May-23
129	KD-1380	Incidental Take Permit - Operations ITP Issued		INV	0		11-May-23
130	KD-1420	Streambed Alteration Agreement			0		11-May-23
131	KD-1390	CWA 404/401 - Submit Final Permit Applications			0		31-May-23
132	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued			0		23-Aug-23
133	KD-1400	CWA 404/401 - Permits Issued			0		24-Aug-23
134	KD-1330	Water Right - Receive Water Right Order & Permit			0		28-Dec-23
135	KD-1440	Eagle Permit - Long Term Permit Issued			0		29-Mar-24
136	KD-1450	Obtain Local Agency Agreements & Permits			0		27-Jun-24
137	**Field Surveys**				621	18-Jul-22	31-Dec-24
138	RE-1030	Cultural Surveys			621	18-Jul-22	31-Dec-24
139	RE-1040	Biological Surveys			621	18-Jul-22	31-Dec-24
140	**Federal Agency Agreements & Permits**				502	11-Jan-21 A	03-Apr-24
141	CE-1570	Mitigation Cost Estimate Update			20	07-Mar-24	03-Apr-24
142	**Clean Water Act Section 404**				352	04-Feb-21 A	24-Aug-23
143	404-050	Prepare Draft 404 Application			291	04-Feb-21 A	30-May-23
144	404-120	Submit 404 Application			1	31-May-23	31-May-23
145	404-130	Receive 404 Permit			0		24-Aug-23
146	**US Army Corps of Engineers Rivers & Harbors Act Section 14, Section 408**				233	20-Sep-22	24-Aug-23
147	408-150	Prepare Encroachment Permit/408 Request			172	20-Sep-22	30-May-23
148	408-160	Submit Encroachment Permit/408 Request			1	31-May-23	31-May-23
149	408-170	Receive Encroachment Permit/408 Permit			0		24-Aug-23
150	**Advisory Council on Historic Preservation NHPA Section 106**				204	14-Mar-22 A	25-Jan-23
151	106-081	Prepare Final PA			99	14-Mar-22 A	19-Aug-22
152	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures			18	22-Aug-22	15-Sep-22
153	106-102	Execute Final PA			10	11-Jan-23	25-Jan-23
154	**SHPO Consultation - Priority 1 Geotech**				25	02-Aug-21 A	05-May-22



Remaining Level of Effort
Actual Level of Effort
Actual Work
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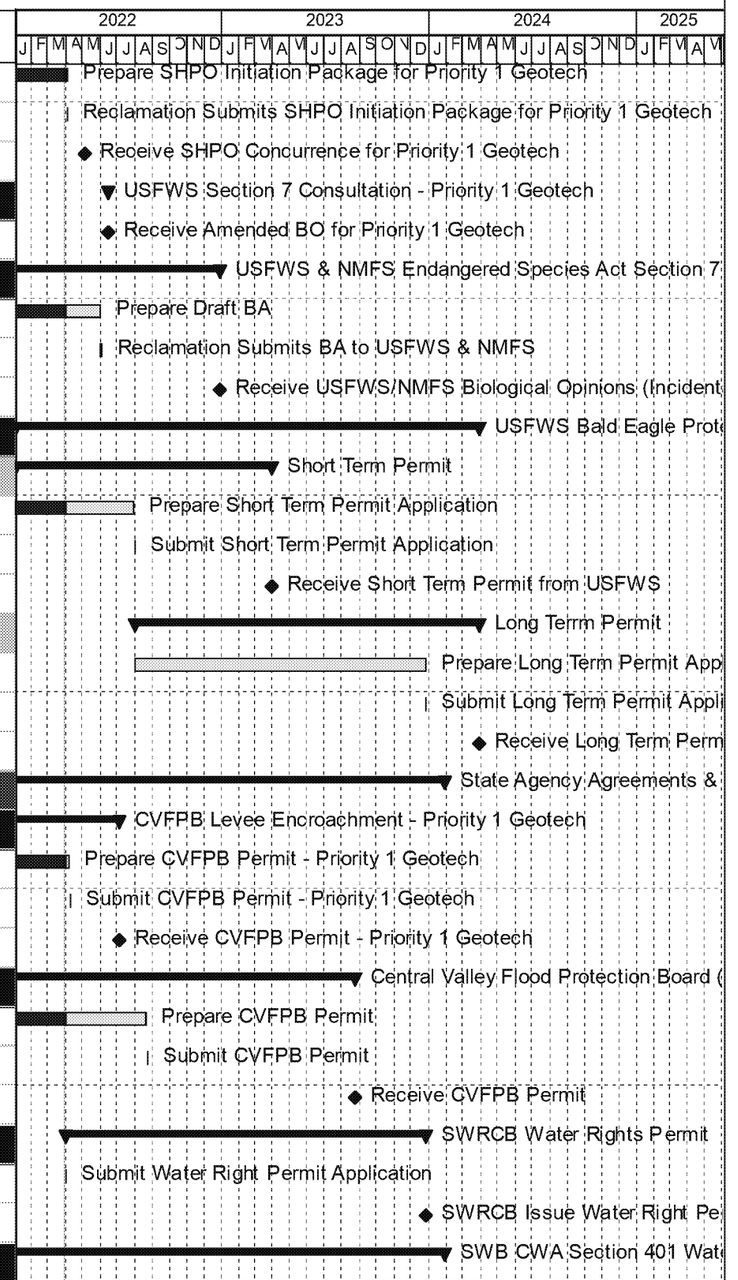
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
155	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geotech	GEO		2	02-Aug-21 A	04-Apr-22
156	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	GEO		1	05-Apr-22	05-Apr-22
157	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	GEO		0		05-May-22
158	**USFWS Section 7 Consultation - Priority 1 Geotech**				0	16-Jun-22	16-Jun-22
159	BA-120	Receive Amended BO for Priority 1 Geotech	GEO		0		16-Jun-22
160	**USFWS & NMFS Endangered Species Act Section 7**				188	11-Jan-21 A	30-Dec-22
161	BA-200	Prepare Draft BA			44	11-Jan-21 A	02-Jun-22
162	BA-210	Reclamation Submits BA to USFWS & NMFS			1	03-Jun-22	03-Jun-22
163	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)			0		30-Dec-22
164	**USFWS Bald Eagle Protection Act**				499	03-Jan-22 A	29-Mar-24
165	**Short Term Permit**				250	03-Jan-22 A	31-Mar-23
166	USFWS-110	Prepare Short Term Permit Application			84	03-Jan-22 A	29-Jul-22
167	USFWS-120	Submit Short Term Permit Application			1	01-Aug-22	01-Aug-22
168	USFWS-130	Receive Short Term Permit from USFWS			0		31-Mar-23
169	**Long Terrm Permit**				414	02-Aug-22	29-Mar-24
170	USFWS-140	Prepare Long Term Permit Application			350	02-Aug-22	27-Dec-23
171	USFWS-150	Submit Long Term Permit Application			1	28-Dec-23	28-Dec-23
172	USFWS-160	Receive Long Term Permit from USFWS			0		29-Mar-24
173	**State Agency Agreements & Permits**				456	04-Jan-21 A	29-Jan-24
174	**CVFPB Levee Encroachment - Priority 1 Geotech**				67	01-Nov-21 A	06-Jul-22
175	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	GEO		6	01-Nov-21 A	08-Apr-22
176	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	GEO		1	11-Apr-22	11-Apr-22
177	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	GEO		0		06-Jul-22
178	**Central Valley Flood Protection Board (CVFPB) Levee Encroachment**				351	13-Dec-21 A	23-Aug-23
179	CVFPB-200	Prepare CVFPB Permit			100	13-Dec-21 A	22-Aug-22
180	CVFPB-210	Submit CVFPB Permit			1	23-Aug-22	23-Aug-22
181	CVFPB-220	Receive CVFPB Permit			0		23-Aug-23
182	**SWRCB Water Rights Permit**				436	01-Apr-22	28-Dec-23
183	WRP-110	Submit Water Right Permit Application			1	01-Apr-22	01-Apr-22
184	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)			0		28-Dec-23
185	**SWB CWA Section 401 Water Quality Certification**				456	04-Jan-21 A	29-Jan-24



Remaining Level of Effort
Actual Level of Effort
Actual Work
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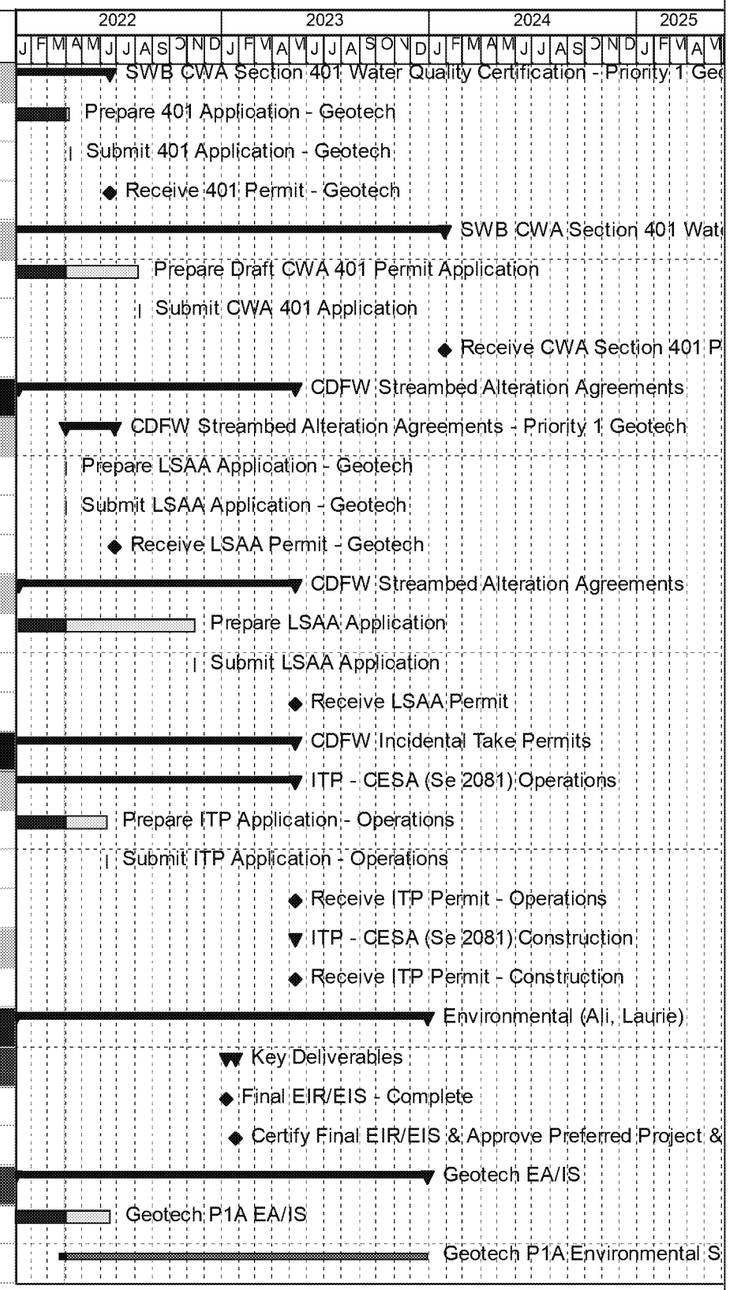
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
186		**SWB CWA Section 401 Water Quality Certification - Priority 1 Geotech**			55	01-Mar-21 A	17-Jun-22
187	401-100	Prepare 401 Application - Geotech	GEO		6	01-Mar-21 A	08-Apr-22
188	401-110	Submit 401 Application - Geotech	GEO		1	11-Apr-22	11-Apr-22
189	401-120	Receive 401 Permit - Geotech	GEO		0		17-Jun-22
190		**SWB CWA Section 401 Water Quality Certification**			456	04-Jan-21 A	29-Jan-24
191	401-200	Prepare Draft CWA 401 Permit Application			90	04-Jan-21 A	08-Aug-22
192	401-210	Submit CWA 401 Application			1	09-Aug-22	09-Aug-22
193	401-220	Receive CWA Section 401 Permit			0		29-Jan-24
194		**CDFW Streambed Alteration Agreements**			279	10-Jan-22 A	11-May-23
195		**CDFW Streambed Alteration Agreements - Priority 1 Geotech**			61	01-Apr-22	27-Jun-22
196	1600-100	Prepare LSAA Application - Geotech	GEO		0	01-Apr-22*	01-Apr-22
197	1600-110	Submit LSAA Application - Geotech	GEO		1	01-Apr-22	01-Apr-22
198	1600-120	Receive LSAA Permit - Geotech	GEO		0		27-Jun-22
199		**CDFW Streambed Alteration Agreements**			279	10-Jan-22 A	11-May-23
200	1600-200	Prepare LSAA Application			157	10-Jan-22 A	14-Nov-22
201	1600-210	Submit LSAA Application			1	15-Nov-22	15-Nov-22
202	1600-220	Receive LSAA Permit			0		11-May-23
203		**CDFW Incidental Take Permits**			279	11-Jan-21 A	11-May-23
204		**ITP - CESA (Se 2081) Operations**			279	11-Jan-21 A	11-May-23
205	2081-100	Prepare ITP Application - Operations			51	11-Jan-21 A	13-Jun-22
206	2081-110	Submit ITP Application - Operations			1	14-Jun-22	14-Jun-22
207	2081-120	Receive ITP Permit - Operations			0		11-May-23
208		**ITP - CESA (Se 2081) Construction**			0	11-May-23	11-May-23
209	2081-220	Receive ITP Permit - Construction			0		11-May-23
210		**Environmental (Ali, Laurie)**			437	03-Jan-22 A	29-Dec-23
211		**Key Deliverables**			10	10-Jan-23	25-Jan-23
212	KD-1470	Final EIR/EIS - Complete			0		10-Jan-23
213	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)		INV	0		25-Jan-23
214		**Geotech EA/IS**			437	03-Jan-22 A	29-Dec-23
215	EIR-230	Geotech P1A EA/IS	GEO		55	03-Jan-22 A	17-Jun-22
216	EIR-260	Geotech P1A Environmental Surveys (which Real Estate access agreements are needed to start this?)	GEO		437	22-Mar-22 A	29-Dec-23



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
Data Date: 31-Mar-22 / Print Date: 01-Apr-22

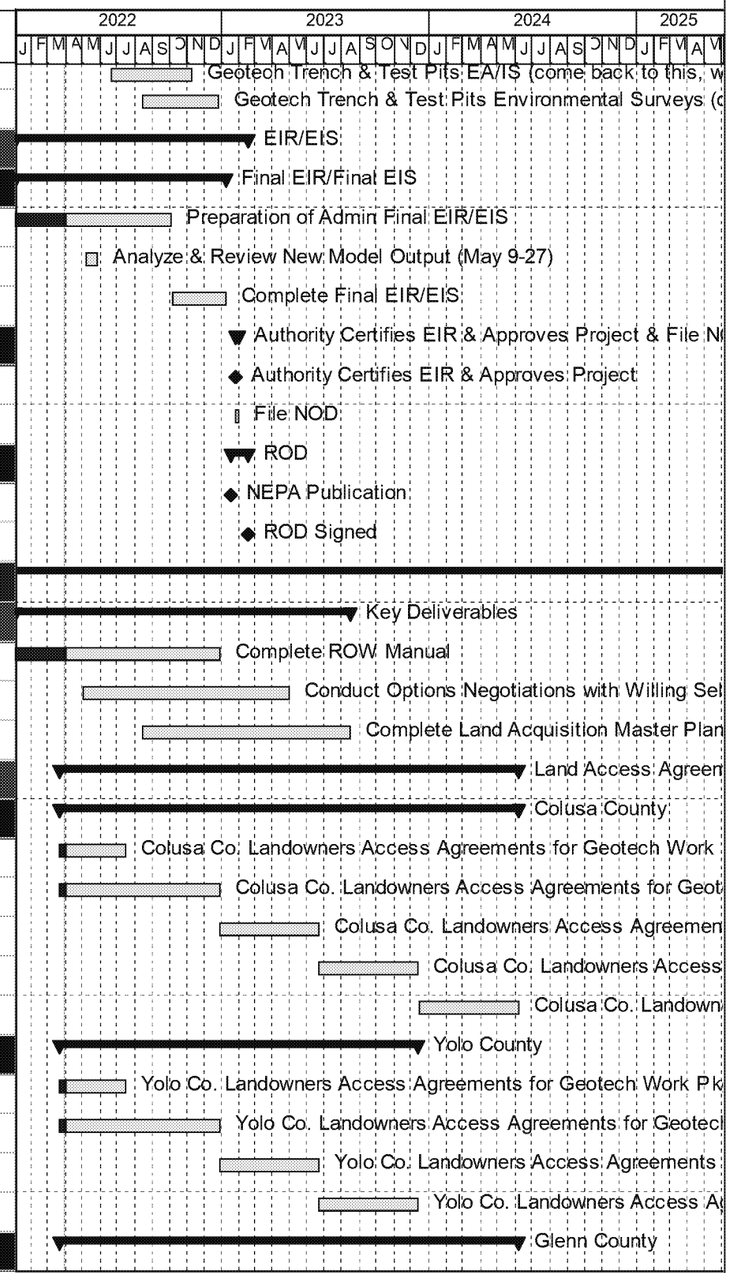
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
217	EIR-630	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	GEO		100	20-Jun-22	09-Nov-22
218	EIR-640	Geotech Trench & Test Pits Environmental Surveys (come back to this, depending on approach may not ne	GEO		90	16-Aug-22	27-Dec-22
219	**EIR/EIS**				221	03-Jan-22 A	17-Feb-23
220	**Final EIR/Final EIS**				194	03-Jan-22 A	10-Jan-23
221	EIR-210	Preparation of Admin Final EIR/EIS			131	03-Jan-22 A	05-Oct-22
222	EIR-220	Analyze & Review New Model Output (May 9-27)			15	09-May-22	27-May-22
223	EIR-250	Complete Final EIR/EIS			63	06-Oct-22	10-Jan-23
224	**Authority Certifies EIR & Approves Project & File NOD**				5	25-Jan-23	01-Feb-23
225	EIR-370	Authority Certifies EIR & Approves Project			0		25-Jan-23
226	EIR-380	File NOD		INV	5	26-Jan-23	01-Feb-23
227	**ROD**				22	18-Jan-23	17-Feb-23
228	EIR-440	NEPA Publication			0		18-Jan-23
229	EIR-450	ROD Signed		INV	0		17-Feb-23
230	**Real Estate**				1771	02-Nov-20 A	14-Feb-29
231	**Key Deliverables**				346	03-Jan-22 A	16-Aug-23
232	KD-1495	Complete ROW Manual			188	03-Jan-22 A	30-Dec-22
233	KD-1500	Conduct Options Negotiations with Willing Seller Properties			250	02-May-22*	01-May-23
234	KD-1490	Complete Land Acquisition Master Plan			250	17-Aug-22	16-Aug-23
235	**Land Access Agreements**				547	22-Mar-22 A	06-Jun-24
236	**Colusa County**				547	22-Mar-22 A	06-Jun-24
237	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	GEO		74	22-Mar-22 A	15-Jul-22
238	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	GEO		187	22-Mar-22 A	29-Dec-22
239	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	GEO		120	30-Dec-22	21-Jun-23
240	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	GEO		120	22-Jun-23	14-Dec-23
241	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	GEO		120	15-Dec-23	06-Jun-24
242	**Yolo County**				427	22-Mar-22 A	14-Dec-23
243	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	GEO		74	22-Mar-22 A	15-Jul-22
244	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	GEO		187	22-Mar-22 A	29-Dec-22
245	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	GEO		120	30-Dec-22	21-Jun-23
246	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	GEO		120	22-Jun-23	14-Dec-23
247	**Glenn County**				547	22-Mar-22 A	06-Jun-24



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
Data Date: 31-Mar-22 / Print Date: 01-Apr-22

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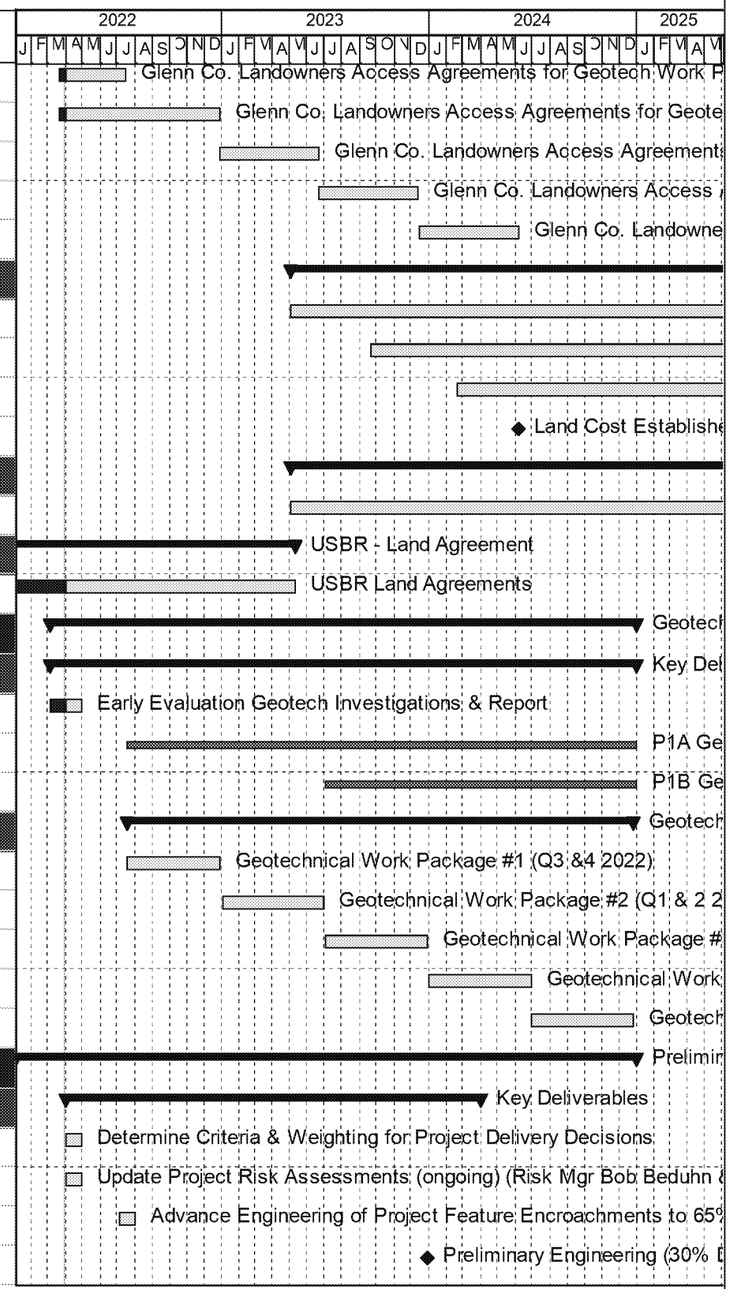
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
248	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	GEO		74	22-Mar-22 A	15-Jul-22
249	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	GEO		187	22-Mar-22 A	29-Dec-22
250	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	GEO		120	30-Dec-22	21-Jun-23
251	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	GEO		120	22-Jun-23	14-Dec-23
252	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	GEO		120	15-Dec-23	06-Jun-24
253	**Land Acquisition**				1500	02-May-23	14-Feb-29
254	RE-1060	Construction Package 1 - Land Acquisition			1500	02-May-23	14-Feb-29
255	RE-1070	Construction Package 2 - Land Acquisition			1400	22-Sep-23	14-Feb-29
256	RE-1080	Construction Package 3 - Land Acquisition			1300	21-Feb-24	14-Feb-29
257	RE-1050	Land Cost Established			0		06-Jun-24
258	**Relocation**				1500	02-May-23	29-Jan-29
259	RE-1100	Relocation Assistance, as Needed			1500	02-May-23	29-Jan-29
260	**USBR - Land Agreement**				278	02-Nov-20 A	10-May-23
261	FED-100	USBR Land Agreements			278	02-Nov-20 A	10-May-23
262	**Geotechnical Engineering**				695	07-Mar-22 A	31-Dec-24
263	**Key Deliverables**				695	07-Mar-22 A	31-Dec-24
264	KD-2000	Early Evaluation Geotech Investigations & Report	GEO		21	07-Mar-22 A	29-Apr-22
265	KD-2015	P1A Geotechnical Investigations & Reports	GEO		621	18-Jul-22	31-Dec-24
266	KD-2025	P1B Geotechnical Investigations & Reports	GEO		381	03-Jul-23	31-Dec-24
267	**Geotechnical Investigations**				619	18-Jul-22	27-Dec-24
268	GWP-1100	Geotechnical Work Package #1 (Q3 &4 2022)	GEO		114	18-Jul-22	30-Dec-22
269	GWP-1200	Geotechnical Work Package #2 (Q1 & 2 2023)	GEO		126	03-Jan-23	30-Jun-23
270	GWP-1300	Geotechnical Work Package #3 (Q3 &4 2023)	GEO		123	03-Jul-23	29-Dec-23
271	GWP-1400	Geotechnical Work Package #4 (Q1 & 2 2024)	GEO		126	02-Jan-24	28-Jun-24
272	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	GEO		130	01-Jul-24	27-Dec-24
273	**Preliminary Engineering**				695	03-Jan-22 A	31-Dec-24
274	**Key Deliverables**				502	01-Apr-22	03-Apr-24
275	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions			21	01-Apr-22	29-Apr-22
276	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)			21	01-Apr-22	29-Apr-22
277	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting			21	05-Jul-22	02-Aug-22
278	KD-1180	Preliminary Engineering (30% Design Level)	GEO		0		29-Dec-23



Remaining Level of Effort
Actual Level of Effort
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Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
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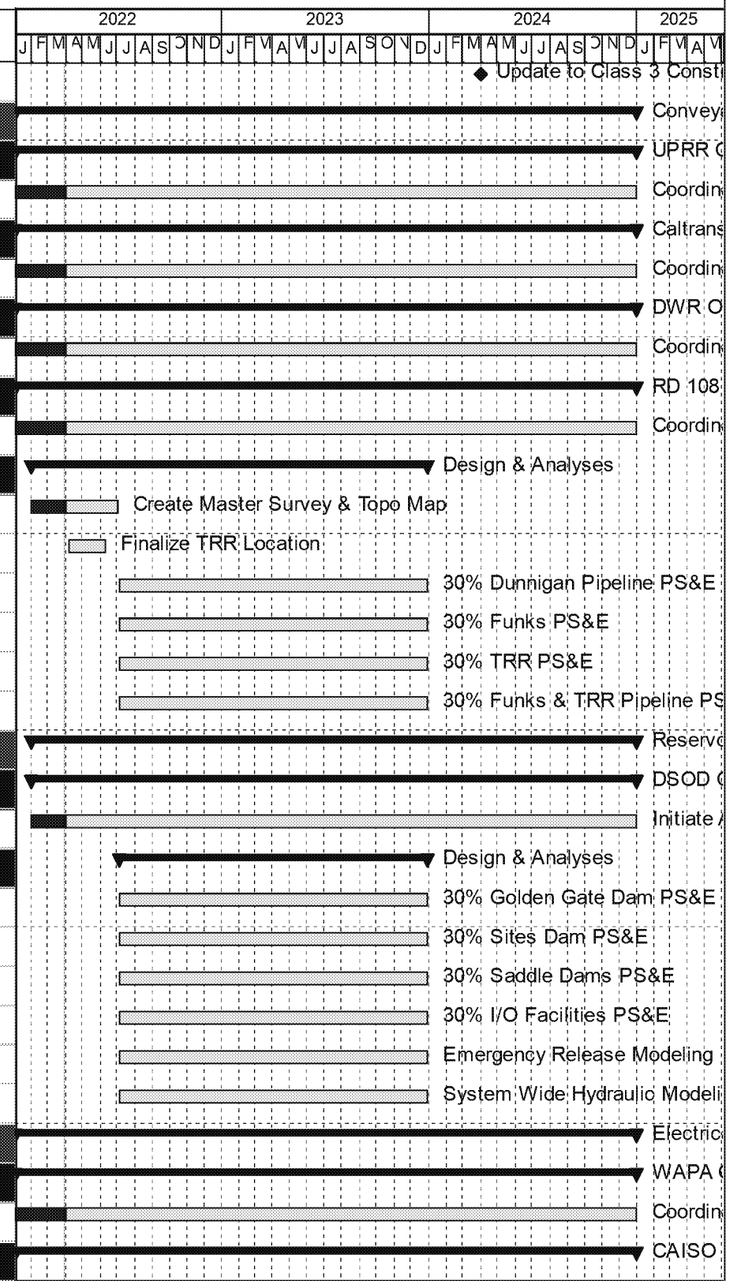
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Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
279	KD-1190	Update to Class 3 Construction Cost Estimate	GEO		0		03-Apr-24
280	**Conveyance (Pipelines, Pump Stations, Canals)**				695	03-Jan-22 A	31-Dec-24
281	**UPRR Oversight & Review**				695	03-Jan-22 A	31-Dec-24
282	A1110	Coordination & Oversight with UPRR			695	03-Jan-22 A	31-Dec-24
283	**Caltrans Oversight & Review**				695	03-Jan-22 A	31-Dec-24
284	A1120	Coordination & Oversight with Caltrans			695	03-Jan-22 A	31-Dec-24
285	**DWR Operations Oversight & Review (KLOG)**				695	03-Jan-22 A	31-Dec-24
286	A1130	Coordination & Oversight with Department of Water Resources			695	03-Jan-22 A	31-Dec-24
287	**RD 108 Oversight & Review**				695	03-Jan-22 A	31-Dec-24
288	A1140	Coordination & Oversight with Reclamation District 108			695	03-Jan-22 A	31-Dec-24
289	**Design & Analyses**				437	01-Feb-22 A	29-Dec-23
290	KD-1140	Create Master Survey & Topo Map			65	01-Feb-22 A	01-Jul-22
291	KD-1150	Finalize TRR Location			46	07-Apr-22	10-Jun-22
292	KD-1630	30% Dunnigan Pipeline PS&E			372	05-Jul-22	29-Dec-23
293	KD-2010	30% Funks PS&E			372	05-Jul-22	29-Dec-23
294	KD-2020	30% TRR PS&E			372	05-Jul-22	29-Dec-23
295	KD-2030	30% Funks & TRR Pipeline PS&E			372	05-Jul-22	29-Dec-23
296	**Reservoir (Dams, Tunnels)**				695	01-Feb-22 A	31-Dec-24
297	**DSOD Oversight & Review**				695	01-Feb-22 A	31-Dec-24
298	KD-1100	Initiate Application for Permit to Construct from DSOD			695	01-Feb-22 A	31-Dec-24
299	**Design & Analyses**				372	05-Jul-22	29-Dec-23
300	KD-1660	30% Golden Gate Dam PS&E			372	05-Jul-22	29-Dec-23
301	KD-2040	30% Sites Dam PS&E			372	05-Jul-22	29-Dec-23
302	KD-2050	30% Saddle Dams PS&E			372	05-Jul-22	29-Dec-23
303	KD-2060	30% I/O Facilities PS&E			372	05-Jul-22	29-Dec-23
304	KD-2070	Emergency Release Modeling			372	05-Jul-22	29-Dec-23
305	KD-2080	System Wide Hydraulic Modeling			372	05-Jul-22	29-Dec-23
306	**Electrical (Substation, Switchyard, Transmission Line)**				695	03-Jan-22 A	31-Dec-24
307	**WAPA Oversight & Review**				695	03-Jan-22 A	31-Dec-24
308	A1150	Coordination & Oversight with WAPA			695	03-Jan-22 A	31-Dec-24
309	**CAISO Oversight & Review**				695	03-Jan-22 A	31-Dec-24



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
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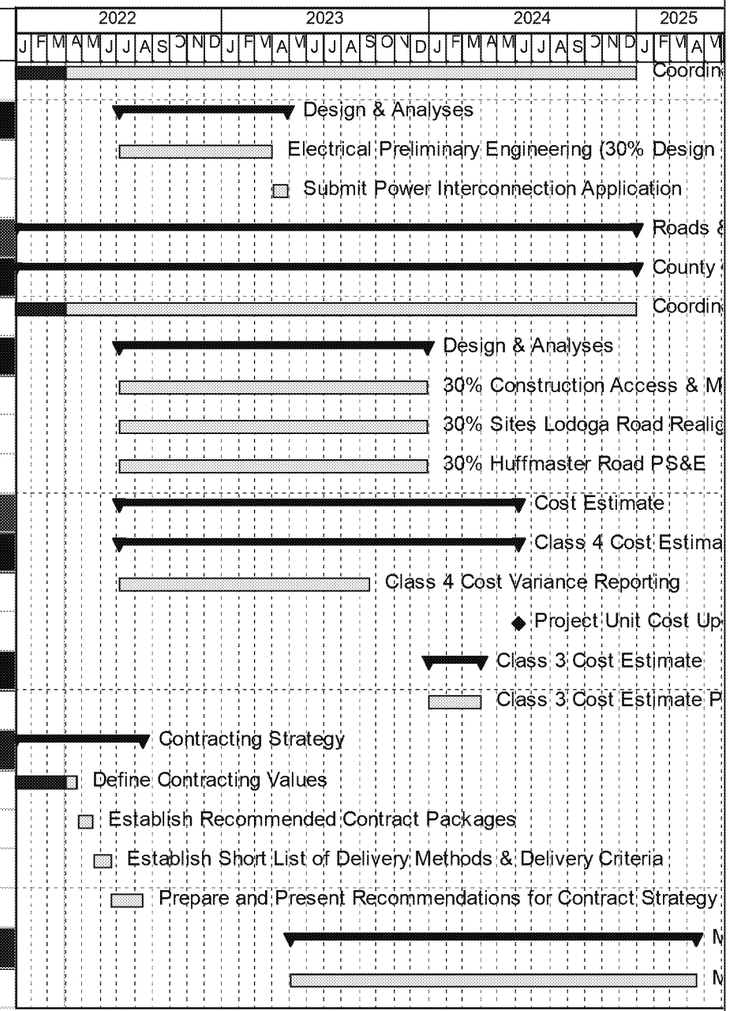
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	A.3 Geotech	A3. Investors	Remaining Duration	Start	Finish
310	A1160	Coordination & Oversight with CAISO			695	03-Jan-22 A	31-Dec-24
311	**Design & Analyses**				205	05-Jul-22	28-Apr-23
312	KD-1640	Electrical Preliminary Engineering (30% Design Level)			185	05-Jul-22	31-Mar-23
313	KD-1200	Submit Power Interconnection Application			20	03-Apr-23	28-Apr-23
314	**Roads & Bridges**				695	03-Jan-22 A	31-Dec-24
315	**County Oversight & Review**				695	03-Jan-22 A	31-Dec-24
316	A1170	Coordination & Oversight with County Authorities			695	03-Jan-22 A	31-Dec-24
317	**Design & Analyses**				372	05-Jul-22	29-Dec-23
318	KD-1650	30% Construction Access & Maintenance Roads PS&E			372	05-Jul-22	29-Dec-23
319	KD-2090	30% Sites Lodoga Road Realignment PS&E			372	05-Jul-22	29-Dec-23
320	KD-2100	30% Huffmaster Road PS&E			372	05-Jul-22	29-Dec-23
321	**Cost Estimate**				482	05-Jul-22	06-Jun-24
322	**Class 4 Cost Estimate Variance Reporting**				482	05-Jul-22	06-Jun-24
323	C4E-1000	Class 4 Cost Variance Reporting	GEO		304	05-Jul-22	19-Sep-23
324	CU-1000	Project Unit Cost Update	GEO	INV	0		06-Jun-24
325	**Class 3 Cost Estimate**				65	02-Jan-24	03-Apr-24
326	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	GEO		65	02-Jan-24	03-Apr-24
327	**Contracting Strategy**				96	03-Jan-22 A	16-Aug-22
328	CS-1100	Define Contracting Values			16	03-Jan-22 A	22-Apr-22
329	CS-1200	Establish Recommended Contract Packages			20	25-Apr-22	20-May-22
330	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria			20	23-May-22	20-Jun-22
331	CS-1400	Prepare and Present Recommendations for Contract Strategy Implementation			40	21-Jun-22	16-Aug-22
332	**Mitigation Implementation**				500	02-May-23	16-Apr-25
333	MI-1100	Mitigation Implementation			500	02-May-23	16-Apr-25



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
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Summary

Project ID: Sites / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
Data Date: 31-Mar-22 / Print Date: 01-Apr-22

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From: Unger, Sophie [Sophie.Unger@icf.com]
Sent: 4/3/2022 1:27:55 PM
To: Spranza, John [john.spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
CC: Hendrick, Mike [Mike.Hendrick@icf.com]; Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: New Method for Analyzing Redd Dewatering

Hi John,

Thank you for some great questions. I'll do my best to answer all except question #3. I'm afraid I don't have any answer for that one, nor even know how to find the answer. I'll ask for your help with that, Mike. Regarding your question to Laurie about changing the analysis from the Draft to Final, I was thinking about introducing this analysis in the BA/ITP, so that we wouldn't have to make the changes in the FEIR/FEIS. I don't know if that makes sense or not. I hate to add a lot of new work for everyone on the FEIR/FEIS. Anyway, here are my responses to your other questions:

1) Does the revised analysis directly address some of the criticism we have received on this analysis? Definitely. Not so much criticisms from public draft reviewers as criticisms for Reclamation and CDFW staff, if memory serves me right. The revised analysis directly answers most of the criticism of our previous analysis. That analysis simply used the largest percentage drop in mean monthly flow over three months after the month of spawning as a proxy for redd dewatering. As pointed out by several critics, this analysis ignores two critical pieces of information: the changes of water depth after spawning and the depth distribution of the redds. The new analysis uses the relationship between river stage and flow at the Gridley gage station and the actual depth distribution of redds from many years of DWR field studies to fill in the missing information.
2) Are there any assumptions that would result in a less robust analysis and be open to new/heightened criticism? I do not believe there are any assumptions that would result in a less robust analysis. However, there is an assumption that could raise some issues. This assumption is that the relationship between changes in flow and changes in stage (depth) at the Gridley gage, which is known, is transferrable to the adjoining river channel. My guess is that they are not exactly transferrable, but are roughly so. Some fairly simple field studies could establish the relationship more exactly, but that would take some time. I did some literature searches and reached out to some hydrologists at Jacobs for answers to this question, but could not get anything definitive. However, even if some error is introduced by estimating changes in river depths from Gridley gage data, there is no question in my mind that the error is much less than what we get from our old method of analysis.
3) Would we need any additional information/modeling from Jacobs? No we would not. However, additional help answering the question above about Gridley gage data vs. river depths would be great.

Thank you for following up with your questions and for bringing in Ali, Laurie and Erin for their perspectives. I really appreciate your help on this.

Sophie

Sophia Unger, ICF
(916) 642-6043

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Sunday, April 3, 2022 10:49 AM
To: Unger, Sophie <Sophie.Unger@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Hendrick, Mike <Mike.Hendrick@icf.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: New Method for Analyzing Redd Dewatering

Hi Sophie,

I apologize for not responding to your earlier email. I generally like the idea but I have a few questions and have included Ali, Laurie and Erin on this email as they may have additional questions.

1) Does the revised analysis directly address some of the criticism we have received on this analysis?
2) Are there any assumptions that would result in a less robust analysis and be open to new/heightened criticism?
3) Would this analysis be consistent with what are expected to come out of the reconsultation on LTO?
Reclamation is going to want to know.
4) Would be need any additional information/modeling from Jacobs?

Laurie, would changing the analysis from Draft to Final be an issue considering we are responding to comments on the analysis?

Thanks for thinking outside of the box Sophie!

John Spranza

D 916.679.8858 M 818.640.2487

From: Unger, Sophie <Sophie.Unger@icf.com>
Sent: Friday, April 1, 2022 3:42 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Cc: Hendrick, Mike <Mike.Hendrick@icf.com>
Subject: New Method for Analyzing Redd Dewatering

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi John,

A while ago I wrote you an email about changing one of our analysis methods for analyzing fish effects in the Feather River for the BA/ITP. I am providing below the explanation that I sent you in my previous email. I want to add to this, which is fresh in my mind from responding to innumerable comments on the Sites DEIR/S, that we should be using the best available science for our analyses. I am convinced that the new method I describe below is better than the old one. Please let me know what you think.

Thank you,
Sophie

I would like to get your opinion about how to proceed with one of the Feather River flow analyses, redd dewatering, planned for the BA. Our analysis approach for the EIR/EIS received quite a lot of criticism, as you may remember. This analysis used the maximum reduction in flow during the three months following the month of spawning as a proxy for percentage of redds dewatered. This approach was criticized because, although flow reductions cause redd dewatering, there are many other undetermined factors that affect the relationship. I have recently developed another method that makes use of staff gauge readings at a site downstream of the Thermalito Afterbay outlet to estimate changes in river stage resulting from changes in flow. Given that changes in river stage affect redd dewatering more directly than changes in flow, I believe this method brings us a step closer to realistically modeling redd dewatering. However, adopting this procedure would entail introducing a new method that was not included in the EIR/EIS and I don't know if this would be problematic. Please let me know what you think. I should note that I recently used this new procedure for another project, but I've had no feedback about it thus far.

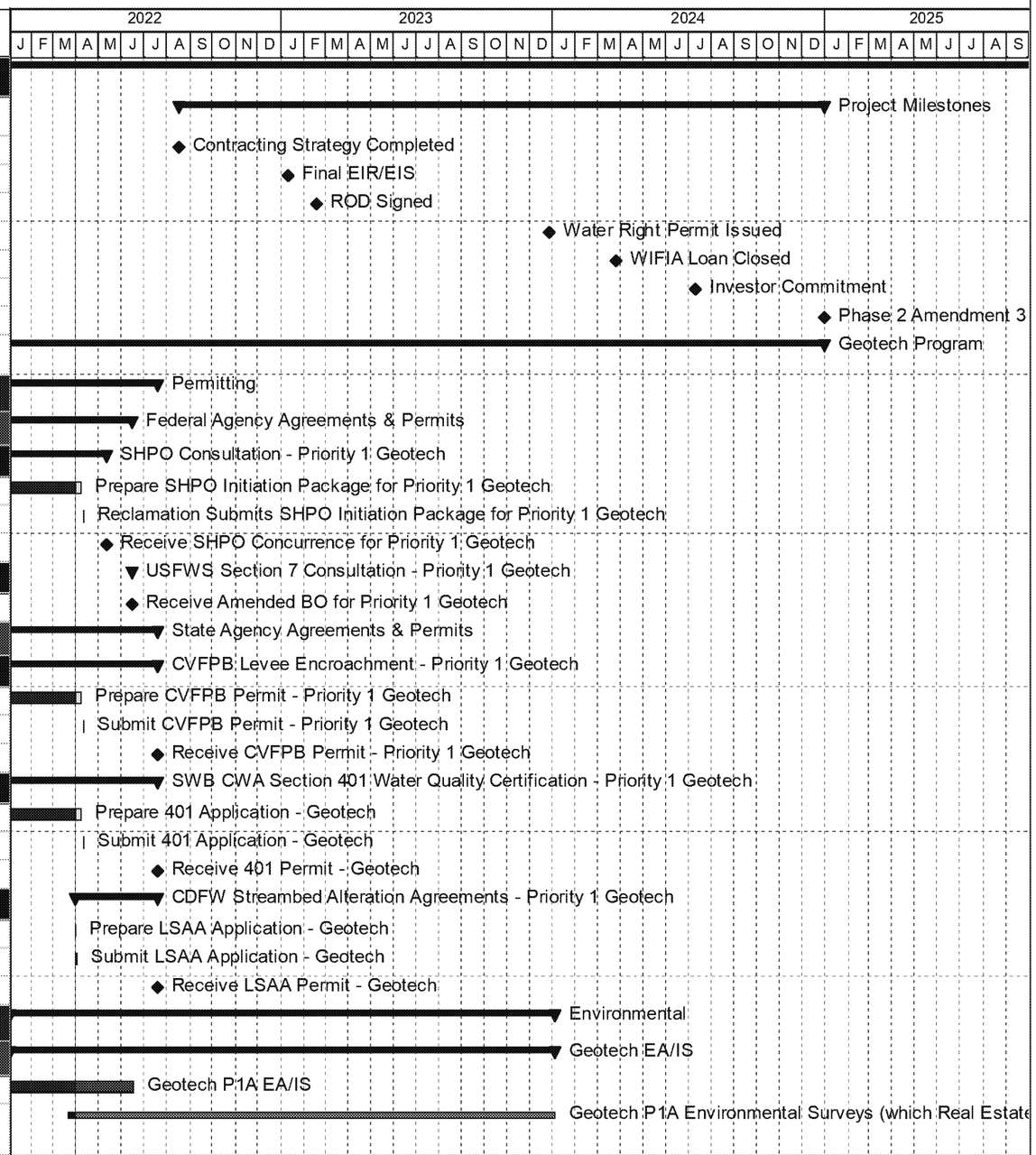
Sophia Unger
(916) 642-6043

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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29
2	**Project Milestones**		599	16-Aug-22	31-Dec-24
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22
4	MS-1200	Final EIR/EIS	0		10-Jan-23
5	MS-1300	ROD Signed	0		17-Feb-23
6	MS-1400	Water Right Permit Issued	0		28-Dec-23
7	MS-1600	WIFIA Loan Closed	0		25-Mar-24
8	MS-1500	Investor Commitment	0		11-Jul-24*
9	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*
10	**Geotech Program**		695	01-Mar-21 A	31-Dec-24
11	**Permitting**		77	01-Mar-21 A	20-Jul-22
12	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22
13	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22
14	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geotech	6	02-Aug-21 A	08-Apr-22
15	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22
16	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22
17	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22
18	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22
19	**State Agency Agreements & Permits**		77	01-Mar-21 A	20-Jul-22
20	**CVFPB Levee Encroachment - Priority 1 Geotech**		77	01-Nov-21 A	20-Jul-22
21	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22
22	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22
23	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		20-Jul-22
24	**SWB CWA Section 401 Water Quality Certification - Priority 1 Geotech**		77	01-Mar-21 A	20-Jul-22
25	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22
26	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22
27	401-120	Receive 401 Permit - Geotech	0		20-Jul-22
28	**CDFW Streambed Alteration Agreements - Priority 1 Geotech**		77	01-Apr-22	20-Jul-22
29	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22*	01-Apr-22
30	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22
31	1600-120	Receive LSAA Permit - Geotech	0		20-Jul-22
32	**Environmental**		440	03-Jan-22 A	04-Jan-24
33	**Geotech EA/IS**		440	03-Jan-22 A	04-Jan-24
34	EIR-230	Geotech P1A EA/IS	55	03-Jan-22 A	17-Jun-22
35	EIR-260	Geotech P1A Environmental Surveys (which Real Estate access agreements are needed to start this?)	440	22-Mar-22 A	04-Jan-24



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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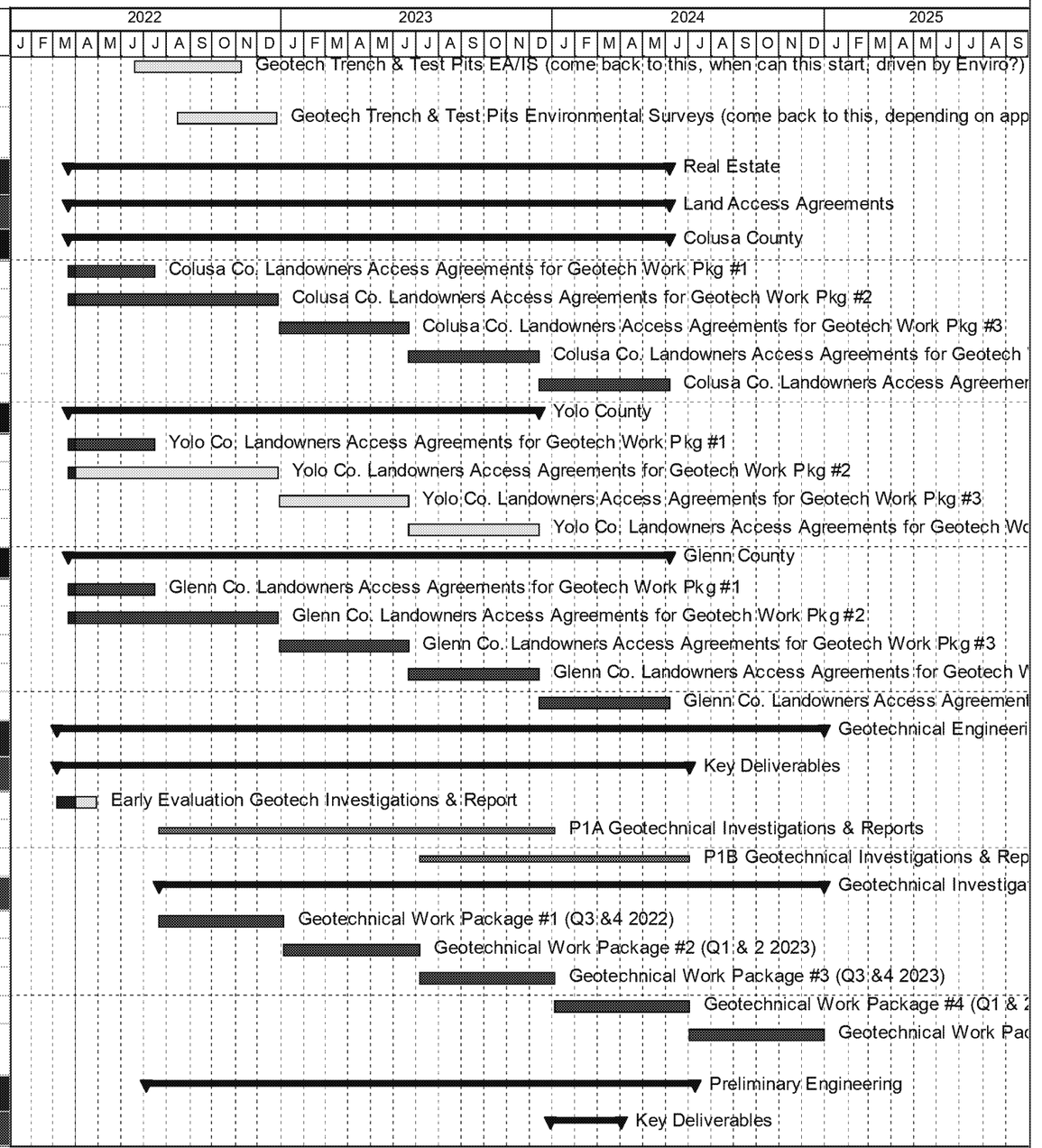
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
36	EIR-630	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	20-Jun-22	09-Nov-22
37	EIR-640	Geotech Trench & Test Pits Environmental Surveys (come back to this, depending on approach may not need early access)	90	16-Aug-22	27-Dec-22
38	**Real Estate**		547	22-Mar-22 A	06-Jun-24
39	**Land Access Agreements**		547	22-Mar-22 A	06-Jun-24
40	**Colusa County**		547	22-Mar-22 A	06-Jun-24
41	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22
42	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22
43	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23
44	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23
45	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24
46	**Yolo County**		427	22-Mar-22 A	14-Dec-23
47	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22
48	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22
49	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23
50	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23
51	**Glenn County**		547	22-Mar-22 A	06-Jun-24
52	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22
53	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22
54	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23
55	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23
56	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24
57	**Geotechnical Engineering**		695	07-Mar-22 A	31-Dec-24
58	**Key Deliverables**		566	07-Mar-22 A	03-Jul-24
59	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22
60	KD-2015	P1A Geotechnical Investigations & Reports	363	21-Jul-22	04-Jan-24
61	KD-2025	P1B Geotechnical Investigations & Reports	249	07-Jul-23	03-Jul-24
62	**Geotechnical Investigations**		618	21-Jul-22	31-Dec-24
63	GWP-1100	Geotechnical Work Package #1 (Q3 &4 2022)	114	21-Jul-22	05-Jan-23
64	GWP-1200	Geotechnical Work Package #2 (Q1 & 2 2023)	126	06-Jan-23	06-Jul-23
65	GWP-1300	Geotechnical Work Package #3 (Q3 &4 2023)	123	07-Jul-23	04-Jan-24
66	GWP-1400	Geotechnical Work Package #4 (Q1 & 2 2024)	126	05-Jan-24	03-Jul-24
67	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	129	04-Jul-24	31-Dec-24
68	**Preliminary Engineering**		507	05-Jul-22	11-Jul-24
69	**Key Deliverables**		65	29-Dec-23	03-Apr-24



Remaining Level of Effort
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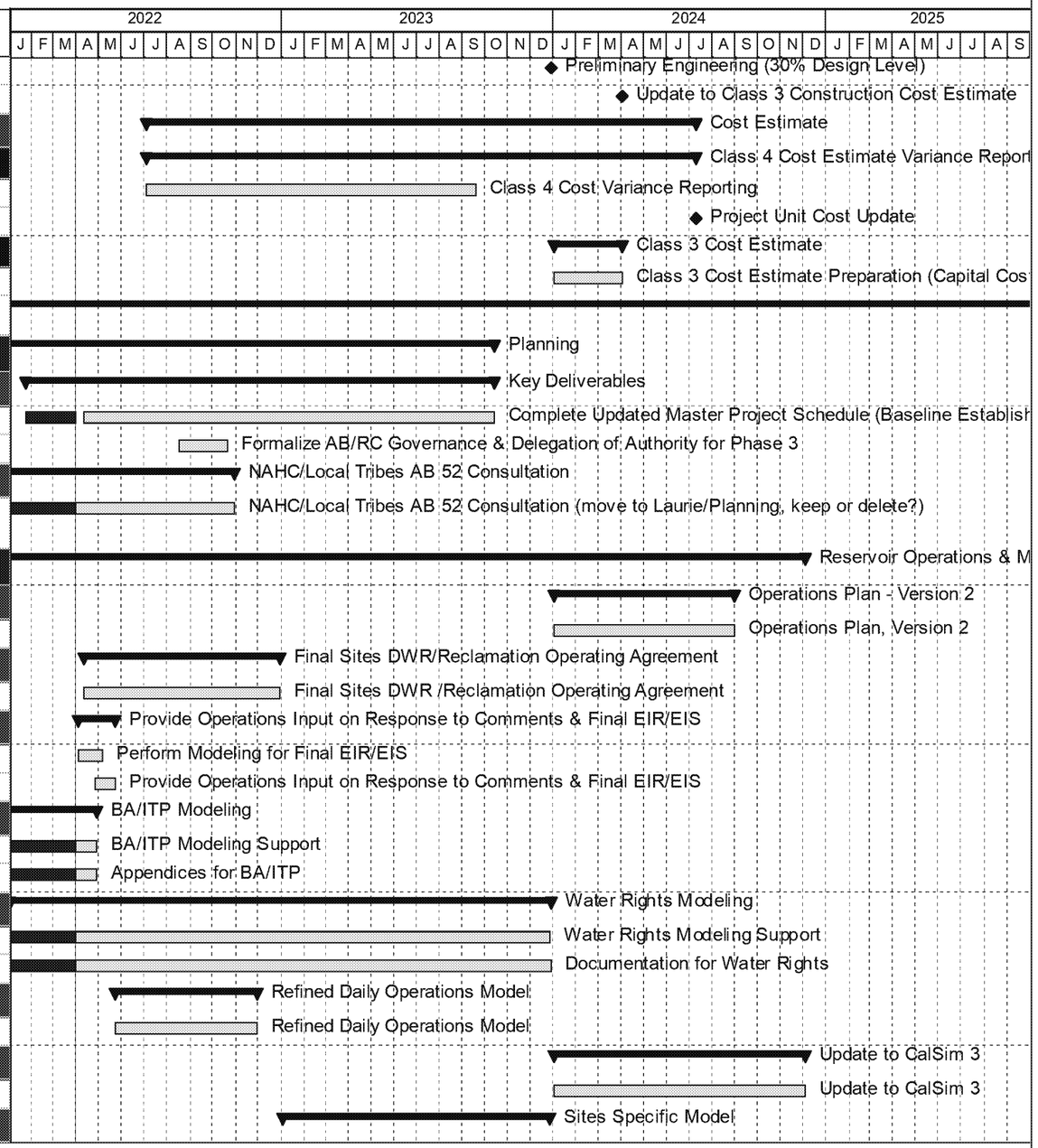
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
70	KD-1180	Preliminary Engineering (30% Design Level)	0		29-Dec-23
71	KD-1190	Update to Class 3 Construction Cost Estimate	0		03-Apr-24
72	**Cost Estimate**		507	05-Jul-22	11-Jul-24
73	**Class 4 Cost Estimate Variance Reporting**		507	05-Jul-22	11-Jul-24
74	C4E-1000	Class 4 Cost Variance Reporting	304	05-Jul-22	19-Sep-23
75	CU-1000	Project Unit Cost Update	0		11-Jul-24
76	**Class 3 Cost Estimate**		65	02-Jan-24	03-Apr-24
77	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	02-Jan-24	03-Apr-24
78	**Overall Project**		1774	01-Sep-20 A	19-Feb-29
79	**Planning**		386	01-Sep-20 A	13-Oct-23
80	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23
81	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23
82	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	20-Oct-22
83	**NAHC/Local Tribes AB 52 Consultation**		148	01-Sep-20 A	31-Oct-22
84	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	148	01-Sep-20 A	31-Oct-22
85	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24
86	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24
87	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24
88	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22
89	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22
90	**Provide Operations Input on Response to Comments & Final EIR/EIS**		36	04-Apr-22	23-May-22
91	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22
92	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22
93	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22
94	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22
95	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22
96	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23
97	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23
98	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23
99	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22
100	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22
101	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24
102	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24
103	**Sites Specific Model**		258	03-Jan-23	28-Dec-23



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
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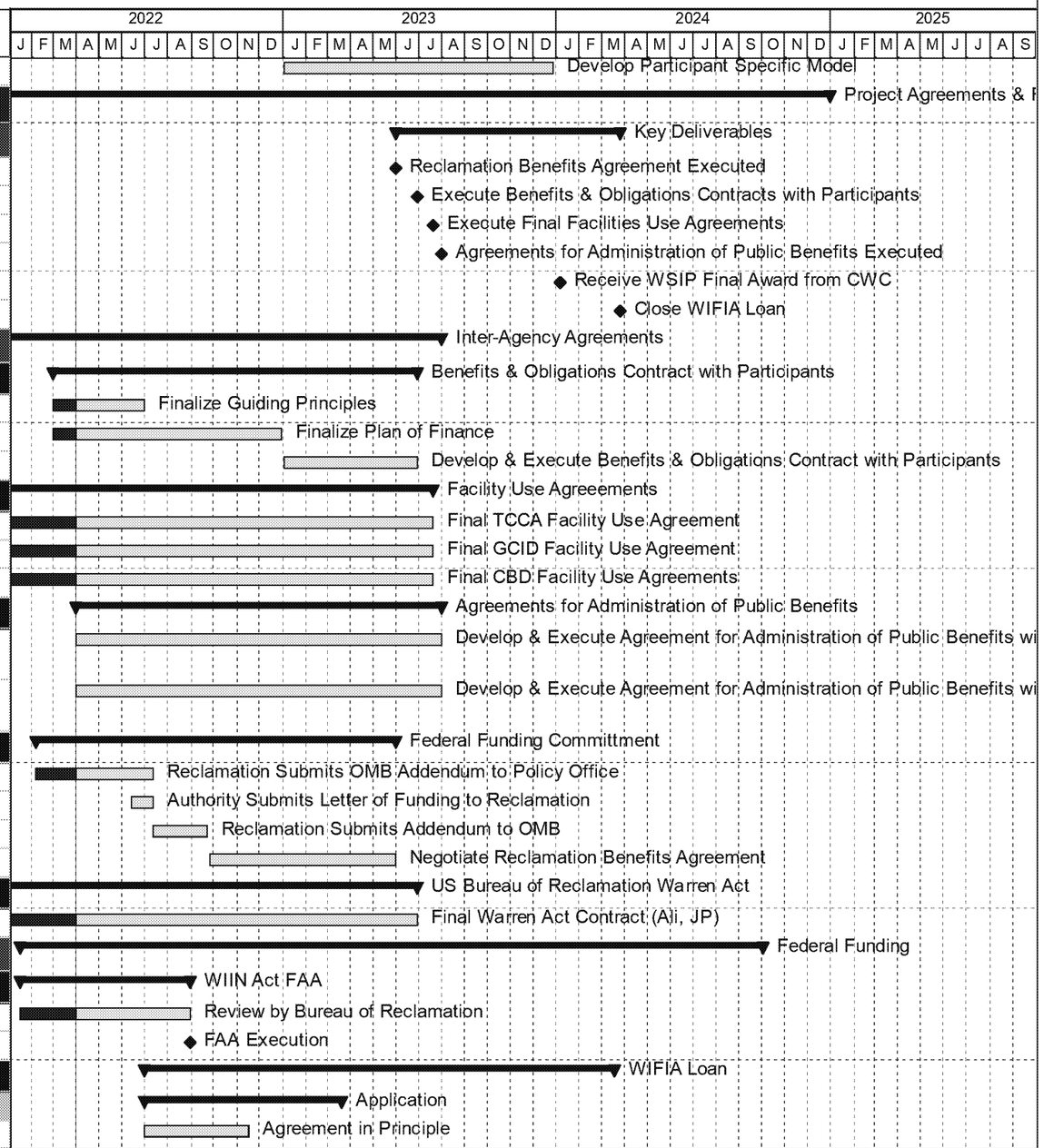
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
104	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23
105	**Project Agreements & Funding**		695	01-Jun-21 A	31-Dec-24
106	**Key Deliverables**		202	01-Jun-23	25-Mar-24
107	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23
108	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23
109	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23
110	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23
111	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24
112	KD-2600	Close WIFIA Loan	0		25-Mar-24
113	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23
114	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23
115	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22
116	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22
117	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants	125	03-Jan-23	29-Jun-23
118	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23
119	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23
120	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23
121	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23
122	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23
123	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23
124	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23
125	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23
126	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22
127	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22
128	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22
129	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23
130	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23
131	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23
132	**Federal Funding**		631	17-Jan-22 A	02-Oct-24
133	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22
134	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22
135	WIIN-1140	FAA Execution	0		31-Aug-22
136	**WIFIA Loan**		426	01-Jul-22	18-Mar-24
137	**Application**		176	01-Jul-22	20-Mar-23
138	WIFIA-110	Agreement in Principle	95	01-Jul-22	16-Nov-22



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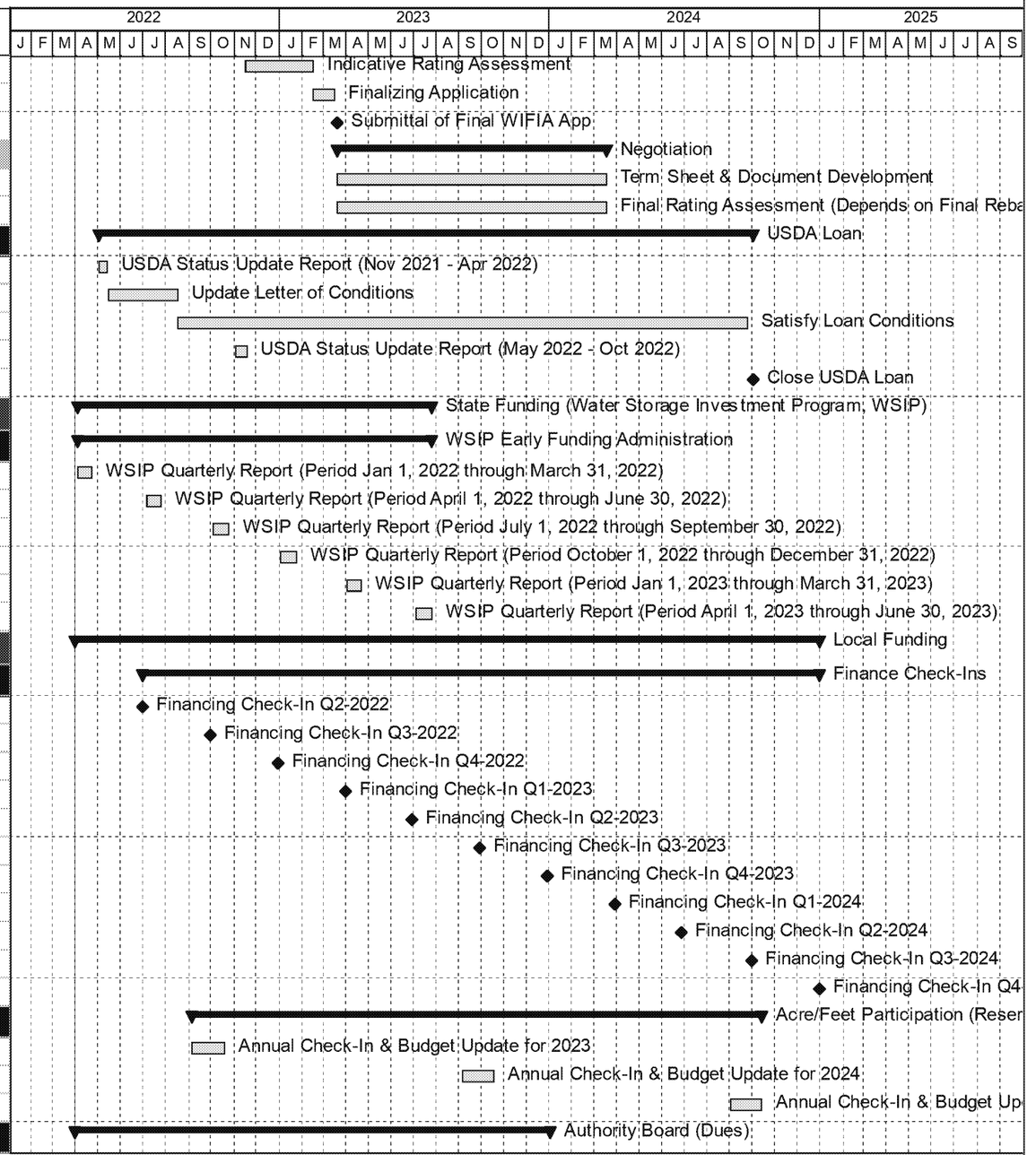
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
139	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23
140	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23
141	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23
142	**Negotiation**		250	20-Mar-23	18-Mar-24
143	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24
144	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24
145	**USDA Loan**		610	02-May-22	02-Oct-24
146	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22
147	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22
148	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24
149	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22
150	USDA-1070	Close USDA Loan	0		02-Oct-24
151	**State Funding (Water Storage Investment Program, WSIP)**		329	04-Apr-22	25-Jul-23
152	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23
153	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22
154	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22
155	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22
156	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23
157	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23
158	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23
159	**Local Funding**		695	01-Apr-22	31-Dec-24
160	**Finance Check-Ins**		631	30-Jun-22	31-Dec-24
161	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22*
162	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22
163	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22
164	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23
165	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23
166	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23
167	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23
168	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24
169	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24
170	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24
171	FC-1350	Financing Check-In Q4-2024	0		31-Dec-24
172	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24
173	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22
174	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23
175	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24
176	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24



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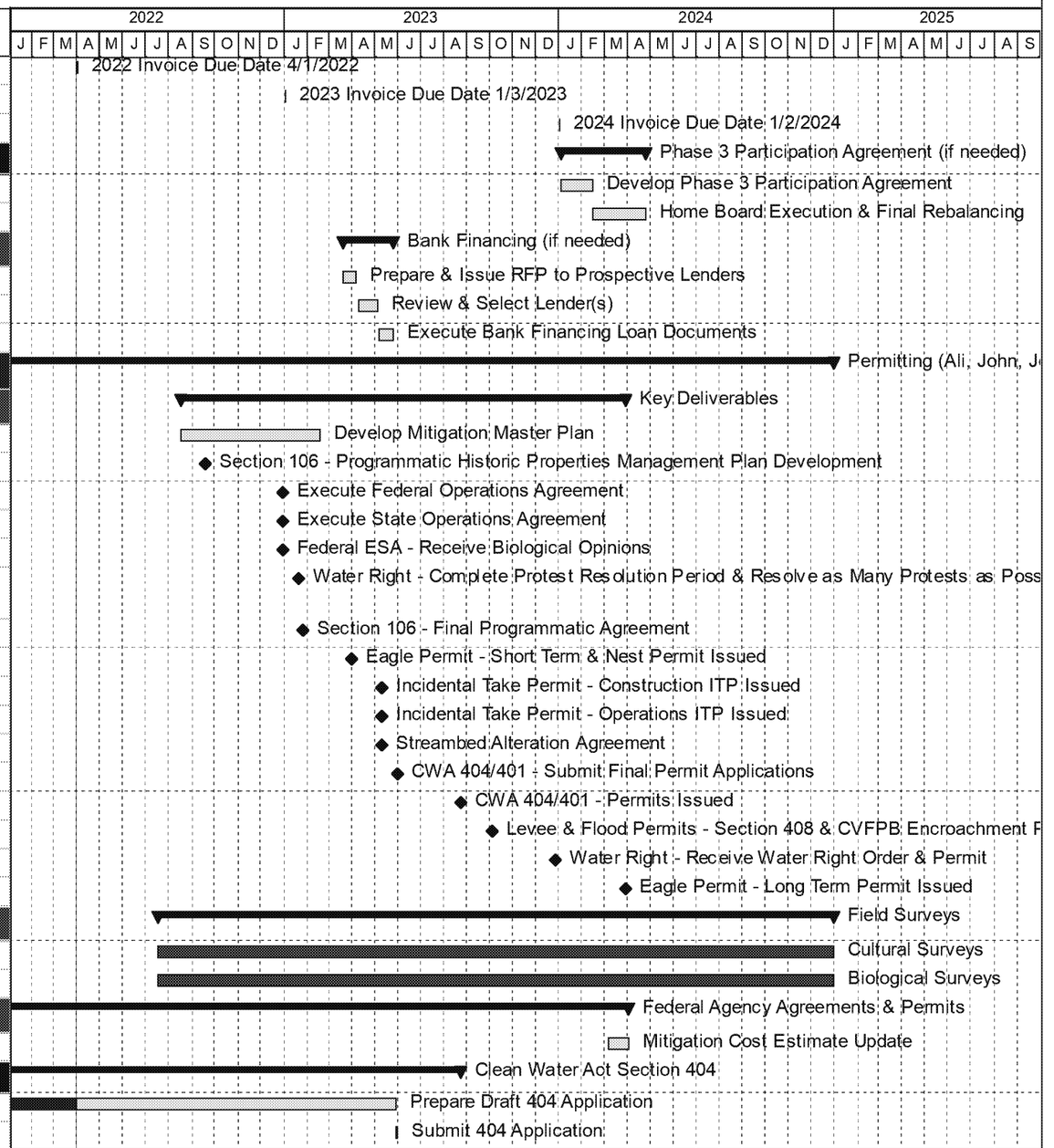
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Schedule

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177	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22
178	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*
179	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*
180	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24
181	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24
182	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24
183	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23
184	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23
185	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23
186	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23
187	**Permitting (Ali, John, Jelica)**		695	04-Jan-21 A	31-Dec-24
188	**Key Deliverables**		403	17-Aug-22	29-Mar-24
189	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23
190	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22
191	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22
192	KD-1250	Execute State Operations Agreement	0		30-Dec-22
193	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22
194	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23
195	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23
196	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23
197	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23
198	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23
199	KD-1420	Streambed Alteration Agreement	0		11-May-23
200	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		31-May-23
201	KD-1400	CWA 404/401 - Permits Issued	0		24-Aug-23
202	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		05-Oct-23
203	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23
204	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24
205	**Field Surveys**		621	18-Jul-22	31-Dec-24
206	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24
207	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24
208	**Federal Agency Agreements & Permits**		502	11-Jan-21 A	03-Apr-24
209	CE-1570	Mitigation Cost Estimate Update	20	07-Mar-24	03-Apr-24
210	**Clean Water Act Section 404**		352	04-Feb-21 A	24-Aug-23
211	404-050	Prepare Draft 404 Application	291	04-Feb-21 A	30-May-23
212	404-120	Submit 404 Application	1	31-May-23	31-May-23



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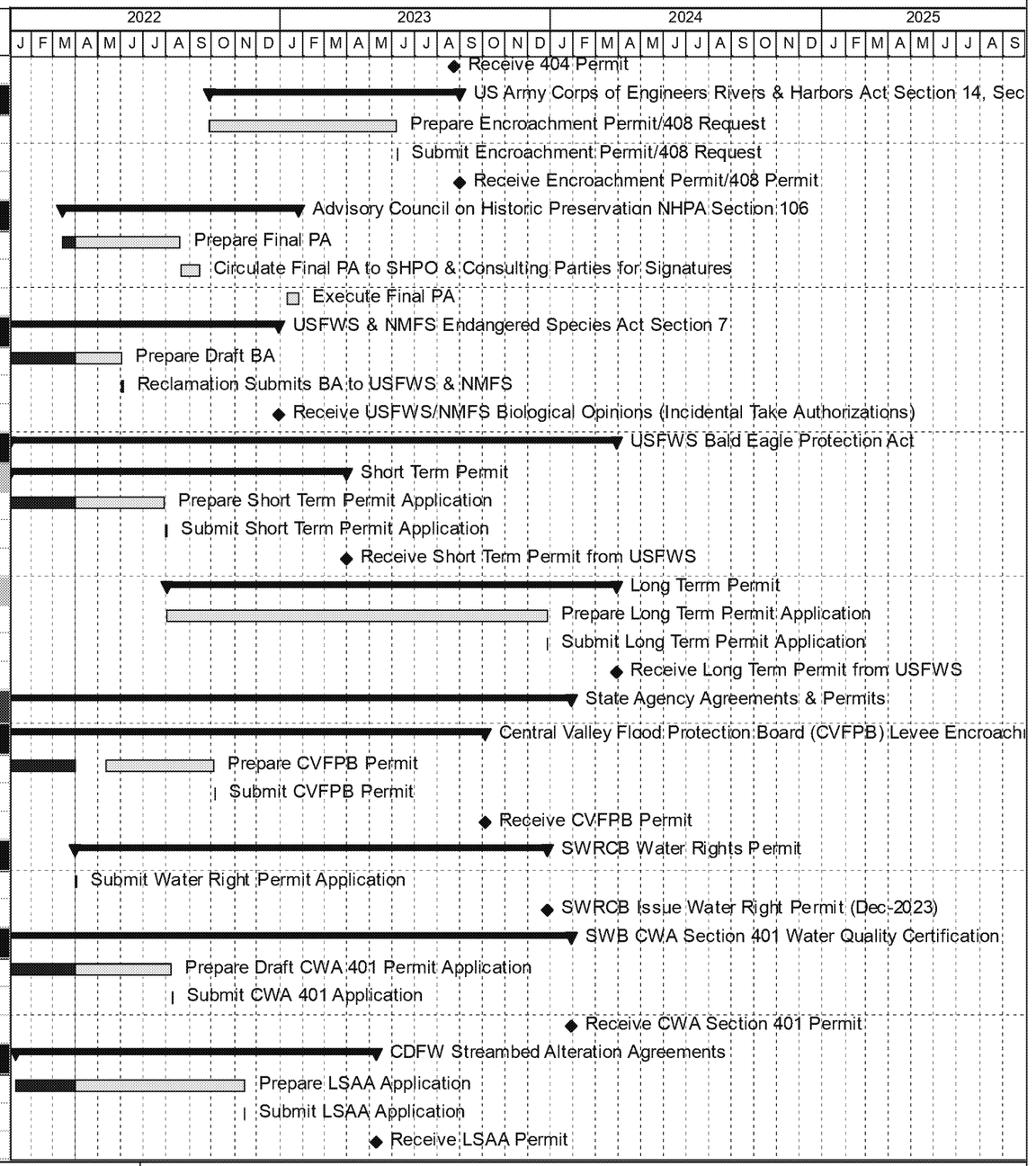
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
213	404-130	Receive 404 Permit	0		24-Aug-23
214	**US Army Corps of Engineers Rivers & Harbors Act Section 14, Section 408**		233	28-Sep-22	01-Sep-23
215	408-150	Prepare Encroachment Permit/408 Request	172	28-Sep-22	07-Jun-23
216	408-160	Submit Encroachment Permit/408 Request	1	08-Jun-23	08-Jun-23
217	408-170	Receive Encroachment Permit/408 Permit	0		01-Sep-23
218	**Advisory Council on Historic Preservation NHPA Section 106**		204	14-Mar-22 A	25-Jan-23
219	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22
220	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22
221	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23
222	**USFWS & NMFS Endangered Species Act Section 7**		188	11-Jan-21 A	30-Dec-22
223	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22
224	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22
225	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22
226	**USFWS Bald Eagle Protection Act**		499	03-Jan-22 A	29-Mar-24
227	**Short Term Permit**		250	03-Jan-22 A	31-Mar-23
228	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22
229	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22
230	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23
231	**Long Terrm Permit**		414	02-Aug-22	29-Mar-24
232	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23
233	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23
234	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24
235	**State Agency Agreements & Permits**		456	04-Jan-21 A	29-Jan-24
236	**Central Valley Flood Protection Board (CVFPB) Levee Encroachment**		351	13-Dec-21 A	05-Oct-23
237	CVFPB-200	Prepare CVFPB Permit	100	13-Dec-21 A	04-Oct-22
238	CVFPB-210	Submit CVFPB Permit	1	05-Oct-22	05-Oct-22
239	CVFPB-220	Receive CVFPB Permit	0		05-Oct-23
240	**SWRCB Water Rights Permit**		436	01-Apr-22	28-Dec-23
241	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22
242	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23
243	**SWB CWA Section 401 Water Quality Certification**		456	04-Jan-21 A	29-Jan-24
244	401-200	Prepare Draft CWA 401 Permit Application	90	04-Jan-21 A	08-Aug-22
245	401-210	Submit CWA 401 Application	1	09-Aug-22	09-Aug-22
246	401-220	Receive CWA Section 401 Permit	0		29-Jan-24
247	**CDFW Streambed Alteration Agreements**		279	10-Jan-22 A	11-May-23
248	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22
249	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22
250	1600-220	Receive LSAA Permit	0		11-May-23



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites with Geo / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
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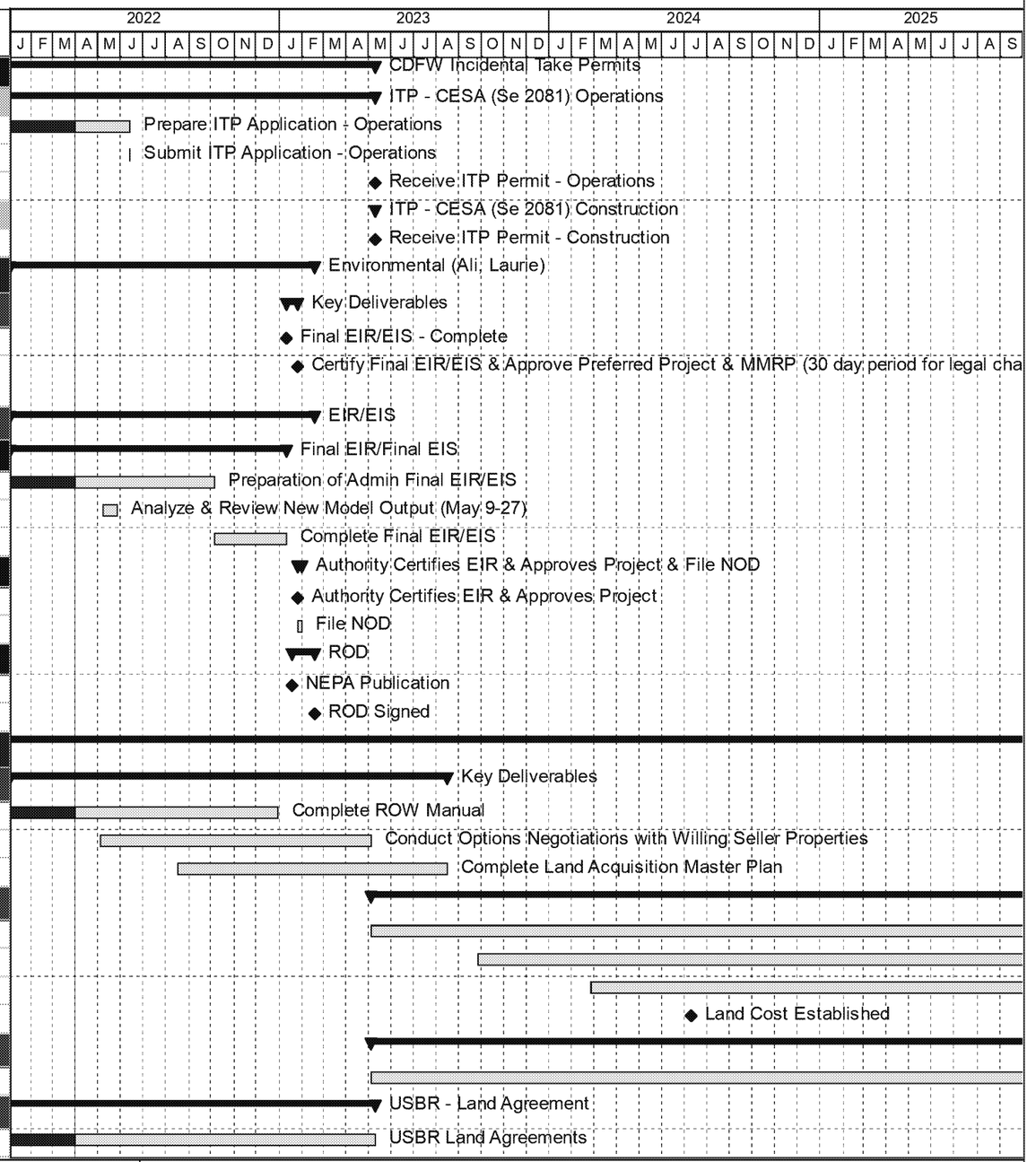
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
251		**CDFW Incidental Take Permits**	279	11-Jan-21 A	11-May-23
252		**ITP - CESA (Se 2081) Operations**	279	11-Jan-21 A	11-May-23
253	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22
254	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22
255	2081-120	Receive ITP Permit - Operations	0		11-May-23
256		**ITP - CESA (Se 2081) Construction**	0	11-May-23	11-May-23
257	2081-220	Receive ITP Permit - Construction	0		11-May-23
258		**Environmental (Ali, Laurie)**	221	03-Jan-22 A	17-Feb-23
259		**Key Deliverables**	10	10-Jan-23	25-Jan-23
260	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23
261	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23
262		**EIR/EIS**	221	03-Jan-22 A	17-Feb-23
263		**Final EIR/Final EIS**	194	03-Jan-22 A	10-Jan-23
264	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22
265	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22
266	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23
267		**Authority Certifies EIR & Approves Project & File NOD**	5	25-Jan-23	01-Feb-23
268	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23
269	EIR-380	File NOD	5	26-Jan-23	01-Feb-23
270		**ROD**	22	18-Jan-23	17-Feb-23
271	EIR-440	NEPA Publication	0		18-Jan-23
272	EIR-450	ROD Signed	0		17-Feb-23
273		**Real Estate**	1774	02-Nov-20 A	19-Feb-29
274		**Key Deliverables**	346	03-Jan-22 A	16-Aug-23
275	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22
276	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23
277	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23
278		**Land Acquisition**	1500	05-May-23	19-Feb-29
279	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29
280	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29
281	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29
282	RE-1050	Land Cost Established	0		11-Jul-24
283		**Relocation**	1500	05-May-23	01-Feb-29
284	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29
285		**USBR - Land Agreement**	278	02-Nov-20 A	10-May-23
286	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23



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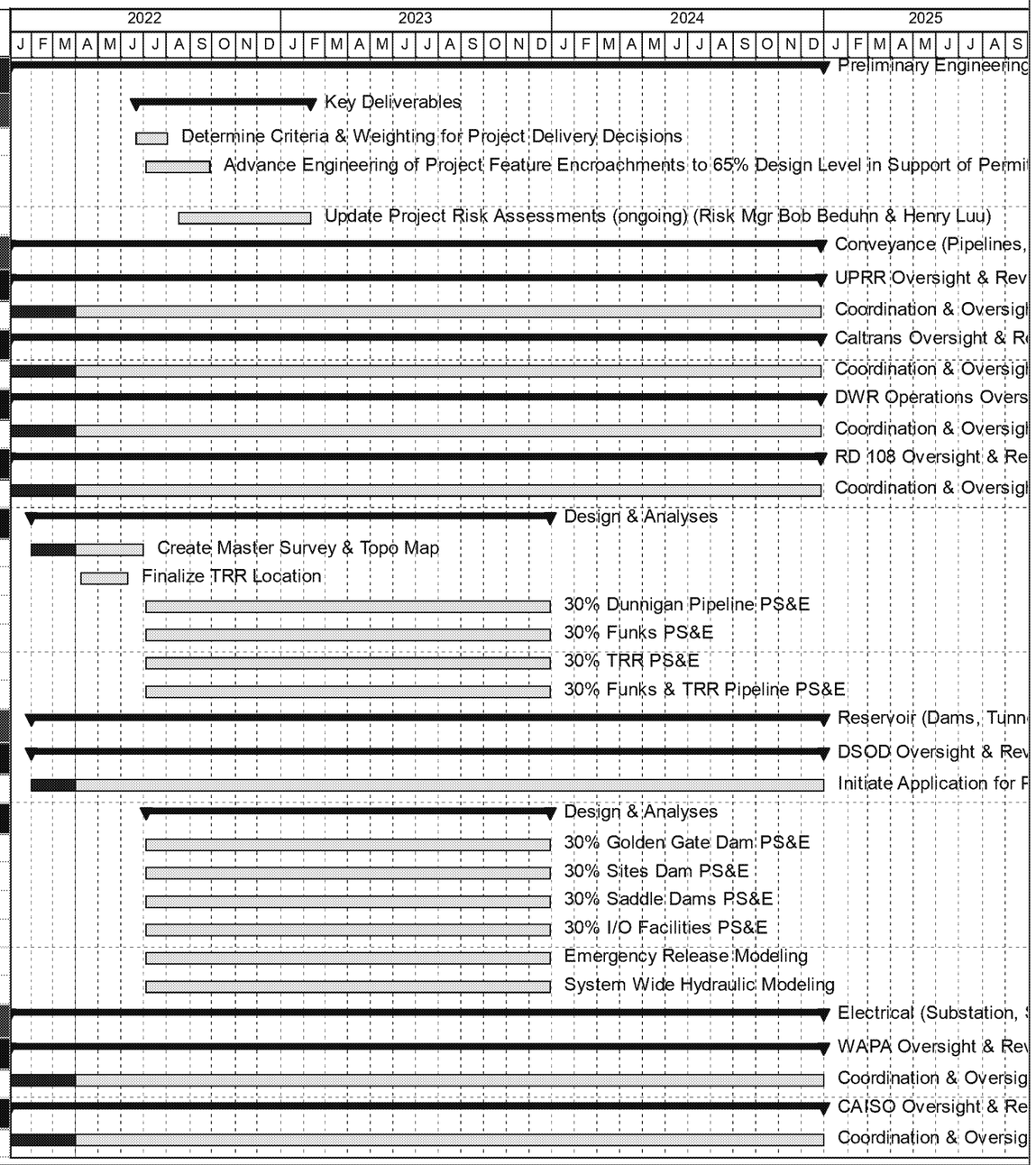
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287		**Preliminary Engineering**	694	03-Jan-22 A	30-Dec-24
288		**Key Deliverables**	160	21-Jun-22	10-Feb-23
289	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22
290	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	05-Jul-22	27-Sep-22
291	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry L	120	17-Aug-22	10-Feb-23
292		**Conveyance (Pipelines, Pump Stations, Canals)**	693	03-Jan-22 A	27-Dec-24
293		**UPRR Oversight & Review**	693	03-Jan-22 A	27-Dec-24
294	A1110	Coordination & Oversight with UPRR	693	03-Jan-22 A	27-Dec-24
295		**Caltrans Oversight & Review**	693	03-Jan-22 A	27-Dec-24
296	A1120	Coordination & Oversight with Caltrans	693	03-Jan-22 A	27-Dec-24
297		**DWR Operations Oversight & Review (KLOG)**	693	03-Jan-22 A	27-Dec-24
298	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24
299		**RD 108 Oversight & Review**	693	03-Jan-22 A	27-Dec-24
300	A1140	Coordination & Oversight with Reclamation District 108	693	03-Jan-22 A	27-Dec-24
301		**Design & Analyses**	437	01-Feb-22 A	29-Dec-23
302	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	01-Jul-22
303	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22
304	KD-1630	30% Dunnigan Pipeline PS&E	372	05-Jul-22	29-Dec-23
305	KD-2010	30% Funks PS&E	372	05-Jul-22	29-Dec-23
306	KD-2020	30% TRR PS&E	372	05-Jul-22	29-Dec-23
307	KD-2030	30% Funks & TRR Pipeline PS&E	372	05-Jul-22	29-Dec-23
308		**Reservoir (Dams, Tunnels)**	694	01-Feb-22 A	30-Dec-24
309		**DSOD Oversight & Review**	694	01-Feb-22 A	30-Dec-24
310	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24
311		**Design & Analyses**	372	05-Jul-22	29-Dec-23
312	KD-1660	30% Golden Gate Dam PS&E	372	05-Jul-22	29-Dec-23
313	KD-2040	30% Sites Dam PS&E	372	05-Jul-22	29-Dec-23
314	KD-2050	30% Saddle Dams PS&E	372	05-Jul-22	29-Dec-23
315	KD-2060	30% I/O Facilities PS&E	372	05-Jul-22	29-Dec-23
316	KD-2070	Emergency Release Modeling	372	05-Jul-22	29-Dec-23
317	KD-2080	System Wide Hydraulic Modeling	372	05-Jul-22	29-Dec-23
318		**Electrical (Substation, Switchyard, Transmission Line)**	694	03-Jan-22 A	30-Dec-24
319		**WAPA Oversight & Review**	694	03-Jan-22 A	30-Dec-24
320	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24
321		**CAISO Oversight & Review**	694	03-Jan-22 A	30-Dec-24
322	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24



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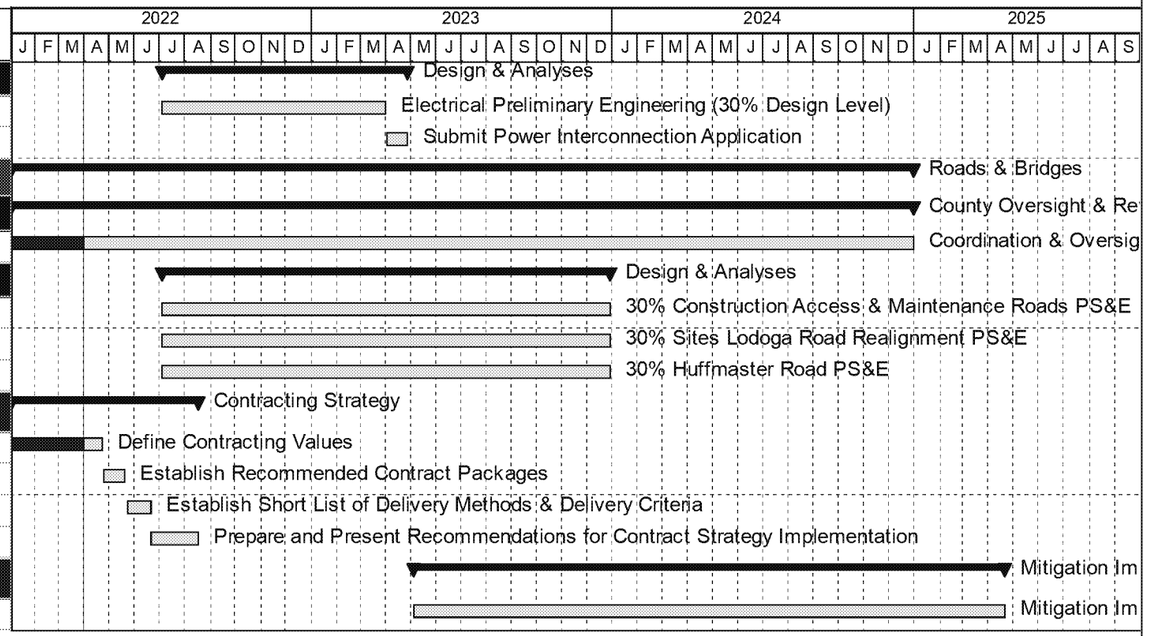
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Schedule

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323		**Design & Analyses**	205	05-Jul-22	28-Apr-23
324	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	05-Jul-22	31-Mar-23
325	KD-1200	Submit Power Interconnection Application	20	03-Apr-23	28-Apr-23
326		**Roads & Bridges**	694	03-Jan-22 A	30-Dec-24
327		**County Oversight & Review**	694	03-Jan-22 A	30-Dec-24
328	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24
329		**Design & Analyses**	372	05-Jul-22	29-Dec-23
330	KD-1650	30% Construction Access & Maintenance Roads PS&E	372	05-Jul-22	29-Dec-23
331	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	05-Jul-22	29-Dec-23
332	KD-2100	30% Huffmaster Road PS&E	372	05-Jul-22	29-Dec-23
333		**Contracting Strategy**	96	03-Jan-22 A	16-Aug-22
334	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22
335	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22
336	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22
337	CS-1400	Prepare and Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22
338		**Mitigation Implementation**	500	05-May-23	21-Apr-25
339	MI-1100	Mitigation Implementation (more information needed to expand detail)	500	05-May-23	21-Apr-25



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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/4/2022 3:22:02 PM
To: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Spranza, John [john.spranza@hdrinc.com]; Fisher, Linda [linda.fisher@hdrinc.com]; Lloyd, John [John.Lloyd@hdrinc.com]
CC: Risse, Danielle [Danielle.Risse@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: Sites: Trenching/test pits Scope of Work - Coordination

Yes – Janice for AB 52. Good thinking.

I do want to press a bit on the monitoring in contract mods. Jerry is going to press me on why this wasn't included in the original Amendment 3 costs as these test pits were included (I think). If this wasn't included, then I can push back on this. If this was included, I'll need to explain why this will be more. And if it's a grey area, I think we need to explain/think about the approach for this more.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Monday, April 4, 2022 1:06 PM
To: Spranza, John <john.spranza@hdrinc.com>; Fisher, Linda <linda.fisher@hdrinc.com>; Lloyd, John <John.Lloyd@hdrinc.com>
Cc: Risse, Danielle <Danielle.Risse@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites: Trenching/test pits Scope of Work - Coordination

Hello folks
Great call! below are notes. As discussed please start working on scope .
I can coordinate a call with ICF (Monique) and we can collectively give her a heads up with what we need from them .

ICF needs (based on call)
- Cultural sensitivity report (with assistance from Far Western)
- Cultural monitoring
- Biological monitoring
- Cultural section of CEQA doc
- Bio section of CEQA doc (likely but will confirm end of week)
- Other?
  - Janice for AB 52?

Jelica Arsenijevic
Environmental Project Manager

Due to COVID-19, I will be working from home. Please contact me via cell # listed below. Be safe out there!

2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

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-----Original Appointment-----
From: Arsenijevic, Jelica
Sent: Friday, April 1, 2022 2:04 PM
To: Arsenijevic, Jelica; Spranza, John; Fisher, Linda; Lloyd, John
Cc: Risse, Danielle; Alicia Forsythe; Laurie Warner Herson
Subject: Sites: Trenching/test pits Scope of Work - Coordination
When: Monday, April 4, 2022 12:30 PM-1:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

Per Ali's request, she'd like the integration team to figure out the path forward for scope of work related to test pits and trenching. Ali is confirming with Jerry today whether this can be an Authority only action (no reimbursement from Reclamation). If a go, we need to determine who is doing what and get contract modifications going and in place by end of April. Desire is to get going on work in early May. I'm sorry for squeezing this in over lunch, but John is out starting Wednesday.

Danielle is out on PTO, and hoping Jay you can provide input.
Including Ali and Laurie as optional ☺

Topics
1. CEQA Only –
a. HDR or ICF
i. Start fresh or utilize existing IS/EA (stripped down)
b. Contribution to CEQA cultural and bio chapters – ICF or HDR?

NOTES:
- Wait to decide HDR or ICF at end of week (4/8)
  - Jay/Danielle preference is to have ICF to prepare cultural section of IS and incorporate results of the cultural sensitivity analysis
- ICF has supported with bio/cultural chapters for current EA/IS

2. Supporting documents
a. Cultural sensitivity report – ICF/Far Western?
- No surveys other preconstruction surveys.
- Far Western (sub to ICF) on board with sensitivity analysis and monitoring.

b. Bio tech report?
- ICF for consistency but wait till end of week for final decision.
- Current tech report is an existing conditions report based on attorney comments

c. Traffic management plan as work proposed on/adjacent to existing roads (Henry mentioned engineering team can prepare and is within their purview [should confirm])
- Jelica to confirm that no scope mod for engineering

d. Other?
- Air quality analysis done by HDR in current EA/IS.
  - Need crews, hours, equipment for Project Description
- Simple analysis for Glenn/Colusa can keep in house.

- Noise?
- AB 52

3. Permits

a. No BA due to CEQA only, no federal action

b. No SHPO due to CEQA only, no federal action

c. No 404/401/1600/ITP – full avoidance

d. Eagle permit – being captured in short-term permit that ICF is currently preparing

i. Mitigation coordination/cost?

- John reached out to USFWS. Will circle back to team.

e. CVFPB – no work within their jurisdiction but need to triple confirm.

- Jelica to confirm

4. Bio/Monitoring Costs including preconstruction surveys (HDR/ICF)

a. Capture additional tribal monitoring costs as tribal agreement doesn't reflect work related to test pits/trenches

- New letters for AB 52
- Jay to coordinate with Ali/Kevin for tribal agreement w/Yocha Dehe to capture test pits/trenching

Action Items:

- Folks to start preparing scope
- John/Jelica to start process with Marcus

Microsoft Teams meeting

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CC: Risse, Danielle [danielle.risse@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: Sites: Trenching/test pits Scope of Work - Coordination

Totally makes sense. I was thinking we had extra work in the IS/MND and permitting. I didn't realize we took out the monitoring costs also. Sounds good.

Ali

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Sent: Monday, April 4, 2022 3:32 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Fisher, Linda <linda.fisher@hdrinc.com>; Lloyd, John <John.Lloyd@hdrinc.com>
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Thanks Ali!
It was not included on the environmental permitting/planning side as part of amendment 3. Engineering included it; however, based on our last years coordination efforts with the geotech team, Reclamation noted that SHPO would be very concerned and SHPO consultation would definitely be 6 months or more. Based on that input, we coordinated with Henry and removed test pits/trenching/dozer trenching . Additionally there were concerns expressed from Kevin for the landowner perspective.

We all assumed that based on schedule we could utilize the overall project permits, including Programmatic Agreement, and Final EIR/EIS to get these activities cleared. However, we got thrown a curve ball when a couple months ago, it was decided (not sure what engineering meeting) to move up the 30/35% design plans from end of 2024 to 2023, meaning that these activities would need to be cleared by June 2023. Per our conversation with JP and Henry, that schedule is now a bit more lax, but we still need to get out there by end of 2023.

Does this help explain the reason why its not part of our scope?

Thanks ☺

Jelica Arsenijevic
Environmental Project Manager

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- Far Western (sub to ICF) on board with sensitivity analysis and monitoring.

b. Bio tech report?
- ICF for consistency but wait till end of week for final decision.
- Current tech report is an existing conditions report based on attorney comments

c. Traffic management plan as work proposed on/adjacent to existing roads (Henry mentioned engineering team can prepare and is within their purview [should confirm])

- Jelica to confirm that no scope mod for engineering

d. Other?

- Air quality analysis done by HDR in current EA/IS.
- Need crews, hours, equipment for Project Description
- Simple analysis for Glenn/Colusa can keep in house.
- Noise?
- AB 52

3. Permits

a. No BA due to CEQA only, no federal action

b. No SHPO due to CEQA only, no federal action

c. No 404/401/1600/ITP – full avoidance

d. Eagle permit – being captured in short-term permit that ICF is currently preparing

i. Mitigation coordination/cost?

- John reached out to USFWS. Will circle back to team.

e. CVFPB – no work within their jurisdiction but need to triple confirm.

- Jelica to confirm

4. Bio/Monitoring Costs including preconstruction surveys (HDR/ICF)

a. Capture additional tribal monitoring costs as tribal agreement doesn't reflect work related to test pits/trenches

- New letters for AB 52
- Jay to coordinate with Ali/Kevin for tribal agreement w/Yocha Dehe to capture test pits/trenching

Action Items:

- Folks to start preparing scope
- John/Jelica to start process with Marcus

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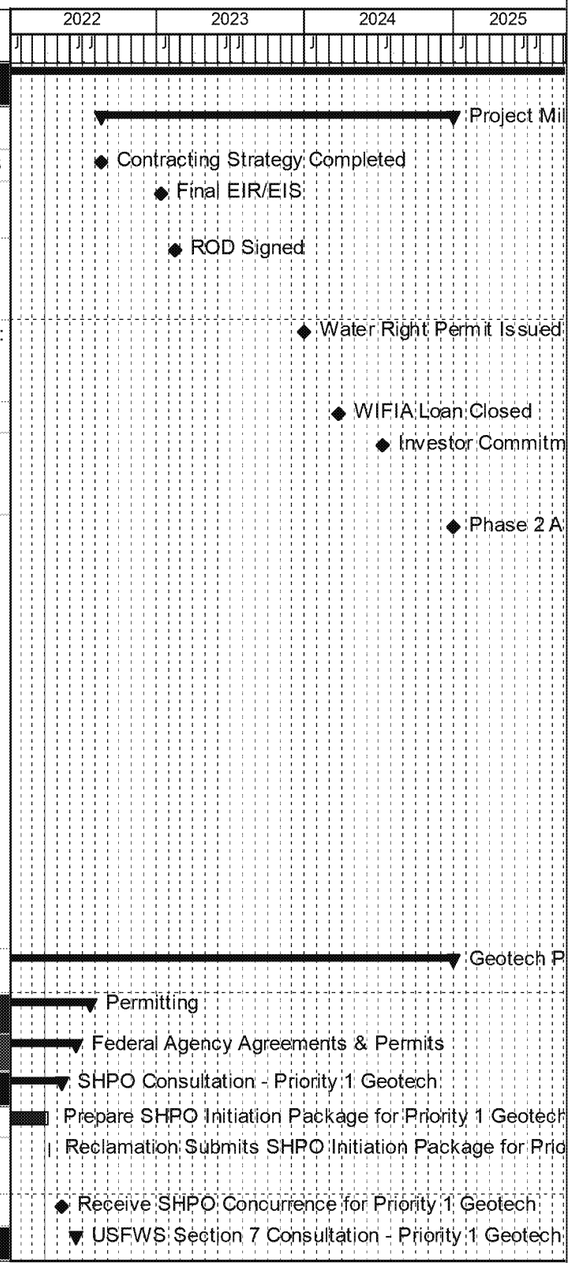
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29		
2	**Project Milestones**		599	16-Aug-22	31-Dec-24		
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22	CS-1400: FS	KD-1290: FS, KD-1490: FS, KD-1460: FS
4	MS-1200	Final EIR/EIS	0		10-Jan-23	MS-011-DE: FS, MS-006-Ph2-2a: FS, STA-140: FF, EIR-250: FF	ENG-460: FS, ENG-450: FS, MS-1300: FS
5	MS-1300	ROD Signed	0		17-Feb-23	USDA-1030: FF, FAA-1070: FF, REC-010: FF, FF-020: FF, MS-1200: FS, EIR-450: FS	EIR-460: FS, MS-500-CS: FS
6	MS-1400	Water Right Permit Issued	0		28-Dec-23	WRP-120: FF	WIFIA-210: FF, KD-1310: FF 5, MS-1500: FF 30, PA-1100: FS 3, MS-5000: FF, CWC-510: FF
7	MS-1600	WIFIA Loan Closed	0		25-Mar-24	KD-2600: FF	
8	MS-1500	Investor Commitment	0		11-Jul-24*	KD-1290: FF, KD-1130: FF, CU-1000: FF, MS-1400: FF 30, 408-170: FF, KD-1480: FF	
9	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*	STA-120: FF, KD-1200: FF, KD-1230: FF, KD-1290: FF, KD-1130: FF, KD-1120: FF, KD-1210: FF, GWP-1500: FF, PB-1100: FF, KD-1310: FF, KD-1300: FF, AB-2300: FF, PA-1200: FF, BF-1300: FF, KD-1240: FF, KD-1250: FF, KD-1320: FF, KD-1360: FF, KD-1340: FF, KD-1350: FF, KD-1430: FF, KD-1410: FF, KD-1400: FF, RE-1030: FF, RE-1040: FF, A1230: FF, A1110: FF, A1120: FF, A1130: FF, A1140: FF, KD-1100: FF, A1150: FF, A1160: FF, A1170: FF, KD-1190: FF, USFWS-160: FF, KD-1420: FF, KD-1440: FF, AF-1300: FF, FC-1350: FF, USDA-1060: FF, KD-2600: FF, KD-1510: FF, OS-1150: FF, MS-1400: FF, USDA-1070: FF, WSIP-1260: FF, 401-220: FF	
10	**Geotech Program**		695	01-Mar-21 A	31-Dec-24		
11	**Permitting**		77	01-Mar-21 A	20-Jul-22		
12	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22		
13	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22		
14	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geote	6	02-Aug-21 A	08-Apr-22		SHPO-250: FS
15	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22	SHPO-240: FS	SHPO-260: FF 22
16	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22	SHPO-250: FF 22	EIR-230: FF
17	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22		



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

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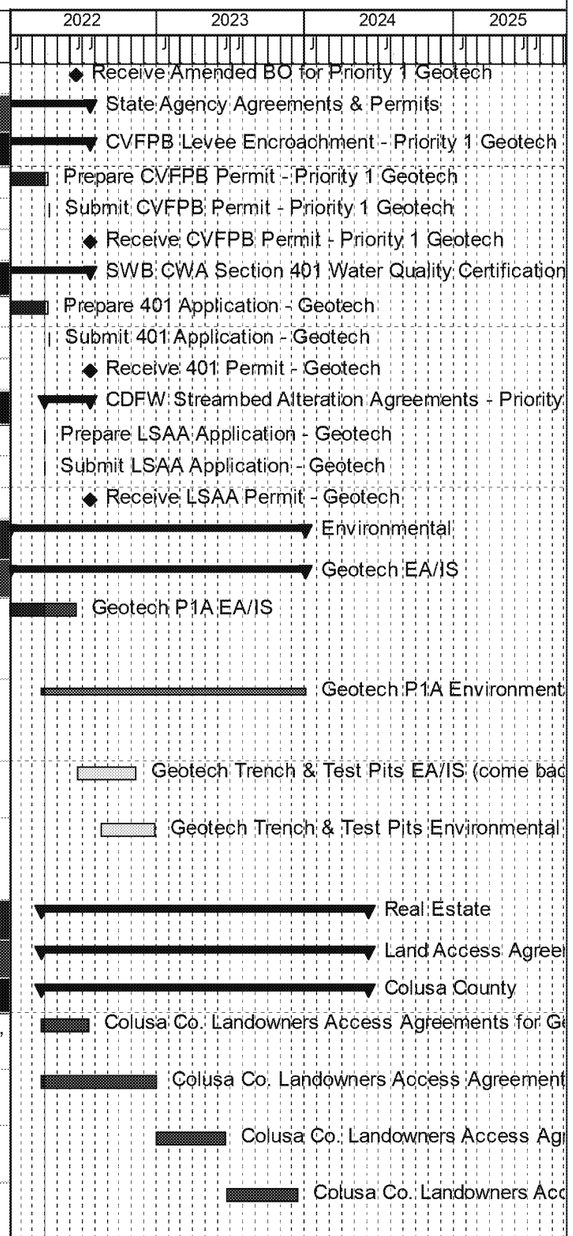
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
18	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22	BA-110: FF 85	EIR-230: FF, KD-1340: FF
19	**State Agency Agreements & Permits**		77	01-Mar-21 A	20-Jul-22		
20	**CVFPB Levee Encroachment - Priority 1 Geotech**		77	01-Nov-21 A	20-Jul-22		
21	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22		CVFPB-110: FS
22	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22	CVFPB-100: FS	CVFPB-120: FF 60
23	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		20-Jul-22	EIR-230: FF 22, CVFPB-110: FF 60	GWP-1100: FS
24	**SWB CWA Section 401 Water Quality Certification - Priori**		77	01-Mar-21 A	20-Jul-22		
25	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22	WP2-130: FS	401-110: FS
26	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22	401-100: FS	401-120: FS 45
27	401-120	Receive 401 Permit - Geotech	0		20-Jul-22	EIR-230: FF 22, 401-110: FS 45	GWP-1100: FF 30
28	**CDFW Streambed Alteration Agreements - Priority 1 Geot**		77	01-Apr-22	20-Jul-22		
29	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22*	01-Apr-22		1600-110: FS
30	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22	1600-100: FS	1600-120: FF 60
31	1600-120	Receive LSAA Permit - Geotech	0		20-Jul-22	EIR-230: FF 22, 1600-110: FF 60	GWP-1100: FF 30
32	**Environmental**		440	03-Jan-22 A	04-Jan-24		
33	**Geotech EA/IS**		440	03-Jan-22 A	04-Jan-24		
34	EIR-230	Geotech P1A EA/IS	55	03-Jan-22 A	17-Jun-22	BA-120: FF, SHPO-260: FF	1600-120: FF 22, 401-120: FF 22, CVFPB-120: FF 22, GWP-1100: FS, EIR-630: FS, EIR-260: FS
35	EIR-260	Geotech P1A Environmental Surveys (which Real Estate access agreements are needed to start this?)	440	22-Mar-22 A	04-Jan-24	GWP-1300: FF, LAAG-1100: SS, LAAY-1100: SS, LAAC-1100: SS, EIR-230: FS	
36	EIR-630	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	20-Jun-22	09-Nov-22	EIR-230: FS	GWP-1500: FS, EIR-640: FF 30, EIR-640: SS 40
37	EIR-640	Geotech Trench & Test Pits Environmental Surveys (come back to this, depending on approach may not need early access)	90	16-Aug-22	27-Dec-22	EIR-630: FF 30, EIR-630: SS 40	
38	**Real Estate**		547	22-Mar-22 A	06-Jun-24		
39	**Land Access Agreements**		547	22-Mar-22 A	06-Jun-24		
40	**Colusa County**		547	22-Mar-22 A	06-Jun-24		
41	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, EIR-260: SS, LAAC-1200: SS, GWP-1100: FS
42	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAC-1100: SS	LAAC-1300: FS, GWP-1200: FS
43	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAC-1200: FS	LAAC-1400: FS, GWP-1300: FS
44	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAC-1300: FS	LAAC-1500: FS, GWP-1400: FS



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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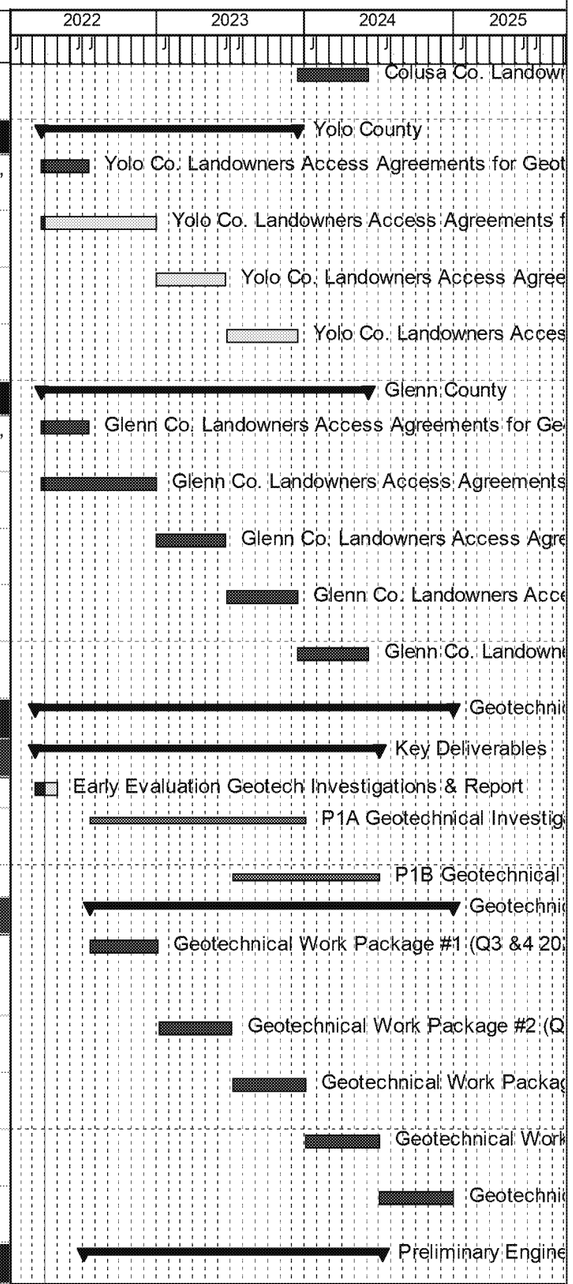
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
45	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAC-1400: FS	RE-1050: FF 25, GWP-1500: FS
46	**Yolo County**		427	22-Mar-22 A	14-Dec-23		
47	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, EIR-260: SS, LAAY-1200: SS, GWP-1100: FS
48	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAY-1100: SS	LAAY-1300: FS, GWP-1200: FS
49	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAY-1200: FS	LAAY-1400: FS, GWP-1300: FS
50	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAY-1300: FS	GWP-1400: FS, RE-1050: FF 25
51	**Glenn County**		547	22-Mar-22 A	06-Jun-24		
52	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, EIR-260: SS, LAAG-1200: SS, GWP-1100: FS
53	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAG-1100: SS	LAAG-1300: FS, GWP-1200: FS
54	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAG-1200: FS	LAAG-1400: FS, GWP-1300: FS
55	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAG-1300: FS	LAAG-1500: FS, GWP-1400: FS
56	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAG-1400: FS	RE-1050: FF 25, GWP-1500: FS
57	**Geotechnical Engineering**		695	07-Mar-22 A	31-Dec-24		
58	**Key Deliverables**		566	07-Mar-22 A	03-Jul-24		
59	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22		KD-1150: SS 22
60	KD-2015	P1A Geotechnical Investigations & Reports	363	21-Jul-22	04-Jan-24	GWP-1300: FF, GWP-1200: FF, GWP-1100: SS	
61	KD-2025	P1B Geotechnical Investigations & Reports	249	07-Jul-23	03-Jul-24	GWP-1400: FF, GWP-1300: SS	
62	**Geotechnical Investigations**		618	21-Jul-22	31-Dec-24		
63	GWP-1100	Geotechnical Work Package #1 (Q3 &4 2022)	114	21-Jul-22	05-Jan-23	CVFPB-120: FS, 1600-120: FF 30, 401-120: FF 30, EIR-230: FS, LAAY-1100: FS, LAAG-1100: FS, LAAC-1100: FS	GWP-1200: FS, KD-2015: SS
64	GWP-1200	Geotechnical Work Package #2 (Q1 & 2 2023)	126	06-Jan-23	06-Jul-23	LAAY-1200: FS, LAAG-1200: FS, GWP-1100: FS, LAAC-1200: FS	KD-2015: FF, GWP-1300: FS
65	GWP-1300	Geotechnical Work Package #3 (Q3 &4 2023)	123	07-Jul-23	04-Jan-24	LAAY-1300: FS, LAAG-1300: FS, LAAC-1300: FS, GWP-1200: FS	EIR-260: FF, KD-2025: SS, KD-2015: FF, GWP-1400: FS
66	GWP-1400	Geotechnical Work Package #4 (Q1 & 2 2024)	126	05-Jan-24	03-Jul-24	LAAY-1400: FS, LAAG-1400: FS, LAAC-1400: FS, GWP-1300: FS	KD-2025: FF, GWP-1500: FS, CU-1000: FF 6
67	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	129	04-Jul-24	31-Dec-24	EIR-630: FS, LAAG-1500: FS, LAAC-1500: FS, GWP-1400: FS	MS-5000: FF
68	**Preliminary Engineering**		507	05-Jul-22	11-Jul-24		



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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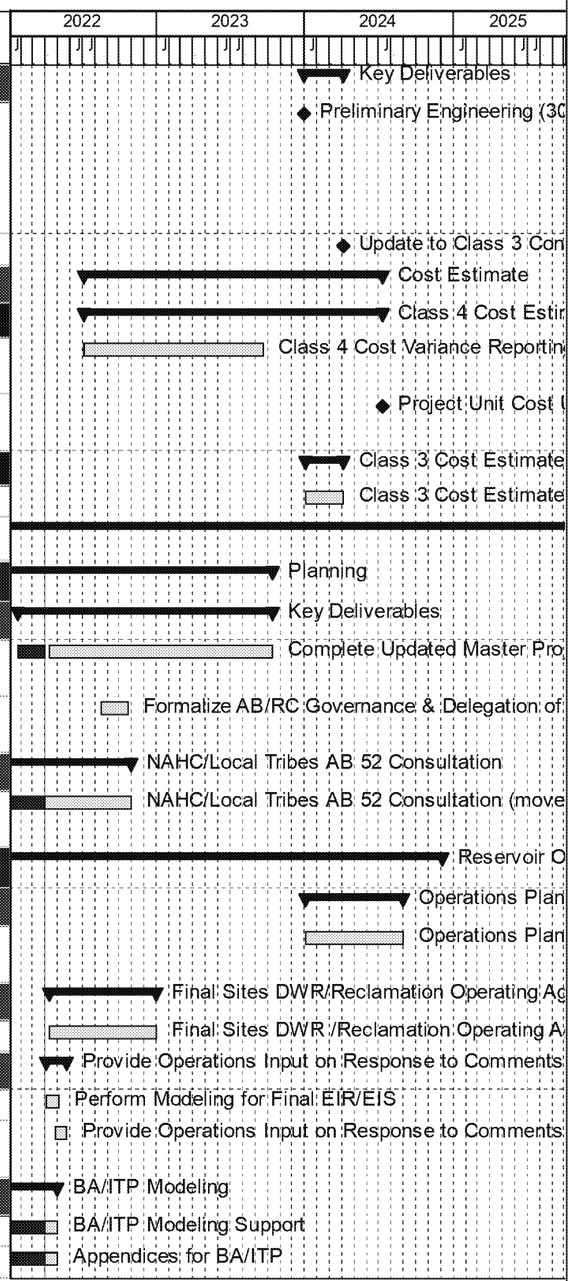
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
69	**Key Deliverables**		65	29-Dec-23	03-Apr-24		
70	KD-1180	Preliminary Engineering (30% Design Level)	0		29-Dec-23	KD-2100: FF, KD-2090: FF, KD-2080: FF, KD-2070: FF, KD-2060: FF, KD-2050: FF, KD-2040: FF, KD-2030: FF, KD-2020: FF, KD-2010: FF, KD-1650: FF, KD-1640: FS, KD-1660: FF, KD-1630: FF, MS-1000: SS	C3E-1000: FS
71	KD-1190	Update to Class 3 Construction Cost Estimate	0		03-Apr-24	C3E-1000: FF	MS-5000: FF
72	**Cost Estimate**		507	05-Jul-22	11-Jul-24		
73	**Class 4 Cost Estimate Variance Reporting**		507	05-Jul-22	11-Jul-24		
74	C4E-1000	Class 4 Cost Variance Reporting	304	05-Jul-22	19-Sep-23	KD-1630: SS, KD-1660: SS, KD-1640: SS, KD-1650: SS	CU-1000: FF 30
75	CU-1000	Project Unit Cost Update	0		11-Jul-24	RE-1050: FF, C3E-1000: FS, C4E-1000: FF 30, GWP-1400: FF 6	MS-1500: FF
76	**Class 3 Cost Estimate**		65	02-Jan-24	03-Apr-24		
77	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	02-Jan-24	03-Apr-24	KD-1180: FS	CU-1000: FS, CE-1570: FF, KD-1190: FF
78	**Overall Project**		1774	01-Sep-20 A	19-Feb-29		
79	**Planning**		386	01-Sep-20 A	13-Oct-23		
80	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23		
81	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23	KD-1490: FF 40, KD-1460: FF 40, CS-1400: FF 40, MS-1000: SS	MS-1500: FF, MS-5000: FF
82	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	20-Oct-22	MS-1100: FS, MS-1000: SS	MS-1500: FF, MS-5000: FF
83	**NAHC/Local Tribes AB 52 Consultation**		148	01-Sep-20 A	31-Oct-22		
84	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	148	01-Sep-20 A	31-Oct-22		MS-5000: FF
85	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24		
86	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24		
87	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24	KD-1370: FS, KD-1330: FS 2, KD-1380: FS	MS-5000: FF
88	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22		
89	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22	WRP-110: FS 5, OP-1110: FS	
90	**Provide Operations Input on Response to Comments**		36	04-Apr-22	23-May-22		
91	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22	EIR-090: FS, WRP-110: FS	EIR-220: FS
92	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22	EIR-100: FS	A1220: FS
93	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22		
94	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22		2081-100: FF, OP-360: SS
95	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22	OP-450: SS	2081-100: FF



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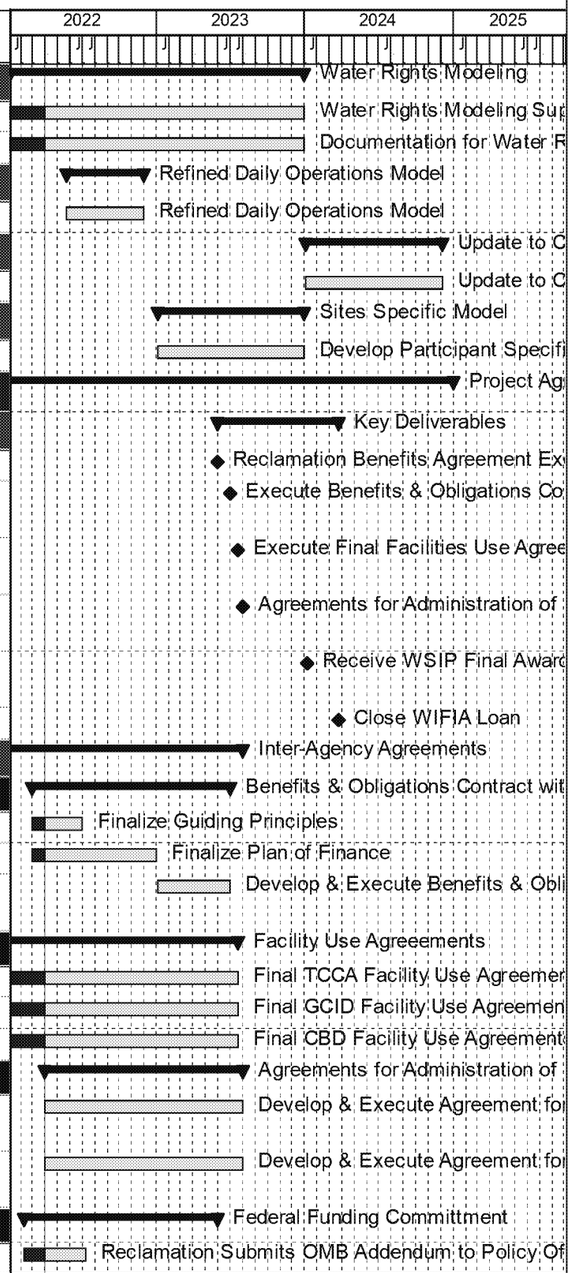
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
96	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23		
97	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23	WRP-120: FF	A1230: FS
98	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23		A1230: FS
99	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22		
100	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22	FO-1080: FS	OS-1150: FS
101	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24		
102	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24	A1200: FS, A1210: FS, OS-1150: FS	MS-5000: FF
103	**Sites Specific Model**		258	03-Jan-23	28-Dec-23		
104	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23	A1220: FS, WRP-120: FF	A1230: FS, MS-5000: FF
105	**Project Agreements & Funding**		695	01-Jun-21 A	31-Dec-24		
106	**Key Deliverables**		202	01-Jun-23	25-Mar-24		
107	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23	WIIN-1170: FF, WIIN-1140: FS	KD-1300: FF
108	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23	KD-1260: FF, BO-1300: FF, WIIN-1170: FF	MS-5000: FF
109	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23	FED-090: FF, FO-1040: FF, FO-1030: FF, FO-1020: FF	MS-5000: FF
110	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23	PB-1200: FF, PB-1100: FF	KD-1310: FF 45
111	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24	EIR-450: FF, EIR-380: FF, KD-1520: FF 45, MS-1400: FF 5	MS-5000: FF
112	KD-2600	Close WIFIA Loan	0		25-Mar-24	WIFIA-220: FF 5, WIFIA-210: FF 5	MS-1600: FF, MS-5000: FF
113	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23		
114	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23		
115	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22		BO-1200: FF
116	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22	BO-1100: FF	BO-1300: FS
117	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants	125	03-Jan-23	29-Jun-23	BO-1200: FS	KD-1300: FF
118	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23		
119	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
120	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
121	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
122	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23		
123	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23	MS-1000: SS	KD-1520: FF, MS-5000: FF
124	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23		KD-1520: FF
125	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23		
126	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22		WIIN-1180: FS, WIIN-1160: FF



Remaining Level of Effort
Actual Level of Effort
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Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites with Geo / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
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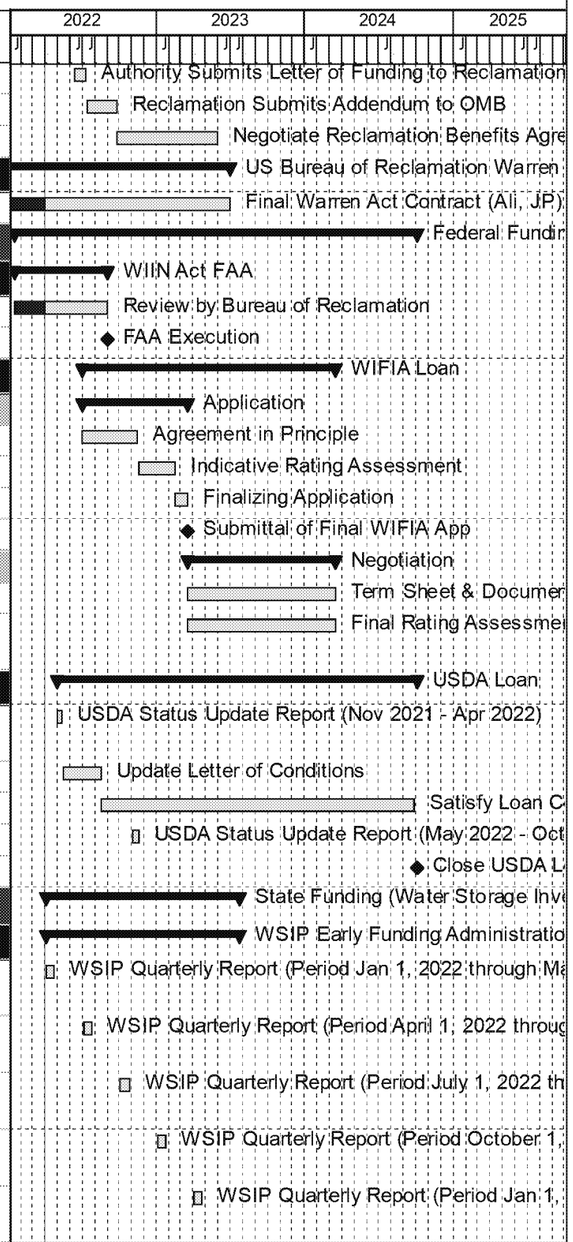
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
127	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22	WIIN-1150: FF	WIIN-1180: FS
128	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22	WIIN-1160: FS, WIIN-1150: FS	WIIN-1170: FS
129	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23	WIIN-1180: FS	KD-1260: FF, KD-1300: FF
130	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23		
131	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23	EIR-450: FF	KD-1230: FF
132	**Federal Funding**		631	17-Jan-22 A	02-Oct-24		
133	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22		
134	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22		WIIN-1140: FS
135	WIIN-1140	FAA Execution	0		31-Aug-22	WIIN-1120: FS	KD-1260: FS
136	**WIFIA Loan**		426	01-Jul-22	18-Mar-24		
137	**Application**		176	01-Jul-22	20-Mar-23		
138	WIFIA-110	Agreement in Principle	95	01-Jul-22	16-Nov-22	FC-1250: FS, WIFIA-005: FS 58	WIFIA-120: FS
139	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23	WIFIA-110: FS	WIFIA-130: FS
140	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23	WIFIA-120: FS	WIFIA-140: FF 1
141	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23	WIFIA-130: FF 1	WIFIA-210: FS, BF-1100: SS
142	**Negotiation**		250	20-Mar-23	18-Mar-24		
143	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24	MS-1400: FF, WIFIA-140: FS	KD-2600: FF 5, WIFIA-220: SS
144	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24	WIFIA-210: SS	KD-2600: FF 5
145	**USDA Loan**		610	02-May-22	02-Oct-24		
146	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22	USDA-1020: FS 105	USDA-1050: FS, MS-1300: FF, USDA-1040: FS 120
147	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22	USDA-1030: FS	USDA-1060: FS
148	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24	USDA-1050: FS	MS-5000: FF, USDA-1070: FF 5
149	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22	USDA-1030: FS 120	USDA-1070: FS
150	USDA-1070	Close USDA Loan	0		02-Oct-24	USDA-1040: FS, USDA-1060: FF 5	MS-5000: FF
151	**State Funding (Water Storage Investment Program, W**		329	04-Apr-22	25-Jul-23		
152	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23		
153	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22	MS-1000: SS 90	WSIP-1220: FS 50
154	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22	WSIP-1210: FS 50	WSIP-1230: FS 47
155	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22	WSIP-1220: FS 47	WSIP-1240: FS 45
156	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23	WSIP-1230: FS 45	WSIP-1250: FS 47
157	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23	WSIP-1240: FS 47	WSIP-1260: FS 50



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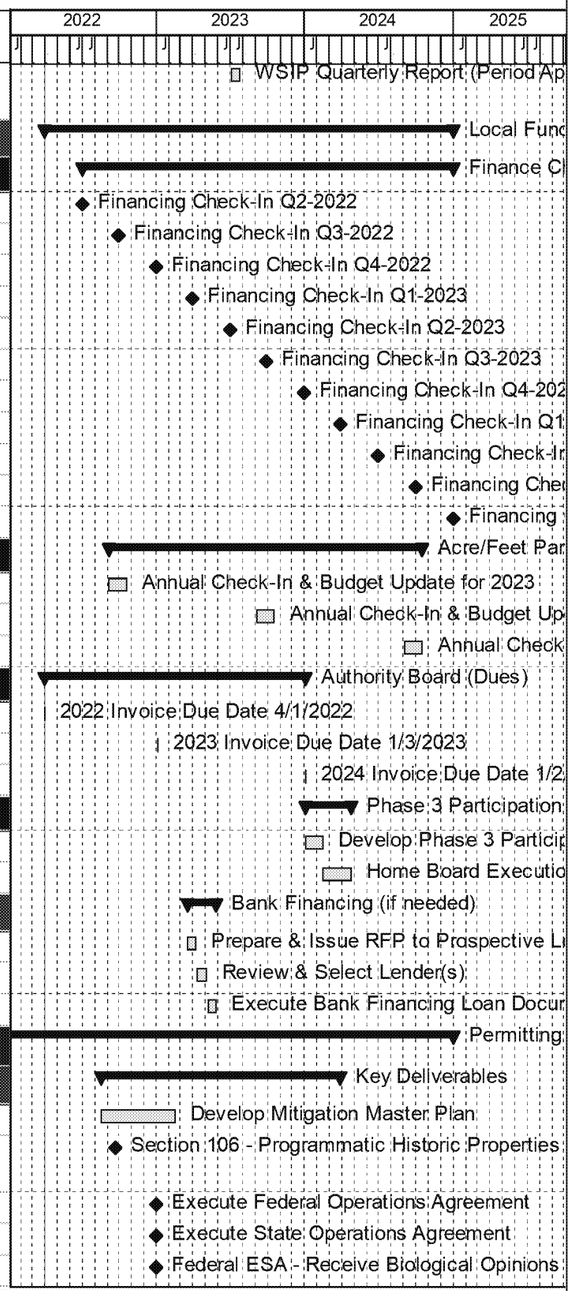
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Schedule

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158	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23	WSIP-1250: FS 50	MS-5000: FF
159	**Local Funding**		695	01-Apr-22	31-Dec-24		
160	**Finance Check-Ins**		631	30-Jun-22	31-Dec-24		
161	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22*		FC-1260: FF 64, WIFIA-110: FS
162	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22	FC-1250: FF 64	FC-1270: FF 60
163	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22	FC-1260: FF 60	FC-1280: FF 62
164	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23	FC-1270: FF 62	FC-1290: FF 64
165	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23	FC-1280: FF 64	FC-1300: FF 63
166	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23	FC-1290: FF 63	FC-1310: FF 60
167	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23	FC-1300: FF 60	FC-1320: FF 62
168	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24	FC-1310: FF 62	FC-1330: FF 64
169	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24	FC-1320: FF 64	FC-1340: FF 66
170	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24	FC-1330: FF 66	FC-1350: FS 66
171	FC-1350	Financing Check-In Q4-2024	0		31-Dec-24	FC-1340: FS 66	MS-5000: FF
172	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24		
173	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22	MS-1000: SS 245	AF-1200: FS 220
174	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23	AF-1100: FS 220	AF-1300: FS 220
175	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24	AF-1200: FS 220	MS-5000: FF
176	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24		
177	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22		AB-2200: FS
178	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*	AB-2100: FS	AB-2300: FS
179	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*	AB-2200: FS	MS-5000: FF
180	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24		
181	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24	MS-1400: FS 3	PA-1200: FS
182	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24	PA-1100: FS	MS-5000: FF
183	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23		
184	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23	WIFIA-140: SS	BF-1200: FS
185	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23	BF-1100: FS	BF-1300: FS
186	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23	BF-1200: FS	MS-5000: FF
187	**Permitting (Ali, John, Jelica)**		695	04-Jan-21 A	31-Dec-24		
188	**Key Deliverables**		403	17-Aug-22	29-Mar-24		
189	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23	MS-1100: FS	KD-1130: FF 40, CE-1570: FS
190	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22	106-081: FF 20	MS-5000: FF
191	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
192	KD-1250	Execute State Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
193	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22	BA-120: FF, BA-220: FF	MS-5000: FF



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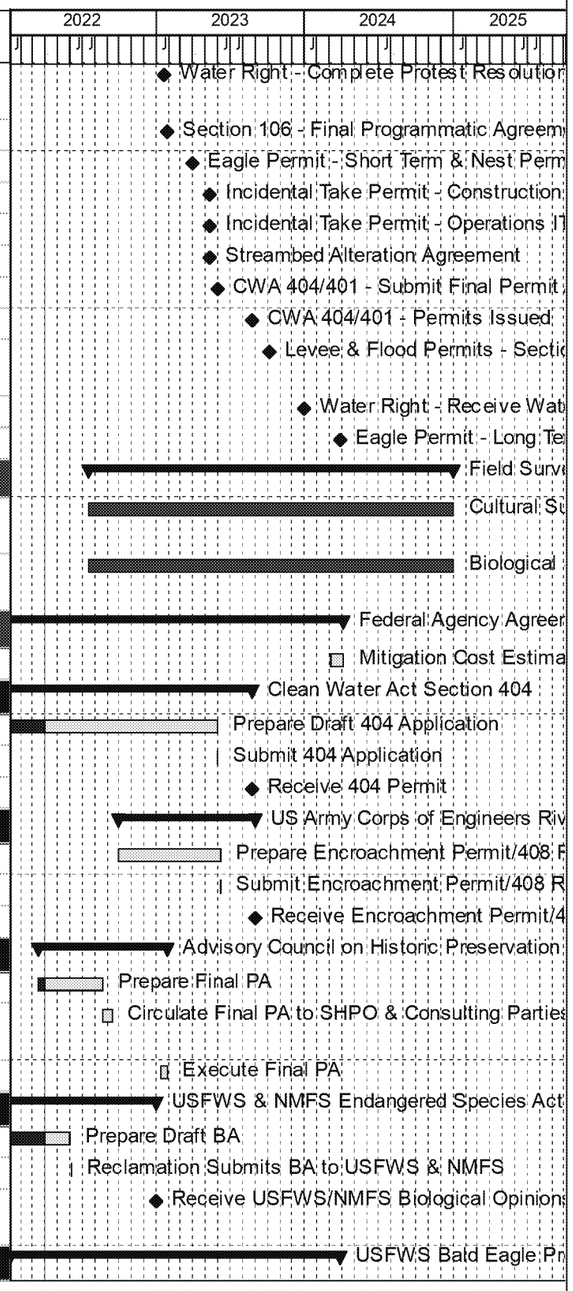
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
194	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23	WRP-110: FS 200	MS-5000: FF
195	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23	106-102: FS	MS-5000: FF
196	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23	USFWS-130: FS, MS-1000: SS	MS-5000: FF
197	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23	2081-220: FS, MS-1000: SS	KD-1510: FS
198	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23	2081-120: FS, MS-1000: SS	KD-1510: FS
199	KD-1420	Streambed Alteration Agreement	0		11-May-23	1600-220: FF	MS-5000: FF
200	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		31-May-23	404-120: FS	KD-1400: FS
201	KD-1400	CWA 404/401 - Permits Issued	0		24-Aug-23	KD-1390: FS, 404-130: FS	MS-5000: FF
202	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		05-Oct-23	CVFPB-220: FF	MS-5000: FF
203	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23	MS-1000: SS, WRP-120: FS	KD-1510: FS 2
204	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24	USFWS-160: FS, MS-1000: SS	MS-5000: FF
205	**Field Surveys**		621	18-Jul-22	31-Dec-24		
206	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
207	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
208	**Federal Agency Agreements & Permits**		502	11-Jan-21 A	03-Apr-24		
209	CE-1570	Mitigation Cost Estimate Update	20	07-Mar-24	03-Apr-24	C3E-1000: FF, KD-1460: FS	
210	**Clean Water Act Section 404**		352	04-Feb-21 A	24-Aug-23		
211	404-050	Prepare Draft 404 Application	291	04-Feb-21 A	30-May-23	EIR-250: FF 30, 404-025: SS, 404-003: I	408-150: FF, 404-120: FS
212	404-120	Submit 404 Application	1	31-May-23	31-May-23	404-050: FS	404-130: FF 60, KD-1390: FS
213	404-130	Receive 404 Permit	0		24-Aug-23	404-120: FF 60	KD-1400: FS
214	**US Army Corps of Engineers Rivers & Harbors Act Sectic**		233	28-Sep-22	01-Sep-23		
215	408-150	Prepare Encroachment Permit/408 Request	172	28-Sep-22	07-Jun-23	KD-1110: FS, 404-050: FF, EIR-450: FF	408-160: FS
216	408-160	Submit Encroachment Permit/408 Request	1	08-Jun-23	08-Jun-23	EIR-450: FS, 408-150: FS	408-170: FF 60
217	408-170	Receive Encroachment Permit/408 Permit	0		01-Sep-23	408-160: FF 60	MS-1500: FF
218	**Advisory Council on Historic Preservation NHPA Section**		204	14-Mar-22 A	25-Jan-23		
219	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22	106-072: FS	KD-1360: FF 20, 106-092: FS
220	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22	106-081: FS	106-102: FS
221	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23	EIR-250: FS, 106-092: FS	KD-1350: FS, EIR-450: FS
222	**USFWS & NMFS Endangered Species Act Section 7**		188	11-Jan-21 A	30-Dec-22		
223	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22		BA-210: FS
224	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22	BA-200: FS	BA-220: FF 210, EIR-450: FS
225	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22	BA-210: FF 210	KD-1250: FF, KD-1240: FF, KD-1340: FF, EIR-450: FS
226	**USFWS Bald Eagle Protection Act**		499	03-Jan-22 A	29-Mar-24		



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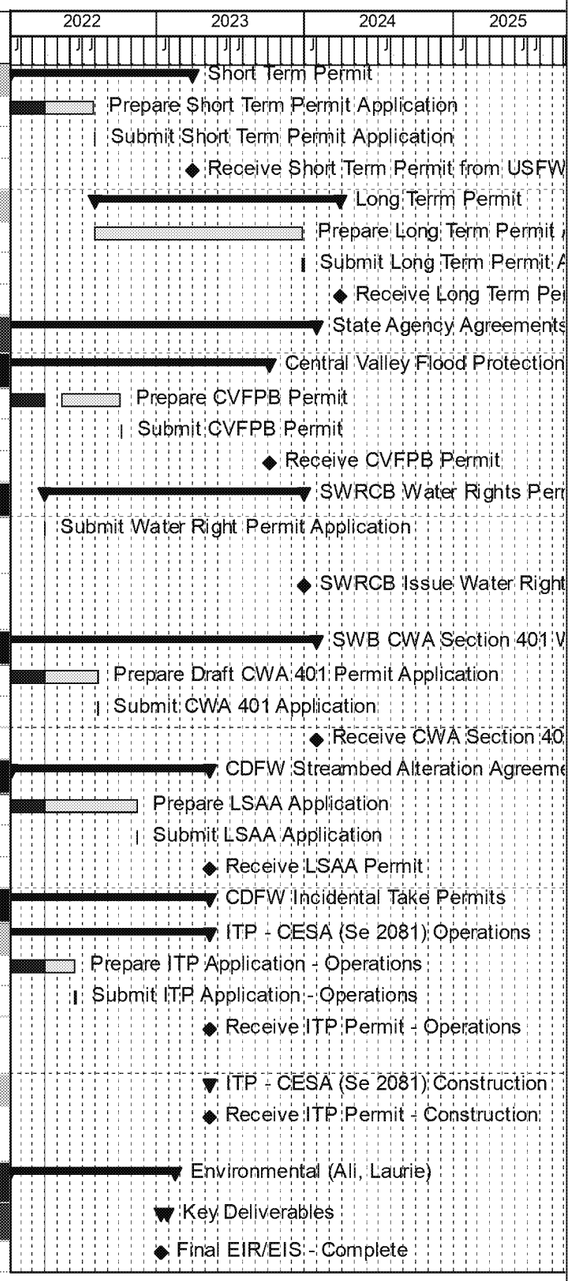
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
227		**Short Term Permit**	250	03-Jan-22 A	31-Mar-23		
228	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22		USFWS-120: FS
229	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22	USFWS-110: FS	USFWS-140: FS, USFWS-130: FF 165
230	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23	USFWS-120: FF 165	KD-1430: FS
231		**Long Terrm Permit**	414	02-Aug-22	29-Mar-24		
232	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23	USFWS-120: FS	USFWS-150: FS
233	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23	USFWS-140: FS	USFWS-160: FF 63
234	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24	USFWS-150: FF 63	MS-5000: FF, KD-1440: FS
235		**State Agency Agreements & Permits**	456	04-Jan-21 A	29-Jan-24		
236		**Central Valley Flood Protection Board (CVFPB) Levee En**	351	13-Dec-21 A	05-Oct-23		
237	CVFPB-200	Prepare CVFPB Permit	100	13-Dec-21 A	04-Oct-22	KD-1110: FF 5	CVFPB-210: FS
238	CVFPB-210	Submit CVFPB Permit	1	05-Oct-22	05-Oct-22	CVFPB-200: FS	CVFPB-220: FF 250
239	CVFPB-220	Receive CVFPB Permit	0		05-Oct-23	EIR-380: FS, CVFPB-210: FF 250	KD-1410: FF
240		**SWRCB Water Rights Permit**	436	01-Apr-22	28-Dec-23		
241	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22	WRP-100: FS	KD-1320: FS 200, WRP-120: FF 435, OP-1005: FS 5, FO-1110: FS
242	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23	EIR-380: FS, WRP-110: FF 435	A1200: FF, OS-1150: FF, MS-1400: FF, KD-1330: FS
243		**SWB CWA Section 401 Water Quality Certification**	456	04-Jan-21 A	29-Jan-24		
244	401-200	Prepare Draft CWA 401 Permit Application	90	04-Jan-21 A	08-Aug-22		401-210: FS
245	401-210	Submit CWA 401 Application	1	09-Aug-22	09-Aug-22	401-200: FS	401-220: FS 365
246	401-220	Receive CWA Section 401 Permit	0		29-Jan-24	EIR-380: FS, 401-210: FS 365	MS-5000: FF
247		**CDFW Streambed Alteration Agreements**	279	10-Jan-22 A	11-May-23		
248	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22		1600-210: FS
249	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22	1600-200: FS	1600-220: FF 121
250	1600-220	Receive LSAA Permit	0		11-May-23	EIR-380: FS, 1600-210: FF 121	2081-120: FF, KD-1420: FF
251		**CDFW Incidental Take Permits**	279	11-Jan-21 A	11-May-23		
252		**ITP - CESA (Se 2081) Operations**	279	11-Jan-21 A	11-May-23		
253	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22	OP-450: FF, OP-360: FF	2081-110: FS
254	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22	2081-100: FS	2081-120: FF 185
255	2081-120	Receive ITP Permit - Operations	0		11-May-23	EIR-380: FS, 1600-220: FF, 2081-110: FF 185	2081-220: FF, KD-1380: FS
256		**ITP - CESA (Se 2081) Construction**	0	11-May-23	11-May-23		
257	2081-220	Receive ITP Permit - Construction	0		11-May-23	EIR-380: FS, 2081-120: FF, 2081-210: FF 60	KD-1370: FS
258		**Environmental (Ali, Laurie)**	221	03-Jan-22 A	17-Feb-23		
259		**Key Deliverables**	10	10-Jan-23	25-Jan-23		
260	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23	MS-1000: SS, EIR-250: FF	KD-1480: FF 10



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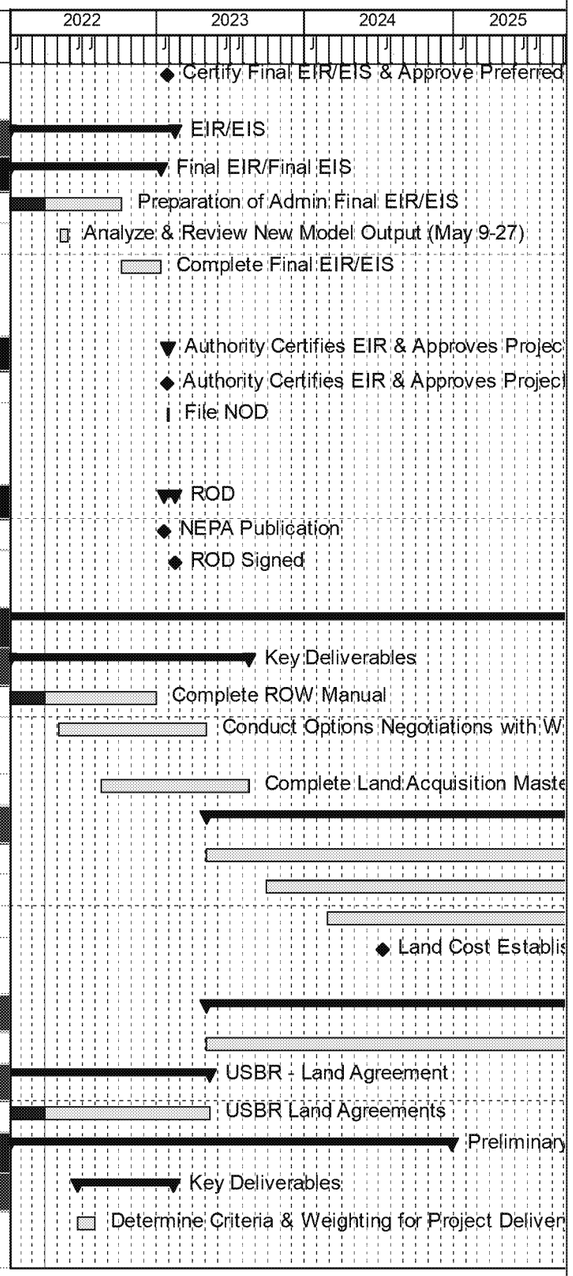
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261	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23	KD-1470: FF 10	MS-1500: FF
262	**EIR/EIS**		221	03-Jan-22 A	17-Feb-23		
263	**Final EIR/Final EIS**		194	03-Jan-22 A	10-Jan-23		
264	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22		EIR-250: FS
265	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22	FO-1110: FS	EIR-250: FS
266	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23	EIR-210: FS, EIR-220: FS	106-102: FS, 404-050: FF 30, EIR-440: FF 5, EIR-370: FF 10, MS-1200: FF, KD-1470: FF
267	**Authority Certifies EIR & Approves Project & File NOD**		5	25-Jan-23	01-Feb-23		
268	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23	EIR-250: FF 10	EIR-380: FS
269	EIR-380	File NOD	5	26-Jan-23	01-Feb-23	EIR-370: FS	KD-1310: FF, CVFPB-220: FS, 2081-220: FS, 2081-120: FS, 1600-220: FS, 401-220: FS, WRP-120: FS, EIR-450: FS
270	**ROD**		22	18-Jan-23	17-Feb-23		
271	EIR-440	NEPA Publication	0		18-Jan-23	EIR-250: FF 5	EIR-450: FS 22
272	EIR-450	ROD Signed	0		17-Feb-23	106-102: FS, BA-220: FS, BA-210: FS, EIR-380: FS, EIR-440: FS 22	KD-1310: FF, 408-150: FF, FED-100: FF, 408-160: FS, FED-090: FF, MS-1300: FS
273	**Real Estate**		1774	02-Nov-20 A	19-Feb-29		
274	**Key Deliverables**		346	03-Jan-22 A	16-Aug-23		
275	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22	MS-1000: SS	KD-1500: FF, KD-1500: SS 85
276	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23	KD-1495: FF, KD-1495: SS 85	MI-1100: FS, RE-1060: FS, RE-1070: FS, RE-1080: FS
277	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23	MS-1100: FS	KD-1130: FF 40
278	**Land Acquisition**		1500	05-May-23	19-Feb-29		
279	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29	KD-1500: FS	RE-1070: SS 100, RE-1100: SS
280	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29	KD-1500: FS, RE-1060: SS 100	RE-1080: SS 100
281	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29	KD-1500: FS, RE-1070: SS 100	
282	RE-1050	Land Cost Established	0		11-Jul-24	LAAC-1500: FF 25, LAAG-1500: FF 25, LAAY-1400: FF 25	CU-1000: FF
283	**Relocation**		1500	05-May-23	01-Feb-29		
284	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29	RE-1060: SS	
285	**USBR - Land Agreement**		278	02-Nov-20 A	10-May-23		
286	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23	EIR-450: FF, WP2-130: FS	
287	**Preliminary Engineering**		694	03-Jan-22 A	30-Dec-24		
288	**Key Deliverables**		160	21-Jun-22	10-Feb-23		
289	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22	CS-1300: FS	MS-5000: FF



Remaining Level of Effort | Remaining Work | Summary
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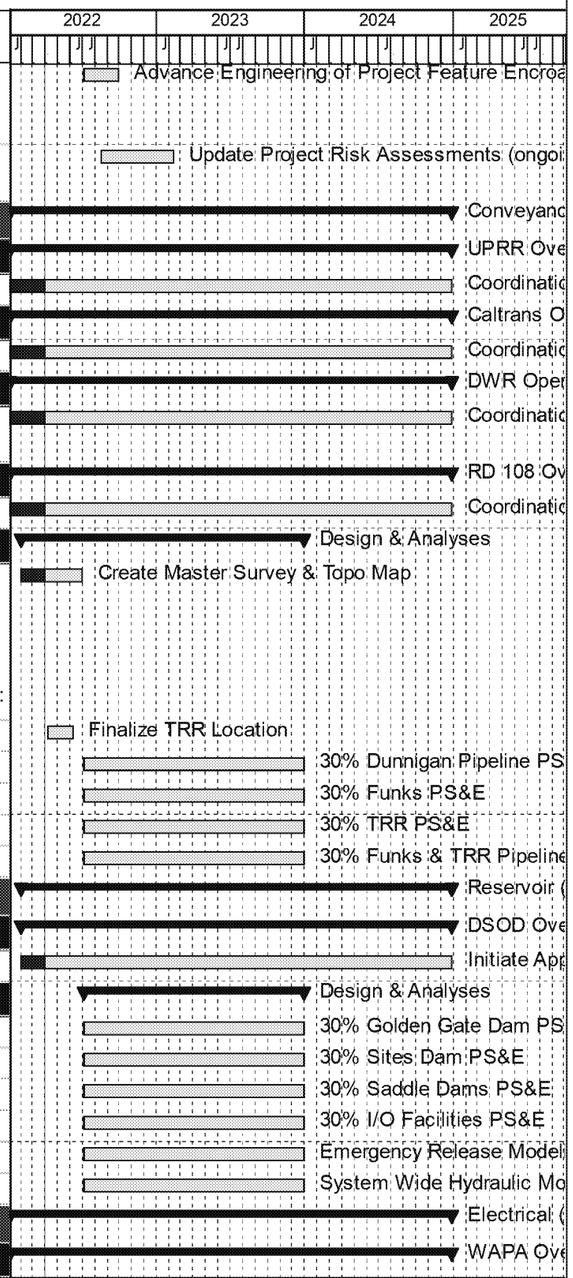
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
290	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	05-Jul-22	27-Sep-22	KD-1140: FS	CVFPB-200: FF 5, 408-150: FS, 408-135: FF
291	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	120	17-Aug-22	10-Feb-23	CS-1400: FS	MS-5000: FF
292	**Conveyance (Pipelines, Pump Stations, Canals)**		693	03-Jan-22 A	27-Dec-24		
293	**UPRR Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
294	A1110	Coordination & Oversight with UPRR	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
295	**Caltrans Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
296	A1120	Coordination & Oversight with Caltrans	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
297	**DWR Operations Oversight & Review (KLOG)**		693	03-Jan-22 A	27-Dec-24		
298	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
299	**RD 108 Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
300	A1140	Coordination & Oversight with Reclamation District 1(	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
301	**Design & Analyses**		437	01-Feb-22 A	29-Dec-23		
302	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	01-Jul-22	MS-1000: SS	KD-2100: FS, KD-2090: FS, KD-2080: FS, KD-2070: FS, KD-2060: FS, KD-2050: FS, KD-2040: FS, KD-2030: FS, KD-2020: FS, KD-2010: FS, KD-1650: FS, KD-1640: FS, KD-1200: FS, KD-1660: FS, KD-1630: FS, KD-1110: FS
303	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22	KD-2000: SS 22	KD-2020: FS
304	KD-1630	30% Dunnigan Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
305	KD-2010	30% Funks PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
306	KD-2020	30% TRR PS&E	372	05-Jul-22	29-Dec-23	KD-1150: FS, KD-1140: FS	KD-1180: FF
307	KD-2030	30% Funks & TRR Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
308	**Reservoir (Dams, Tunnels)**		694	01-Feb-22 A	30-Dec-24		
309	**DSOD Oversight & Review**		694	01-Feb-22 A	30-Dec-24		
310	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24	MS-1000: SS	MS-5000: FF
311	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
312	KD-1660	30% Golden Gate Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
313	KD-2040	30% Sites Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
314	KD-2050	30% Saddle Dams PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
315	KD-2060	30% I/O Facilities PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
316	KD-2070	Emergency Release Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
317	KD-2080	System Wide Hydraulic Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
318	**Electrical (Substation, Switchyard, Transmission Line**		694	03-Jan-22 A	30-Dec-24		
319	**WAPA Oversight & Review**		694	03-Jan-22 A	30-Dec-24		



Remaining Level of Effort | Remaining Work | Summary
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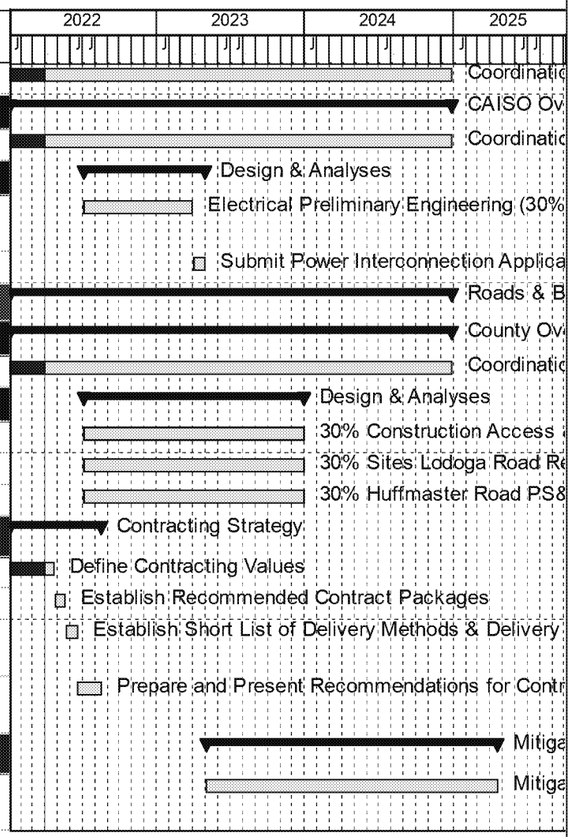
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Schedule

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320	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
321	**CAISO Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
322	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
323	**Design & Analyses**		205	05-Jul-22	28-Apr-23		
324	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	05-Jul-22	31-Mar-23	KD-1140: FS	C4E-1000: SS, KD-1180: FS, KD-1200: FS
325	KD-1200	Submit Power Interconnection Application	20	03-Apr-23	28-Apr-23	KD-1640: FS, KD-1140: FS, MS-1000: SS	MS-5000: FF
326	**Roads & Bridges**		694	03-Jan-22 A	30-Dec-24		
327	**County Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
328	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
329	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
330	KD-1650	30% Construction Access & Maintenance Roads PS	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
331	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
332	KD-2100	30% Huffmaster Road PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
333	**Contracting Strategy**		96	03-Jan-22 A	16-Aug-22		
334	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22		CS-1200: FS
335	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22	CS-1100: FS	CS-1300: FS
336	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22	CS-1200: FS	CS-1400: FS, KD-1120: FS
337	CS-1400	Prepare and Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22	CS-1300: FS	KD-1130: FF 40, MS-1100: FS, KD-1210: FS
338	**Mitigation Implementation**		500	05-May-23	21-Apr-25		
339	MI-1100	Mitigation Implementation (more information needed to expand detail)	500	05-May-23	21-Apr-25	KD-1500: FS	



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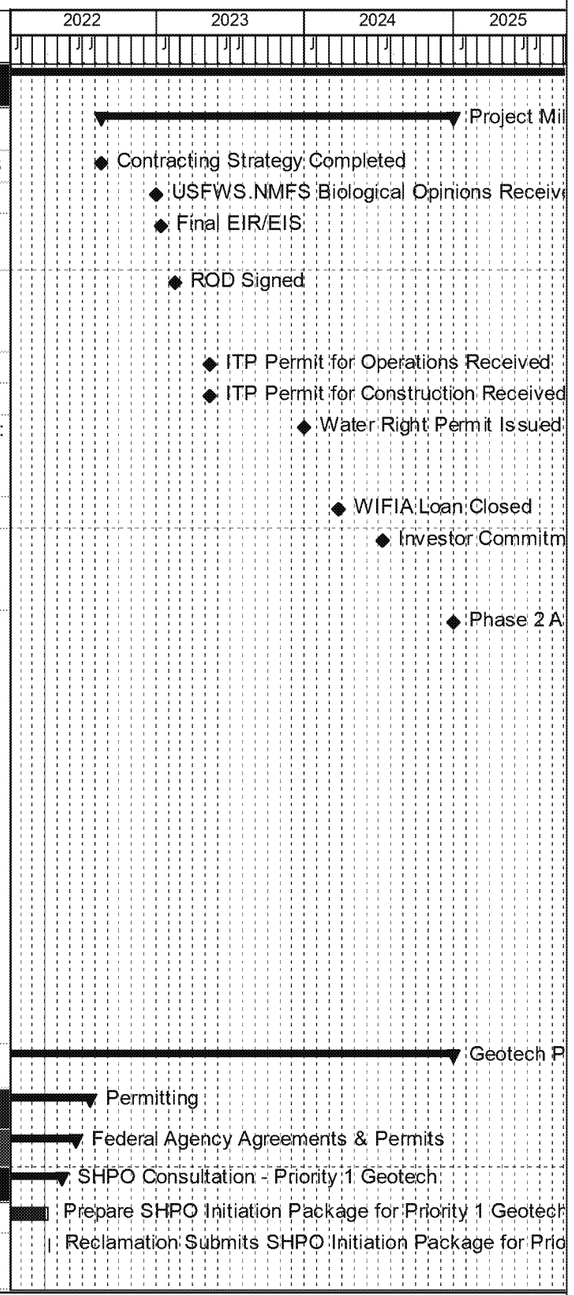
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Schedule

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1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29		
2	**Project Milestones**		599	16-Aug-22	31-Dec-24		
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22	CS-1400: FS	KD-1290: FS, KD-1490: FS, KD-1460: FS
4	MS-1150	USFWS.NMFS Biological Opinions Received	0		30-Dec-22	BA-220: FF	
5	MS-1200	Final EIR/EIS	0		10-Jan-23	MS-011-DE: FS, MS-006-Ph2-2a: FS, STA-140: FF, EIR-250: FF	ENG-460: FS, ENG-450: FS, MS-1300: FS
6	MS-1300	ROD Signed	0		17-Feb-23	USDA-1030: FF, FAA-1070: FF, REC-010: FF, FF-020: FF, MS-1200: FS, EIR-450: FS	EIR-460: FS, MS-500-CS: FS
7	MS-1320	ITP Permit for Operations Received	0		11-May-23	2081-120: FF	
8	MS-1340	ITP Permit for Construction Received	0		11-May-23	2081-220: FF	
9	MS-1400	Water Right Permit Issued	0		28-Dec-23	WRP-120: FF	WIFIA-210: FF, KD-1310: FF 5, MS-1500: FF 30, PA-1100: FS 3, MS-5000: FF, CWC-510: FF
10	MS-1600	WIFIA Loan Closed	0		25-Mar-24	KD-2600: FF	
11	MS-1500	Investor Commitment	0		11-Jul-24*	KD-1290: FF, KD-1130: FF, CU-1000: FF, MS-1400: FF 30, 408-170: FF, KD-1480: FF	
12	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*	STA-120: FF, KD-1200: FF, KD-1230: FF, KD-1290: FF, KD-1130: FF, KD-1120: FF, KD-1210: FF, GWP-1500: FF, PB-1100: FF, KD-1310: FF, KD-1300: FF, AB-2300: FF, PA-1200: FF, BF-1300: FF, KD-1240: FF, KD-1250: FF, KD-1320: FF, KD-1360: FF, KD-1340: FF, KD-1350: FF, KD-1430: FF, KD-1410: FF, KD-1400: FF, RE-1030: FF, RE-1040: FF, A1230: FF, A1110: FF, A1120: FF, A1130: FF, A1140: FF, KD-1100: FF, A1150: FF, A1160: FF, A1170: FF, KD-1190: FF, USFWS-160: FF, KD-1420: FF, KD-1440: FF, AF-1300: FF, FC-1350: FF, USDA-1060: FF, KD-2600: FF, KD-1510: FF, OS-1150: FF, MS-1400: FF, USDA-1070: FF, WSIP-1260: FF, 401-220: FF	
13	**Geotech Program**		695	01-Mar-21 A	31-Dec-24		
14	**Permitting**		77	01-Mar-21 A	20-Jul-22		
15	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22		
16	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22		
17	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geote	6	02-Aug-21 A	08-Apr-22		SHPO-250: FS
18	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22	SHPO-240: FS	SHPO-260: FF 22



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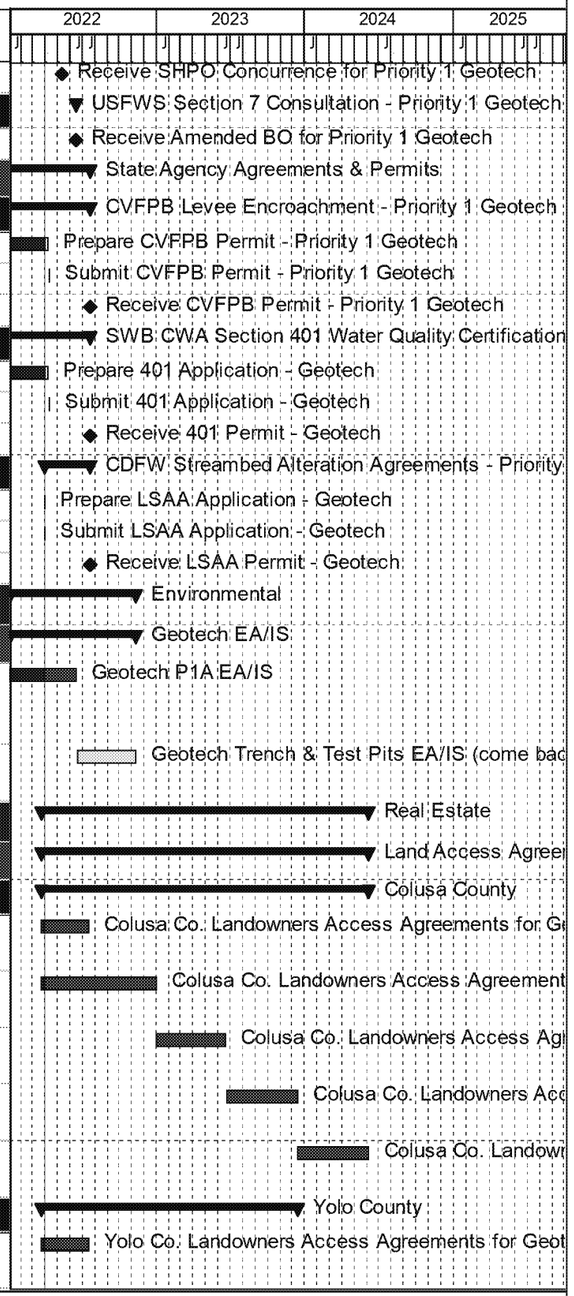
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Schedule

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19	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22	SHPO-250: FF 22	EA-200: FF
20	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22		
21	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22	BA-110: FF 85	EA-200: FF, KD-1340: FF
22	**State Agency Agreements & Permits**		77	01-Mar-21 A	20-Jul-22		
23	**CVFPB Levee Encroachment - Priority 1 Geotech**		77	01-Nov-21 A	20-Jul-22		
24	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22		CVFPB-110: FS
25	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22	CVFPB-100: FS	CVFPB-120: FF 60
26	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		20-Jul-22	EA-200: FF 22, CVFPB-110: FF 60	GWP-1100: FS
27	**SWB CWA Section 401 Water Quality Certification - Priori**		77	01-Mar-21 A	20-Jul-22		
28	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22	WP2-130: FS	401-110: FS
29	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22	401-100: FS	401-120: FS 45
30	401-120	Receive 401 Permit - Geotech	0		20-Jul-22	EA-200: FF 22, 401-110: FS 45	GWP-1100: FF 30
31	**CDFW Streambed Alteration Agreements - Priority 1 Geot**		77	01-Apr-22	20-Jul-22		
32	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22*	01-Apr-22		1600-110: FS
33	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22	1600-100: FS	1600-120: FF 60
34	1600-120	Receive LSAA Permit - Geotech	0		20-Jul-22	EA-200: FF 22, 1600-110: FF 60	GWP-1100: FF 30
35	**Environmental**		155	03-Jan-22 A	09-Nov-22		
36	**Geotech EA/IS**		155	03-Jan-22 A	09-Nov-22		
37	EA-200	Geotech P1A EA/IS	55	03-Jan-22 A	17-Jun-22	BA-120: FF, SHPO-260: FF	1600-120: FF 22, 401-120: FF 22, CVFPB-120: FF 22, GWP-1100: FS, EA-220: FS
38	EA-220	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	20-Jun-22	09-Nov-22	EA-200: FS	GWP-1500: FS
39	**Real Estate**		547	22-Mar-22 A	06-Jun-24		
40	**Land Access Agreements**		547	22-Mar-22 A	06-Jun-24		
41	**Colusa County**		547	22-Mar-22 A	06-Jun-24		
42	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAC-1200: SS, GWP-1100: FS
43	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAC-1100: SS	LAAC-1300: FS, GWP-1200: FS
44	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAC-1200: FS	LAAC-1400: FS, GWP-1300: FS
45	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAC-1300: FS	LAAC-1500: FS, GWP-1400: FS
46	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAC-1400: FS	RE-1050: FF 25, GWP-1500: FS
47	**Yolo County**		427	22-Mar-22 A	14-Dec-23		
48	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAY-1200: SS, GWP-1100: FS



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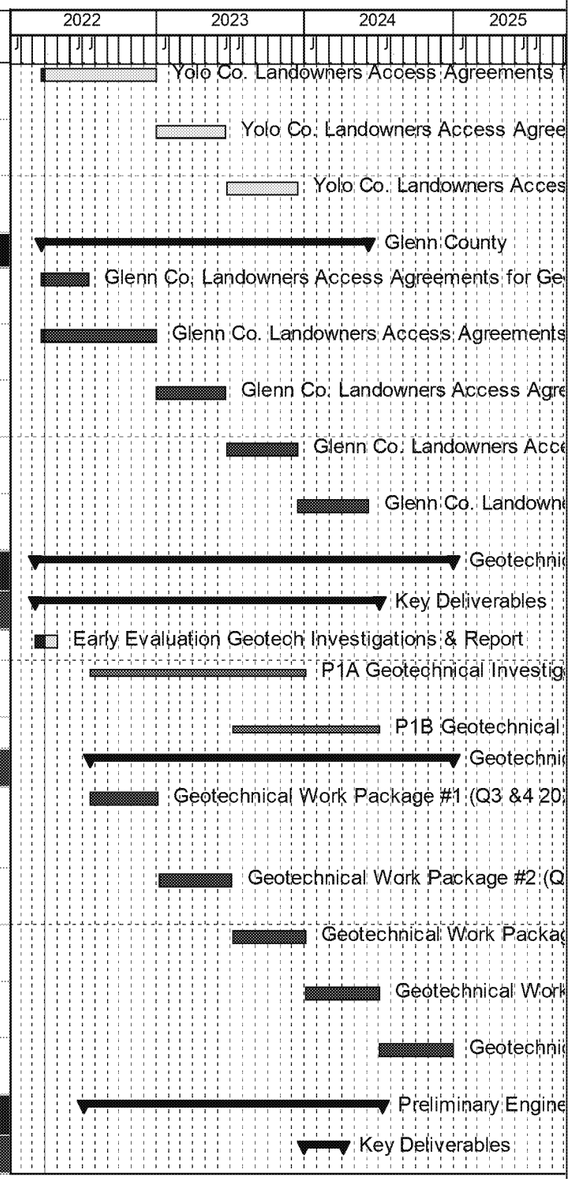
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49	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAY-1100: SS	LAAY-1300: FS, GWP-1200: FS
50	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAY-1200: FS	LAAY-1400: FS, GWP-1300: FS
51	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAY-1300: FS	GWP-1400: FS, RE-1050: FF 25
52	**Glenn County**		547	22-Mar-22 A	06-Jun-24		
53	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAG-1200: SS, GWP-1100: FS
54	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAG-1100: SS	LAAG-1300: FS, GWP-1200: FS
55	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAG-1200: FS	LAAG-1400: FS, GWP-1300: FS
56	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAG-1300: FS	LAAG-1500: FS, GWP-1400: FS
57	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAG-1400: FS	RE-1050: FF 25, GWP-1500: FS
58	**Geotechnical Engineering**		695	07-Mar-22 A	31-Dec-24		
59	**Key Deliverables**		566	07-Mar-22 A	03-Jul-24		
60	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22		KD-1150: SS 22
61	KD-2015	P1A Geotechnical Investigations & Reports	363	21-Jul-22	04-Jan-24	GWP-1300: FF, GWP-1200: FF, GWP-1100: SS	
62	KD-2025	P1B Geotechnical Investigations & Reports	249	07-Jul-23	03-Jul-24	GWP-1400: FF, GWP-1300: SS	
63	**Geotechnical Investigations**		618	21-Jul-22	31-Dec-24		
64	GWP-1100	Geotechnical Work Package #1 (Q3 &4 2022)	114	21-Jul-22	05-Jan-23	CVFPB-120: FS, 1600-120: FF 30, 401-120: FF 30, EA-200: FS, LAAY-1100: FS, LAAG-1100: FS, LAAC-1100: FS	GWP-1200: FS, KD-2015: SS
65	GWP-1200	Geotechnical Work Package #2 (Q1 & 2 2023)	126	06-Jan-23	06-Jul-23	LAAY-1200: FS, LAAG-1200: FS, GWP-1100: FS, LAAC-1200: FS	KD-2015: FF, GWP-1300: FS
66	GWP-1300	Geotechnical Work Package #3 (Q3 &4 2023)	123	07-Jul-23	04-Jan-24	LAAY-1300: FS, LAAG-1300: FS, LAAC-1300: FS, GWP-1200: FS	KD-2025: SS, KD-2015: FF, GWP-1400: FS
67	GWP-1400	Geotechnical Work Package #4 (Q1 & 2 2024)	126	05-Jan-24	03-Jul-24	LAAY-1400: FS, LAAG-1400: FS, LAAC-1400: FS, GWP-1300: FS	KD-2025: FF, GWP-1500: FS, CU-1000: FF 6
68	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	129	04-Jul-24	31-Dec-24	EA-220: FS, LAAG-1500: FS, LAAC-1500: FS, GWP-1400: FS	MS-5000: FF
69	**Preliminary Engineering**		507	05-Jul-22	11-Jul-24		
70	**Key Deliverables**		65	29-Dec-23	03-Apr-24		



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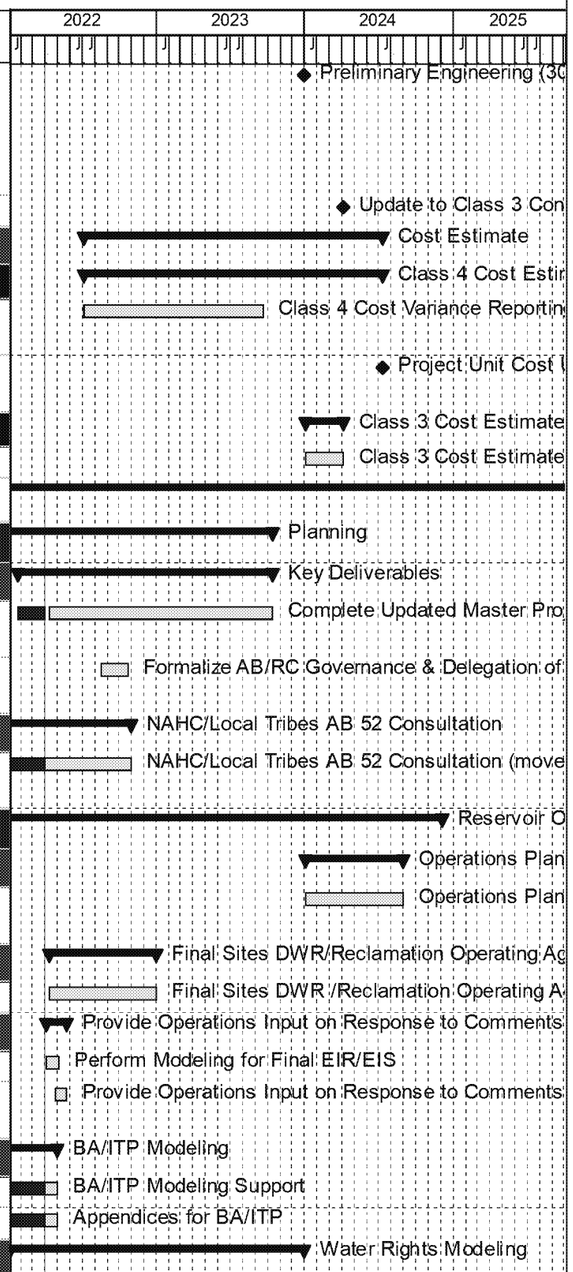
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
71	KD-1180	Preliminary Engineering (30% Design Level)	0		29-Dec-23	KD-2100: FF, KD-2090: FF, KD-2080: FF, KD-2070: FF, KD-2060: FF, KD-2050: FF, KD-2040: FF, KD-2030: FF, KD-2020: FF, KD-2010: FF, KD-1650: FF, KD-1640: FS, KD-1660: FF, KD-1630: FF, MS-1000: SS	C3E-1000: FS
72	KD-1190	Update to Class 3 Construction Cost Estimate	0		03-Apr-24	C3E-1000: FF	MS-5000: FF
73	**Cost Estimate**		507	05-Jul-22	11-Jul-24		
74	**Class 4 Cost Estimate Variance Reporting**		507	05-Jul-22	11-Jul-24		
75	C4E-1000	Class 4 Cost Variance Reporting	304	05-Jul-22	19-Sep-23	KD-1630: SS, KD-1660: SS, KD-1640: SS, KD-1650: SS	CU-1000: FF 30
76	CU-1000	Project Unit Cost Update	0		11-Jul-24	RE-1050: FF, C3E-1000: FS, C4E-1000: FF 30, GWP-1400: FF 6	MS-1500: FF
77	**Class 3 Cost Estimate**		65	02-Jan-24	03-Apr-24		
78	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	02-Jan-24	03-Apr-24	KD-1180: FS	CU-1000: FS, CE-1570: FF, KD-1190: FF
79	**Overall Project**		1774	01-Sep-20 A	19-Feb-29		
80	**Planning**		386	01-Sep-20 A	13-Oct-23		
81	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23		
82	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23	KD-1490: FF 40, KD-1460: FF 40, CS-1400: FF 40, MS-1000: SS	MS-1500: FF, MS-5000: FF
83	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	20-Oct-22	MS-1100: FS, MS-1000: SS	MS-1500: FF, MS-5000: FF
84	**NAHC/Local Tribes AB 52 Consultation**		148	01-Sep-20 A	31-Oct-22		
85	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	148	01-Sep-20 A	31-Oct-22		MS-5000: FF
86	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24		
87	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24		
88	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24	KD-1370: FS, KD-1330: FS 2, KD-1380: FS	MS-5000: FF
89	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22		
90	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22	WRP-110: FS 5, OP-1110: FS	
91	**Provide Operations Input on Response to Comments**		36	04-Apr-22	23-May-22		
92	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22	EIR-090: FS, WRP-110: FS	EIR-220: FS
93	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22	EIR-100: FS	A1220: FS
94	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22		
95	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22		2081-100: FF, OP-360: SS
96	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22	OP-450: SS	2081-100: FF
97	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23		



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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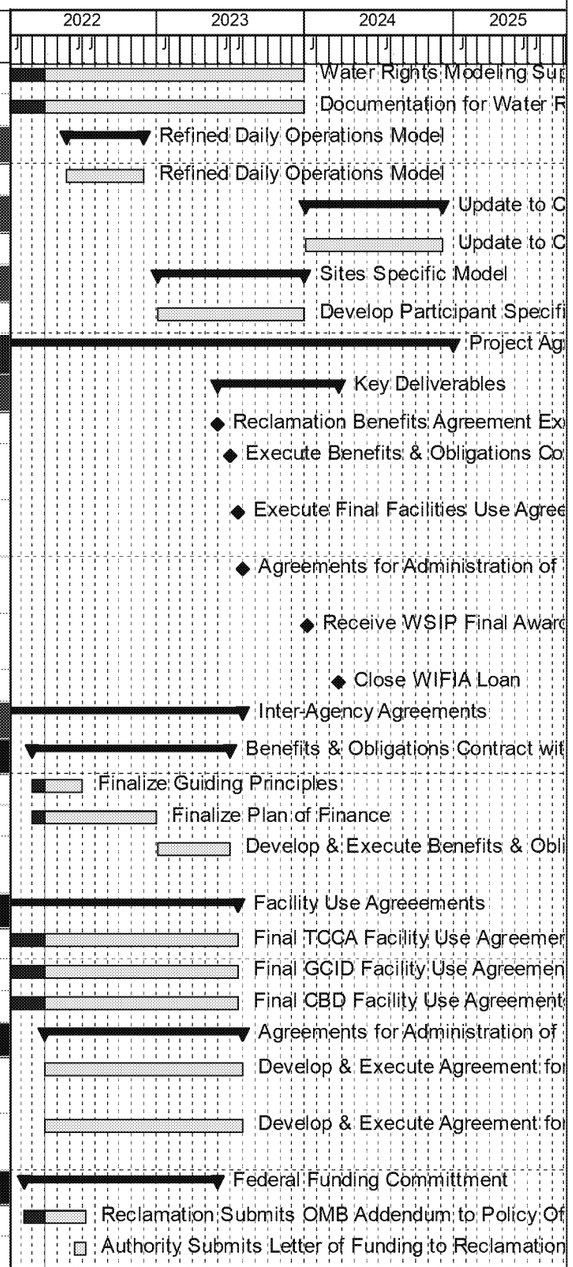
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
98	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23	WRP-120: FF	A1230: FS
99	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23		A1230: FS
100	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22		
101	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22	FO-1080: FS	OS-1150: FS
102	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24		
103	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24	A1200: FS, A1210: FS, OS-1150: FS	MS-5000: FF
104	**Sites Specific Model**		258	03-Jan-23	28-Dec-23		
105	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23	A1220: FS, WRP-120: FF	A1230: FS, MS-5000: FF
106	**Project Agreements & Funding**		695	01-Jun-21 A	31-Dec-24		
107	**Key Deliverables**		202	01-Jun-23	25-Mar-24		
108	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23	WIIN-1170: FF, WIIN-1140: FS	KD-1300: FF
109	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23	KD-1260: FF, BO-1300: FF, WIIN-1170: FF	MS-5000: FF
110	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23	FED-090: FF, FO-1040: FF, FO-1030: FF, FO-1020: FF	MS-5000: FF
111	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23	PB-1200: FF, PB-1100: FF	KD-1310: FF 45
112	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24	EIR-450: FF, EIR-380: FF, KD-1520: FF 45, MS-1400: FF 5	MS-5000: FF
113	KD-2600	Close WIFIA Loan	0		25-Mar-24	WIFIA-220: FF 5, WIFIA-210: FF 5	MS-1600: FF, MS-5000: FF
114	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23		
115	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23		
116	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22		BO-1200: FF
117	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22	BO-1100: FF	BO-1300: FS
118	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants	125	03-Jan-23	29-Jun-23	BO-1200: FS	KD-1300: FF
119	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23		
120	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
121	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
122	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
123	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23		
124	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23	MS-1000: SS	KD-1520: FF, MS-5000: FF
125	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23		KD-1520: FF
126	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23		
127	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22		WIIN-1180: FS, WIIN-1160: FF
128	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22	WIIN-1150: FF	WIIN-1180: FS



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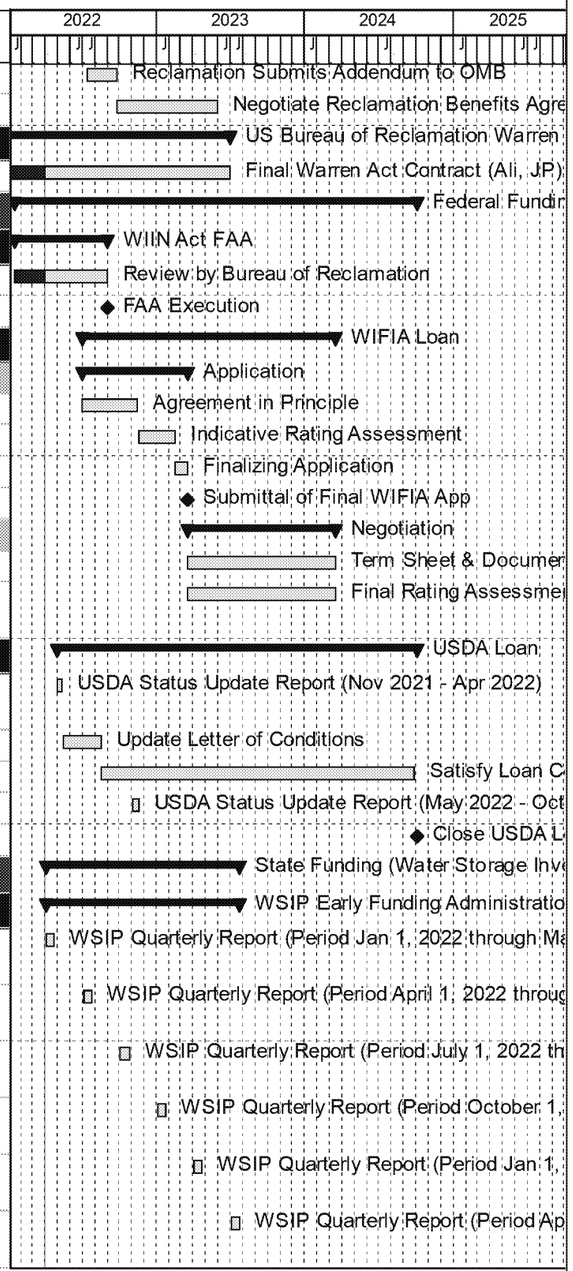
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
129	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22	WIIN-1160: FS, WIIN-1150: FS	WIIN-1170: FS
130	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23	WIIN-1180: FS	KD-1260: FF, KD-1300: FF
131	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23		
132	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23	EIR-450: FF	KD-1230: FF
133	**Federal Funding**		631	17-Jan-22 A	02-Oct-24		
134	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22		
135	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22		WIIN-1140: FS
136	WIIN-1140	FAA Execution	0		31-Aug-22	WIIN-1120: FS	KD-1260: FS
137	**WIFIA Loan**		426	01-Jul-22	18-Mar-24		
138	**Application**		176	01-Jul-22	20-Mar-23		
139	WIFIA-110	Agreement in Principle	95	01-Jul-22	16-Nov-22	FC-1250: FS, WIFIA-005: FS 58	WIFIA-120: FS
140	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23	WIFIA-110: FS	WIFIA-130: FS
141	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23	WIFIA-120: FS	WIFIA-140: FF 1
142	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23	WIFIA-130: FF 1	WIFIA-210: FS, BF-1100: SS
143	**Negotiation**		250	20-Mar-23	18-Mar-24		
144	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24	MS-1400: FF, WIFIA-140: FS	KD-2600: FF 5, WIFIA-220: SS
145	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24	WIFIA-210: SS	KD-2600: FF 5
146	**USDA Loan**		610	02-May-22	02-Oct-24		
147	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22	USDA-1020: FS 105	USDA-1050: FS, MS-1300: FF, USDA-1040: FS 120
148	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22	USDA-1030: FS	USDA-1060: FS
149	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24	USDA-1050: FS	MS-5000: FF, USDA-1070: FF 5
150	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22	USDA-1030: FS 120	USDA-1070: FS
151	USDA-1070	Close USDA Loan	0		02-Oct-24	USDA-1040: FS, USDA-1060: FF 5	MS-5000: FF
152	**State Funding (Water Storage Investment Program, W**		329	04-Apr-22	25-Jul-23		
153	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23		
154	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22	MS-1000: SS 90	WSIP-1220: FS 50
155	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22	WSIP-1210: FS 50	WSIP-1230: FS 47
156	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22	WSIP-1220: FS 47	WSIP-1240: FS 45
157	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23	WSIP-1230: FS 45	WSIP-1250: FS 47
158	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23	WSIP-1240: FS 47	WSIP-1260: FS 50
159	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23	WSIP-1250: FS 50	MS-5000: FF



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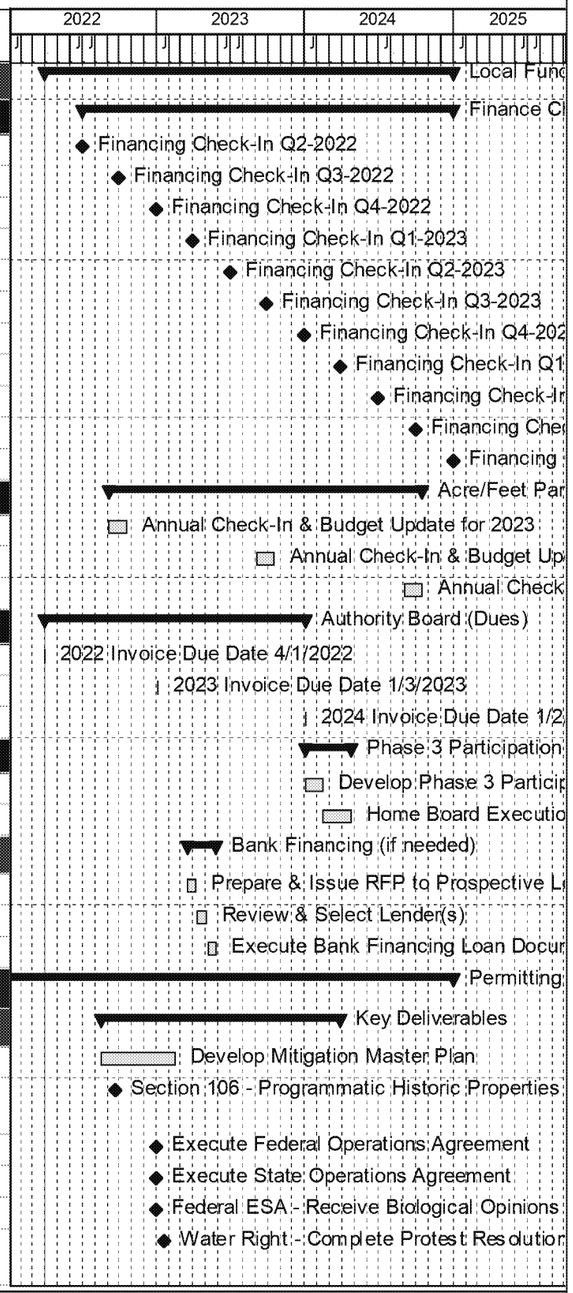
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
160	**Local Funding**		695	01-Apr-22	31-Dec-24		
161	**Finance Check-Ins**		631	30-Jun-22	31-Dec-24		
162	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22*		FC-1260: FF 64, WIFIA-110: FS
163	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22	FC-1250: FF 64	FC-1270: FF 60
164	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22	FC-1260: FF 60	FC-1280: FF 62
165	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23	FC-1270: FF 62	FC-1290: FF 64
166	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23	FC-1280: FF 64	FC-1300: FF 63
167	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23	FC-1290: FF 63	FC-1310: FF 60
168	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23	FC-1300: FF 60	FC-1320: FF 62
169	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24	FC-1310: FF 62	FC-1330: FF 64
170	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24	FC-1320: FF 64	FC-1340: FF 66
171	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24	FC-1330: FF 66	FC-1350: FS 66
172	FC-1350	Financing Check-In Q4-2024	0		31-Dec-24	FC-1340: FS 66	MS-5000: FF
173	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24		
174	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22	MS-1000: SS 245	AF-1200: FS 220
175	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23	AF-1100: FS 220	AF-1300: FS 220
176	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24	AF-1200: FS 220	MS-5000: FF
177	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24		
178	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22		AB-2200: FS
179	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*	AB-2100: FS	AB-2300: FS
180	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*	AB-2200: FS	MS-5000: FF
181	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24		
182	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24	MS-1400: FS 3	PA-1200: FS
183	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24	PA-1100: FS	MS-5000: FF
184	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23		
185	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23	WIFIA-140: SS	BF-1200: FS
186	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23	BF-1100: FS	BF-1300: FS
187	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23	BF-1200: FS	MS-5000: FF
188	**Permitting (Ali, John, Jelica)**		695	04-Jan-21 A	31-Dec-24		
189	**Key Deliverables**		403	17-Aug-22	29-Mar-24		
190	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23	MS-1100: FS	KD-1130: FF 40, CE-1570: FS
191	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22	106-081: FF 20	MS-5000: FF
192	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
193	KD-1250	Execute State Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
194	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22	BA-120: FF, BA-220: FF	MS-5000: FF
195	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23	WRP-110: FS 200	MS-5000: FF



Remaining Level of Effort
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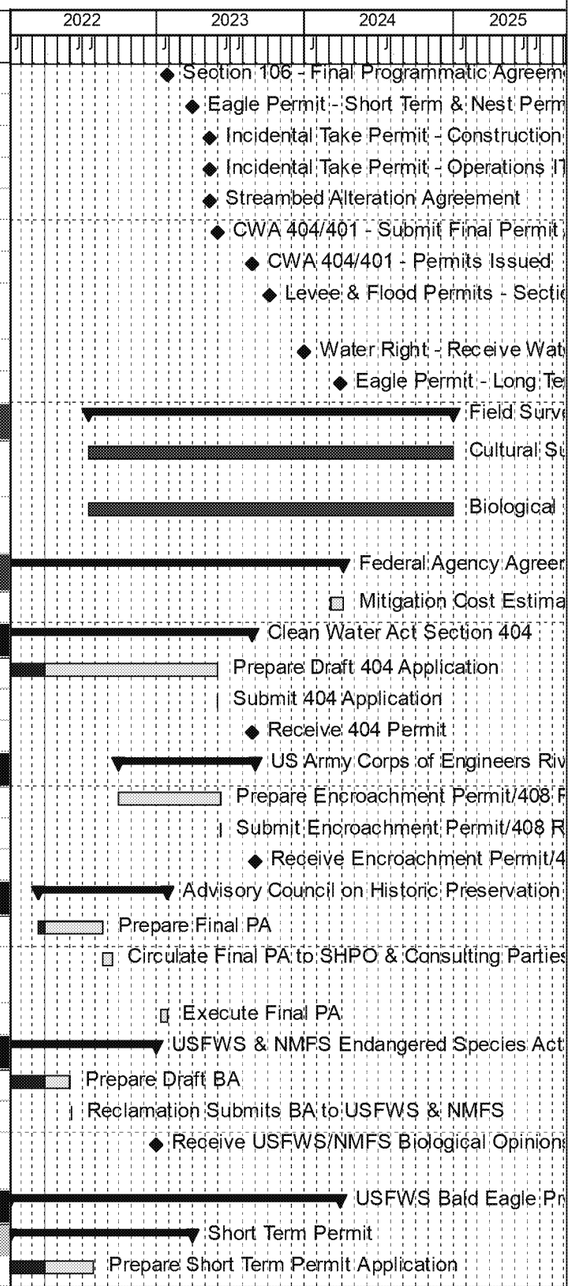
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Schedule

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196	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23	106-102: FS	MS-5000: FF
197	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23	USFWS-130: FS, MS-1000: SS	MS-5000: FF
198	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23	2081-220: FS, MS-1000: SS	KD-1510: FS
199	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23	2081-120: FS, MS-1000: SS	KD-1510: FS
200	KD-1420	Streambed Alteration Agreement	0		11-May-23	1600-220: FF	MS-5000: FF
201	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		31-May-23	404-120: FS	KD-1400: FS
202	KD-1400	CWA 404/401 - Permits Issued	0		24-Aug-23	KD-1390: FS, 404-130: FS	MS-5000: FF
203	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		05-Oct-23	CVFPB-220: FF	MS-5000: FF
204	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23	MS-1000: SS, WRP-120: FS	KD-1510: FS 2
205	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24	USFWS-160: FS, MS-1000: SS	MS-5000: FF
206	**Field Surveys**		621	18-Jul-22	31-Dec-24		
207	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
208	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
209	**Federal Agency Agreements & Permits**		502	11-Jan-21 A	03-Apr-24		
210	CE-1570	Mitigation Cost Estimate Update	20	07-Mar-24	03-Apr-24	C3E-1000: FF, KD-1460: FS	
211	**Clean Water Act Section 404**		352	04-Feb-21 A	24-Aug-23		
212	404-050	Prepare Draft 404 Application	291	04-Feb-21 A	30-May-23	EIR-250: FF 30, 404-025: SS, 404-003: I	408-150: FF, 404-120: FS
213	404-120	Submit 404 Application	1	31-May-23	31-May-23	404-050: FS	404-130: FF 60, KD-1390: FS
214	404-130	Receive 404 Permit	0		24-Aug-23	404-120: FF 60	KD-1400: FS
215	**US Army Corps of Engineers Rivers & Harbors Act Sectic**		233	28-Sep-22	01-Sep-23		
216	408-150	Prepare Encroachment Permit/408 Request	172	28-Sep-22	07-Jun-23	KD-1110: FS, 404-050: FF, EIR-450: FF	408-160: FS
217	408-160	Submit Encroachment Permit/408 Request	1	08-Jun-23	08-Jun-23	EIR-450: FS, 408-150: FS	408-170: FF 60
218	408-170	Receive Encroachment Permit/408 Permit	0		01-Sep-23	408-160: FF 60	MS-1500: FF
219	**Advisory Council on Historic Preservation NHPA Section**		204	14-Mar-22 A	25-Jan-23		
220	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22	106-072: FS	KD-1360: FF 20, 106-092: FS
221	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22	106-081: FS	106-102: FS
222	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23	EIR-250: FS, 106-092: FS	KD-1350: FS, EIR-450: FS
223	**USFWS & NMFS Endangered Species Act Section 7**		188	11-Jan-21 A	30-Dec-22		
224	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22		BA-210: FS
225	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22	BA-200: FS	BA-220: FF 210, EIR-450: FS
226	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22	BA-210: FF 210	KD-1250: FF, KD-1240: FF, KD-1340: FF, EIR-450: FS, MS-1150: FF
227	**USFWS Bald Eagle Protection Act**		499	03-Jan-22 A	29-Mar-24		
228	**Short Term Permit**		250	03-Jan-22 A	31-Mar-23		
229	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22		USFWS-120: FS



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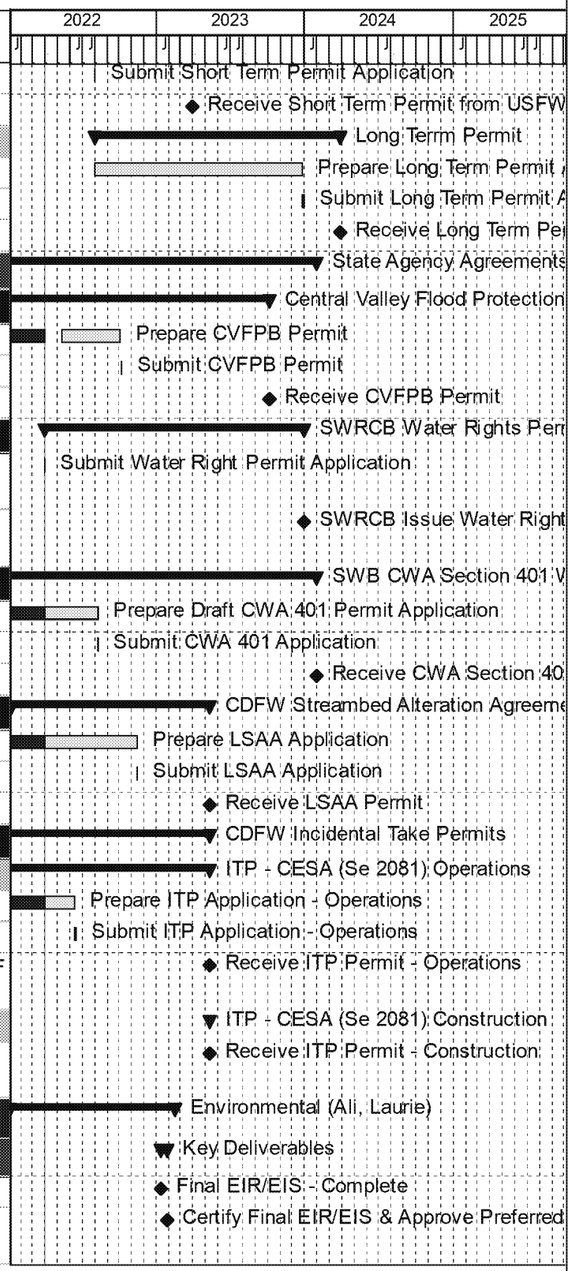
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
230	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22	USFWS-110: FS	USFWS-140: FS, USFWS-130: FF 165
231	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23	USFWS-120: FF 165	KD-1430: FS
232	**Long Terrm Permit**		414	02-Aug-22	29-Mar-24		
233	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23	USFWS-120: FS	USFWS-150: FS
234	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23	USFWS-140: FS	USFWS-160: FF 63
235	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24	USFWS-150: FF 63	MS-5000: FF, KD-1440: FS
236	**State Agency Agreements & Permits**		456	04-Jan-21 A	29-Jan-24		
237	**Central Valley Flood Protection Board (CVFPB) Levee En**		351	13-Dec-21 A	05-Oct-23		
238	CVFPB-200	Prepare CVFPB Permit	100	13-Dec-21 A	04-Oct-22	KD-1110: FF 5	CVFPB-210: FS
239	CVFPB-210	Submit CVFPB Permit	1	05-Oct-22	05-Oct-22	CVFPB-200: FS	CVFPB-220: FF 250
240	CVFPB-220	Receive CVFPB Permit	0		05-Oct-23	EIR-380: FS, CVFPB-210: FF 250	KD-1410: FF
241	**SWRCB Water Rights Permit**		436	01-Apr-22	28-Dec-23		
242	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22	WRP-100: FS	KD-1320: FS 200, WRP-120: FF 435, OP-1005: FS 5, FO-1110: FS
243	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23	EIR-380: FS, WRP-110: FF 435	A1200: FF, OS-1150: FF, MS-1400: FF, KD-1330: FS
244	**SWB CWA Section 401 Water Quality Certification**		456	04-Jan-21 A	29-Jan-24		
245	401-200	Prepare Draft CWA 401 Permit Application	90	04-Jan-21 A	08-Aug-22		401-210: FS
246	401-210	Submit CWA 401 Application	1	09-Aug-22	09-Aug-22	401-200: FS	401-220: FS 365
247	401-220	Receive CWA Section 401 Permit	0		29-Jan-24	EIR-380: FS, 401-210: FS 365	MS-5000: FF
248	**CDFW Streambed Alteration Agreements**		279	10-Jan-22 A	11-May-23		
249	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22		1600-210: FS
250	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22	1600-200: FS	1600-220: FF 121
251	1600-220	Receive LSAA Permit	0		11-May-23	EIR-380: FS, 1600-210: FF 121	2081-120: FF, KD-1420: FF
252	**CDFW Incidental Take Permits**		279	11-Jan-21 A	11-May-23		
253	**ITP - CESA (Se 2081) Operations**		279	11-Jan-21 A	11-May-23		
254	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22	OP-450: FF, OP-360: FF	2081-110: FS
255	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22	2081-100: FS	2081-120: FF 185
256	2081-120	Receive ITP Permit - Operations	0		11-May-23	EIR-380: FS, 1600-220: FF, 2081-110: FF 185	2081-220: FF, KD-1380: FS, MS-1320: FF
257	**ITP - CESA (Se 2081) Construction**		0	11-May-23	11-May-23		
258	2081-220	Receive ITP Permit - Construction	0		11-May-23	EIR-380: FS, 2081-120: FF, 2081-210: FF 60	KD-1370: FS, MS-1340: FF
259	**Environmental (Ali, Laurie)**		221	03-Jan-22 A	17-Feb-23		
260	**Key Deliverables**		10	10-Jan-23	25-Jan-23		
261	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23	MS-1000: SS, EIR-250: FF	KD-1480: FF 10
262	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23	KD-1470: FF 10	MS-1500: FF



Remaining Level of Effort
Actual Level of Effort
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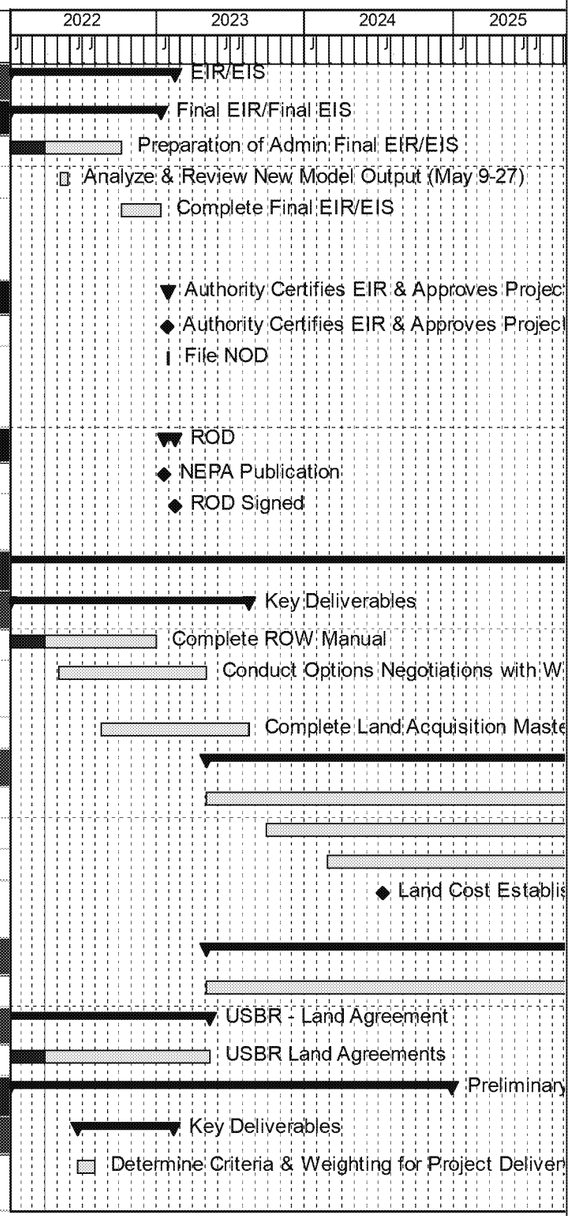
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Schedule

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263	**EIR/EIS**		221	03-Jan-22 A	17-Feb-23		
264	**Final EIR/Final EIS**		194	03-Jan-22 A	10-Jan-23		
265	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22		EIR-250: FS
266	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22	FO-1110: FS	EIR-250: FS
267	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23	EIR-210: FS, EIR-220: FS	106-102: FS, 404-050: FF 30, EIR-440: FF 5, EIR-370: FF 10, MS-1200: FF, KD-1470: FF
268	**Authority Certifies EIR & Approves Project & File NOD**		5	25-Jan-23	01-Feb-23		
269	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23	EIR-250: FF 10	EIR-380: FS
270	EIR-380	File NOD	5	26-Jan-23	01-Feb-23	EIR-370: FS	KD-1310: FF, CVFPB-220: FS, 2081-220: FS, 2081-120: FS, 1600-220: FS, 401-220: FS, WRP-120: FS, EIR-450: FS
271	**ROD**		22	18-Jan-23	17-Feb-23		
272	EIR-440	NEPA Publication	0		18-Jan-23	EIR-250: FF 5	EIR-450: FS 22
273	EIR-450	ROD Signed	0		17-Feb-23	106-102: FS, BA-220: FS, BA-210: FS, EIR-380: FS, EIR-440: FS 22	KD-1310: FF, 408-150: FF, FED-100: FF, 408-160: FS, FED-090: FF, MS-1300: FS
274	**Real Estate**		1774	02-Nov-20 A	19-Feb-29		
275	**Key Deliverables**		346	03-Jan-22 A	16-Aug-23		
276	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22	MS-1000: SS	KD-1500: FF, KD-1500: SS 85
277	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23	KD-1495: FF, KD-1495: SS 85	MI-1100: FS, RE-1060: FS, RE-1070: FS, RE-1080: FS
278	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23	MS-1100: FS	KD-1130: FF 40
279	**Land Acquisition**		1500	05-May-23	19-Feb-29		
280	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29	KD-1500: FS	RE-1070: SS 100, RE-1100: SS
281	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29	KD-1500: FS, RE-1060: SS 100	RE-1080: SS 100
282	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29	KD-1500: FS, RE-1070: SS 100	
283	RE-1050	Land Cost Established	0		11-Jul-24	LAAC-1500: FF 25, LAAG-1500: FF 25, LAAY-1400: FF 25	CU-1000: FF
284	**Relocation**		1500	05-May-23	01-Feb-29		
285	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29	RE-1060: SS	
286	**USBR - Land Agreement**		278	02-Nov-20 A	10-May-23		
287	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23	EIR-450: FF, WP2-130: FS	
288	**Preliminary Engineering**		694	03-Jan-22 A	30-Dec-24		
289	**Key Deliverables**		160	21-Jun-22	10-Feb-23		
290	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22	CS-1300: FS	MS-5000: FF



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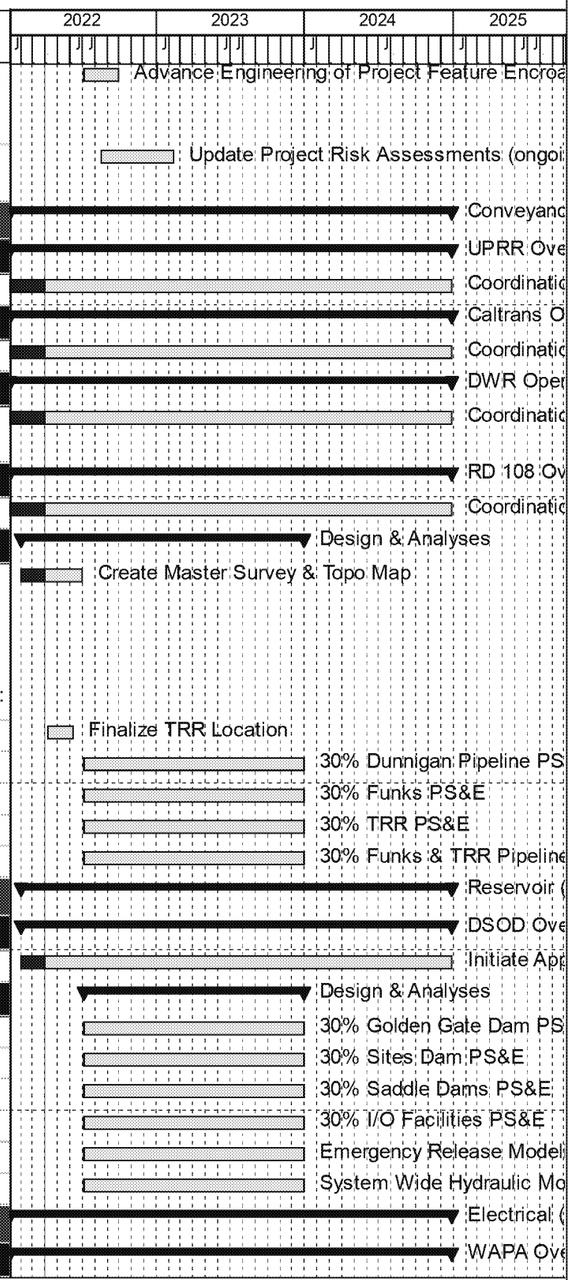
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
291	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	05-Jul-22	27-Sep-22	KD-1140: FS	CVFPB-200: FF 5, 408-150: FS, 408-135: FF
292	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	120	17-Aug-22	10-Feb-23	CS-1400: FS	MS-5000: FF
293	**Conveyance (Pipelines, Pump Stations, Canals)**		693	03-Jan-22 A	27-Dec-24		
294	**UPRR Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
295	A1110	Coordination & Oversight with UPRR	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
296	**Caltrans Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
297	A1120	Coordination & Oversight with Caltrans	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
298	**DWR Operations Oversight & Review (KLOG)**		693	03-Jan-22 A	27-Dec-24		
299	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
300	**RD 108 Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
301	A1140	Coordination & Oversight with Reclamation District 1(	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
302	**Design & Analyses**		437	01-Feb-22 A	29-Dec-23		
303	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	01-Jul-22	MS-1000: SS	KD-2100: FS, KD-2090: FS, KD-2080: FS, KD-2070: FS, KD-2060: FS, KD-2050: FS, KD-2040: FS, KD-2030: FS, KD-2020: FS, KD-2010: FS, KD-1650: FS, KD-1640: FS, KD-1200: FS, KD-1660: FS, KD-1630: FS, KD-1110: FS
304	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22	KD-2000: SS 22	KD-2020: FS
305	KD-1630	30% Dunnigan Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
306	KD-2010	30% Funks PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
307	KD-2020	30% TRR PS&E	372	05-Jul-22	29-Dec-23	KD-1150: FS, KD-1140: FS	KD-1180: FF
308	KD-2030	30% Funks & TRR Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
309	**Reservoir (Dams, Tunnels)**		694	01-Feb-22 A	30-Dec-24		
310	**DSOD Oversight & Review**		694	01-Feb-22 A	30-Dec-24		
311	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24	MS-1000: SS	MS-5000: FF
312	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
313	KD-1660	30% Golden Gate Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
314	KD-2040	30% Sites Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
315	KD-2050	30% Saddle Dams PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
316	KD-2060	30% I/O Facilities PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
317	KD-2070	Emergency Release Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
318	KD-2080	System Wide Hydraulic Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
319	**Electrical (Substation, Switchyard, Transmission Line**		694	03-Jan-22 A	30-Dec-24		
320	**WAPA Oversight & Review**		694	03-Jan-22 A	30-Dec-24		



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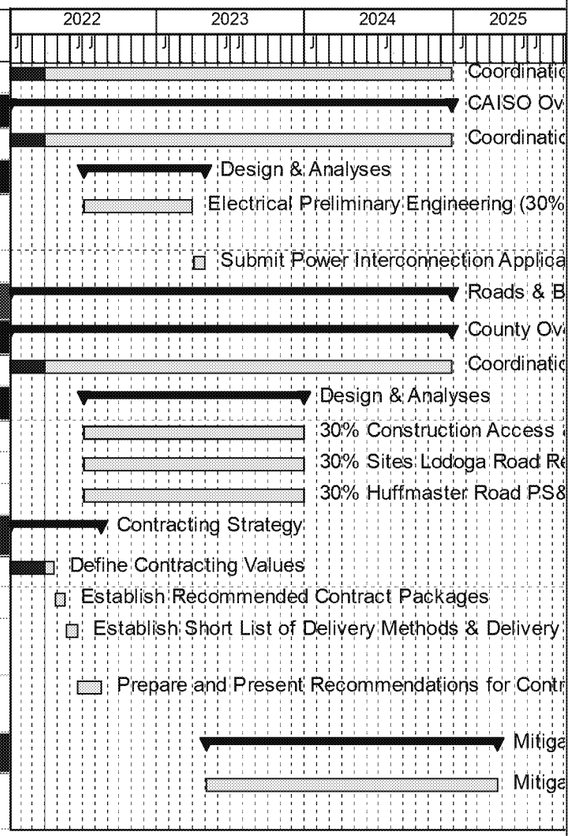
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Schedule

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321	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
322	**CAISO Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
323	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
324	**Design & Analyses**		205	05-Jul-22	28-Apr-23		
325	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	05-Jul-22	31-Mar-23	KD-1140: FS	C4E-1000: SS, KD-1180: FS, KD-1200: FS
326	KD-1200	Submit Power Interconnection Application	20	03-Apr-23	28-Apr-23	KD-1640: FS, KD-1140: FS, MS-1000: SS	MS-5000: FF
327	**Roads & Bridges**		694	03-Jan-22 A	30-Dec-24		
328	**County Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
329	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
330	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
331	KD-1650	30% Construction Access & Maintenance Roads PS&	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
332	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
333	KD-2100	30% Huffmaster Road PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
334	**Contracting Strategy**		96	03-Jan-22 A	16-Aug-22		
335	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22		CS-1200: FS
336	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22	CS-1100: FS	CS-1300: FS
337	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22	CS-1200: FS	CS-1400: FS, KD-1120: FS
338	CS-1400	Prepare and Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22	CS-1300: FS	KD-1130: FF 40, MS-1100: FS, KD-1210: FS
339	**Mitigation Implementation**		500	05-May-23	21-Apr-25		
340	MI-1100	Mitigation Implementation (more information needed to expand detail)	500	05-May-23	21-Apr-25	KD-1500: FS	



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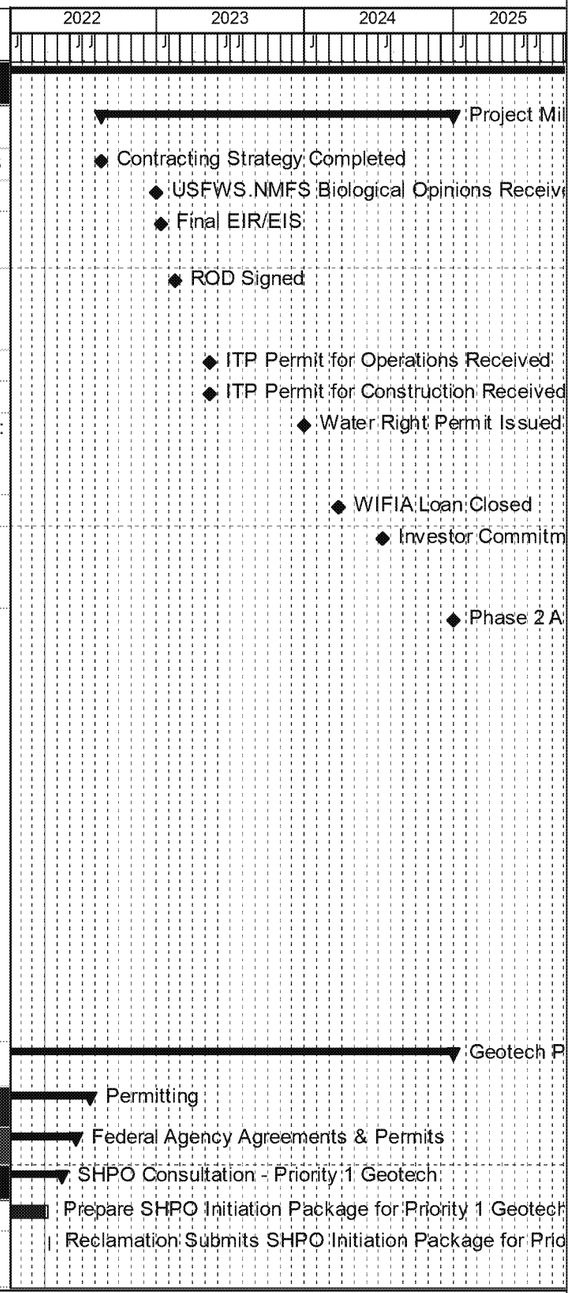
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Schedule

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1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29		
2	**Project Milestones**		599	16-Aug-22	31-Dec-24		
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22	CS-1400: FS	KD-1290: FS, KD-1490: FS, KD-1460: FS
4	MS-1150	USFWS.NMFS Biological Opinions Received	0		30-Dec-22	BA-220: FF	
5	MS-1200	Final EIR/EIS	0		10-Jan-23	EIR-250: FF	ENG-460: FS, ENG-450: FS, MS-1300: FS
6	MS-1300	ROD Signed	0		17-Feb-23	USDA-1030: FF, MS-1200: FS, EIR-450: FS	EIR-460: FS, MS-500-CS: FS
7	MS-1320	ITP Permit for Operations Received	0		11-May-23	2081-120: FF	
8	MS-1340	ITP Permit for Construction Received	0		11-May-23	2081-220: FF	
9	MS-1400	Water Right Permit Issued	0		28-Dec-23	WRP-120: FF	WIFIA-210: FF, KD-1310: FF 5, MS-1500: FF 30, PA-1100: FS 3, MS-5000: FF, CWC-510: FF
10	MS-1600	WIFIA Loan Closed	0		25-Mar-24	KD-2600: FF	
11	MS-1500	Investor Commitment	0		11-Jul-24*	KD-1290: FF, KD-1130: FF, CU-1000: FF, MS-1400: FF 30, 408-170: FF, KD-1480: FF	
12	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*	STA-120: FF, KD-1200: FF, KD-1230: FF, KD-1290: FF, KD-1130: FF, KD-1120: FF, KD-1210: FF, GWP-1500: FF, PB-1100: FF, KD-1310: FF, KD-1300: FF, AB-2300: FF, PA-1200: FF, BF-1300: FF, KD-1240: FF, KD-1250: FF, KD-1320: FF, KD-1360: FF, KD-1340: FF, KD-1350: FF, KD-1430: FF, KD-1410: FF, KD-1400: FF, RE-1030: FF, RE-1040: FF, A1230: FF, A1110: FF, A1120: FF, A1130: FF, A1140: FF, KD-1100: FF, A1150: FF, A1160: FF, A1170: FF, KD-1190: FF, USFWS-160: FF, KD-1420: FF, KD-1440: FF, AF-1300: FF, FC-1350: FF, USDA-1060: FF, KD-2600: FF, KD-1510: FF, OS-1150: FF, MS-1400: FF, USDA-1070: FF, WSIP-1260: FF, 401-220: FF	
13	**Geotech Program**		695	01-Mar-21 A	31-Dec-24		
14	**Permitting**		77	01-Mar-21 A	20-Jul-22		
15	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22		
16	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22		
17	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geote	6	02-Aug-21 A	08-Apr-22		SHPO-250: FS
18	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22	SHPO-240: FS	SHPO-260: FF 22



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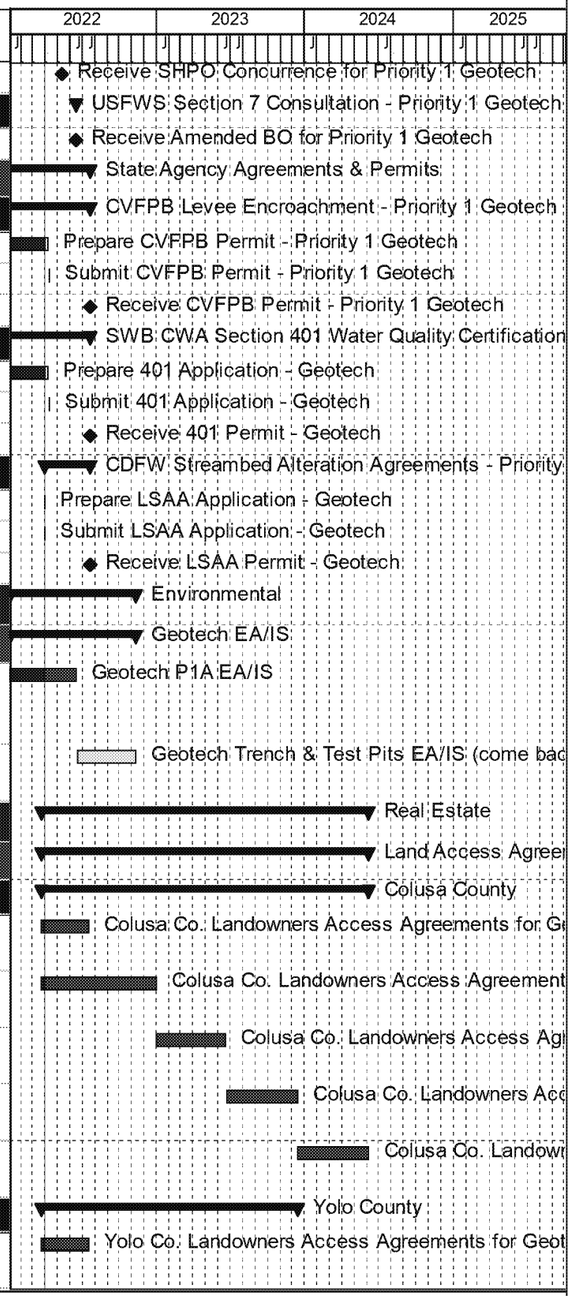
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Schedule

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19	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22	SHPO-250: FF 22	EA-200: FF
20	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22		
21	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22	BA-110: FF 85	EA-200: FF, KD-1340: FF
22	**State Agency Agreements & Permits**		77	01-Mar-21 A	20-Jul-22		
23	**CVFPB Levee Encroachment - Priority 1 Geotech**		77	01-Nov-21 A	20-Jul-22		
24	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22		CVFPB-110: FS
25	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22	CVFPB-100: FS	CVFPB-120: FF 60
26	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		20-Jul-22	EA-200: FF 22, CVFPB-110: FF 60	GWP-1100: FS
27	**SWB CWA Section 401 Water Quality Certification - Priori**		77	01-Mar-21 A	20-Jul-22		
28	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22	WP2-130: FS	401-110: FS
29	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22	401-100: FS	401-120: FS 45
30	401-120	Receive 401 Permit - Geotech	0		20-Jul-22	EA-200: FF 22, 401-110: FS 45	GWP-1100: FF 30
31	**CDFW Streambed Alteration Agreements - Priority 1 Geot**		77	01-Apr-22	20-Jul-22		
32	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22*	01-Apr-22		1600-110: FS
33	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22	1600-100: FS	1600-120: FF 60
34	1600-120	Receive LSAA Permit - Geotech	0		20-Jul-22	EA-200: FF 22, 1600-110: FF 60	GWP-1100: FF 30
35	**Environmental**		155	03-Jan-22 A	09-Nov-22		
36	**Geotech EA/IS**		155	03-Jan-22 A	09-Nov-22		
37	EA-200	Geotech P1A EA/IS	55	03-Jan-22 A	17-Jun-22	BA-120: FF, SHPO-260: FF	1600-120: FF 22, 401-120: FF 22, CVFPB-120: FF 22, GWP-1100: FS, EA-220: FS
38	EA-220	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	20-Jun-22	09-Nov-22	EA-200: FS	GWP-1500: FS
39	**Real Estate**		547	22-Mar-22 A	06-Jun-24		
40	**Land Access Agreements**		547	22-Mar-22 A	06-Jun-24		
41	**Colusa County**		547	22-Mar-22 A	06-Jun-24		
42	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAC-1200: SS, GWP-1100: FS
43	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAC-1100: SS	LAAC-1300: FS, GWP-1200: FS
44	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAC-1200: FS	LAAC-1400: FS, GWP-1300: FS
45	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAC-1300: FS	LAAC-1500: FS, GWP-1400: FS
46	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAC-1400: FS	RE-1050: FF 25, GWP-1500: FS
47	**Yolo County**		427	22-Mar-22 A	14-Dec-23		
48	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAY-1200: SS, GWP-1100: FS



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
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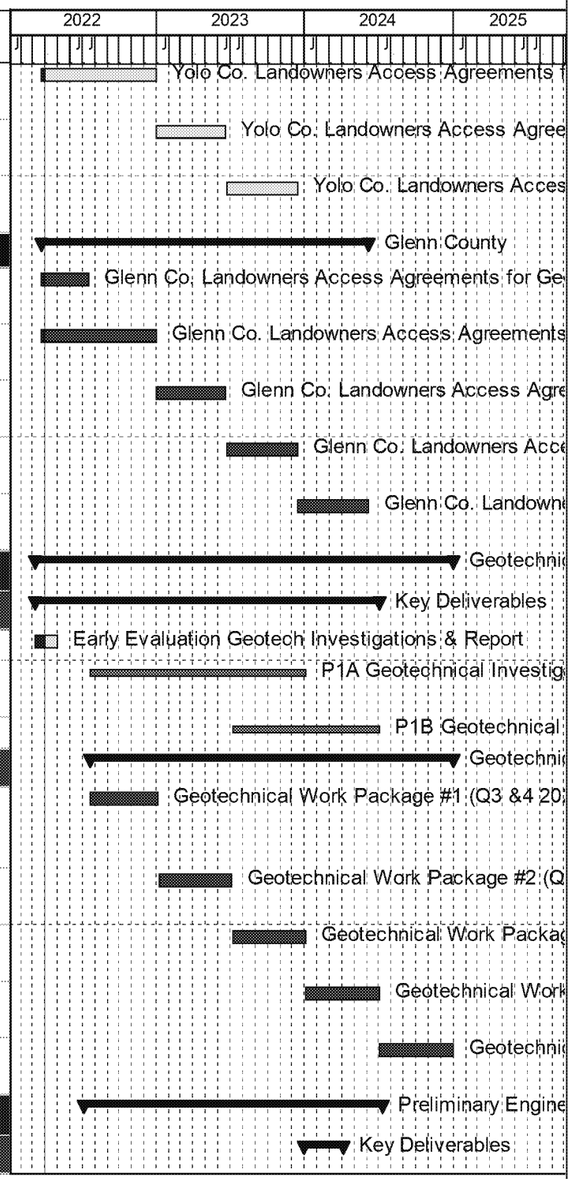
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
49	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAY-1100: SS	LAAY-1300: FS, GWP-1200: FS
50	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAY-1200: FS	LAAY-1400: FS, GWP-1300: FS
51	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAY-1300: FS	GWP-1400: FS, RE-1050: FF 25
52	**Glenn County**		547	22-Mar-22 A	06-Jun-24		
53	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAG-1200: SS, GWP-1100: FS
54	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAG-1100: SS	LAAG-1300: FS, GWP-1200: FS
55	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAG-1200: FS	LAAG-1400: FS, GWP-1300: FS
56	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAG-1300: FS	LAAG-1500: FS, GWP-1400: FS
57	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAG-1400: FS	RE-1050: FF 25, GWP-1500: FS
58	**Geotechnical Engineering**		695	07-Mar-22 A	31-Dec-24		
59	**Key Deliverables**		566	07-Mar-22 A	03-Jul-24		
60	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22		KD-1150: SS 22
61	KD-2015	P1A Geotechnical Investigations & Reports	363	21-Jul-22	04-Jan-24	GWP-1300: FF, GWP-1200: FF, GWP-1100: SS	
62	KD-2025	P1B Geotechnical Investigations & Reports	249	07-Jul-23	03-Jul-24	GWP-1400: FF, GWP-1300: SS	
63	**Geotechnical Investigations**		618	21-Jul-22	31-Dec-24		
64	GWP-1100	Geotechnical Work Package #1 (Q3 &4 2022)	114	21-Jul-22	05-Jan-23	CVFPB-120: FS, 1600-120: FF 30, 401-120: FF 30, EA-200: FS, LAAY-1100: FS, LAAG-1100: FS, LAAC-1100: FS	GWP-1200: FS, KD-2015: SS
65	GWP-1200	Geotechnical Work Package #2 (Q1 & 2 2023)	126	06-Jan-23	06-Jul-23	LAAY-1200: FS, LAAG-1200: FS, GWP-1100: FS, LAAC-1200: FS	KD-2015: FF, GWP-1300: FS
66	GWP-1300	Geotechnical Work Package #3 (Q3 &4 2023)	123	07-Jul-23	04-Jan-24	LAAY-1300: FS, LAAG-1300: FS, LAAC-1300: FS, GWP-1200: FS	KD-2025: SS, KD-2015: FF, GWP-1400: FS
67	GWP-1400	Geotechnical Work Package #4 (Q1 & 2 2024)	126	05-Jan-24	03-Jul-24	LAAY-1400: FS, LAAG-1400: FS, LAAC-1400: FS, GWP-1300: FS	KD-2025: FF, GWP-1500: FS, CU-1000: FF 6
68	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	129	04-Jul-24	31-Dec-24	EA-220: FS, LAAG-1500: FS, LAAC-1500: FS, GWP-1400: FS	MS-5000: FF
69	**Preliminary Engineering**		507	05-Jul-22	11-Jul-24		
70	**Key Deliverables**		65	29-Dec-23	03-Apr-24		



Remaining Level of Effort
Actual Level of Effort
Actual Work
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Milestone
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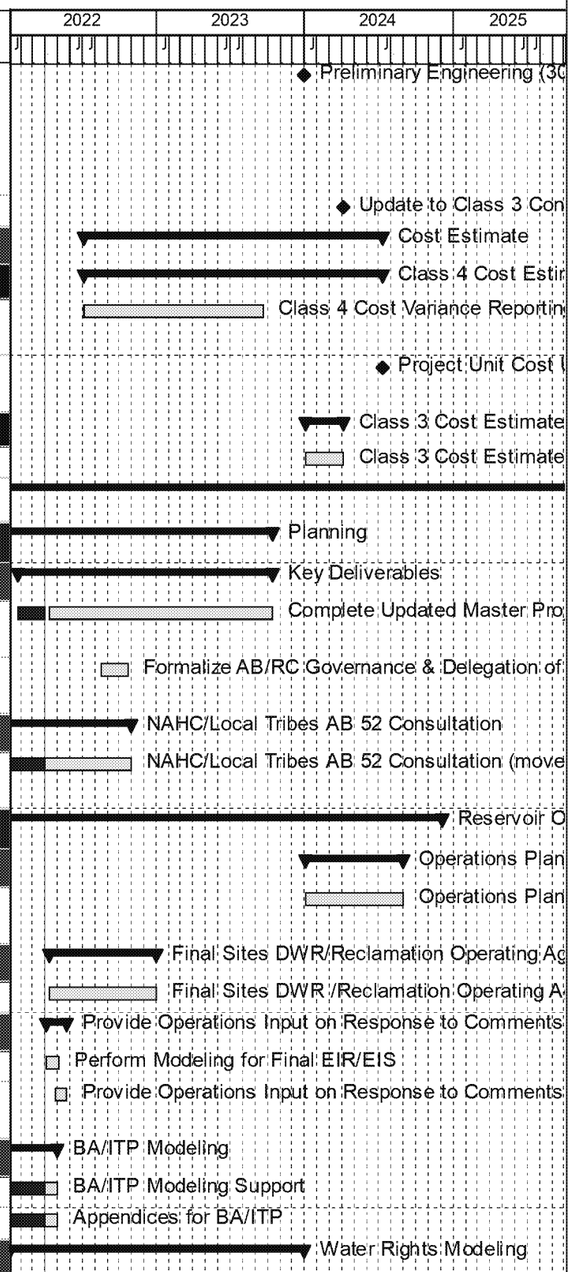
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Schedule

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71	KD-1180	Preliminary Engineering (30% Design Level)	0		29-Dec-23	KD-2100: FF, KD-2090: FF, KD-2080: FF, KD-2070: FF, KD-2060: FF, KD-2050: FF, KD-2040: FF, KD-2030: FF, KD-2020: FF, KD-2010: FF, KD-1650: FF, KD-1640: FS, KD-1660: FF, KD-1630: FF, MS-1000: SS	C3E-1000: FS
72	KD-1190	Update to Class 3 Construction Cost Estimate	0		03-Apr-24	C3E-1000: FF	MS-5000: FF
73	**Cost Estimate**		507	05-Jul-22	11-Jul-24		
74	**Class 4 Cost Estimate Variance Reporting**		507	05-Jul-22	11-Jul-24		
75	C4E-1000	Class 4 Cost Variance Reporting	304	05-Jul-22	19-Sep-23	KD-1630: SS, KD-1660: SS, KD-1640: SS, KD-1650: SS	CU-1000: FF 30
76	CU-1000	Project Unit Cost Update	0		11-Jul-24	RE-1050: FF, C3E-1000: FS, C4E-1000: FF 30, GWP-1400: FF 6	MS-1500: FF
77	**Class 3 Cost Estimate**		65	02-Jan-24	03-Apr-24		
78	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	02-Jan-24	03-Apr-24	KD-1180: FS	CU-1000: FS, CE-1570: FF, KD-1190: FF
79	**Overall Project**		1774	01-Sep-20 A	19-Feb-29		
80	**Planning**		386	01-Sep-20 A	13-Oct-23		
81	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23		
82	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23	KD-1490: FF 40, KD-1460: FF 40, CS-1400: FF 40, MS-1000: SS	MS-1500: FF, MS-5000: FF
83	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	20-Oct-22	MS-1100: FS, MS-1000: SS	MS-1500: FF, MS-5000: FF
84	**NAHC/Local Tribes AB 52 Consultation**		148	01-Sep-20 A	31-Oct-22		
85	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	148	01-Sep-20 A	31-Oct-22		MS-5000: FF
86	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24		
87	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24		
88	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24	KD-1370: FS, KD-1330: FS 2, KD-1380: FS	MS-5000: FF
89	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22		
90	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22	WRP-110: FS 5, OP-1110: FS	
91	**Provide Operations Input on Response to Comments**		36	04-Apr-22	23-May-22		
92	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22	EIR-090: FS, WRP-110: FS	EIR-220: FS, FO-1080: SS 16
93	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22	FO-1110: SS 16	A1220: FS
94	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22		
95	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22		2081-100: FF, OP-360: SS
96	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22	OP-450: SS	2081-100: FF
97	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23		



Remaining Level of Effort
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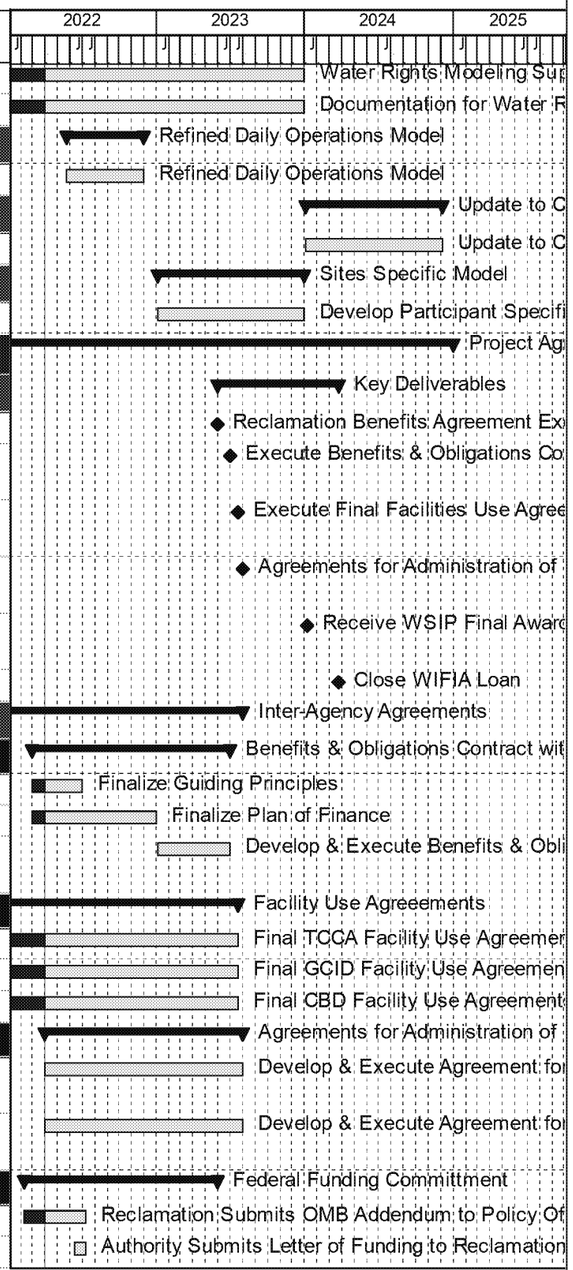
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Schedule

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98	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23	WRP-120: FF	A1230: FS
99	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23		A1230: FS
100	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22		
101	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22	FO-1080: FS	OS-1150: FS
102	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24		
103	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24	A1200: FS, A1210: FS, OS-1150: FS	MS-5000: FF
104	**Sites Specific Model**		258	03-Jan-23	28-Dec-23		
105	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23	A1220: FS, WRP-120: FF	A1230: FS, MS-5000: FF
106	**Project Agreements & Funding**		695	01-Jun-21 A	31-Dec-24		
107	**Key Deliverables**		202	01-Jun-23	25-Mar-24		
108	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23	WIIN-1170: FF, WIIN-1140: FS	KD-1300: FF
109	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23	KD-1260: FF, BO-1300: FF, WIIN-1170: FF	MS-5000: FF
110	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23	FED-090: FF, FO-1040: FF, FO-1030: FF, FO-1020: FF	MS-5000: FF
111	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23	PB-1200: FF, PB-1100: FF	KD-1310: FF 45
112	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24	EIR-450: FF, EIR-380: FF, KD-1520: FF 45, MS-1400: FF 5	MS-5000: FF
113	KD-2600	Close WIFIA Loan	0		25-Mar-24	WIFIA-220: FF 5, WIFIA-210: FF 5	MS-1600: FF, MS-5000: FF
114	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23		
115	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23		
116	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22		BO-1200: FF
117	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22	BO-1100: FF	BO-1300: FS
118	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants	125	03-Jan-23	29-Jun-23	BO-1200: FS	KD-1300: FF
119	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23		
120	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
121	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
122	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
123	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23		
124	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23	MS-1000: SS	KD-1520: FF, MS-5000: FF
125	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23		KD-1520: FF
126	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23		
127	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22		WIIN-1180: FS, WIIN-1160: FF
128	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22	WIIN-1150: FF	WIIN-1180: FS



Remaining Level of Effort
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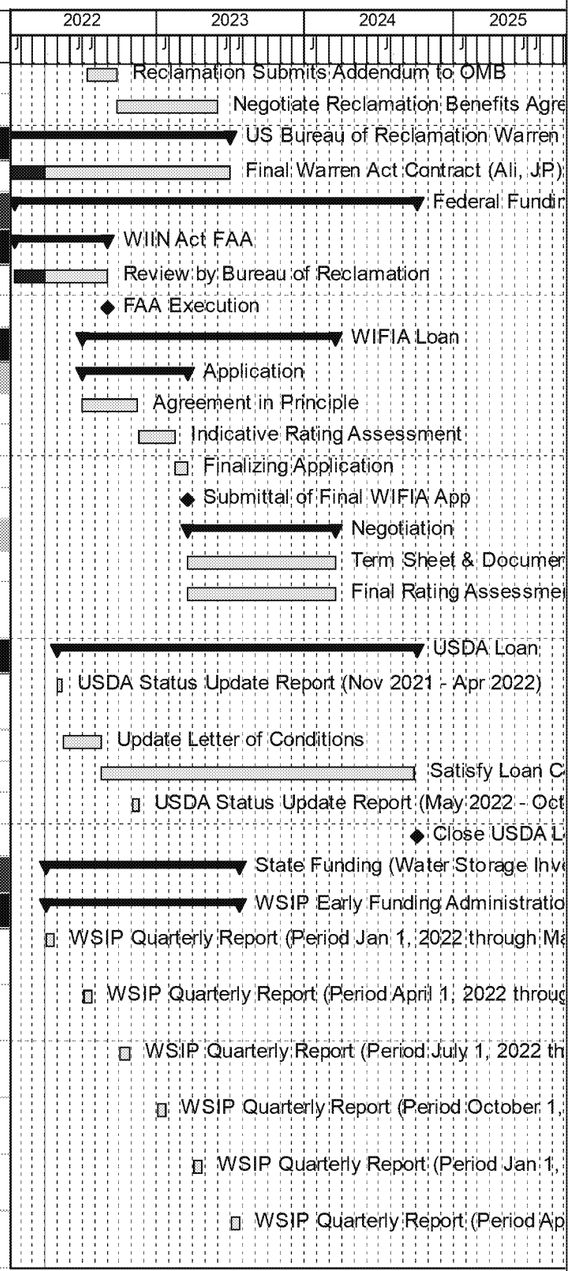
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Schedule

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129	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22	WIIN-1160: FS, WIIN-1150: FS	WIIN-1170: FS
130	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23	WIIN-1180: FS	KD-1260: FF, KD-1300: FF
131	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23		
132	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23	EIR-450: FF	KD-1230: FF
133	**Federal Funding**		631	17-Jan-22 A	02-Oct-24		
134	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22		
135	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22		WIIN-1140: FS
136	WIIN-1140	FAA Execution	0		31-Aug-22	WIIN-1120: FS	KD-1260: FS
137	**WIFIA Loan**		426	01-Jul-22	18-Mar-24		
138	**Application**		176	01-Jul-22	20-Mar-23		
139	WIFIA-110	Agreement in Principle	95	01-Jul-22	16-Nov-22	FC-1250: FS, WIFIA-005: FS 58	WIFIA-120: FS
140	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23	WIFIA-110: FS	WIFIA-130: FS
141	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23	WIFIA-120: FS	WIFIA-140: FF 1
142	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23	WIFIA-130: FF 1	WIFIA-210: FS, BF-1100: SS
143	**Negotiation**		250	20-Mar-23	18-Mar-24		
144	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24	MS-1400: FF, WIFIA-140: FS	KD-2600: FF 5, WIFIA-220: SS
145	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24	WIFIA-210: SS	KD-2600: FF 5
146	**USDA Loan**		610	02-May-22	02-Oct-24		
147	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22	USDA-1020: FS 105	USDA-1050: FS, MS-1300: FF, USDA-1040: FS 120
148	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22	USDA-1030: FS	USDA-1060: FS
149	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24	USDA-1050: FS	MS-5000: FF, USDA-1070: FF 5
150	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22	USDA-1030: FS 120	USDA-1070: FS
151	USDA-1070	Close USDA Loan	0		02-Oct-24	USDA-1040: FS, USDA-1060: FF 5	MS-5000: FF
152	**State Funding (Water Storage Investment Program, W**		329	04-Apr-22	25-Jul-23		
153	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23		
154	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22	MS-1000: SS 90	WSIP-1220: FS 50
155	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22	WSIP-1210: FS 50	WSIP-1230: FS 47
156	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22	WSIP-1220: FS 47	WSIP-1240: FS 45
157	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23	WSIP-1230: FS 45	WSIP-1250: FS 47
158	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23	WSIP-1240: FS 47	WSIP-1260: FS 50
159	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23	WSIP-1250: FS 50	MS-5000: FF



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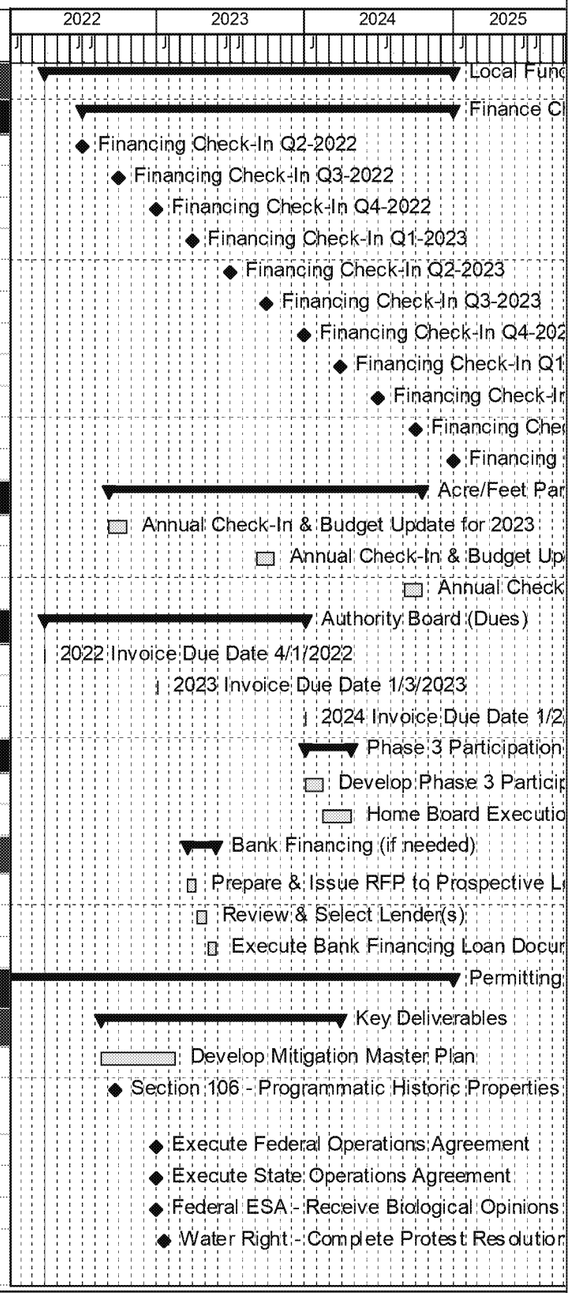
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Schedule

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160	**Local Funding**		695	01-Apr-22	31-Dec-24		
161	**Finance Check-Ins**		631	30-Jun-22	31-Dec-24		
162	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22*		FC-1260: FF 64, WIFIA-110: FS
163	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22	FC-1250: FF 64	FC-1270: FF 60
164	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22	FC-1260: FF 60	FC-1280: FF 62
165	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23	FC-1270: FF 62	FC-1290: FF 64
166	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23	FC-1280: FF 64	FC-1300: FF 63
167	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23	FC-1290: FF 63	FC-1310: FF 60
168	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23	FC-1300: FF 60	FC-1320: FF 62
169	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24	FC-1310: FF 62	FC-1330: FF 64
170	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24	FC-1320: FF 64	FC-1340: FF 66
171	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24	FC-1330: FF 66	FC-1350: FS 66
172	FC-1350	Financing Check-In Q4-2024	0		31-Dec-24	FC-1340: FS 66	MS-5000: FF
173	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24		
174	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22	MS-1000: SS 245	AF-1200: FS 220
175	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23	AF-1100: FS 220	AF-1300: FS 220
176	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24	AF-1200: FS 220	MS-5000: FF
177	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24		
178	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22		AB-2200: FS
179	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*	AB-2100: FS	AB-2300: FS
180	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*	AB-2200: FS	MS-5000: FF
181	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24		
182	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24	MS-1400: FS 3	PA-1200: FS
183	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24	PA-1100: FS	MS-5000: FF
184	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23		
185	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23	WIFIA-140: SS	BF-1200: FS
186	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23	BF-1100: FS	BF-1300: FS
187	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23	BF-1200: FS	MS-5000: FF
188	**Permitting (Ali, John, Jelica)**		695	04-Jan-21 A	31-Dec-24		
189	**Key Deliverables**		403	17-Aug-22	29-Mar-24		
190	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23	MS-1100: FS	KD-1130: FF 40, CE-1570: FS
191	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22	106-081: FF 20	MS-5000: FF
192	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
193	KD-1250	Execute State Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
194	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22	BA-120: FF, BA-220: FF	MS-5000: FF
195	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23	WRP-110: FS 200	MS-5000: FF



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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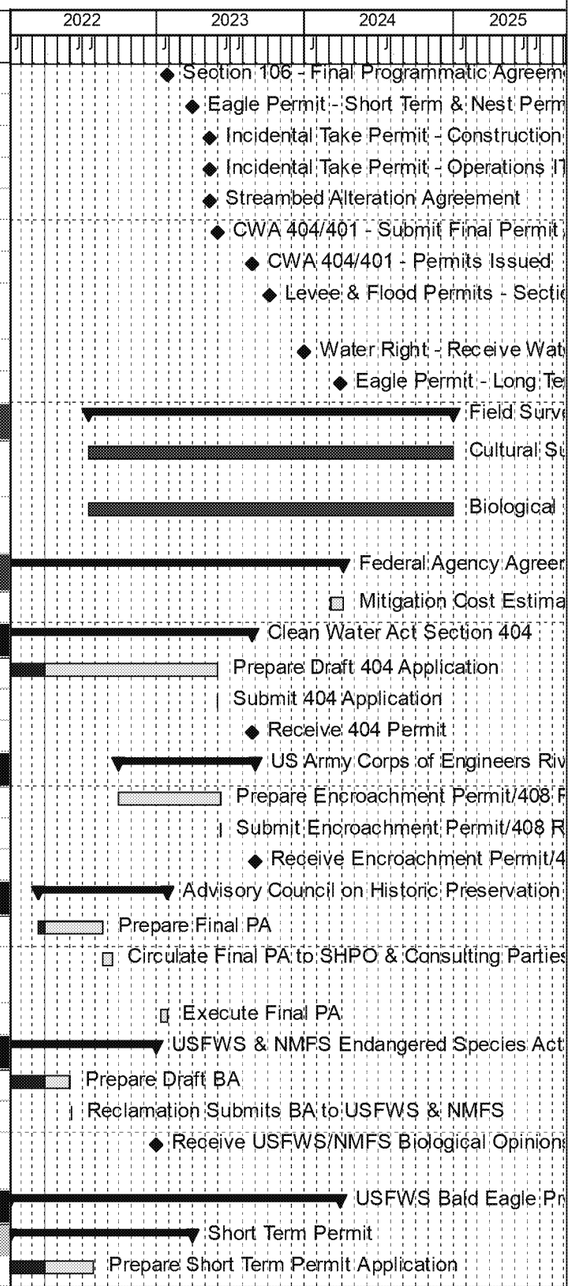
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
196	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23	106-102: FS	MS-5000: FF
197	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23	USFWS-130: FS, MS-1000: SS	MS-5000: FF
198	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23	2081-220: FS, MS-1000: SS	KD-1510: FS
199	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23	2081-120: FS, MS-1000: SS	KD-1510: FS
200	KD-1420	Streambed Alteration Agreement	0		11-May-23	1600-220: FF	MS-5000: FF
201	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		31-May-23	404-120: FS	KD-1400: FS
202	KD-1400	CWA 404/401 - Permits Issued	0		24-Aug-23	KD-1390: FS, 404-130: FS	MS-5000: FF
203	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		05-Oct-23	CVFPB-220: FF	MS-5000: FF
204	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23	MS-1000: SS, WRP-120: FS	KD-1510: FS 2
205	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24	USFWS-160: FS, MS-1000: SS	MS-5000: FF
206	**Field Surveys**		621	18-Jul-22	31-Dec-24		
207	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
208	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
209	**Federal Agency Agreements & Permits**		502	11-Jan-21 A	03-Apr-24		
210	CE-1570	Mitigation Cost Estimate Update	20	07-Mar-24	03-Apr-24	C3E-1000: FF, KD-1460: FS	
211	**Clean Water Act Section 404**		352	04-Feb-21 A	24-Aug-23		
212	404-050	Prepare Draft 404 Application	291	04-Feb-21 A	30-May-23	EIR-250: FF 30	408-150: FF, 404-120: FS
213	404-120	Submit 404 Application	1	31-May-23	31-May-23	404-050: FS	404-130: FF 60, KD-1390: FS
214	404-130	Receive 404 Permit	0		24-Aug-23	404-120: FF 60	KD-1400: FS
215	**US Army Corps of Engineers Rivers & Harbors Act Sectic**		233	28-Sep-22	01-Sep-23		
216	408-150	Prepare Encroachment Permit/408 Request	172	28-Sep-22	07-Jun-23	KD-1110: FS, 404-050: FF, EIR-450: FF	408-160: FS
217	408-160	Submit Encroachment Permit/408 Request	1	08-Jun-23	08-Jun-23	EIR-450: FS, 408-150: FS	408-170: FF 60
218	408-170	Receive Encroachment Permit/408 Permit	0		01-Sep-23	408-160: FF 60	MS-1500: FF
219	**Advisory Council on Historic Preservation NHPA Section**		204	14-Mar-22 A	25-Jan-23		
220	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22	106-072: FS	KD-1360: FF 20, 106-092: FS
221	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22	106-081: FS	106-102: FS
222	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23	EIR-250: FS, 106-092: FS	KD-1350: FS, EIR-450: FS
223	**USFWS & NMFS Endangered Species Act Section 7**		188	11-Jan-21 A	30-Dec-22		
224	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22		BA-210: FS
225	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22	BA-200: FS	BA-220: FF 210, EIR-450: FS
226	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22	BA-210: FF 210	KD-1250: FF, KD-1240: FF, KD-1340: FF, EIR-450: FS, MS-1150: FF
227	**USFWS Bald Eagle Protection Act**		499	03-Jan-22 A	29-Mar-24		
228	**Short Term Permit**		250	03-Jan-22 A	31-Mar-23		
229	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22		USFWS-120: FS



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
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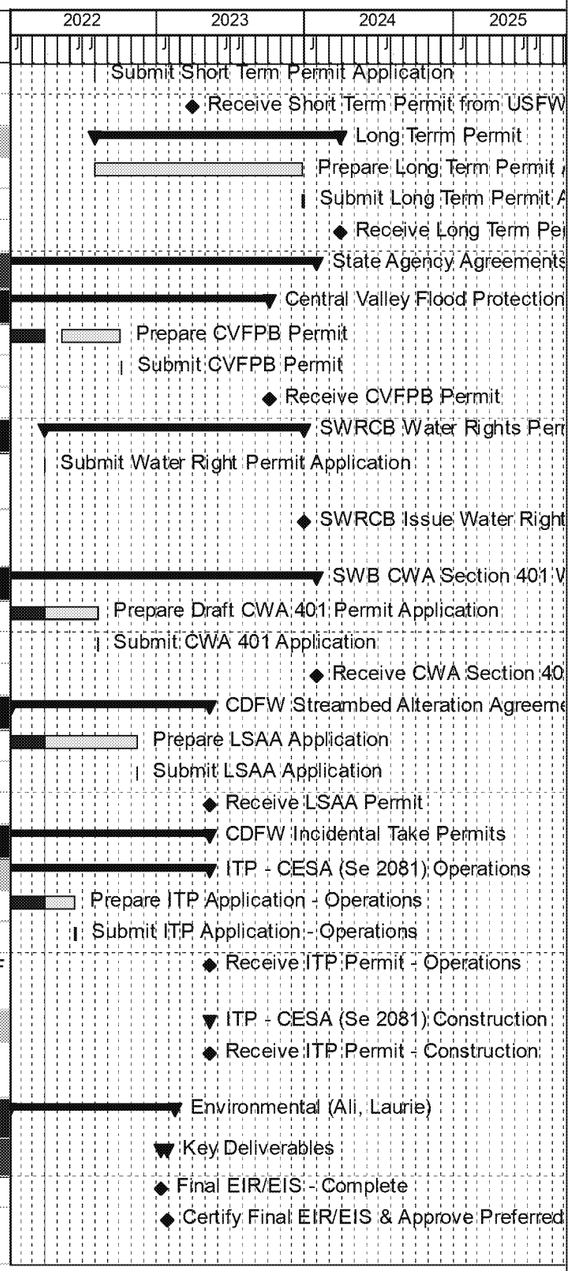
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
230	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22	USFWS-110: FS	USFWS-140: FS, USFWS-130: FF 165
231	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23	USFWS-120: FF 165	KD-1430: FS
232	**Long Terrm Permit**		414	02-Aug-22	29-Mar-24		
233	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23	USFWS-120: FS	USFWS-150: FS
234	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23	USFWS-140: FS	USFWS-160: FF 63
235	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24	USFWS-150: FF 63	MS-5000: FF, KD-1440: FS
236	**State Agency Agreements & Permits**		456	04-Jan-21 A	29-Jan-24		
237	**Central Valley Flood Protection Board (CVFPB) Levee En**		351	13-Dec-21 A	05-Oct-23		
238	CVFPB-200	Prepare CVFPB Permit	100	13-Dec-21 A	04-Oct-22	KD-1110: FF 5	CVFPB-210: FS
239	CVFPB-210	Submit CVFPB Permit	1	05-Oct-22	05-Oct-22	CVFPB-200: FS	CVFPB-220: FF 250
240	CVFPB-220	Receive CVFPB Permit	0		05-Oct-23	EIR-380: FS, CVFPB-210: FF 250	KD-1410: FF
241	**SWRCB Water Rights Permit**		436	01-Apr-22	28-Dec-23		
242	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22	WRP-100: FS	KD-1320: FS 200, WRP-120: FF 435, OP-1005: FS 5, FO-1110: FS
243	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23	EIR-380: FS, WRP-110: FF 435	A1200: FF, OS-1150: FF, MS-1400: FF, KD-1330: FS
244	**SWB CWA Section 401 Water Quality Certification**		456	04-Jan-21 A	29-Jan-24		
245	401-200	Prepare Draft CWA 401 Permit Application	90	04-Jan-21 A	08-Aug-22		401-210: FS
246	401-210	Submit CWA 401 Application	1	09-Aug-22	09-Aug-22	401-200: FS	401-220: FS 365
247	401-220	Receive CWA Section 401 Permit	0		29-Jan-24	EIR-380: FS, 401-210: FS 365	MS-5000: FF
248	**CDFW Streambed Alteration Agreements**		279	10-Jan-22 A	11-May-23		
249	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22		1600-210: FS
250	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22	1600-200: FS	1600-220: FF 121
251	1600-220	Receive LSAA Permit	0		11-May-23	EIR-380: FS, 1600-210: FF 121	2081-120: FF, KD-1420: FF
252	**CDFW Incidental Take Permits**		279	11-Jan-21 A	11-May-23		
253	**ITP - CESA (Se 2081) Operations**		279	11-Jan-21 A	11-May-23		
254	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22	OP-450: FF, OP-360: FF	2081-110: FS
255	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22	2081-100: FS	2081-120: FF 185
256	2081-120	Receive ITP Permit - Operations	0		11-May-23	EIR-380: FS, 1600-220: FF, 2081-110: FF 185	2081-220: FF, KD-1380: FS, MS-1320: FF
257	**ITP - CESA (Se 2081) Construction**		0	11-May-23	11-May-23		
258	2081-220	Receive ITP Permit - Construction	0		11-May-23	EIR-380: FS, 2081-120: FF, 2081-210: FF 60	KD-1370: FS, MS-1340: FF
259	**Environmental (Ali, Laurie)**		221	03-Jan-22 A	17-Feb-23		
260	**Key Deliverables**		10	10-Jan-23	25-Jan-23		
261	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23	MS-1000: SS, EIR-250: FF	KD-1480: FF 10
262	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23	KD-1470: FF 10	MS-1500: FF



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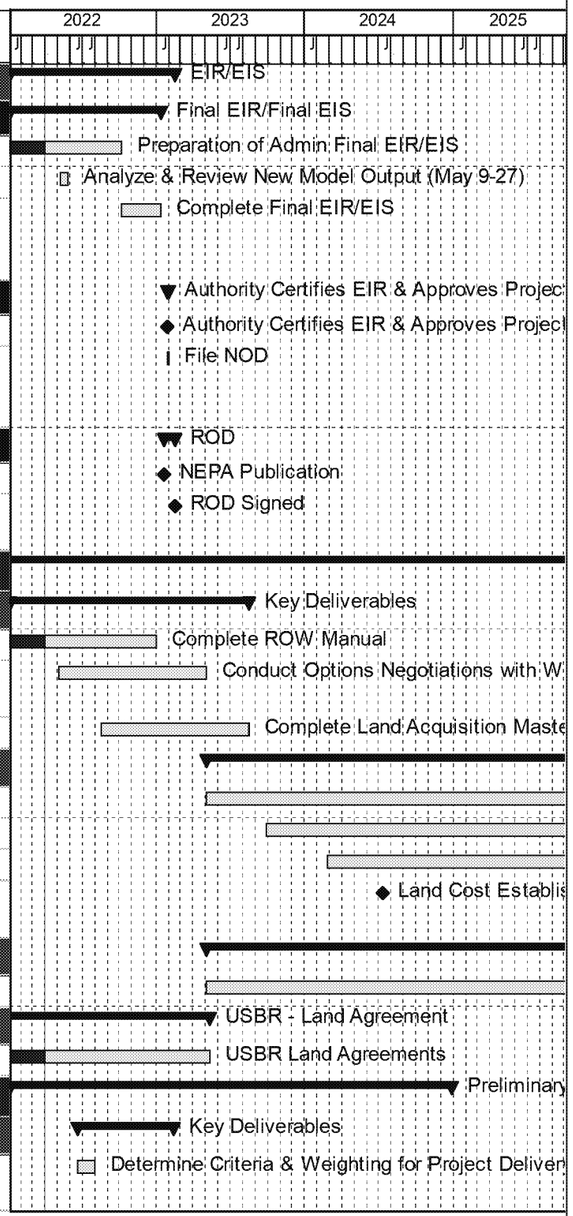
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Schedule

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263	**EIR/EIS**		221	03-Jan-22 A	17-Feb-23		
264	**Final EIR/Final EIS**		194	03-Jan-22 A	10-Jan-23		
265	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22		EIR-250: FS
266	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22	FO-1110: FS	EIR-250: FS
267	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23	EIR-210: FS, EIR-220: FS	106-102: FS, 404-050: FF 30, EIR-440: FF 5, EIR-370: FF 10, MS-1200: FF, KD-1470: FF
268	**Authority Certifies EIR & Approves Project & File NOD**		5	25-Jan-23	01-Feb-23		
269	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23	EIR-250: FF 10	EIR-380: FS
270	EIR-380	File NOD	5	26-Jan-23	01-Feb-23	EIR-370: FS	KD-1310: FF, CVFPB-220: FS, 2081-220: FS, 2081-120: FS, 1600-220: FS, 401-220: FS, WRP-120: FS, EIR-450: FS
271	**ROD**		22	18-Jan-23	17-Feb-23		
272	EIR-440	NEPA Publication	0		18-Jan-23	EIR-250: FF 5	EIR-450: FS 22
273	EIR-450	ROD Signed	0		17-Feb-23	106-102: FS, BA-220: FS, BA-210: FS, EIR-380: FS, EIR-440: FS 22	KD-1310: FF, 408-150: FF, FED-100: FF, 408-160: FS, FED-090: FF, MS-1300: FS
274	**Real Estate**		1774	02-Nov-20 A	19-Feb-29		
275	**Key Deliverables**		346	03-Jan-22 A	16-Aug-23		
276	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22	MS-1000: SS	KD-1500: FF, KD-1500: SS 85
277	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23	KD-1495: FF, KD-1495: SS 85	MI-1100: FS, RE-1060: FS, RE-1070: FS, RE-1080: FS
278	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23	MS-1100: FS	KD-1130: FF 40
279	**Land Acquisition**		1500	05-May-23	19-Feb-29		
280	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29	KD-1500: FS	RE-1070: SS 100, RE-1100: SS
281	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29	KD-1500: FS, RE-1060: SS 100	RE-1080: SS 100
282	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29	KD-1500: FS, RE-1070: SS 100	
283	RE-1050	Land Cost Established	0		11-Jul-24	LAAC-1500: FF 25, LAAG-1500: FF 25, LAAY-1400: FF 25	CU-1000: FF
284	**Relocation**		1500	05-May-23	01-Feb-29		
285	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29	RE-1060: SS	
286	**USBR - Land Agreement**		278	02-Nov-20 A	10-May-23		
287	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23	EIR-450: FF	
288	**Preliminary Engineering**		694	03-Jan-22 A	30-Dec-24		
289	**Key Deliverables**		160	21-Jun-22	10-Feb-23		
290	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22	CS-1300: FS	MS-5000: FF



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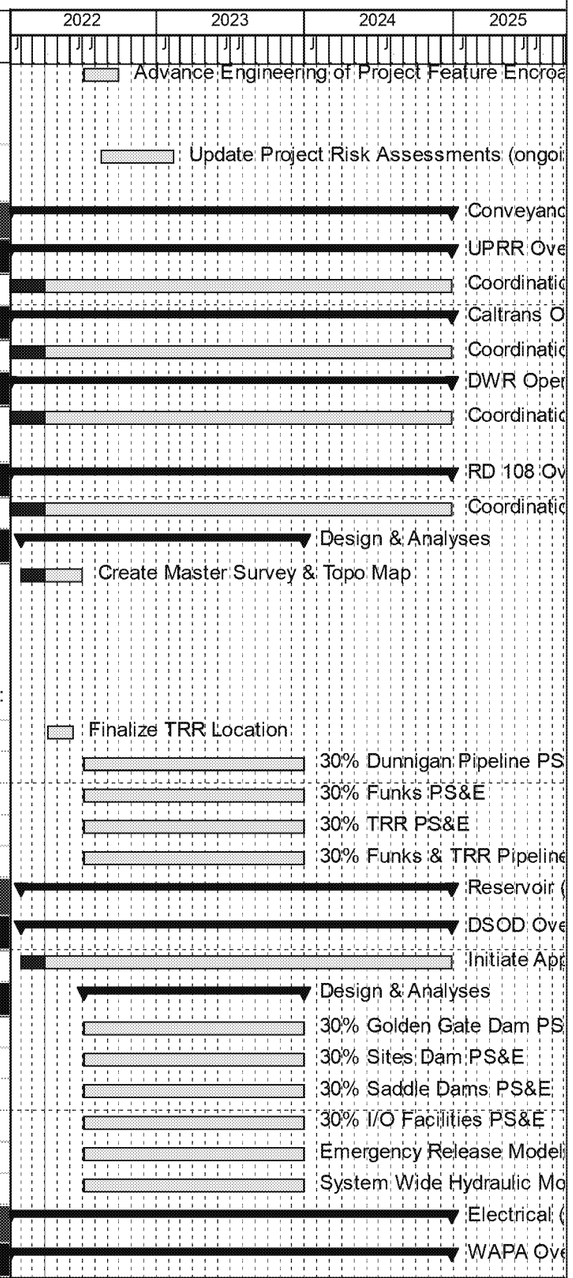
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Schedule

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291	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	05-Jul-22	27-Sep-22	KD-1140: FS	CVFPB-200: FF 5, 408-150: FS, 408-135: FF
292	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	120	17-Aug-22	10-Feb-23	CS-1400: FS	MS-5000: FF
293	**Conveyance (Pipelines, Pump Stations, Canals)**		693	03-Jan-22 A	27-Dec-24		
294	**UPRR Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
295	A1110	Coordination & Oversight with UPRR	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
296	**Caltrans Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
297	A1120	Coordination & Oversight with Caltrans	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
298	**DWR Operations Oversight & Review (KLOG)**		693	03-Jan-22 A	27-Dec-24		
299	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
300	**RD 108 Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
301	A1140	Coordination & Oversight with Reclamation District 1(	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
302	**Design & Analyses**		437	01-Feb-22 A	29-Dec-23		
303	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	01-Jul-22	MS-1000: SS	KD-2100: FS, KD-2090: FS, KD-2080: FS, KD-2070: FS, KD-2060: FS, KD-2050: FS, KD-2040: FS, KD-2030: FS, KD-2020: FS, KD-2010: FS, KD-1650: FS, KD-1640: FS, KD-1200: FS, KD-1660: FS, KD-1630: FS, KD-1110: FS
304	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22	KD-2000: SS 22	KD-2020: FS
305	KD-1630	30% Dunnigan Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
306	KD-2010	30% Funks PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
307	KD-2020	30% TRR PS&E	372	05-Jul-22	29-Dec-23	KD-1150: FS, KD-1140: FS	KD-1180: FF
308	KD-2030	30% Funks & TRR Pipeline PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
309	**Reservoir (Dams, Tunnels)**		694	01-Feb-22 A	30-Dec-24		
310	**DSOD Oversight & Review**		694	01-Feb-22 A	30-Dec-24		
311	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24	MS-1000: SS	MS-5000: FF
312	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
313	KD-1660	30% Golden Gate Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
314	KD-2040	30% Sites Dam PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
315	KD-2050	30% Saddle Dams PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
316	KD-2060	30% I/O Facilities PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
317	KD-2070	Emergency Release Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
318	KD-2080	System Wide Hydraulic Modeling	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
319	**Electrical (Substation, Switchyard, Transmission Line**		694	03-Jan-22 A	30-Dec-24		
320	**WAPA Oversight & Review**		694	03-Jan-22 A	30-Dec-24		



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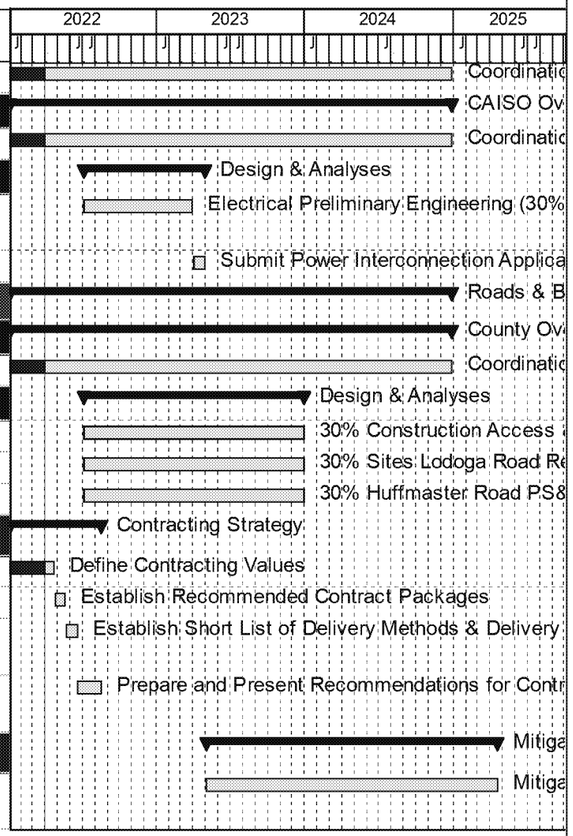
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321	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
322	**CAISO Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
323	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
324	**Design & Analyses**		205	05-Jul-22	28-Apr-23		
325	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	05-Jul-22	31-Mar-23	KD-1140: FS	C4E-1000: SS, KD-1180: FS, KD-1200: FS
326	KD-1200	Submit Power Interconnection Application	20	03-Apr-23	28-Apr-23	KD-1640: FS, KD-1140: FS, MS-1000: SS	MS-5000: FF
327	**Roads & Bridges**		694	03-Jan-22 A	30-Dec-24		
328	**County Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
329	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
330	**Design & Analyses**		372	05-Jul-22	29-Dec-23		
331	KD-1650	30% Construction Access & Maintenance Roads PS&	372	05-Jul-22	29-Dec-23	KD-1140: FS	C4E-1000: SS, KD-1180: FF
332	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
333	KD-2100	30% Huffmaster Road PS&E	372	05-Jul-22	29-Dec-23	KD-1140: FS	KD-1180: FF
334	**Contracting Strategy**		96	03-Jan-22 A	16-Aug-22		
335	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22		CS-1200: FS
336	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22	CS-1100: FS	CS-1300: FS
337	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22	CS-1200: FS	CS-1400: FS, KD-1120: FS
338	CS-1400	Prepare and Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22	CS-1300: FS	KD-1130: FF 40, MS-1100: FS, KD-1210: FS
339	**Mitigation Implementation**		500	05-May-23	21-Apr-25		
340	MI-1100	Mitigation Implementation (more information needed to expand detail)	500	05-May-23	21-Apr-25	KD-1500: FS	



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites with Geo / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
Data Date: 31-Mar-22 / Print Date: 05-Apr-22

© Oracle Corporation

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/5/2022 3:01:39 PM
To: Spranza, John [john.spranza@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Risse, Danielle [Danielle.Risse@hdrinc.com]
Subject: Re: Yoca Dehe GIS requests for isolates

I'm checking with Janis on status so we all know where they are in getting remaining data to the Tribe.

On Apr 5, 2022, at 4:46 PM, Spranza, John <John.Spranza@hdrinc.com> wrote:

Thank you!! Just wanted to close the loop

John Spranza

D 916.679.8858 M 818.640.2487

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, April 5, 2022 2:44 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Risse, Danielle <Danielle.Risse@hdrinc.com>
Subject: Re: Yoca Dehe GIS requests for isolates

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Yes, Janis and I talked about it. She had a conversation with Laverne Bill and indicated that he said data was needed. I then reached out to Ali and she agreed to provide the isolate data. This was communicated back to Janis.

On Apr 5, 2022, at 3:12 PM, Spranza, John <John.Spranza@hdrinc.com> wrote:

Hi Laurie,
I wanted to follow up on a Yoca Dehe data request from a few weeks ago to see where it ended up. Last I heard Andrew from the tribe wanted a significant amount of additional GIS data (descriptions and records) for all of the isolates and there was some question from the cultural team as to whether or not is was actually needed for them to perform their anticipated work. Did we ever come to a resolution on this? Danielle is out and I thought I had heard that Janis or Susan were going to raise this question to you if needed.

Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916.679.8858 M 816.640.2487
john.spranza@hdrinc.com

hdrinc.com/follow-us
hdrinc.com/follow-us

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/5/2022 5:49:23 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Williams, Nicole [Nicole.Williams@icf.com]
Subject: RE: Sites - GCID Improvements in the Final EIR/EIS

This is perfect! Thanks much Nicole!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, April 5, 2022 5:45 PM
To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites - GCID Improvements in the Final EIR/EIS

Just saw your emails - thanks for confirming Nicole !

On Apr 5, 2022, at 7:28 PM, Williams, Nicole <Nicole.Williams@icf.com> wrote:

Hello,

The two emergency release structures for Alternatives 1 and 3 are eliminated. Thus the emergency releases into Hunters Creek are being reduced (from what was evaluated in the RDEIR/SDEIS).

If it helps, here's the description we currently have in the outline of MR2 (presumably not yet reviewed by Henry or HR since we just turned it in yesterday):
Two emergency release structures, Emergency Release Structure 1 located adjacent to Saddle Dam 3 and Emergency Release Structure 2 located adjacent to Saddle Dam 5, identified and described in Chapter 2, Project Description and Alternatives, of the RDEIR/SDEIS and evaluated in the resource chapters, have been eliminated from Alternatives 1 and 3. Alternative 2 as described and evaluated in the RDEIR/SDEIS does not include these emergency release structures.

Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, April 5, 2022 5:19 PM

To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - GCID Improvements in the Final EIR/EIS

Thanks much! One more question – we are removing the following from the final, correct:

Saddle Dams 3 and 5 would be designed to release emergency flows. Therefore, these two saddle dams would have an intake in the reservoir, a tunnel under the ridge, and an outlet structure to provide energy dissipation and controlled emergency releases of water to the local receiving drainage, Hunters Creek. The intake would be a reinforced concrete structure of appropriate length (approximately 65 linear feet with trashracks). The tunnel would be reinforced concrete with a steel liner; its diameter is expected to range from 10 to 12 feet, and it would be approximately 830 linear feet. The energy dissipation structure would be a reinforced concrete structure containing one or multiple energy dissipation valves within steel-lined chambers to contain spray and provide controlled release of water to Hunters Creek. The size of the energy dissipation chambers would be determined based on manufacturer recommendations. A riprap lined basin would extend for a minimum of 100 feet downstream of the energy dissipation structure to transition the discharge to the receiving channel.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Williams, Nicole <Nicole.Williams@icf.com>
Sent: Tuesday, April 5, 2022 5:02 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites - GCID Improvements in the Final EIR/EIS

Hello Ali – all GCID improvements are remaining in the Final EIR/EIS (headgate and siphons). Cheers, Nicole

NICOLE L. WILLIAMS
Senior Environmental Planner
ICF
o 916.231.9614
icf.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, April 5, 2022 5:00 PM
To: Williams, Nicole <Nicole.Williams@icf.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites - GCID Improvements in the Final EIR/EIS

Apologies because I cant remember where we landed on these for the Final EIR/EIS and I want to make the water right application consistent. Will the headgate improvements and canal improvements be in the Final EIR/EIS or did we pull those out? Checking in with you Nicole as Laurie is on vacation and I figure you likely know the answer. 😉

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/5/2022 6:08:36 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Danielle Risse [Danielle.Risse@hdrinc.com]
Subject: Fwd: Yoca Dehe GIS requests for isolates

I checked in with Janis - she and ICF continue to work with Yocha Dehe staff to get them the GIS data they requested. I'll get an update after their meeting on Thursday.

I told her that we want to accommodate to the extent we can, even though there isn't much data for isolates.

Sent from my iPhone

Begin forwarded message:

From: Janis Offermann <janis@horizonh2o.com>
Date: April 5, 2022 at 5:05:12 PM CDT
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Yoca Dehe GIS requests for isolates

Hi, Laurie
We are having a call with ICF GIS and Yocha Dehe on Thursday. I have volunteered to add in the descriptions to the isolate notes, but hopefully GIS can talk Andrew from YD out of needing more.
It is very frustrating.
Hope you are enjoying your vacation!

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, April 05, 2022 3:00 PM
To: Janis Offermann <Janis@Horizonh2o.com>
Subject: Fwd: Yoca Dehe GIS requests for isolates

FYI - John was asking me about the GIS data for Yocha Dehe. I sent this and then forwarded the email chain that included Ali's direction to move forward. I am on "vacation" but responding to email. How i# this process going? Do they have the data now or are you still working on it?

Begin forwarded message:

From: "Spranza, John" <John.Spranza@hdrinc.com>
Date: April 5, 2022 at 4:46:00 PM CDT
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>, "Risse, Danielle" <Danielle.Risse@hdrinc.com>
Subject: RE: Yoca Dehe GIS requests for isolates

Thank you!! Just wanted to close the loop

John Spranza

D 916.679.8858 M 818.640.2487

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, April 5, 2022 2:44 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Risse, Danielle <Danielle.Risse@hdrinc.com>
Subject: Re: Yoca Dehe GIS requests for isolates

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Yes, Janis and I talked about it. She had a conversation with Laverne Bill and indicated that he said data was needed. I then reached out to Ali and she agreed to provide the isolate data. This was communicated back to Janis.

On Apr 5, 2022, at 3:12 PM, Spranza, John <John.Spranza@hdrinc.com> wrote:

Hi Laurie,
I wanted to follow up on a Yoca Dehe data request from a few weeks ago to see where it ended up. Last I heard Andrew from the tribe wanted a significant amount of additional GIS data (descriptions and records) for all of the isolates and there was some question from the cultural team as to whether or not is was actually needed for them to perform their anticipated work. Did we ever come to a resolution on this? Danielle is out and I thought I had heard that Janis or Susan were going to raise this question to you if needed.

Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916.679.8858 M 818.640.2487
john.spranza@hdrinc.com

hdrinc.com/follow-us
hdrinc.com/follow-us

From: Briard, Monique [Monique.Briard@icf.com]
Sent: 4/6/2022 1:00:12 PM
To: steve.micko@jacobs.com; Hendrick, Mike [Mike.Hendrick@icf.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Heydinger, Erin [erin.heydinger@hdrinc.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Saadat, Samaneh [Samaneh.Saadat@jacobs.com]
Subject: RE: Sites BA Sacramento River Temperature and Martin/Anderson Models

Thank you, Steve. We will get this sent out to the team. Monique

From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Wednesday, April 6, 2022 10:45 AM
To: Briard, Monique <Monique.Briard@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
Subject: Sites BA Sacramento River Temperature and Martin/Anderson Models

Hi Monique and Mike,

The following model results files are attached:

- **NODOS_Trend_Reporting_rev06cye_DV6_2035CT_HEC5Q___NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.xlsm**
  - Trend reporting spreadsheet with Sacramento River temperature results for:
    - NAA 032822 2035CT,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- **Sites_MartinMortalityExceedancePlots_rev03_20220405_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf**
  - Monthly temperature-dependent mortality (as estimated with the Martin Model) exceedance plots for:
    - NAA 032822 2035CT,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.
  - Monthly exceedance plots display cumulative results. For example, end of September mortality displays the cumulative mortality from the beginning of the temperature management season until the end of September.
- **Sites_AndersonMortalityExceedancePlots_rev03_20220405_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf**
  - Monthly temperature-dependent mortality (as estimated with the Anderson Model) exceedance plots for:
    - NAA 032822 2035CT,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.
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I've posted all attached material and HEC5Q models to the SharePoint as well.

Please let me know if you have any questions.

Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/7/2022 5:55:36 AM
To: Spranza, John [john.spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: FW: Sites BA Sacramento River Temperature and Martin/Anderson Models
Attachments: NODOS_Trend_Reporting_rev06cye_DV6_2035CT_HEC5Q___NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.xlsm; Sites_MartinMortalityExceedancePlots_rev03_20220405_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf; Sites_AndersonMortalityExceedancePlots_rev03_20220405_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf

FYI

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Wednesday, April 6, 2022 10:45 AM
To: Briard, Monique <Monique.Briard@icf.com>; Hendrick, Mike <mike.hendrick@icf.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
Subject: Sites BA Sacramento River Temperature and Martin/Anderson Models

Hi Monique and Mike,

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    - ALT3B 032922 2035CT.
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Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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File Provided Natively

From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/7/2022 7:48:13 AM
To: mmaltby@brwncald.com
CC: David Hubbard [Dhubbard@BrwnCald.com]; Cheyanne Harris [charris@brwncald.com]
Subject: Re: Scheduling Questions

Hi Marcus,

I agree with your comments. Your brown boxes are covered by other sets of activities. Those boxes that are not highlighted have been "overcome by events" and have been captured thoroughly in the follow-up discussions after our St. Patrick's Day workshop ☘.

The WIFIA loan will not close until after the investors commit. This loan needs to be ready to close (negotiations complete) as soon as the investors are satisfied with all other key components of the project (water right received, key permits, unit cost update). Right now, we need to push the closing WIFIA milestone to lag investor commitment by 20 days or so.

Thanks,
JP

From: Marcus Maltby <mmaltby@BrwnCald.com>
Sent: Wednesday, April 6, 2022 3:27 PM
To: JP Robinette <jrobinette@sitesproject.org>
Cc: David Hubbard <Dhubbard@BrwnCald.com>
Subject: Scheduling Questions

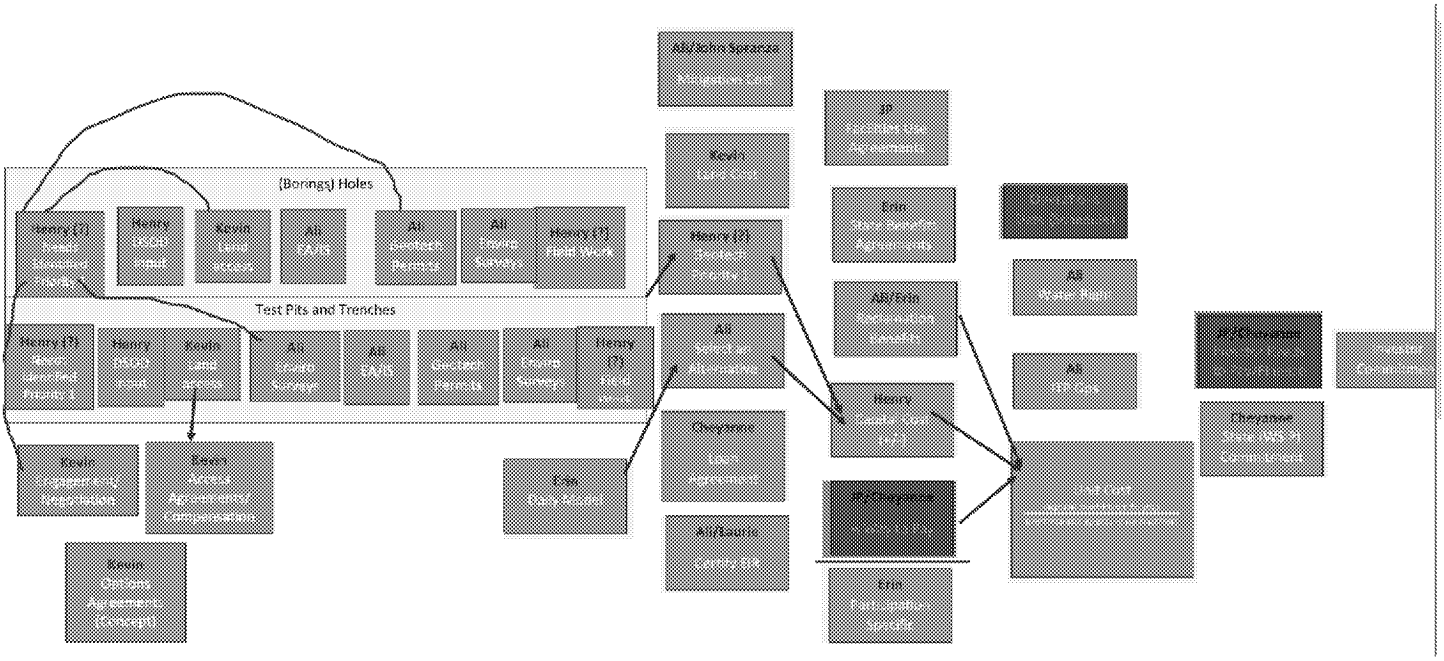
Hey JP – I'd like to confirm something with you regarding the schedule. See below graphic (Cheyanne's notes of the whiteboard from Scheduling WS). As we are getting close to wrapping up this baseline schedule, myself and Dave tested what we have in the schedule vs our whiteboard notes.

How to read the graphic:

- The boxes highlighted in yellow represent activities that are in the schedule and seemed to have appropriate logic.
- The orange/brown boxes represent items that I don't think are in the schedule. Now these could be under a different name or more than likely they are a title of a collection of activities that wouldn't necessarily need its own activity.
- The non highlighted boxes are items that have been influx and have changed a good amount since the WS. I asked Henry to confirm that those activities in one form or another are represented. We can ask Environmental team to do the same.

Questions:

1. Do you agree with my comments on the Orange/Brown boxes? Or are we missing something?
2. What step in the WIFIA loan process is a successor and predecessor to Investor Commitment? My understanding is we cant close on the WIFIA loan without investor commitment but likely a certain level of certainty would be needed for investor commitment?



Thanks,

Marcus Maltby, PE*
Brown and Caldwell
MMaltby@brwncald.com
T 714.689.4826 | **C** 714.392.1909
*Professional Registration in Specific States

Meeting: **Sites Reservoir Committee, Operations & Engineering Workgroup**

Call in: **1-213-379-5743** Code: **223 227 280#** Click here to join the meeting

Workgroup Chair:	Robert Kunde (Wheeler Ridge Maricopa WSD)
Workgroup Vice Chair:	Mike Azevedo (Colusa County)
Staff Lead:	JP Robinette, Engineering & Construction Manager

Notice: Pursuant to Assembly Bill 361 this meeting will be conducted by teleconference. The public may attend the meeting and offer public comments by phone, using the call-in number above. Members of the workgroup will participate by teleconference from other locations.

AGENDA

Wednesday, April 13, 2022; 1:30 – 3:30 pm

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions.
- Period for Public Comment.

1. Discussion and Information Items:

1.1 Review and comment on updated workgroup charter and guidelines.

1.2 Review and comment on initial modeling results related to the Biological Assessment and Operations Incedental Take Permit.

1.3 Receive an update from the Contract Strategy Sub-Workgroup on progress and next steps.

1.4 Review and comment on the engineering and geotech activities in the project schedule for the Amendment 3 work period.

2. Engineering and Construction Manager Report

3. Upcoming Meetings:

Joint Sites Ag District Structuring Workshop
Friday, April 15, 2022 (9:00 am – 10:30 am)

Reservoir Committee
Friday, April 22, 2022 (9:00 am – 12:00 pm)

Authority Board
Wednesday, April 27, 2022 (1:30 – 4:00 pm)

Operations & Engineering Workgroup
Wednesday, June 8, 2022 (1:30 – 3:30 pm)

Virtual Information will be provided before all meetings at Sitesproject.org.

ADJOURN

PERIOD OF PUBLIC COMMENT: Any person may speak about any subject of concern, provided it is within the jurisdiction of the Reservoir Committee and is not already on today's agenda. The total amount of time allotted for receiving such public communication shall be limited to a total of 10 minutes per issue and each individual or group will be limited to no more than 3 minutes each within the 10 minutes allocated per issue. **Note:** No action shall be taken on comments made under this comment period.

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

Preliminary Evaluation of the Planning Aid Memorandum, Technical Memorandum

To:	Alicia Forsythe, Sites Project Authority
CC:	John Spranza, Sites Integration Laurie Warner-Herson, Sites Integration
Date:	March 21, 2022
From:	ICF
Quality Review:	Mike Hendrick (ICF)
Authority Agent Review:	N/A
Subject:	Preliminary Evaluation of the Planning Aid Memorandum

1.0 Purpose

This memorandum presents a preliminary evaluation of the August 5, 2021, Planning Aid Memorandum (PAM) provided by the U.S. Fish and Wildlife Service (USFWS) to the U.S. Bureau of Reclamation (Reclamation) for the Sites Reservoir Project (Project). The purpose of the PAM was to provide Reclamation with the USFWS's comments and recommendations regarding the Project's potential effects on biological resources for consideration in project planning and preparation of a public revised draft environmental document. The PAM was prepared under the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). The Fish and Wildlife Coordination Act requires federal agencies proposing water resource development projects or involved in issuance of related permits or licenses to consult with the USFWS and provide equal consideration to the conservation, rehabilitation, and enhancement of fish and wildlife resources with other project purposes.

The PAM summarized early coordination between USFWS and Reclamation regarding potential Project effects of the proposed Sites Reservoir Project (Project). It provided a high-level description of the Project and USFWS's views of potential effects of the inundation of upland habitat (i.e., upland effects), increased diversions of Sacramento River water (i.e., in-river effects), and cumulative impacts associated with implementation of other projects. The PAM also summarized information and early analysis of effects provided to the USFWS by Reclamation and identified areas and concerns where the USFWS indicated that more information or analysis was needed.

The key concerns identified in the PAM are categorized as upland effects (Section 2.0), in-river effects (Section 3.0), and cumulative impacts (Section 4.0). Responses summarizing how each key concern was addressed are provided herein; the Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) released in

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November 2021 contained much of the information to address these key concerns (Sites Project Authority and U.S. Bureau of Reclamation 2021). Subsequent analysis that was developed in preparation of responses to public comments on the RDEIR/SDEIS and for the development of related permitting processes was also used to address the key concerns.

2.0 Upland Effects

Key Concern: Provide greater specificity regarding potential mitigation lands or banks for each of the habitat types for which mitigation is proposed.

Commented [SJ1]: Reclamation Comment: Note that the mitigation plan will need to discuss more than conceptual, some specifications and general criteria

Commented [SJ2R1]: The plan is in the process of being revised and will incorporate this comment

Response: Given the size of Sites Reservoir, the Sites Project Authority (Authority) will have to rely on several mitigation strategies including a mix of mitigation banks and other mitigation mechanisms. The Project's Mitigation and Monitoring Plan (Plan) that will be provided to the USFWS prior to the coordination Report and will accompany the Final EIR/EIS and the permitting documents provides. The Plan is a comprehensive mitigation planning strategy, and implementation approach and general criteria for species and habitats based on anticipated and permitted Project impacts on regulated biological resources. As access is currently limited to less than 1% of the Project area, a final analysis of impacts will be conducted following the final refinements of Project design and completion of on-the-ground and protocol-level biological field surveys.

Commented [DMD3]: Something is missing

Commented [SJ4]: Reclamation Comment: Add assurance for MP to be shared with service prior to coordination act report

Commented [SJ5R4]: Added text to address

Following completion of Project construction, temporary impacts will be mitigated through restoration and revegetation of areas disturbed by construction in accordance with an approved habitat restoration plan. Permanent impacts will be mitigated on site and at agency-approved (USFWS, National Marine Fisheries Service [NMFS], and/or California Department of Fish and Wildlife [CDFW]) offsite locations. Onsite compensatory mitigation may include restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or preservation of aquatic or terrestrial biological resources that occur within the proposed Project area. Offsite compensatory mitigation for the proposed Project may include the purchase of agency-approved mitigation/conservation bank credits, the establishment of third party-responsible "turn-key" mitigation/conservation bank projects, preservation of biological resources through conservation easements with private landowners, payments to in-lieu fee programs, or the establishment of permittee-responsible offsite mitigation sites. The methods for assessing resources in the project footprint, best management practices to be applied, tools available for mitigating effects of the project are discusses in chapters 9 – *Vegetation and Wetland Resources*, and 10 – *Wildlife Resources* RDEIR/SDEIS.

The Authority has conferred with USFWS about species habitat models and used this information to estimate mitigation obligations. The Authority expects to continue to work with USFWS and Reclamation as the Project moves forward and better information becomes available to define mitigation requirements.

Key Concern: Provide a better description of how increases in Level 4 refuge water will be provided and the expected benefit to migratory birds.

Commented [SJ6]: Reclamation Comment: Review the comment for coordination with the service

Commented [SJ7R6]: Added coordination text to first paragraph of response to address

Response: Security/expansion of Level 4 refuge water supply is an environmental benefit recognized by the California Water Commission in its authorization of State funding from the

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Water Storage Investment Program (WSIP). The Authority envisions that CDFW will take an active role in managing the ecosystem water and would work with CDFW to schedule and adjust releases of ecosystem water to address real-time conditions and needs. The Authority also recognizes that Level 4 refuge water may be made available to federal refuges north and south of the Sacramento–San Joaquin Delta (Delta) and as such, expects that it would provide Level 4 water to appropriate destinations based on guidance from, and coordination with the CDFW, USFWS, and Reclamation.

Commented [DMD8]: this is one of our NEPA purposes, shouldn't this be: "... that L4 refuge water would be made available ..." or is there some other distinction we're making here?

Table 1 below is from the *Water Storage Investment Program: Sites Reservoir Project Continuing Eligibility and Feasibility Determination* report (California Water Commission 2021). It identifies the Project's Incremental Level 4 Refuge water supply benefits in terms of water supply increases to National Wildlife Refuges, State Wildlife Areas, and privately managed wetlands projected in 2030 and 2070 as estimated based on WSIP Unit Water Values.

The Authority expects to work closely with the state and federal refuge managers to ensure this water is used effectively, including for migratory waterfowl use in winter and, as appropriate, its inclusion in the Central Valley Project Improvement Act Refuge Water Supply Program.

Table 1. Incremental Level 4 Refuge Water Supply Increases (2030 and 2070) (TAF/year)

Period	North-of-the-Delta	South-of-the-Delta [b]	Total
2030 Results			
Long-Term Average [a]	5	11	17
Wet	0	0	0
Above Normal	9	5	14
Below Normal	9	13	22
Dry	8	27	34
Critical	6	17	23
2070 Results			
Long-Term Average [a]	5	10	15
Wet	0	0	0
Above Normal	9	1	10
Below Normal	7	8	16
Dry	7	10	17
Critical	6	21	27

Source: CALSIM II.
Notes:
(a) Average weighted based on water-year frequency rates
(b) Includes both San Joaquin and Tulare Lake Refuge deliveries and based on San Joaquin Valley 60-20-20 Index Year Class.
TAF = thousand acre-feet

Key Concern: More thorough analysis of geomorphic effects of flow reduction in the higher flow range on habitat (cut bank formation, cottonwood seed dispersion/regeneration processes, wood transport) and the sensitive species that use it (e.g., bank swallows, yellow-billed cuckoo).

Commented [SJ9]: Reclamation Comment: May have ROC implications and need to crosscheck this topic

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Response: The SRH-Meander model results presented in the RDEIR/SDEIS (Chapter 7 – *Fluvial Geomorphology* ,Sites Project Authority and U.S. Bureau of Reclamation 2021) suggested that the tendency for meander is not significant among the Project alternatives and the No Action Alternative (NAA). The river meandering, bank erosion, and deposition modeling concluded that there were no significant differences in the channel alignments between existing conditions and the modeled alternatives. Thus, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal, and consequently, impacts on sensitive species would be negligible or minimal as well. The Authority will review these results with USFWS and Reclamation to determine whether additional analysis is warranted, or additional considerations will be added to the monitoring and adaptive management plans or the Project description.

Key Concern: Additional review may be needed of the resource protection measures identified for habitats (e.g., riparian, upland, stream, and wetland) that could support special-status species including the listed valley elderberry longhorn beetle, red-legged frog, and several rare plants, which are potentially present within the impact area.

Commented [DMD10]: I think this comment is about the minimization and avoidance measures for certain spp/habitats. There may be buffers or other conservation measures in there that are not consistent with what the Service typically requires. We could ask them about this. It would be easier for implementation if our NEPA/CEQA commitments are consistent w/ what the BO will require.

Response: As stated above, verification of species' presence and habitat suitability has been limited by lack of access to lands that would be affected by the Project. Potential wildlife resources in the study area were evaluated by reviewing existing information and identifying potentially suitable habitat with geographic information system modeling. Sources of information and modeling techniques are summarized in Chapter 10, *Wildlife Resources*, of the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021). During the development of Project environmental documents and prior to the Record of Decision, the Authority will continue to work with USFWS, Reclamation, and other regulatory agencies to review these results and verify whether the resource protection measures identified address their concerns.

3.0 In-River Effects

Key Concern: Provide a better demonstration of temperature benefit expected from opportunities to increase storage in Shasta reservoir.

Response: In coordination with Reclamation, text was developed to expand the discussion of fisheries benefits related to increased operational flexibility associated with Shasta reservoir. Additional water supply from Sites Reservoir would provide opportunities for improved management of salmonid habitat, particularly in the Sacramento River above Red Bluff Diversion Dam. By exchanging Sites Reservoir water for Central Valley Project (CVP) water, Reclamation has an additional tool to maintain and improve habitat for salmonid spawning, incubation, rearing, and migration. By delivering water to CVP contractors from Sites Reservoir, Reclamation may maintain supply in Shasta reservoir. Maintenance of supply can then be allocated in real-time management scenarios to uses that protect and enhance anadromous fish benefits, including protecting and enhancing the cold-water pool, which is essential for temperature control in the salmonid spawning reaches below Keswick Dam during Dry and Critically Dry Water Years. Increased storage may provide benefits beyond temperature such as

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~~Maintenance of supply in Shasta reservoir may also provide~~ providing a resource for maintaining fall flows to sustain spawning redds that persist in the wetted margins of the Sacramento River. In years when storm events are weak and naturally-occurring pulse flows are minimal, this maintenance of supply could be used to manufacture a spring pulse flow to assist juvenile salmonids in completing their migration from the upper Sacramento River to the Delta and ultimately the Pacific Ocean. Sites Authority and its contractor will work with USBR to re-analyze various levels of USBR participation in the project to assess fisheries benefits associated with those levels of participation for the multiple objectives related to increased Shasta Reservoir storage.

The Project would also provide an additional capability to address expected changes in precipitation and runoff patterns anticipated to result from climate change (see chapter 28 of the RDEIR/SDEIS). While long-term averages in precipitation are not expected to change, more precipitation is expected to fall as rain, resulting in a decreased snowpack and changes in runoff patterns. These changes will likely present challenges for future water management, including that for environmental benefits. The ability of the Project to capture and store water that cannot be captured and stored by Reclamation and to exchange water with Shasta reservoir creates flexibility to provide environmental benefits to anadromous fish in the upper Sacramento River under climate change scenarios.

Key Concern: In general, whenever water diversions occur, there will be an associated loss of food organisms and sediment, incidental mortality of fish at the intake screen(s), and lower survival due to lower flows and related mechanisms (predation exposure, less inundated edge cover, less food production, less suspended sediment):

A. Flow criteria at Wilkins Slough (8,000 cfs [cubic feet per second] in April and May; 5,000 cfs in other months) is likely inadequate to protect downstream migrating salmon. Suggest consideration of Michel et al. (2021).

B. Need more thorough analysis of effects of habitat reduction on survival, weighted usable area (WUA) curves do not disclose all effects associated with reduced flow

C. More complete analysis of effects of flow reductions on sturgeon migration

Response:

A. Wilkins Slough: During discussions with the State of California and others, the Authority has agreed to analyze increasing the base flow requirement at Wilkins Slough during October ~~to~~ May to 10,700 cfs (303 m^3/s), which is consistent with the step function identified to in Michel et al. (2021) for increased Chinook salmon survival in the Sacramento River. In summary, Michel et al. (2021) looked at the challenge of implementing functional flows to optimize ecosystem improvements given the limited resources. Operations of the Project will include this revised Wilkins Slough standard and the pulse flow requirements. The following criteria have been drafted to define a qualified pulse flow event:

    1. Outmigration pulse of anadromous fish is detected based on the Project's fish monitoring program.

Commented [DMD11]: This response includes exchanges, if we remove exchanges from the EIR/S's PD or S7 consult, then we may need to revisit/update this response.

Commented [DMD12]: Same

Commented [MSC13R12]: How does this relate to the key concern of temperature? Or to other benefits of increased storage?

Is there an analysis of frequency of these exchanges and improved storage by WY type?
What results are expected to demonstrate this flexibility?
Is this related to all 3 objectives or just temperature benefits?
What seasons would these exchanges need to occur within to provide benefits?

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2. If the 3-day forecasted average of Sacramento River flow at Bend Bridge is projected to exceed 8,000 cfs and the 3-day forecasted average tributary flow upstream of Bend Bridge (Cow Creek, Cottonwood Creek, and Battle Creek) is projected to exceed 2,500 cfs, a pulse event is initiated and diversion restrictions would begin when flows in the Sacramento River at Bend Bridge exceed 8,000 cfs and flows in the tributaries upstream of Bend Bridge cumulatively exceed 2,500 cfs and the previous day was not already in a pulse event. If no forecast data are available for Sacramento River flow at Bend Bridge, a pulse event is initiated, and diversion restrictions would begin when the 3-day trailing average of Sacramento River flow at Bend Bridge exceeds 8,000 cfs and the 3-day trailing average of tributary flow upstream of Bend Bridge (Cow Creek, Cottonwood Creek, and Battle Creek) exceeds 2,500 cfs and the previous day was not already in a pulse event.

3. A pulse event terminates 7 days after initiation or earlier if any of the following conditions occur: (1) the outmigration pulse of anadromous fish is no longer detected by the fish monitoring program; or (2) Sacramento River flow at Bend Bridge exceeds 25,000 cfs. If the Sacramento River flow at Bend Bridge exceeds 25,000 cfs during the 7-day pulse event, Project diversions may resume such that average daily diversions subtracted from Sacramento River flow at Bend Bridge continues to be at least 25,000 cfs.

4. After completion of a pulse event, the following conditions must occur before another pulse event is triggered: (1) 3-day trailing average of Sacramento River flow at Bend Bridge was less than 7,500 cfs for 7 consecutive days; and (2) 3-day trailing average of tributary flow upstream of Bend Bridge (Cow Creek, Cottonwood Creek, and Battle Creek) was less than 2,500 cfs for 7 consecutive days. Diversions are otherwise unrestricted by the Bend Bridge pulse flow protection criteria.

The Authority consulting team will be working with Reclamation to model the effects of this new operations criteria ~~scenario~~ on fisheries resources affected by the Project. The Authority and its consulting team are in ongoing conversations with Reclamation, CDFW, NMFS, and USFWS to develop language to describe how these operational requirements will be implemented and the fish monitoring program necessary. For example, pulse flow criteria could be based on a 3-day trailing average as proposed in the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021) or based on a forecast from the California Nevada River Forecast Center. The operating language also needs to take into account the distance between the two diversion locations and Wilkins Slough and the travel time of flows.

Commented [MSC14]: Move to above? I find this language to somewhat address the few comments I made prior putting on my "non-BOR hat"

B. Upstream habitat: The Authority agrees diverting flow can have effects on habitat volume and available food that are likely more limiting, and not apparent in WUA calculations. The WUA is derived from the CALSIM runs and as such the WUA's are based on monthly averages that may not accurately reflect real time operations. The analysis in Chapter 11, *Aquatic Biological Resources*, of the RDEIR/SDEIS considers factors such

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as temperature, flow, and the effects of flow reductions on side channel and floodplain habitats to support its impact determination of less than significant with mitigation for salmonids (Sites Project Authority and U.S. Bureau of Reclamation).

The Authority and its consulting team will be revising the CALSIM analysis with the updated modeling inputs associated with RDEIR/SDEIS Alternative 3 and updated flow criteria to reassess the effects on WUA. During the spring and summer of 2022, the Authority will work with Reclamation, USFWS, CDFW, and NMFS to review the revised CALSIM and related analyses to assess the adequacy of the analysis and work toward consensus on impact determinations and any measures needed to reduce impacts to less than significant levels.

Commented [DMD15]: Please also add the NEPA effects terms.

C. Sturgeon: Shaffter (1997) reported spawning on white sturgeon in the Sacramento River at flows on 184 to 188 m^3/s after observing pulse of 40 m^3/s over base flow conditions. This reference appears to be the source for the concern. The Sites Authority's decision to adopt a higher Wilkins Slough flow discussed above and the proposed pulse flow protection measure incorporated in the proposed action will ensure Sites Project diversion do not cause flows to decline below those likely to influence sturgeon migration and spawning.

Key Concern: The relationship between pulses and fish movement is not a precise relationship. Longer and more frequent flows may be necessary to protect downstream-migrating juvenile salmon.

Response: The pulse flow criteria described in the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021) were developed to facilitate modeling the effect of pulse flow protection on diversions to the Sites Reservoir. The purpose of the pulse protection measure is to a account for the importance of pulses in stimulating and providing for the redistribution of juvenile fish for their spawning grounds to downstream rearing areas and seaward migration (Poytress 2014, Michel 2021, Hassrick 2022). How pulses are identified in real-time operations is a current topic of discussion between the Authority and the regulatory agencies. The Authority will continue this discussion as it develops the Final EIR/EIS ~~and ROD~~. The Authority will continue to work with Reclamation, USFWS, CDFW, and NMFS to develop a suitable set of pulse flow protection criteria for the initial period of Project operations. And the Authority intends to incorporate pulse protection criteria, and strategies for evaluating the effectiveness of the criteria, into its adaptive management plan to address the uncertainty and refine to criteria to ensure they provide the intended protections.

Commented [MSC16]: These 3 citations are not mechanistic models – more correlations based on modeling.

Steel et al. 2020 provides a mechanistic model of survival on the Sac River -- >

Steel et al. 2020
Applying the mean free-path length model to juvenile Chinook salmon migrating in the Sacramento River, California
Environmental Biology of Fishes
103: 1603-1617

Key Concern: Need to address pulses as a mechanism to initiate/attract adult salmon and sturgeon up stream.

Response: The proposed pulse flow criteria will ensure pulses are protected and propagate downstream to the Delta. The maximum rate of diversion for the Project is 3,900 cfs and many pulse flow criteria far exceed that level. As presented in the RDEIR/SDEIS, the Project is not expected to impede the upstream migration of adult salmon or sturgeon (Sites Project Authority and U.S. Bureau of Reclamation 2021). In addition, the revised Wilkins Slough flow requirement will ensure that Project operations do not diminish flows below levels which may interrupt or

Commented [IJA17]: Upstream passage is not reliant on diversion rate, it is reliant of some quantity of flow. Perhaps provide that flow that is observed in the modeling rather than describe rate of diversion here. See next comment.

Say something like "The minimum flows passing the Project is required to be X in months when salon and sturgeon are initiating and attracted upstream."

Also, it is true that upstream pulses attract salmon? Most fall run salmon enter in Aug and Sept at low outflow conditions with no storms, winter run enter in the spring during high baseflow periods? This mechanism likely is about attracting fish into tributaries not the mainstem, but were not familiar with the literature on Central Valley attraction flows. I think this mostly occurs on Clear Ck, not the Sacramento, Stanislaus, Feather, or American rivers.

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delay the upstream migration of sturgeon. The Authority will review these results and those for new model runs that reflect revised operations criteria and Reclamation's increased Project involvement with the regulatory agencies and Reclamation to ensure concurrence with these findings.

Commented [IJA18]: May want to mention the detection of sturgeon and salmon in the river in 2014-2015 and 2021 drought conditions when initiation/attraction occurred on Sacramento River when flows were 4000-5000 through May. What are the CALSIM flows for Critical April-May? Do they go less than this? Has this been a stressor in years when we know fish are migrating and flows have been observed to be very low?

Key Concern: Provide a better explanation of effects and benefits of fall pulse flows into Yolo Bypass for plankton production and discussion of consequences of reduced flow into the bypass due to reduction in flows attributable to diversions at TCCA and GCID diversions.

Response: An analysis of the expected timing and benefit of the Yolo Bypass flow measure to stimulate food production and convey forage species to the north Delta for the benefit of delta smelt (*Hypomesus transpacificus*) and other planktivorous fish is presented in Chapter 11 - *Aquatic Biological Resources*, of the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021). The Authority notes the benefit of this measure has been acknowledged by CDFW in the review of the Project during the California Water Commission's WSIP approval process. Nevertheless, the Authority expects to continue discussions with Reclamation, USFWS, and the regulatory agencies to refine criteria for implementing a food production release, and strategies for evaluating the effectiveness of the releases, which could be incorporated into the adaptive management plan.

Key Concern: Address expected increase in loss of fish at South Delta export facilities associated with July – September increases in Delta exports.

Response: The effect of moving Sites Reservoir water across the Delta to the Delta export facilities on the location of X2, flows in Old and Middle River, and expected loss at the export facilities are addressed in Chapter 11 - *Aquatic Biological Resources*, and Appendix 5B3, *Delta Operations*, of the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021). The results of these analyses suggest there would be little difference in south Delta ~~entrainment risk~~loss between the NAA and Alternatives 1, 2, and 3, primarily due to absence of juvenile ESA-listed fish in the Delta between July and September.

~~As indicated above, the Authority is revising its CALSIM analysis and subsequent modeling efforts to reflect a larger Reclamation involvement in the Project and modified Wilkins Slough flow requirement of 10,700 cfs from October through June. The Authority's expectation is that these results should demonstrate improvements in fish survival relative to the existing analyses. The Authority will make these results available to Reclamation and the regulatory agencies to ensure the interpretation of the results and findings of effects are vetted by the agencies.~~

Commented [MSC19]: Suggest deleting this paragraph, the key concern was July – September and this refers to October – June.

Key Concern: More thorough analysis may be needed of the effects of exchanges on spawning and rearing habitat in the American and Feather Rivers.

Response: The effects of Project operations on temperatures in the American and Feather Rivers are discussed in Chapter 11, *Aquatic Biological Resources*; Appendix 11B, *Upstream Fisheries Impact Assessment Quantitative Methods*; and Appendix 11D, *Fisheries Water Temperature Assessment*, of the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021). The results indicate impacts from changes in temperatures are less than significant. The effects of Project operations on availability of spawning and rearing habitat in the American and

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Feather Rivers are also analyzed in Chapter 11 and Appendix 11K, *Weighted Usable Area Analysis*, of the RDEIR/SDEIS. The analysis suggests no significant differences between Alternatives 1, 2, and 3 and the NAA with respect to WUA. An analysis of the potential redd dewatering in the American and Feather Rivers was also conducted and discussed in Chapter 11. The results of that analysis suggested no significant differences among the alternatives. Data were not available to support a redd dewatering analysis on the Feather River; however, the Project operations are expected to have minimal to no effect on the low-flow channel.

Commented [MSC20]: If data are not available to support analyses then is it appropriate to claim ops would be expected to be minimal to no effect?

Commented [IJA21R20]: But see 2 sentences earlier that says potential redd dewatering analysis was done? In review, it may be that the Feather R was not analyzed, so sentence should be consistent.

These analyses will be revised to reflect the new CALSIM runs, and the Authority will be available to present and discuss those results with Reclamation, USFWS, and the other regulatory agencies.

4.0 Cumulative Impacts with Other Projects

Key Concern: Reclamation should consider the benefits of these other projects, how they would interact with the proposed project, and explain the sequence of construction/completion relative to the proposed project.

Response: The Authority understands the interest in exploring how the Project may operate in conjunction with proposed projects such as the revised Delta Conveyance Project and the Shasta Raise Project. However, these projects are presently not sufficiently developed to assess how they would be constructed and operated, and any analysis of cumulative effects would be speculative. The Authority thinks adding speculative results to the cumulative effects analysis could be misleading; therefore, it does not plan to pursue such an analysis. For additional details, refer to Chapter 31, *Cumulative Impacts*, in the RDEIR/SDEIS (Sites Project Authority and U.S. Bureau of Reclamation 2021). Chapter 31 states "The cumulative analysis is primarily qualitative. The cumulative analysis qualitatively addresses projects listed in Table 31-1, such as Delta Conveyance Project. For many of the projects in Table 31-1 it would be speculative to define multiple parameters and assumptions within a numerical modeling effort."

5.0 References

California Water Commission. December 2021. Water Storage Investment Program: Sites Reservoir Project Continuing Eligibility and Feasibility Determination. Available: https://cwc.ca.gov/-/media/CWC-Website/Files/Documents/2021/12_December/December2021_Item_10_SitesFeasibility_Final.pdf

Hassrick, J.L., A.J. Ammann, R.W. Perry, S.N. John, and M.E. Daniels, 2022. Factors affecting spatiotemporal variation in survival of endangered winter-run Chinook salmon out-migrating from the Sacramento River. N. Am. J. of Fish. Man. https://doi.org/10.1002/NAFM.10748

Michel, C.J., J. Notch, F. Cordoleani, A. Ammann, E. Danner. 2021. Nonlinear survival of imperiled fish informs managed flows in a highly modified river. *Freshwater Ecology.* Available: https://doi.org/10.1002/ecs2.3498

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Schaffter, R. G. 1997. White Sturgeon spawning migrations and location of spawning habitat in the Sacramento River, California. Calif Fish Game 83(1):1-20.

Sites Project Authority and U.S. Bureau of Reclamation. 2021. Sites Reservoir Project Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS). November. Available: https://sitesproject.org/revised-draft-environmental-impact-report-supplemental-draft-environmental-impact-statement/

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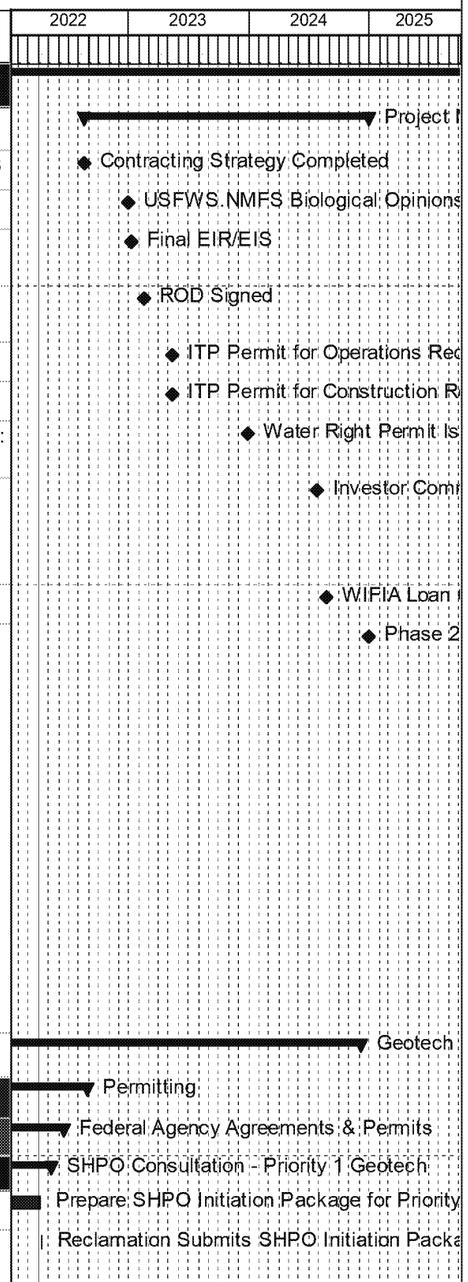
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29		
2	**Project Milestones**		599	16-Aug-22	31-Dec-24		
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22	CS-1400: FS	KD-1290: FS, KD-1490: FS, KD-1460: FS
4	MS-1150	USFWS.NMFS Biological Opinions Received	0		30-Dec-22	BA-220: FF	MS-1200: FF
5	MS-1200	Final EIR/EIS	0		10-Jan-23	EIR-250: FF, MS-1150: FF	ENG-460: FS, ENG-450: FS, MS-1300: FS
6	MS-1300	ROD Signed	0		17-Feb-23	USDA-1030: FF, MS-1200: FS, EIR-450: FS	MS-1500: FF
7	MS-1320	ITP Permit for Operations Received	0		11-May-23	2081-120: FF	MS-1500: FF
8	MS-1340	ITP Permit for Construction Received	0		11-May-23	2081-220: FF	MS-1500: FF
9	MS-1400	Water Right Permit Issued	0		28-Dec-23	WRP-120: FF	WIFIA-210: FF, KD-1310: FF 5, MS-1500: FF 30, PA-1100: FS 3, A1200: FF
10	MS-1500	Investor Commitment	0		25-Jul-24*	KD-1290: FF, KD-1130: FF, CU-1000: FF, MS-1400: FF 30, 408-170: FF, KD-1480: FF, KD-1300: FF, MS-1320: FF, MS-1340: FF, MS-1300: FF	MS-5000: FF, KD-2600: FF 20
11	MS-1600	WIFIA Loan Closed	0		22-Aug-24	KD-2600: FF	
12	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*	STA-120: FF, KD-1200: FF, KD-1230: FF, KD-1290: FF, KD-1130: FF, KD-1120: FF, KD-1210: FF, GWP-1500: FF, PB-1100: FF, KD-1310: FF, AB-2300: FF, PA-1200: FF, BF-1300: FF, KD-1240: FF, KD-1250: FF, KD-1320: FF, KD-1360: FF, KD-1340: FF, KD-1350: FF, KD-1430: FF, KD-1410: FF, KD-1400: FF, RE-1030: FF, RE-1040: FF, A1230: FF, A1110: FF, A1120: FF, A1130: FF, A1140: FF, KD-1100: FF, A1150: FF, A1160: FF, A1170: FF, KD-1190: FF, USFWS-160: FF, KD-1420: FF, KD-1440: FF, AF-1300: FF, FC-1350: FF, USDA-1060: FF, KD-1510: FF, USDA-1070: FF, WSIP-1260: FF, 401-220: FF, MI-1100: FF, MS-1500: FF	
13	**Geotech Program**		677	01-Mar-21 A	05-Dec-24		
14	**Permitting**		104	01-Mar-21 A	26-Aug-22		
15	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22		
16	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22		
17	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geotech	6	02-Aug-21 A	08-Apr-22		SHPO-250: FS
18	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22	SHPO-240: FS	SHPO-260: FF 22



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Project ID: Sites with Geo / Project Name: Sites Reservoir Project
Layout Name: Sites WBS / TASK filters: Less than 100%, Remove XX.
Data Date: 31-Mar-22 / Print Date: 07-Apr-22

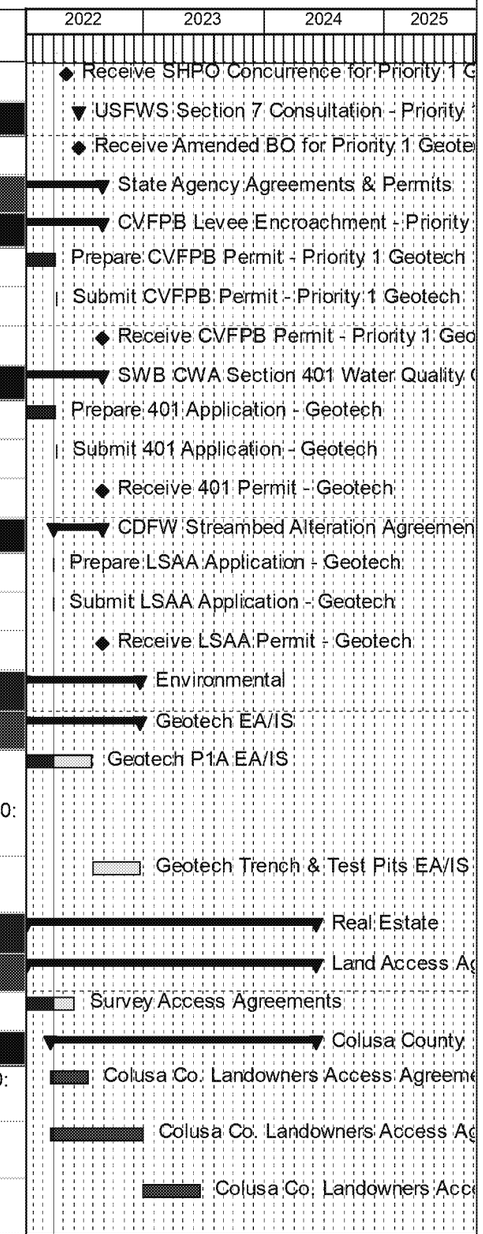
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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
19	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22	SHPO-250: FF 22	EA-200: FF
20	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22		
21	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22	BA-110: FF 85	EA-200: FF, KD-1340: FF
22	**State Agency Agreements & Permits**		104	01-Mar-21 A	26-Aug-22		
23	**CVFPB Levee Encroachment - Priority 1 Geotech**		104	01-Nov-21 A	26-Aug-22		
24	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22		CVFPB-110: FS
25	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22	CVFPB-100: FS	CVFPB-120: FF 60
26	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		26-Aug-22	EA-200: FF 22, CVFPB-110: FF 60	GWP-1100: FF 60
27	**SWB CWA Section 401 Water Quality Certification - Priority 1 Geot**		104	01-Mar-21 A	26-Aug-22		
28	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22	WP2-130: FS	401-110: FS
29	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22	401-100: FS	401-120: FS 45
30	401-120	Receive 401 Permit - Geotech	0		26-Aug-22	EA-200: FF 22, 401-110: FS 45	GWP-1100: FF 30
31	**CDFW Streambed Alteration Agreements - Priority 1 Geotech**		104	01-Apr-22	26-Aug-22		
32	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22	01-Apr-22		1600-110: FS
33	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22	1600-100: FS	1600-120: FF 60
34	1600-120	Receive LSAA Permit - Geotech	0		26-Aug-22	EA-200: FF 22, 1600-110: FF 60	GWP-1100: FF 30
35	**Environmental**		182	03-Jan-22 A	21-Dec-22		
36	**Geotech EA/IS**		182	03-Jan-22 A	21-Dec-22		
37	EA-200	Geotech P1A EA/IS	82	03-Jan-22 A	27-Jul-22	BA-120: FF, SHPO-260: FF	1600-120: FF 22, 401-120: FF 22, CVFPB-120: FF 22, GWP-1100: FS, EA-220: FS, GWP-1200: FS, GWP-1300: FS, GWP-1400: FS
38	EA-220	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	28-Jul-22	21-Dec-22	EA-200: FS	GWP-1500: FS
39	**Real Estate**		547	10-Jan-22 A	06-Jun-24		
40	**Land Access Agreements**		547	10-Jan-22 A	06-Jun-24		
41	A1240	Survey Access Agreements	42	10-Jan-22 A	31-May-22		KD-1140: FF 30
42	**Colusa County**		547	22-Mar-22 A	06-Jun-24		
43	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAC-1200: SS, GWP-1100: FS
44	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAC-1100: SS	LAAC-1300: FS, GWP-1200: FS
45	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAC-1200: FS	LAAC-1400: FS, GWP-1300: FS



Remaining Level of Effort
Actual Level of Effort
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Remaining Work
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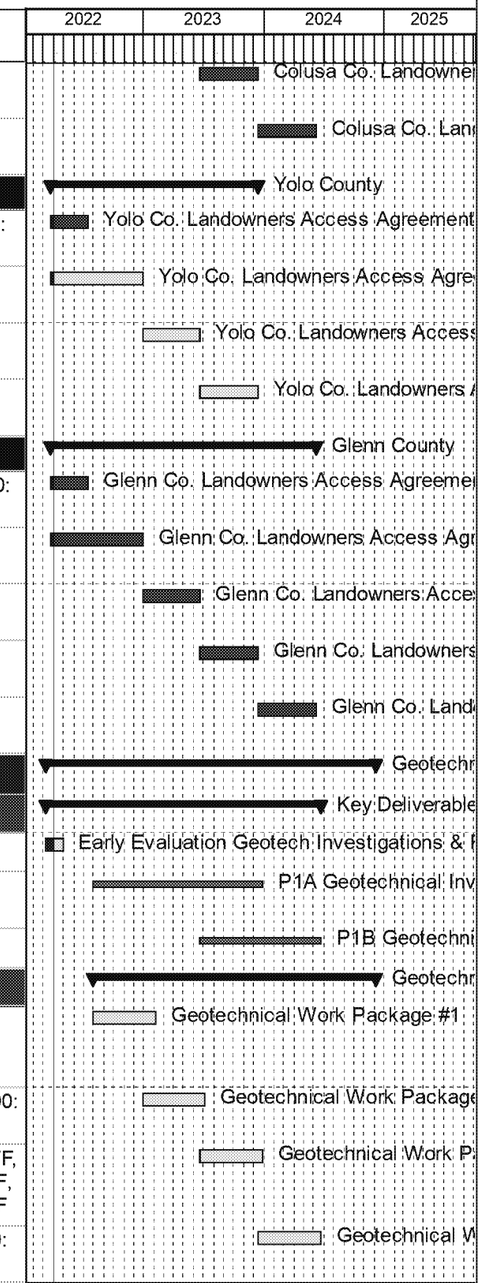
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Schedule

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46	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAC-1300: FS	LAAC-1500: FS, GWP-1400: FS
47	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAC-1400: FS	RE-1050: FF 25, GWP-1500: FS
48	**Yolo County**		427	22-Mar-22 A	14-Dec-23		
49	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAY-1200: SS, GWP-1100: FS
50	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAY-1100: SS	LAAY-1300: FS, GWP-1200: FS
51	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAY-1200: FS	LAAY-1400: FS, GWP-1300: FS
52	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAY-1300: FS	GWP-1400: FS, RE-1050: FF 25
53	**Glenn County**		547	22-Mar-22 A	06-Jun-24		
54	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22		RE-1040: FS, RE-1030: FS, LAAG-1200: SS, GWP-1100: FS
55	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22	LAAG-1100: SS	LAAG-1300: FS, GWP-1200: FS
56	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23	LAAG-1200: FS	LAAG-1400: FS, GWP-1300: FS
57	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23	LAAG-1300: FS	LAAG-1500: FS, GWP-1400: FS
58	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24	LAAG-1400: FS	RE-1050: FF 25, GWP-1500: FS
59	**Geotechnical Engineering**		677	07-Mar-22 A	05-Dec-24		
60	**Key Deliverables**		557	07-Mar-22 A	20-Jun-24		
61	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22		KD-1150: SS 22
62	KD-2015	P1A Geotechnical Investigations & Reports	355	28-Jul-22	29-Dec-23	GWP-1300: FF, GWP-1200: FF, GWP-1100: SS	
63	KD-2025	P1B Geotechnical Investigations & Reports	250	22-Jun-23	20-Jun-24	GWP-1400: FF, GWP-1300: SS	
64	**Geotechnical Investigations**		595	28-Jul-22	05-Dec-24		
65	GWP-1100	Geotechnical Work Package #1	130	28-Jul-22	06-Feb-23	CVFPB-120: FF 60, 1600-120: FF 30, 401-120: FF 30, EA-200: FS, LAAY-1100: FS, LAAG-1100: FS, LAAC-1100: FS	KD-2015: SS, KD-1630: FF 220, KD-2010: FF 220
66	GWP-1200	Geotechnical Work Package #2	130	30-Dec-22	06-Jul-23	LAAY-1200: FS, LAAG-1200: FS, LAAC-1200: FS, EA-200: FS	KD-2015: FF, KD-2020: FF 125, KD-2090: FF 120
67	GWP-1300	Geotechnical Work Package #3	130	22-Jun-23	29-Dec-23	LAAY-1300: FS, LAAG-1300: FS, LAAC-1300: FS, EA-200: FS	KD-2025: SS, KD-2015: FF, KD-2030: FF, KD-1660: FF, KD-2040: FF, KD-2050: FF, KD-2060: FF, KD-1650: FF, KD-2100: FF
68	GWP-1400	Geotechnical Work Package #4	130	15-Dec-23	20-Jun-24	LAAY-1400: FS, LAAG-1400: FS, LAAC-1400: FS, EA-200: FS	KD-2025: FF, CU-1000: FF 6, C3E-1000: FF 20



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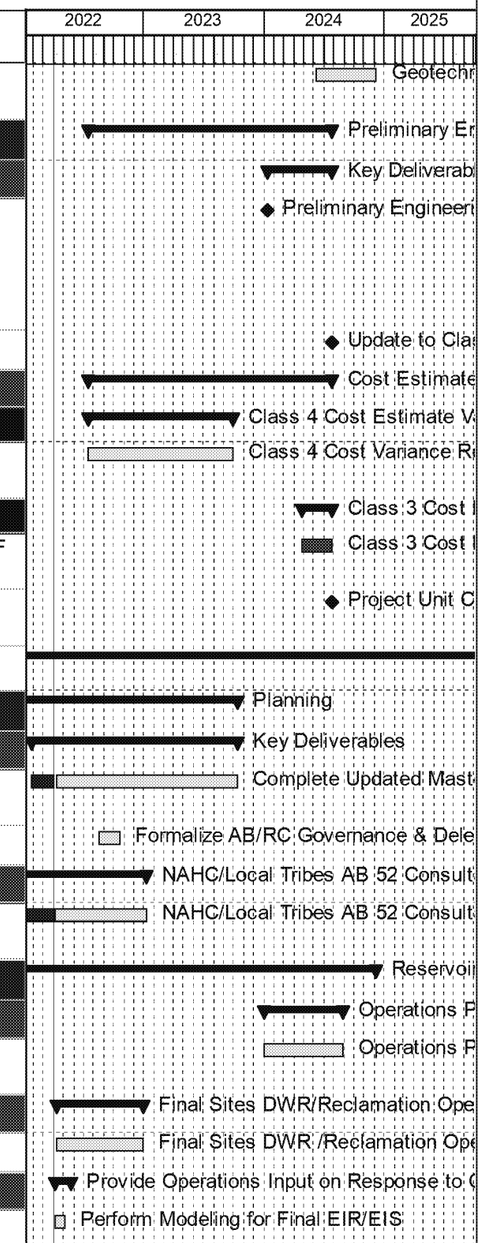
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Schedule

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69	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	130	07-Jun-24	05-Dec-24	EA-220: FS, LAAG-1500: FS, LAAC-1500: FS	MS-5000: FF
70	**Preliminary Engineering**		510	14-Jul-22	25-Jul-24		
71	**Key Deliverables**		138	10-Jan-24	25-Jul-24		
72	KD-1180	Preliminary Engineering (30% Design Level)	0		10-Jan-24	KD-2100: FF, KD-2090: FF, KD-2080: FF, KD-2070: FF, KD-2060: FF, KD-2050: FF, KD-2040: FF, KD-2030: FF, KD-2020: FF, KD-2010: FF, KD-1650: FF, KD-1640: FS, KD-1660: FF, KD-1630: FF, MS-1000: SS	C3E-1000: FS
73	KD-1190	Update to Class 3 Construction Cost Estimate	0		25-Jul-24	C3E-1000: FF	MS-5000: FF
74	**Cost Estimate**		510	14-Jul-22	25-Jul-24		
75	**Class 4 Cost Estimate Variance Reporting**		304	14-Jul-22	28-Sep-23		
76	C4E-1000	Class 4 Cost Variance Reporting	304	14-Jul-22	28-Sep-23	KD-1630: SS, KD-1660: SS, KD-1640: SS, KD-1650: SS	CU-1000: FF 30
77	**Class 3 Cost Estimate**		65	25-Apr-24	25-Jul-24		
78	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	25-Apr-24	25-Jul-24	KD-1180: FS, RE-1050: FF 10, CE-1570: FS, GWP-1400: FF 20	CU-1000: FF, KD-1190: FF, KD-1210: FF 60
79	CU-1000	Project Unit Cost Update	0		25-Jul-24	C3E-1000: FF, C4E-1000: FF 30, GWP-1400: FF 6, OS-1150: FF	MS-1500: FF
80	**Overall Project**		1774	01-Sep-20 A	19-Feb-29		
81	**Planning**		382	01-Sep-20 A	13-Oct-23		
82	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23		
83	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23	KD-1490: FF 40, KD-1460: FF 40, CS-1400: FF 40, MS-1000: SS	MS-1500: FF, MS-5000: FF
84	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phas	45	17-Aug-22	20-Oct-22	MS-1100: FS, MS-1000: SS	MS-1500: FF, MS-5000: FF
85	**NAHC/Local Tribes AB 52 Consultation**		190	01-Sep-20 A	10-Jan-23		
86	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	190	01-Sep-20 A	10-Jan-23	EIR-250: FF	MS-5000: FF
87	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24		
88	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24		
89	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24	KD-1370: FS, KD-1330: FS 2, KD-1380: FS	MS-5000: FF
90	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22		
91	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22	WRP-110: FS 5, OP-1110: FS	
92	**Provide Operations Input on Response to Comments & Final I**		36	04-Apr-22	23-May-22		
93	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22	EIR-090: FS, WRP-110: FS	EIR-220: FS, FO-1080: SS 16



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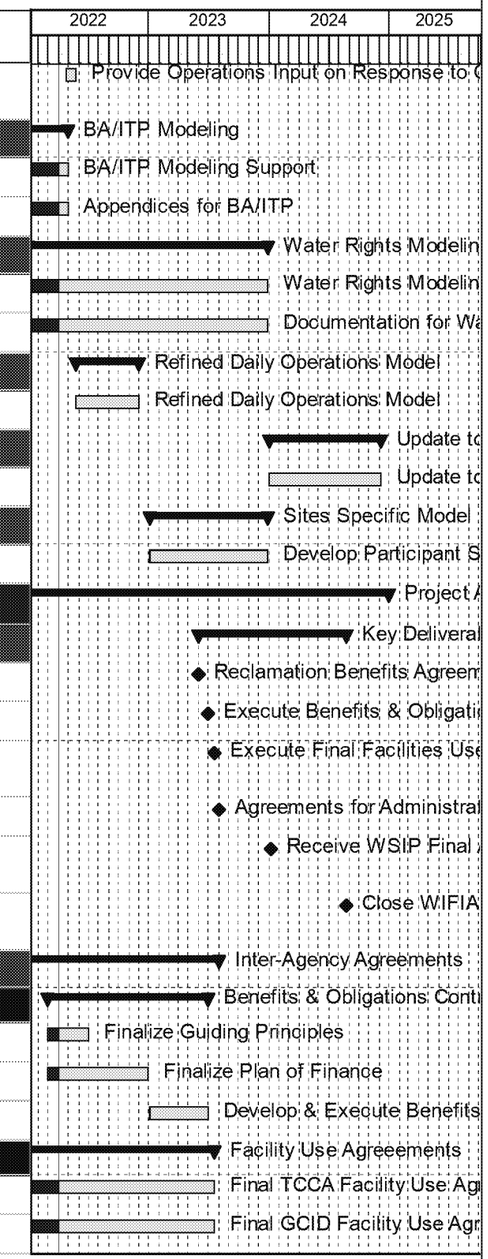
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Schedule

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94	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22	FO-1110: SS 16	A1220: FS
95	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22		
96	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22		2081-100: FF, OP-360: SS
97	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22	OP-450: SS	2081-100: FF
98	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23		
99	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23	WRP-120: FF, MS-1400: FF	A1230: FS
100	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23		A1230: FS
101	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22		
102	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22	FO-1080: FS	OS-1150: FS
103	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24		
104	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24	A1200: FS, A1210: FS, OS-1150: FS	MS-5000: FF
105	**Sites Specific Model**		258	03-Jan-23	28-Dec-23		
106	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23	A1220: FS, WRP-120: FF	A1230: FS, CU-1000: FF
107	**Project Agreements & Funding**		694	01-Jun-21 A	30-Dec-24		
108	**Key Deliverables**		309	01-Jun-23	22-Aug-24		
109	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23	WIIN-1170: FF, WIIN-1140: FS	KD-1300: FF
110	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23	KD-1260: FF, BO-1300: FF, WIIN-1170: I	MS-1500: FF
111	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23	FED-090: FF, FO-1040: FF, FO-1030: FF, FO-1020: FF	MS-5000: FF
112	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23	PB-1200: FF, PB-1100: FF	KD-1310: FF 45
113	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24	EIR-450: FF, EIR-380: FF, KD-1520: FF 45, MS-1400: FF 5	MS-5000: FF
114	KD-2600	Close WIFIA Loan	0		22-Aug-24	WIFIA-220: FF 5, WIFIA-210: FF 5, MS-1500: FF 20	MS-1600: FF
115	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23		
116	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23		
117	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22		BO-1200: FF
118	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22	BO-1100: FF	BO-1300: FS
119	BO-1300	Develop & Execute Benefits & Obligations Contract with Particip	125	03-Jan-23	29-Jun-23	BO-1200: FS	KD-1300: FF
120	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23		
121	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
122	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23		KD-1230: FF



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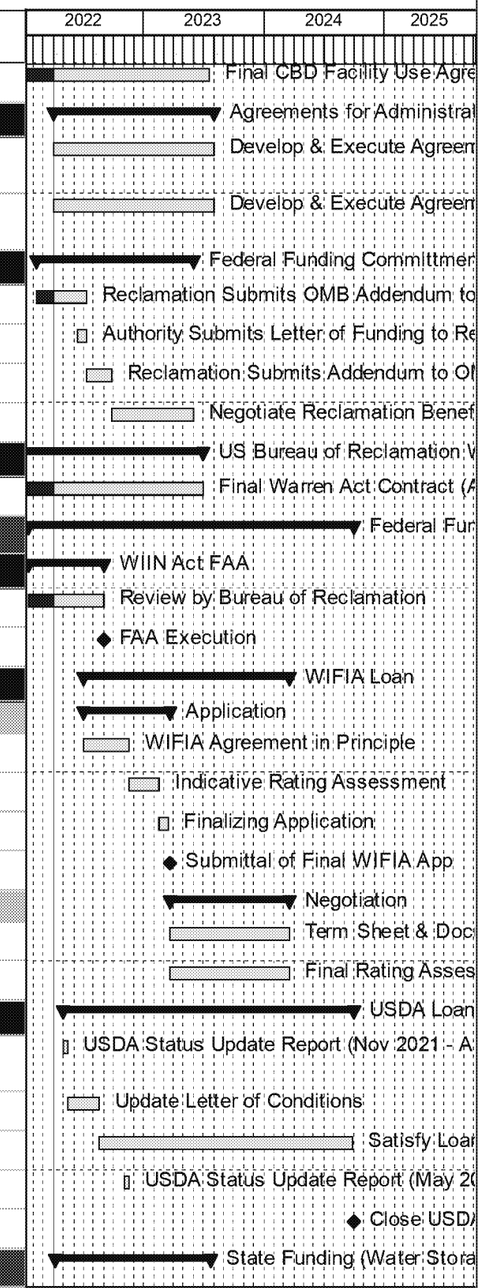
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123	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23		KD-1230: FF
124	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23		
125	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23	MS-1000: SS	KD-1520: FF, MS-5000: FF
126	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23		KD-1520: FF
127	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23		
128	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22		WIIN-1180: FS, WIIN-1160: FF
129	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22	WIIN-1150: FF	WIIN-1180: FS
130	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22	WIIN-1160: FS, WIIN-1150: FS	WIIN-1170: FS
131	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23	WIIN-1180: FS	KD-1260: FF, KD-1300: FF
132	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23		
133	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23	EIR-450: FF	KD-1230: FF
134	**Federal Funding**		631	17-Jan-22 A	02-Oct-24		
135	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22		
136	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22		WIIN-1140: FS
137	WIIN-1140	FAA Execution	0		31-Aug-22	WIIN-1120: FS	KD-1260: FS
138	**WIFIA Loan**		426	01-Jul-22	18-Mar-24		
139	**Application**		176	01-Jul-22	20-Mar-23		
140	WIFIA-110	WIFIA Agreement in Principle	95	01-Jul-22	16-Nov-22	FC-1250: FS, WIFIA-005: FS 58	WIFIA-120: FS
141	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23	WIFIA-110: FS	WIFIA-130: FS
142	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23	WIFIA-120: FS	WIFIA-140: FF 1
143	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23	WIFIA-130: FF 1	WIFIA-210: FS, BF-1100: SS
144	**Negotiation**		250	20-Mar-23	18-Mar-24		
145	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24	MS-1400: FF, WIFIA-140: FS	KD-2600: FF 5, WIFIA-220: SS
146	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24	WIFIA-210: SS	KD-2600: FF 5
147	**USDA Loan**		610	02-May-22	02-Oct-24		
148	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22	USDA-1020: FS 105	USDA-1050: FS, MS-1300: FF, USDA-1040: FS 120
149	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22	USDA-1030: FS	USDA-1060: FS
150	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24	USDA-1050: FS	MS-5000: FF, USDA-1070: FF 5
151	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22	USDA-1030: FS 120	USDA-1070: FS
152	USDA-1070	Close USDA Loan	0		02-Oct-24	USDA-1040: FS, USDA-1060: FF 5	MS-5000: FF
153	**State Funding (Water Storage Investment Program, WSIP)**		329	04-Apr-22	25-Jul-23		



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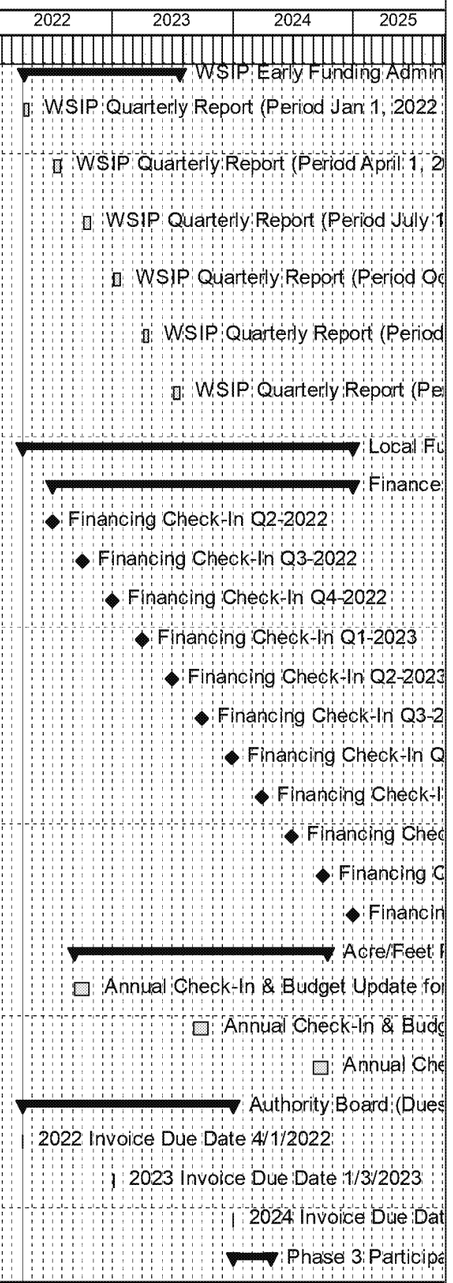
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154	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23		
155	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22	MS-1000: SS 90	WSIP-1220: FS 50
156	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22	WSIP-1210: FS 50	WSIP-1230: FS 47
157	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22	WSIP-1220: FS 47	WSIP-1240: FS 45
158	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23	WSIP-1230: FS 45	WSIP-1250: FS 47
159	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23	WSIP-1240: FS 47	WSIP-1260: FS 50
160	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23	WSIP-1250: FS 50	MS-5000: FF
161	**Local Funding**		694	01-Apr-22	30-Dec-24		
162	**Finance Check-Ins**		630	30-Jun-22	30-Dec-24		
163	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22	AB-2100: FF 63	FC-1260: FF 64, WIFIA-110: FS
164	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22	FC-1250: FF 64	FC-1270: FF 60
165	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22	FC-1260: FF 60	FC-1280: FF 62
166	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23	FC-1270: FF 62	FC-1290: FF 64
167	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23	FC-1280: FF 64	FC-1300: FF 63
168	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23	FC-1290: FF 63	FC-1310: FF 60
169	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23	FC-1300: FF 60	FC-1320: FF 62
170	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24	FC-1310: FF 62	FC-1330: FF 64
171	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24	FC-1320: FF 64	FC-1340: FF 66
172	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24	FC-1330: FF 66	FC-1350: FS 65
173	FC-1350	Financing Check-In Q4-2024	0		30-Dec-24	FC-1340: FS 65	MS-5000: FF
174	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24		
175	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22	MS-1000: SS 245	AF-1200: FS 220
176	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23	AF-1100: FS 220	AF-1300: FS 220
177	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24	AF-1200: FS 220	MS-5000: FF
178	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24		
179	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22		AB-2200: FS, FC-1250: FF 63
180	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*	AB-2100: FS	AB-2300: FS
181	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*	AB-2200: FS	MS-5000: FF
182	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24		



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
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Milestone
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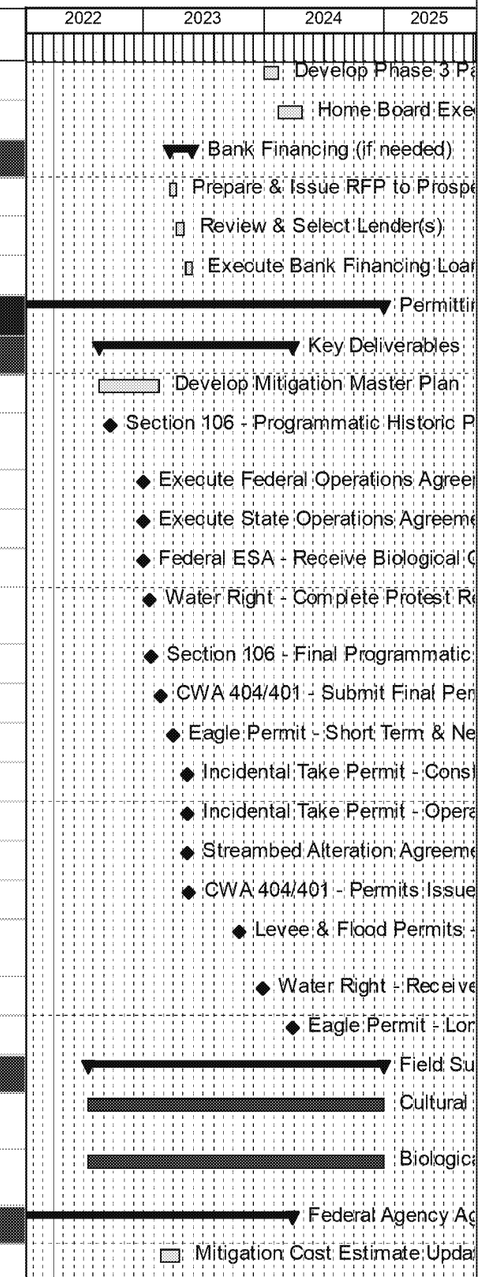
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
183	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24	MS-1400: FS 3	PA-1200: FS
184	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24	PA-1100: FS	MS-5000: FF
185	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23		
186	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23	WIFIA-140: SS	BF-1200: FS
187	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23	BF-1100: FS	BF-1300: FS
188	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23	BF-1200: FS	MS-5000: FF
189	**Permitting**		695	04-Jan-21 A	31-Dec-24		
190	**Key Deliverables**		403	17-Aug-22	29-Mar-24		
191	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23	MS-1100: FS	KD-1130: FF 40, CE-1570: FS
192	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22	106-081: FF 20	MS-5000: FF
193	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
194	KD-1250	Execute State Operations Agreement	0		30-Dec-22	BA-220: FF	MS-5000: FF
195	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22	BA-120: FF, BA-220: FF	MS-5000: FF
196	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23	WRP-110: FS 200	MS-5000: FF
197	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23	106-102: FS	MS-5000: FF
198	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		21-Feb-23	404-120: FS	KD-1400: FS
199	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23	USFWS-130: FS, MS-1000: SS	MS-5000: FF
200	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23	2081-220: FS, MS-1000: SS	KD-1510: FS
201	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23	2081-120: FS, MS-1000: SS	KD-1510: FS
202	KD-1420	Streambed Alteration Agreement	0		11-May-23	1600-220: FF	MS-5000: FF
203	KD-1400	CWA 404/401 - Permits Issued	0		16-May-23	KD-1390: FS, 404-130: FS	MS-5000: FF
204	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		17-Oct-23	CVFPB-220: FF	MS-5000: FF
205	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23	MS-1000: SS, WRP-120: FF	KD-1510: FS 2
206	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24	USFWS-160: FS, MS-1000: SS	MS-5000: FF
207	**Field Surveys**		621	18-Jul-22	31-Dec-24		
208	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
209	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24	LAAG-1100: FS, LAAY-1100: FS, LAAC-1100: FS	MS-5000: FF
210	**Federal Agency Agreements & Permits**		499	11-Jan-21 A	29-Mar-24		
211	CE-1570	Mitigation Cost Estimate Update	40	21-Feb-23	17-Apr-23	KD-1460: FS	C3E-1000: FS



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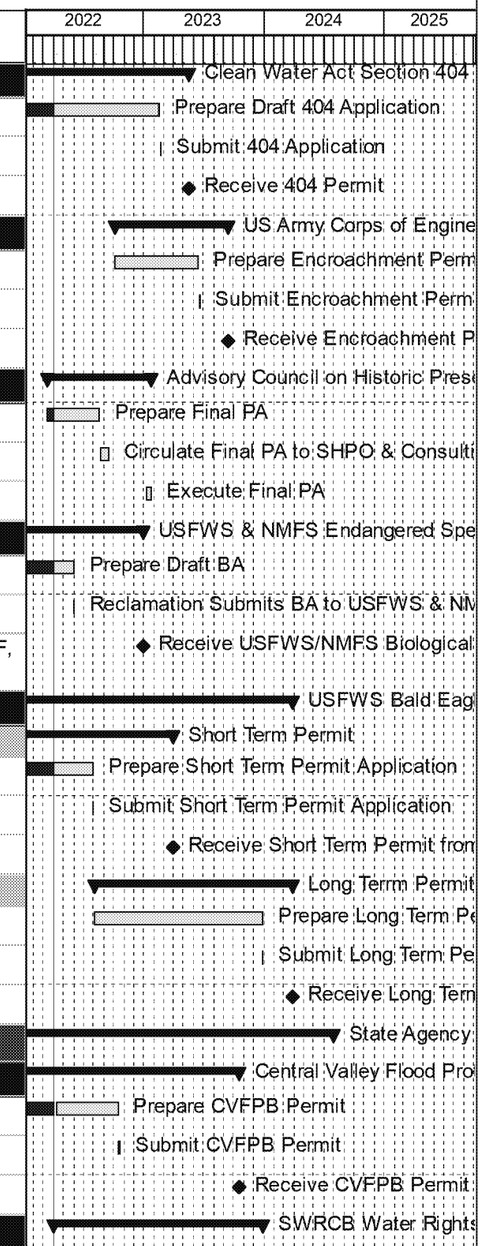
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Schedule

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212	**Clean Water Act Section 404**		282	04-Feb-21 A	16-May-23		
213	404-050	Prepare Draft 404 Application	221	04-Feb-21 A	17-Feb-23	EIR-250: FF 20, EIR-450: FF	408-150: FF, 404-120: FS
214	404-120	Submit 404 Application	1	21-Feb-23	21-Feb-23	404-050: FS	404-130: FF 60, KD-1390: FS
215	404-130	Receive 404 Permit	0		16-May-23	404-120: FF 60	KD-1400: FS
216	**US Army Corps of Engineers Rivers & Harbors Act Section 14, Sec**		233	07-Oct-22	13-Sep-23		
217	408-150	Prepare Encroachment Permit/408 Request	172	07-Oct-22	16-Jun-23	KD-1110: FS, 404-050: FF, EIR-450: FF	408-160: FS
218	408-160	Submit Encroachment Permit/408 Request	1	19-Jun-23	19-Jun-23	EIR-450: FS, 408-150: FS	408-170: FF 60
219	408-170	Receive Encroachment Permit/408 Permit	0		13-Sep-23	408-160: FF 60	MS-1500: FF
220	**Advisory Council on Historic Preservation NHPA Section 106**		204	14-Mar-22 A	25-Jan-23		
221	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22	106-072: FS	KD-1360: FF 20, 106-092: FS
222	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22	106-081: FS	106-102: FS
223	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23	EIR-250: FS, 106-092: FS	KD-1350: FS, EIR-450: FS
224	**USFWS & NMFS Endangered Species Act Section 7**		188	11-Jan-21 A	30-Dec-22		
225	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22		BA-210: FS
226	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22	BA-200: FS	BA-220: FF 210, EIR-450: FS
227	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22	BA-210: FF 210	KD-1250: FF, KD-1240: FF, KD-1340: FF, EIR-450: FS, MS-1150: FF
228	**USFWS Bald Eagle Protection Act**		499	03-Jan-22 A	29-Mar-24		
229	**Short Term Permit**		250	03-Jan-22 A	31-Mar-23		
230	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22		USFWS-120: FS
231	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22	USFWS-110: FS	USFWS-140: FS, USFWS-130: FF 165
232	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23	USFWS-120: FF 165	KD-1430: FS
233	**Long Terrm Permit**		414	02-Aug-22	29-Mar-24		
234	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23	USFWS-120: FS	USFWS-150: FS
235	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23	USFWS-140: FS	USFWS-160: FF 63
236	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24	USFWS-150: FF 63	MS-5000: FF, KD-1440: FS
237	**State Agency Agreements & Permits**		587	04-Jan-21 A	01-Aug-24		
238	**Central Valley Flood Protection Board (CVFPB) Levee Encroachme**		381	13-Dec-21 A	17-Oct-23		
239	CVFPB-200	Prepare CVFPB Permit	130	13-Dec-21 A	14-Oct-22	KD-1110: FF 5	CVFPB-210: FS
240	CVFPB-210	Submit CVFPB Permit	1	17-Oct-22	17-Oct-22	CVFPB-200: FS	CVFPB-220: FF 250
241	CVFPB-220	Receive CVFPB Permit	0		17-Oct-23	EIR-380: FS, CVFPB-210: FF 250	KD-1410: FF
242	**SWRCB Water Rights Permit**		436	01-Apr-22	28-Dec-23		



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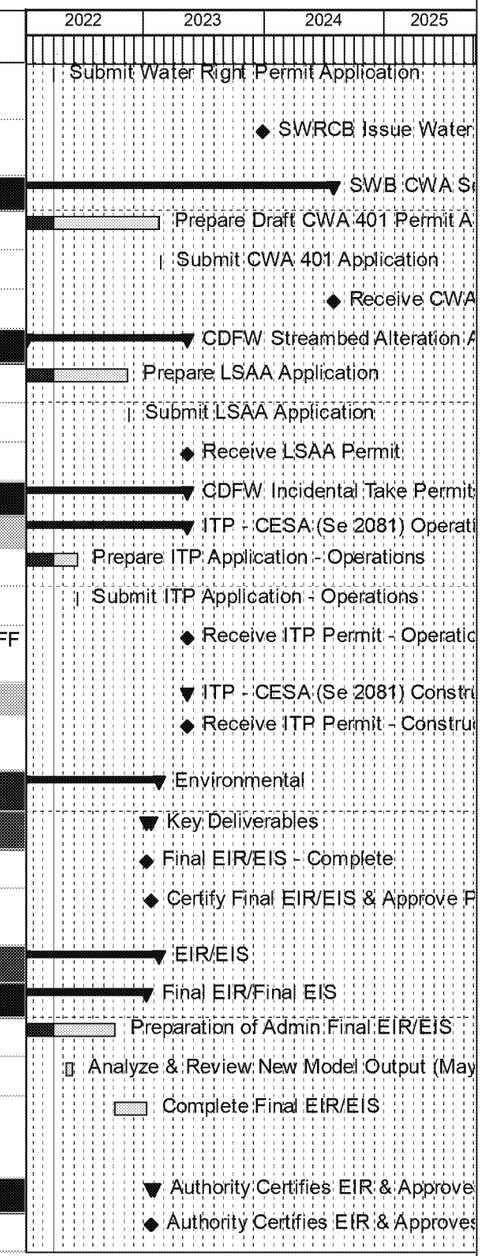
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Schedule

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243	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22	WRP-100: FS	KD-1320: FS 200, WRP-120: FF 435, OP-1005: FS 5, FO-1110: FS
244	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23	EIR-380: FS, WRP-110: FF 435	A1200: FF, OS-1150: FF, MS-1400: FF, KD-1330: FF
245	**SWB CWA Section 401 Water Quality Certification**		587	04-Jan-21 A	01-Aug-24		
246	401-200	Prepare Draft CWA 401 Permit Application	221	04-Jan-21 A	17-Feb-23	EIR-450: FF	401-210: FS
247	401-210	Submit CWA 401 Application	1	21-Feb-23	21-Feb-23	401-200: FS	401-220: FS 365
248	401-220	Receive CWA Section 401 Permit	0		01-Aug-24	EIR-380: FS, 401-210: FS 365	MS-5000: FF
249	**CDFW Streambed Alteration Agreements**		279	10-Jan-22 A	11-May-23		
250	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22		1600-210: FS
251	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22	1600-200: FS	1600-220: FF 121
252	1600-220	Receive LSAA Permit	0		11-May-23	EIR-380: FS, 1600-210: FF 121	2081-120: FF, KD-1420: FF
253	**CDFW Incidental Take Permits**		279	11-Jan-21 A	11-May-23		
254	**ITP - CESA (Se 2081) Operations**		279	11-Jan-21 A	11-May-23		
255	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22	OP-450: FF, OP-360: FF	2081-110: FS
256	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22	2081-100: FS	2081-120: FF 185
257	2081-120	Receive ITP Permit - Operations	0		11-May-23	EIR-380: FF 30, 1600-220: FF, 2081-110: FF 185	2081-220: FF, KD-1380: FS, MS-1320: FF
258	**ITP - CESA (Se 2081) Construction**		0	11-May-23	11-May-23		
259	2081-220	Receive ITP Permit - Construction	0		11-May-23	EIR-380: FF 30, 2081-120: FF, 2081-210: FF 60	KD-1370: FS, MS-1340: FF
260	**Environmental**		221	03-Jan-22 A	17-Feb-23		
261	**Key Deliverables**		10	10-Jan-23	25-Jan-23		
262	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23	MS-1000: SS, EIR-250: FF	KD-1480: FF 10
263	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23	KD-1470: FF 10	MS-1500: FF
264	**EIR/EIS**		221	03-Jan-22 A	17-Feb-23		
265	**Final EIR/Final EIS**		194	03-Jan-22 A	10-Jan-23		
266	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22		EIR-250: FS
267	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22	FO-1110: FS	EIR-250: FS
268	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23	EIR-210: FS, EIR-220: FS	106-102: FS, 404-050: FF 20, EIR-440: FF 5, EIR-370: FF 10, MS-1200: FF, KD-1470: FF, STA-120: FF
269	**Authority Certifies EIR & Approves Project & File NOD**		5	25-Jan-23	01-Feb-23		
270	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23	EIR-250: FF 10	EIR-380: FS



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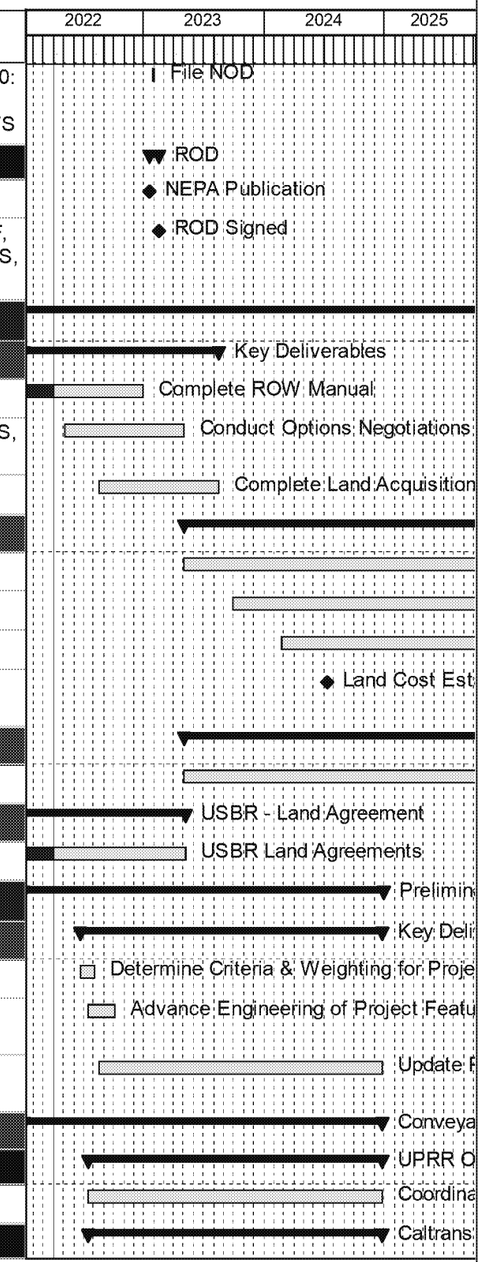
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Schedule

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271	EIR-380	File NOD	5	26-Jan-23	01-Feb-23	EIR-370: FS	KD-1310: FF, CVFPB-220: FS, 2081-220: FF 30, 2081-120: FF 30, 1600-220: FS, 401-220: FS, WRP-120: FS, EIR-450: FS
272	**ROD**		22	18-Jan-23	17-Feb-23		
273	EIR-440	NEPA Publication	0		18-Jan-23	EIR-250: FF 5	EIR-450: FS 22
274	EIR-450	ROD Signed	0		17-Feb-23	106-102: FS, BA-220: FS, BA-210: FS, EIR-380: FS, EIR-440: FS 22	KD-1310: FF, 408-150: FF, FED-100: FF, 408-160: FS, FED-090: FF, MS-1300: FS, 404-050: FF, 401-200: FF
275	**Real Estate**		1774	02-Nov-20 A	19-Feb-29		
276	**Key Deliverables**		346	03-Jan-22 A	16-Aug-23		
277	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22	MS-1000: SS	KD-1500: FF, KD-1500: SS 85
278	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23	KD-1495: FF, KD-1495: SS 85	MI-1100: FS, RE-1060: FS, RE-1070: FS, RE-1080: FS
279	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23	MS-1100: FS, FED-100: FF	KD-1130: FF 40
280	**Land Acquisition**		1500	05-May-23	19-Feb-29		
281	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29	KD-1500: FS	RE-1070: SS 100, RE-1100: SS
282	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29	KD-1500: FS, RE-1060: SS 100	RE-1080: SS 100
283	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29	KD-1500: FS, RE-1070: SS 100	
284	RE-1050	Land Cost Established	0		11-Jul-24	LAAC-1500: FF 25, LAAG-1500: FF 25, LAAY-1400: FF 25	C3E-1000: FF 10
285	**Relocation**		1500	05-May-23	01-Feb-29		
286	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29	RE-1060: SS	
287	**USBR - Land Agreement**		278	02-Nov-20 A	10-May-23		
288	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23	EIR-450: FF	KD-1490: FF
289	**Preliminary Engineering**		694	03-Jan-22 A	30-Dec-24		
290	**Key Deliverables**		637	21-Jun-22	27-Dec-24		
291	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22	CS-1300: FS	MS-5000: FF, KD-1110: FF
292	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	14-Jul-22	06-Oct-22	KD-1140: FS, KD-1120: FF	CVFPB-200: FF 5, 408-150: FS, KD-1210: SS
293	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	597	17-Aug-22	27-Dec-24	CS-1400: FS, KD-1110: SS, C3E-1000: FF 60	MS-5000: FF
294	**Conveyance (Pipelines, Pump Stations, Canals)**		693	03-Jan-22 A	27-Dec-24		
295	**UPRR Oversight & Review**		621	14-Jul-22	27-Dec-24		
296	A1110	Coordination & Oversight with UPRR	621	14-Jul-22	27-Dec-24	KD-1630: SS	MS-5000: FF
297	**Caltrans Oversight & Review**		621	14-Jul-22	27-Dec-24		



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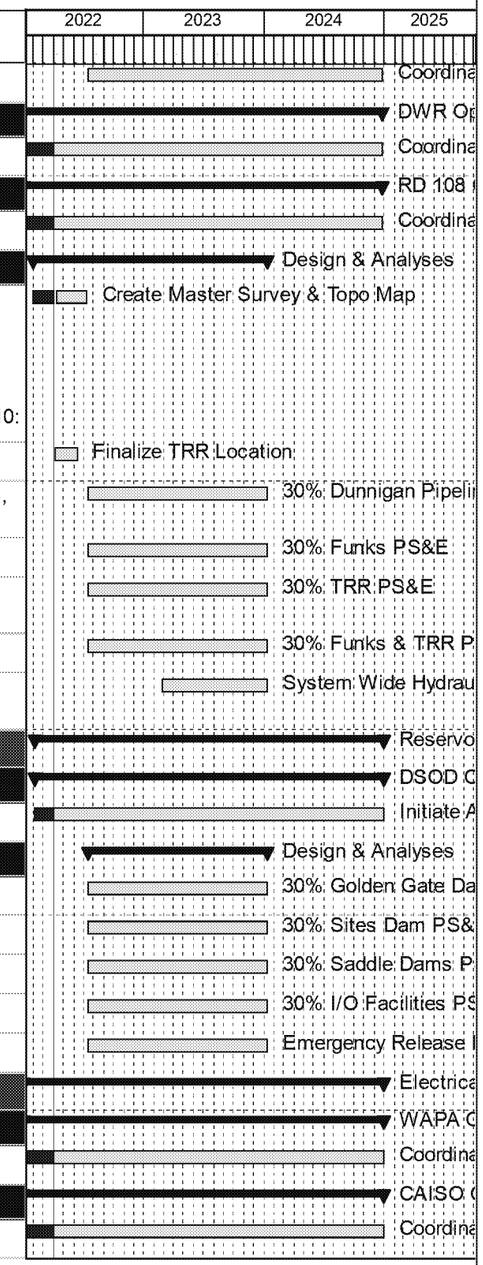
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Schedule

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298	A1120	Coordination & Oversight with Caltrans	621	14-Jul-22	27-Dec-24	KD-1630: SS	MS-5000: FF
299	**DWR Operations Oversight & Review (KLOG)**		693	03-Jan-22 A	27-Dec-24		
300	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
301	**RD 108 Oversight & Review**		693	03-Jan-22 A	27-Dec-24		
302	A1140	Coordination & Oversight with Reclamation District 108	693	03-Jan-22 A	27-Dec-24		MS-5000: FF
303	**Design & Analyses**		440	01-Feb-22 A	10-Jan-24		
304	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	13-Jul-22	MS-1000: SS, A1240: FF 30	KD-2100: FS, KD-2090: FS, KD-2080: FS, KD-2070: FS, KD-2060: FS, KD-2050: FS, KD-2040: FS, KD-2030: FS, KD-2020: FS, KD-2010: FS, KD-1650: FS, KD-1640: FS, KD-1200: FS, KD-1660: FS, KD-1630: FS, KD-1110: FS
305	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22	KD-2000: SS 22	KD-2020: FS
306	KD-1630	30% Dunnigan Pipeline PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1100: FF 220	C4E-1000: SS, KD-1180: FF, A1110: SS, A1120: SS, KD-2080: FF
307	KD-2010	30% Funks PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1100: FF 220	KD-1180: FF, KD-2080: FF
308	KD-2020	30% TRR PS&E	372	14-Jul-22	10-Jan-24	KD-1150: FS, KD-1140: FS, GWP-1200: FF 125	KD-1180: FF, KD-2080: FF
309	KD-2030	30% Funks & TRR Pipeline PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	KD-1180: FF, KD-2080: FF
310	KD-2080	System Wide Hydraulic Modeling	220	24-Feb-23	10-Jan-24	KD-1140: FS, KD-1630: FF, KD-2010: FF, KD-2020: FF, KD-2030: FF, KD-2060: FF	KD-1180: FF
311	**Reservoir (Dams, Tunnels)**		694	01-Feb-22 A	30-Dec-24		
312	**DSOD Oversight & Review**		694	01-Feb-22 A	30-Dec-24		
313	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24	MS-1000: SS	MS-5000: FF
314	**Design & Analyses**		372	14-Jul-22	10-Jan-24		
315	KD-1660	30% Golden Gate Dam PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	C4E-1000: SS, KD-1180: FF
316	KD-2040	30% Sites Dam PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	KD-1180: FF
317	KD-2050	30% Saddle Dams PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	KD-1180: FF
318	KD-2060	30% I/O Facilities PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	KD-1180: FF, KD-2080: FF
319	KD-2070	Emergency Release Modeling	372	14-Jul-22	10-Jan-24	KD-1140: FS	KD-1180: FF
320	**Electrical (Substation, Switchyard, Transmission Line)**		694	03-Jan-22 A	30-Dec-24		
321	**WAPA Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
322	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
323	**CAISO Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
324	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24		MS-5000: FF



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

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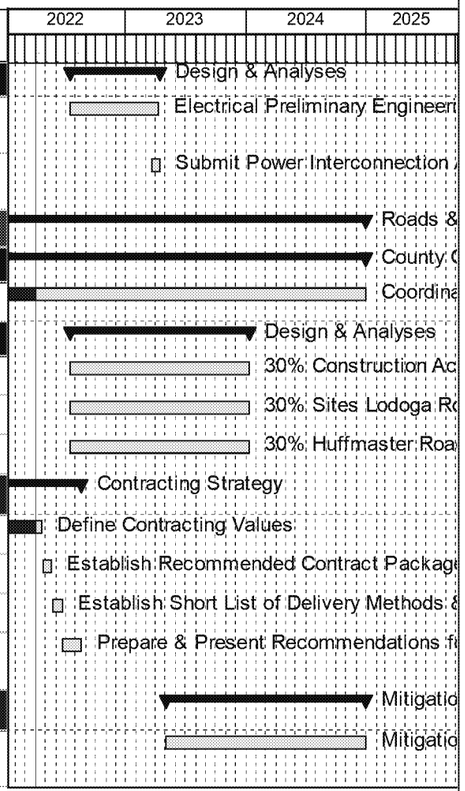
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish	Predecessor Details	Successor Details
325	**Design & Analyses**		188	14-Jul-22	14-Apr-23		
326	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	14-Jul-22	11-Apr-23	KD-1140: FS	C4E-1000: SS, KD-1180: FS, KD-1200: FF 3
327	KD-1200	Submit Power Interconnection Application	20	20-Mar-23	14-Apr-23	KD-1640: FF 3, KD-1140: FS, MS-1000: SS	MS-5000: FF
328	**Roads & Bridges**		694	03-Jan-22 A	30-Dec-24		
329	**County Oversight & Review**		694	03-Jan-22 A	30-Dec-24		
330	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24		MS-5000: FF
331	**Design & Analyses**		372	14-Jul-22	10-Jan-24		
332	KD-1650	30% Construction Access & Maintenance Roads PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	C4E-1000: SS, KD-1180: FF
333	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1200: FF 120	KD-1180: FF
334	KD-2100	30% Huffmaster Road PS&E	372	14-Jul-22	10-Jan-24	KD-1140: FS, GWP-1300: FF	KD-1180: FF
335	**Contracting Strategy**		96	03-Jan-22 A	16-Aug-22		
336	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22		CS-1200: FS
337	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22	CS-1100: FS	CS-1300: FS
338	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22	CS-1200: FS	CS-1400: FS, KD-1120: FS
339	CS-1400	Prepare & Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22	CS-1300: FS	KD-1130: FF 40, MS-1100: FS, KD-1210: FS
340	**Mitigation Implementation**		420	05-May-23	30-Dec-24		
341	MI-1100	Mitigation Implementation (more information needed to expand detail)	420	05-May-23	30-Dec-24	KD-1500: FS	MS-5000: FF



Remaining Level of Effort
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Actual Work
Remaining Work
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Milestone
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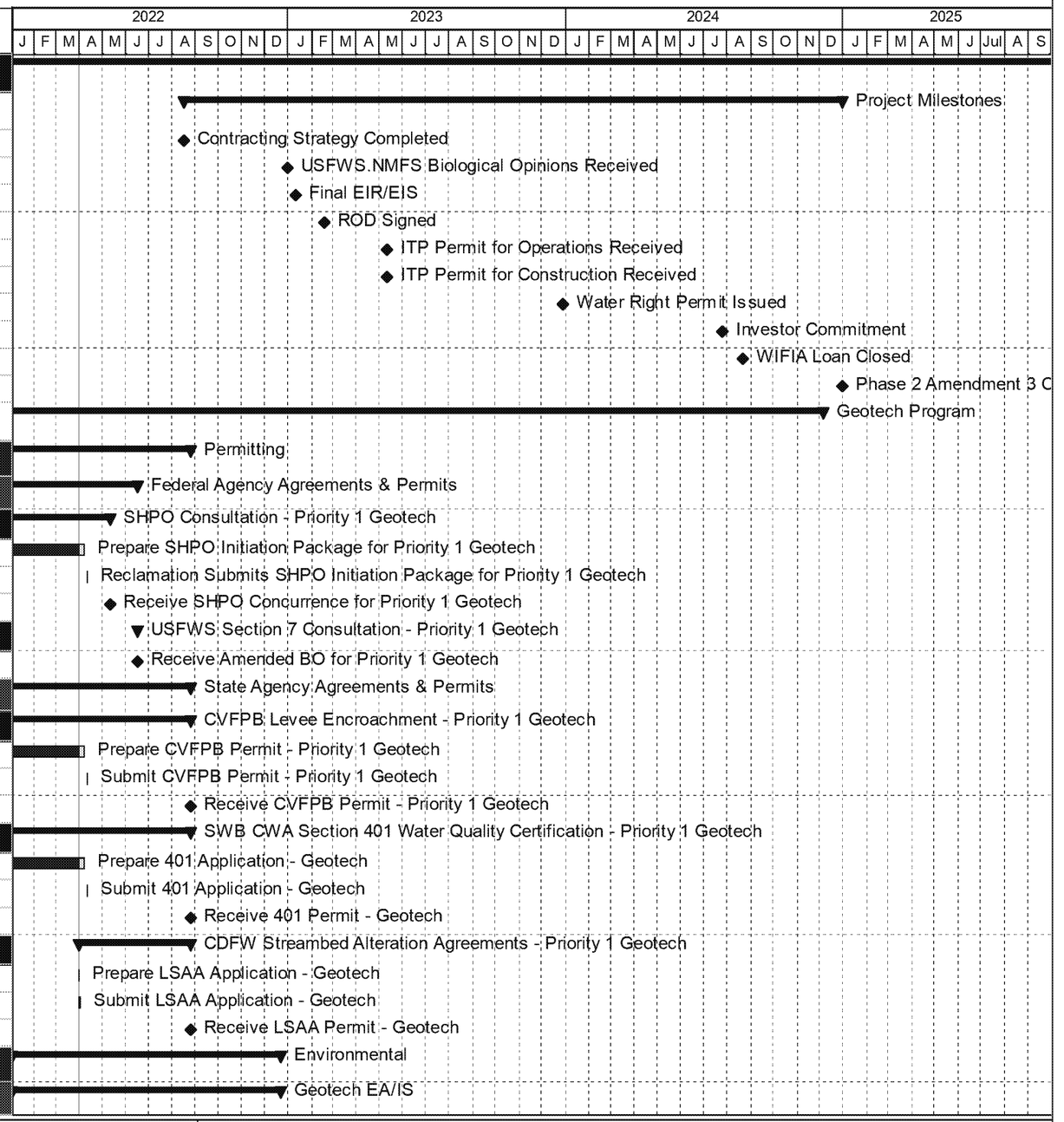
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
1	**Sites Reservoir Project**		1774	01-Sep-20 A	19-Feb-29
2	**Project Milestones**		599	16-Aug-22	31-Dec-24
3	MS-1100	Contracting Strategy Completed	0		16-Aug-22
4	MS-1150	USFWS.NMFS Biological Opinions Received	0		30-Dec-22
5	MS-1200	Final EIR/EIS	0		10-Jan-23
6	MS-1300	ROD Signed	0		17-Feb-23
7	MS-1320	ITP Permit for Operations Received	0		11-May-23
8	MS-1340	ITP Permit for Construction Received	0		11-May-23
9	MS-1400	Water Right Permit Issued	0		28-Dec-23
10	MS-1500	Investor Commitment	0		25-Jul-24*
11	MS-1600	WIFIA Loan Closed	0		22-Aug-24
12	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*
13	**Geotech Program**		677	01-Mar-21 A	05-Dec-24
14	**Permitting**		104	01-Mar-21 A	26-Aug-22
15	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	16-Jun-22
16	**SHPO Consultation - Priority 1 Geotech**		29	02-Aug-21 A	11-May-22
17	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geotech	6	02-Aug-21 A	08-Apr-22
18	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	11-Apr-22	11-Apr-22
19	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		11-May-22
20	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	16-Jun-22	16-Jun-22
21	BA-120	Receive Amended BO for Priority 1 Geotech	0		16-Jun-22
22	**State Agency Agreements & Permits**		104	01-Mar-21 A	26-Aug-22
23	**CVFPB Levee Encroachment - Priority 1 Geotech**		104	01-Nov-21 A	26-Aug-22
24	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	6	01-Nov-21 A	08-Apr-22
25	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	11-Apr-22	11-Apr-22
26	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		26-Aug-22
27	**SWB CWA Section 401 Water Quality Certification - Priority 1 Geotech**		104	01-Mar-21 A	26-Aug-22
28	401-100	Prepare 401 Application - Geotech	6	01-Mar-21 A	08-Apr-22
29	401-110	Submit 401 Application - Geotech	1	11-Apr-22	11-Apr-22
30	401-120	Receive 401 Permit - Geotech	0		26-Aug-22
31	**CDFW Streambed Alteration Agreements - Priority 1 Geotech**		104	01-Apr-22	26-Aug-22
32	1600-100	Prepare LSAA Application - Geotech	0	01-Apr-22	01-Apr-22
33	1600-110	Submit LSAA Application - Geotech	1	01-Apr-22	01-Apr-22
34	1600-120	Receive LSAA Permit - Geotech	0		26-Aug-22
35	**Environmental**		182	03-Jan-22 A	21-Dec-22
36	**Geotech EA/IS**		182	03-Jan-22 A	21-Dec-22



Remaining Level of Effort | Remaining Work | Summary
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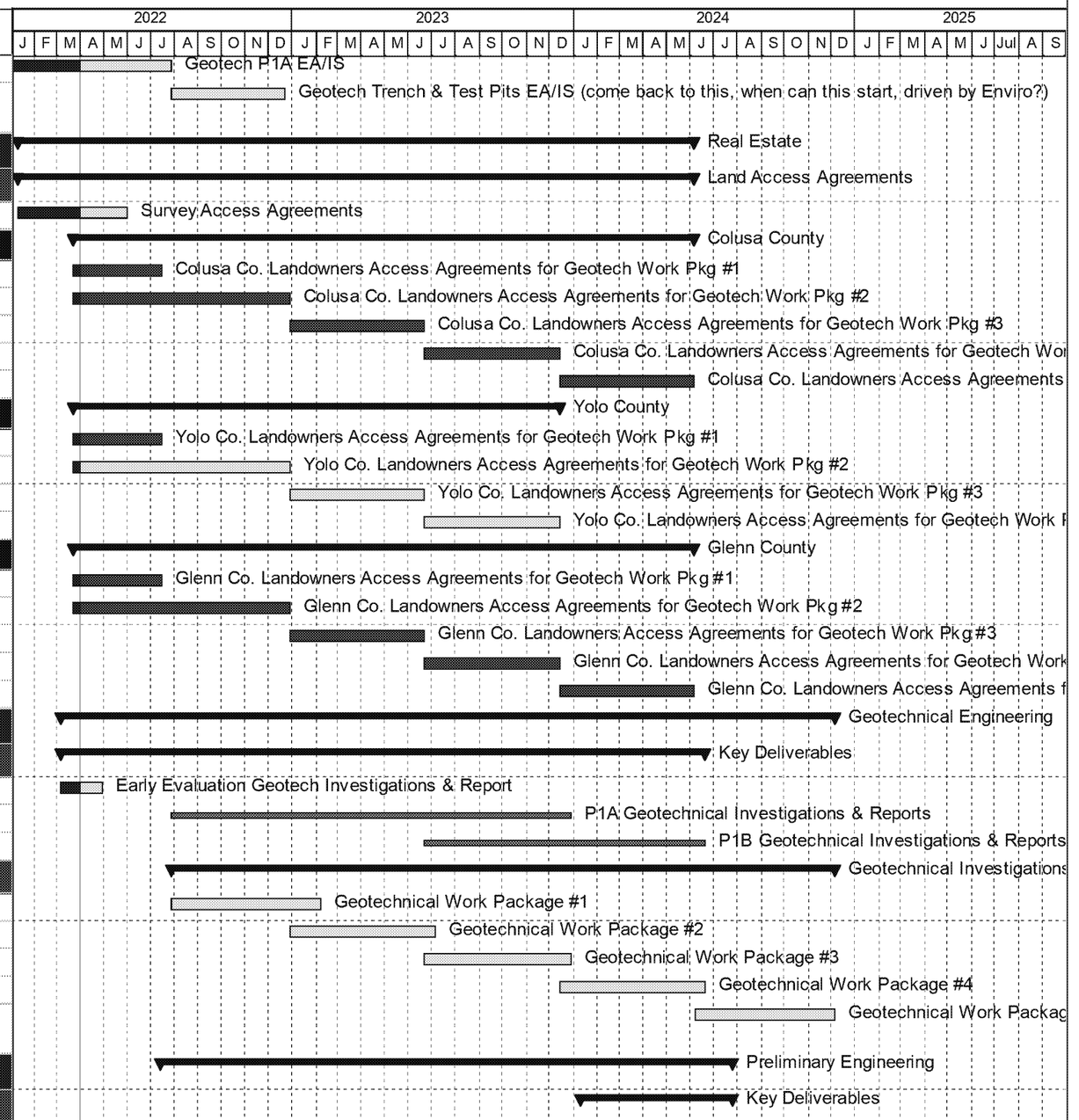
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
37	EA-200	Geotech P1A EA/IS	82	03-Jan-22 A	27-Jul-22
38	EA-220	Geotech Trench & Test Pits EA/IS (come back to this, when can this start, driven by Enviro?)	100	28-Jul-22	21-Dec-22
39	**Real Estate**		547	10-Jan-22 A	06-Jun-24
40	**Land Access Agreements**		547	10-Jan-22 A	06-Jun-24
41	A1240	Survey Access Agreements	42	10-Jan-22 A	31-May-22
42	**Colusa County**		547	22-Mar-22 A	06-Jun-24
43	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg :	74	22-Mar-22 A	15-Jul-22
44	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg :	187	22-Mar-22 A	29-Dec-22
45	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg :	120	30-Dec-22	21-Jun-23
46	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg :	120	22-Jun-23	14-Dec-23
47	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg :	120	15-Dec-23	06-Jun-24
48	**Yolo County**		427	22-Mar-22 A	14-Dec-23
49	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22
50	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22
51	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23
52	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23
53	**Glenn County**		547	22-Mar-22 A	06-Jun-24
54	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	74	22-Mar-22 A	15-Jul-22
55	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	187	22-Mar-22 A	29-Dec-22
56	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	21-Jun-23
57	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	22-Jun-23	14-Dec-23
58	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	15-Dec-23	06-Jun-24
59	**Geotechnical Engineering**		677	07-Mar-22 A	05-Dec-24
60	**Key Deliverables**		557	07-Mar-22 A	20-Jun-24
61	KD-2000	Early Evaluation Geotech Investigations & Report	21	07-Mar-22 A	29-Apr-22
62	KD-2015	P1A Geotechnical Investigations & Reports	355	28-Jul-22	29-Dec-23
63	KD-2025	P1B Geotechnical Investigations & Reports	250	22-Jun-23	20-Jun-24
64	**Geotechnical Investigations**		595	28-Jul-22	05-Dec-24
65	GWP-1100	Geotechnical Work Package #1	130	28-Jul-22	06-Feb-23
66	GWP-1200	Geotechnical Work Package #2	130	30-Dec-22	06-Jul-23
67	GWP-1300	Geotechnical Work Package #3	130	22-Jun-23	29-Dec-23
68	GWP-1400	Geotechnical Work Package #4	130	15-Dec-23	20-Jun-24
69	GWP-1500	Geotechnical Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	130	07-Jun-24	05-Dec-24
70	**Preliminary Engineering**		510	14-Jul-22	25-Jul-24
71	**Key Deliverables**		138	10-Jan-24	25-Jul-24



Remaining Level of Effort
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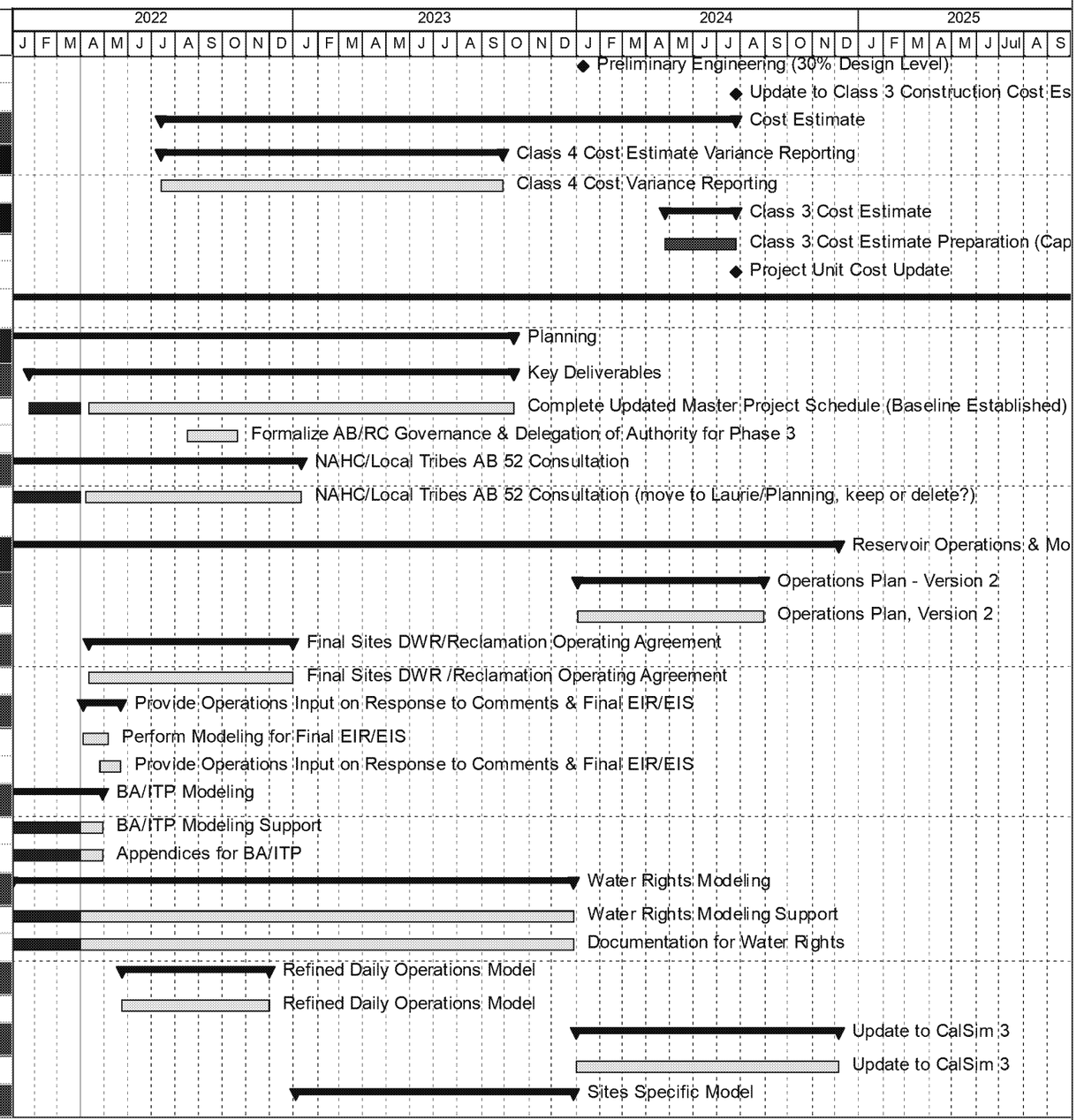
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
72	KD-1180	Preliminary Engineering (30% Design Level)	0		10-Jan-24
73	KD-1190	Update to Class 3 Construction Cost Estimate	0		25-Jul-24
74	**Cost Estimate**		510	14-Jul-22	25-Jul-24
75	**Class 4 Cost Estimate Variance Reporting**		304	14-Jul-22	28-Sep-23
76	C4E-1000	Class 4 Cost Variance Reporting	304	14-Jul-22	28-Sep-23
77	**Class 3 Cost Estimate**		65	25-Apr-24	25-Jul-24
78	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	25-Apr-24	25-Jul-24
79	CU-1000	Project Unit Cost Update	0		25-Jul-24
80	**Overall Project**		1774	01-Sep-20 A	19-Feb-29
81	**Planning**		382	01-Sep-20 A	13-Oct-23
82	**Key Deliverables**		380	24-Jan-22 A	13-Oct-23
83	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	380	24-Jan-22 A	13-Oct-23
84	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	20-Oct-22
85	**NAHC/Local Tribes AB 52 Consultation**		190	01-Sep-20 A	10-Jan-23
86	STA-120	NAHC/Local Tribes AB 52 Consultation (move to Laurie/Planning, keep or delete?)	190	01-Sep-20 A	10-Jan-23
87	**Reservoir Operations & Modeling**		677	01-Nov-20 A	05-Dec-24
88	**Operations Plan - Version 2**		173	03-Jan-24	30-Aug-24
89	KD-1510	Operations Plan, Version 2	173	03-Jan-24	30-Aug-24
90	**Final Sites DWR/Reclamation Operating Agreement**		182	11-Apr-22	30-Dec-22
91	OP-1005	Final Sites DWR /Reclamation Operating Agreement	182	11-Apr-22	30-Dec-22
92	**Provide Operations Input on Response to Comments & Final EIR**		36	04-Apr-22	23-May-22
93	FO-1110	Perform Modeling for Final EIR/EIS	25	04-Apr-22	06-May-22
94	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	26-Apr-22	23-May-22
95	**BA/ITP Modeling**		21	01-Nov-20 A	29-Apr-22
96	OP-450	BA/ITP Modeling Support	21	01-Nov-20 A	29-Apr-22
97	OP-360	Appendices for BA/ITP	21	01-Apr-21 A	29-Apr-22
98	**Water Rights Modeling**		437	03-Jan-22 A	29-Dec-23
99	A1200	Water Rights Modeling Support	436	03-Jan-22 A	28-Dec-23
100	A1210	Documentation for Water Rights	437	03-Jan-22 A	29-Dec-23
101	**Refined Daily Operations Model**		130	24-May-22	30-Nov-22
102	A1220	Refined Daily Operations Model	130	24-May-22	30-Nov-22
103	**Update to CalSim 3**		240	02-Jan-24	05-Dec-24
104	A1230	Update to CalSim 3	240	02-Jan-24	05-Dec-24
105	**Sites Specific Model**		258	03-Jan-23	28-Dec-23



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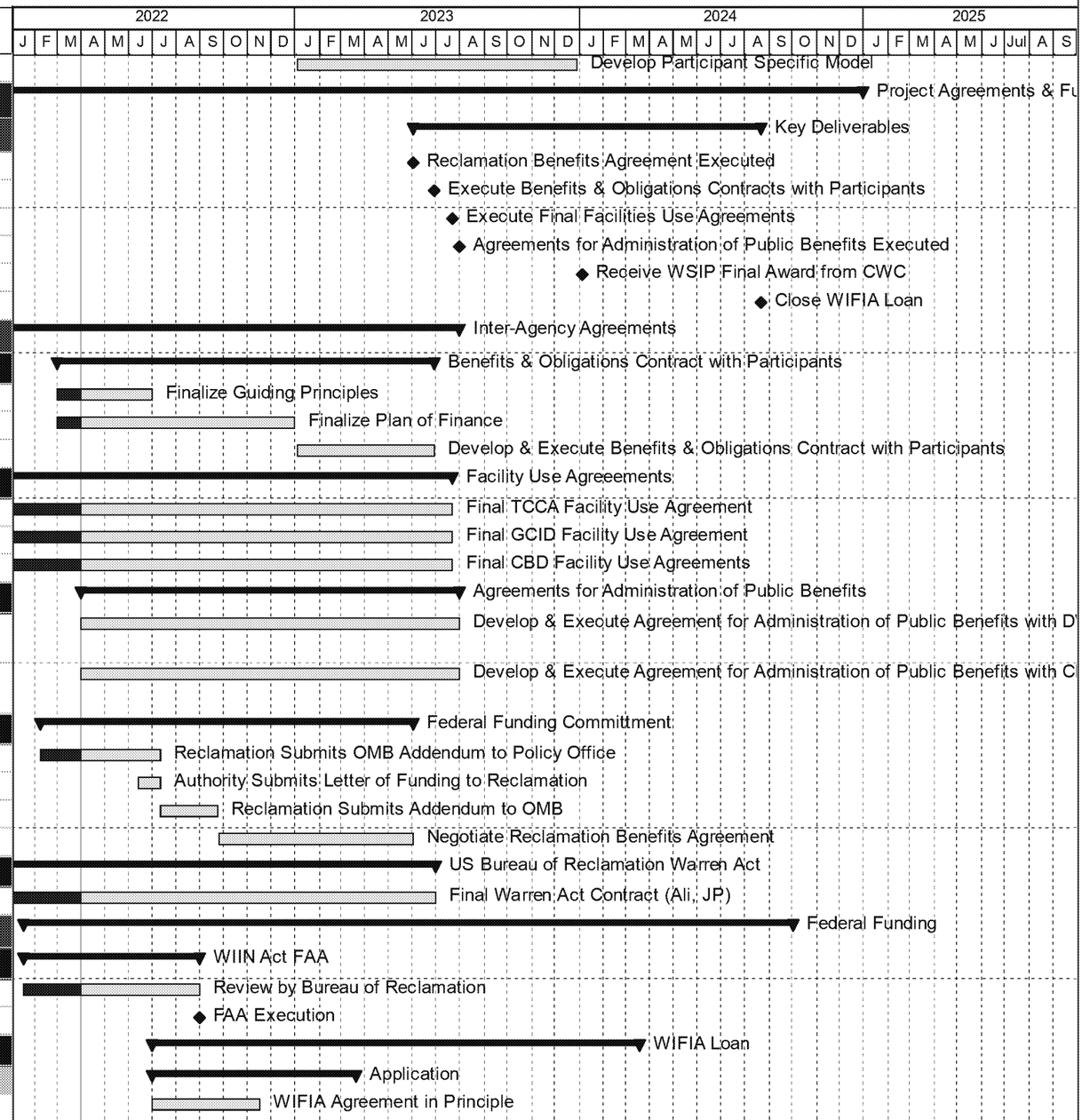
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
106	OS-1150	Develop Participant Specific Model	258	03-Jan-23	28-Dec-23
107	**Project Agreements & Funding**		694	01-Jun-21 A	30-Dec-24
108	**Key Deliverables**		309	01-Jun-23	22-Aug-24
109	KD-1260	Reclamation Benefits Agreement Executed	0		01-Jun-23
110	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		29-Jun-23
111	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23
112	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23
113	KD-1310	Receive WSIP Final Award from CWC	0		05-Jan-24
114	KD-2600	Close WIFIA Loan	0		22-Aug-24
115	**Inter-Agency Agreements**		334	01-Jun-21 A	31-Jul-23
116	**Benefits & Obligations Contract with Participants**		313	01-Mar-22 A	29-Jun-23
117	BO-1100	Finalize Guiding Principles	64	01-Mar-22 A	30-Jun-22
118	BO-1200	Finalize Plan of Finance	188	01-Mar-22 A	30-Dec-22
119	BO-1300	Develop & Execute Benefits & Obligations Contract with Participants	125	03-Jan-23	29-Jun-23
120	**Facility Use Agreeements**		328	27-Aug-21 A	21-Jul-23
121	FO-1020	Final TCCA Facility Use Agreement	328	27-Aug-21 A	21-Jul-23
122	FO-1030	Final GCID Facility Use Agreement	328	27-Aug-21 A	21-Jul-23
123	FO-1040	Final CBD Facility Use Agreements	328	27-Aug-21 A	21-Jul-23
124	**Agreements for Administration of Public Benefits**		334	01-Apr-22	31-Jul-23
125	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR (Erin start? end June 2023)	334	01-Apr-22	31-Jul-23
126	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW (Erin)	334	01-Apr-22	31-Jul-23
127	**Federal Funding Committment**		293	07-Feb-22 A	01-Jun-23
128	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	70	07-Feb-22 A	11-Jul-22
129	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22
130	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22
131	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	01-Jun-23
132	**US Bureau of Reclamation Warren Act**		314	01-Jun-21 A	30-Jun-23
133	FED-090	Final Warren Act Contract (Ali, JP)	314	01-Jun-21 A	30-Jun-23
134	**Federal Funding**		631	17-Jan-22 A	02-Oct-24
135	**WIIN Act FAA**		107	17-Jan-22 A	31-Aug-22
136	WIIN-1120	Review by Bureau of Reclamation	107	17-Jan-22 A	31-Aug-22
137	WIIN-1140	FAA Execution	0		31-Aug-22
138	**WIFIA Loan**		426	01-Jul-22	18-Mar-24
139	**Application**		176	01-Jul-22	20-Mar-23
140	WIFIA-110	WIFIA Agreement in Principle	95	01-Jul-22	16-Nov-22



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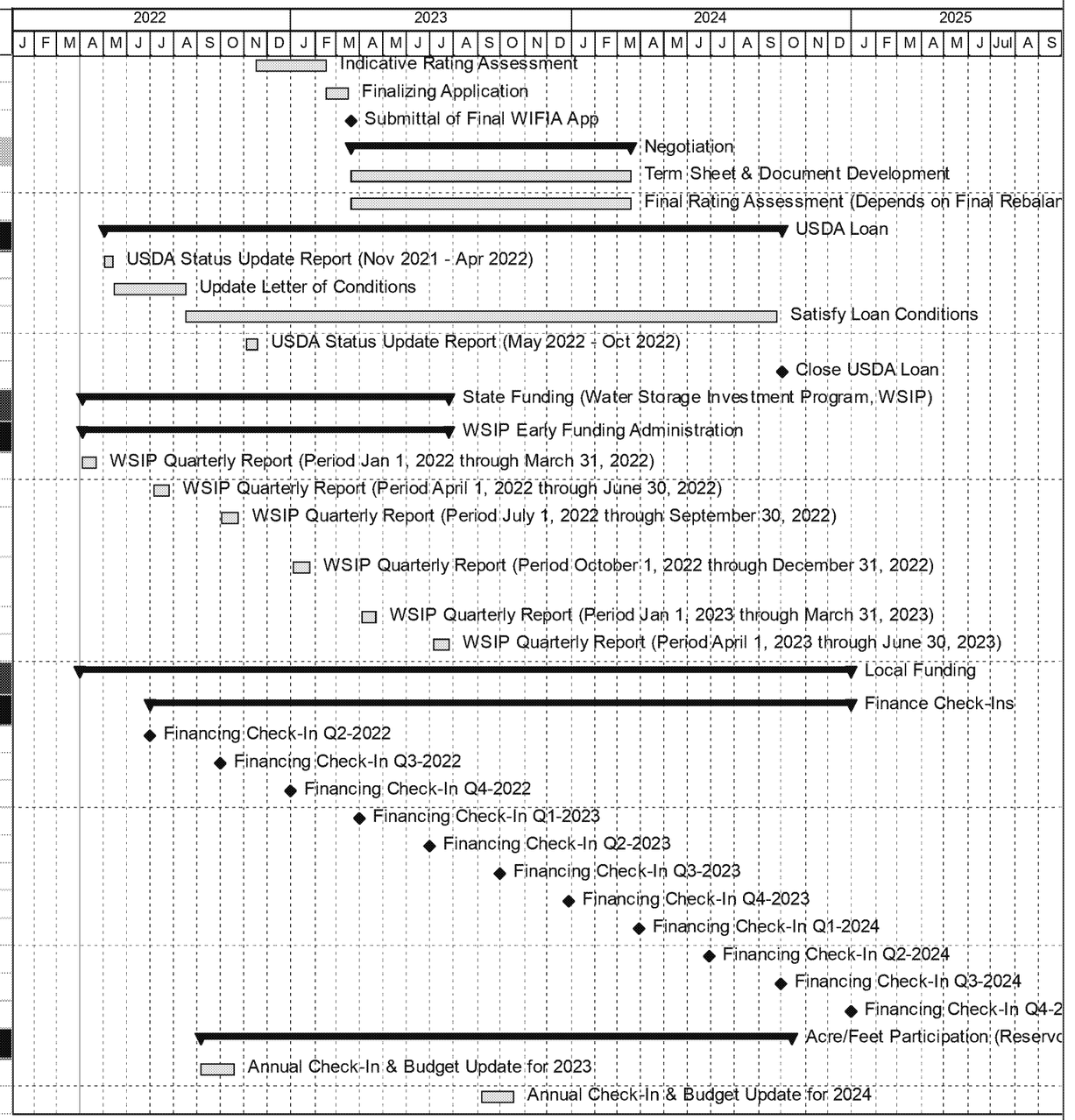
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
141	WIFIA-120	Indicative Rating Assessment	60	17-Nov-22	15-Feb-23
142	WIFIA-130	Finalizing Application	30	16-Feb-23	17-Mar-23
143	WIFIA-140	Submittal of Final WIFIA App	0		20-Mar-23
144	**Negotiation**		250	20-Mar-23	18-Mar-24
145	WIFIA-210	Term Sheet & Document Development	250	20-Mar-23	18-Mar-24
146	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	20-Mar-23	18-Mar-24
147	**USDA Loan**		610	02-May-22	02-Oct-24
148	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	02-May-22	13-May-22
149	USDA-1050	Update Letter of Conditions	65	16-May-22	16-Aug-22
150	USDA-1060	Satisfy Loan Conditions	530	17-Aug-22	25-Sep-24
151	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	04-Nov-22	18-Nov-22
152	USDA-1070	Close USDA Loan	0		02-Oct-24
153	**State Funding (Water Storage Investment Program, WSIP)**		329	04-Apr-22	25-Jul-23
154	**WSIP Early Funding Administration**		329	04-Apr-22	25-Jul-23
155	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	04-Apr-22	22-Apr-22
156	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	06-Jul-22	26-Jul-22
157	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	24-Oct-22
158	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	24-Jan-23
159	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23
160	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23
161	**Local Funding**		694	01-Apr-22	30-Dec-24
162	**Finance Check-Ins**		630	30-Jun-22	30-Dec-24
163	FC-1250	Financing Check-In Q2-2022	0		30-Jun-22
164	FC-1260	Financing Check-In Q3-2022	0		30-Sep-22
165	FC-1270	Financing Check-In Q4-2022	0		30-Dec-22
166	FC-1280	Financing Check-In Q1-2023	0		31-Mar-23
167	FC-1290	Financing Check-In Q2-2023	0		30-Jun-23
168	FC-1300	Financing Check-In Q3-2023	0		29-Sep-23
169	FC-1310	Financing Check-In Q4-2023	0		29-Dec-23
170	FC-1320	Financing Check-In Q1-2024	0		29-Mar-24
171	FC-1330	Financing Check-In Q2-2024	0		28-Jun-24
172	FC-1340	Financing Check-In Q3-2024	0		30-Sep-24
173	FC-1350	Financing Check-In Q4-2024	0		30-Dec-24
174	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		530	06-Sep-22	14-Oct-24
175	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	18-Oct-22
176	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	18-Oct-23



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

Project ID: Sites with Geo / Project Name: Sites Reservoir Project
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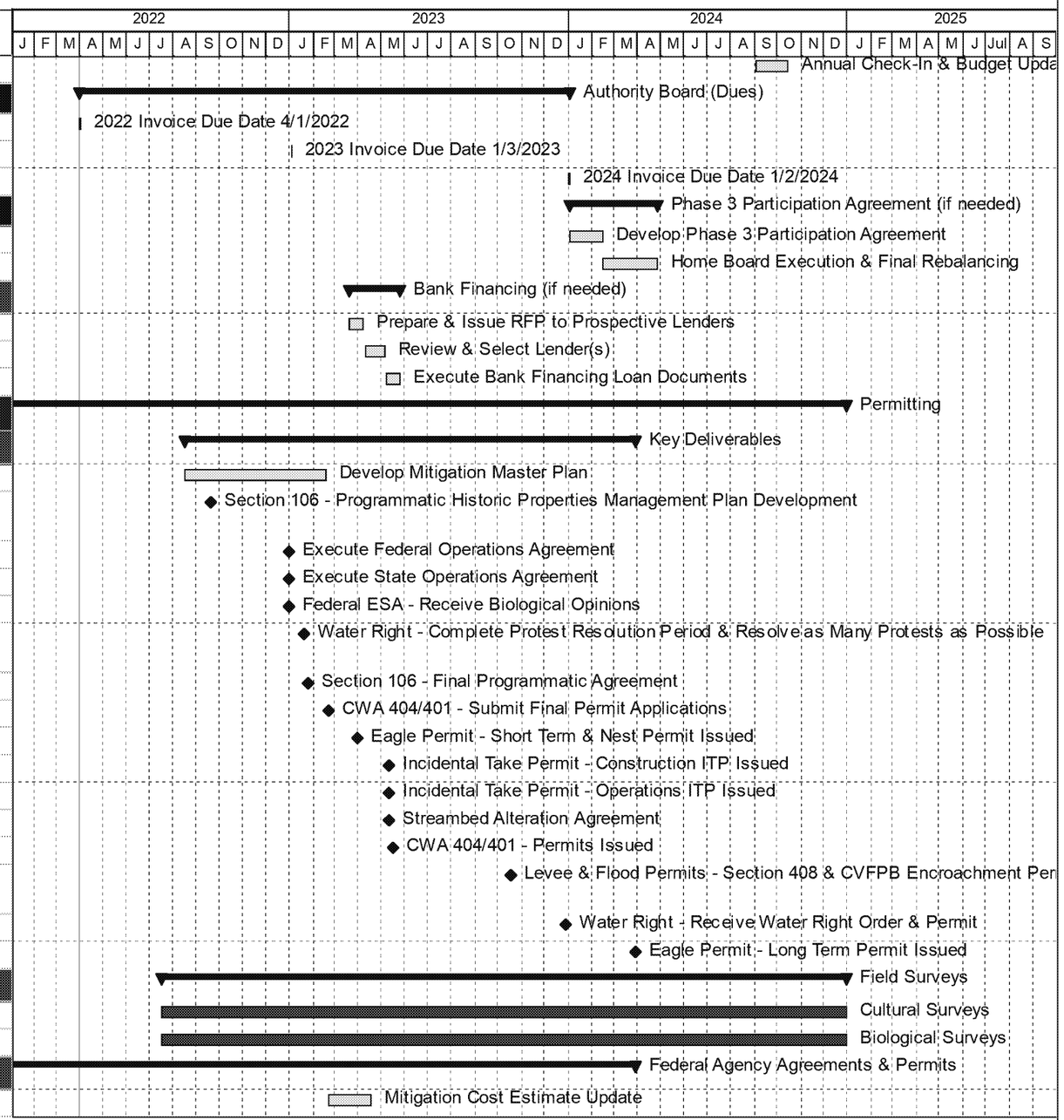
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
177	AF-1300	Annual Check-In & Budget Update for 2025	30	03-Sep-24	14-Oct-24
178	**Authority Board (Dues)**		438	01-Apr-22	02-Jan-24
179	AB-2100	2022 Invoice Due Date 4/1/2022	1	01-Apr-22	01-Apr-22
180	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*
181	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*
182	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	26-Apr-24
183	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	15-Feb-24
184	PA-1200	Home Board Execution & Final Rebalancing	50	16-Feb-24	26-Apr-24
185	**Bank Financing (if needed)**		50	20-Mar-23	26-May-23
186	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	20-Mar-23	07-Apr-23
187	BF-1200	Review & Select Lender(s)	20	10-Apr-23	05-May-23
188	BF-1300	Execute Bank Financing Loan Documents	15	08-May-23	26-May-23
189	**Permitting**		695	04-Jan-21 A	31-Dec-24
190	**Key Deliverables**		403	17-Aug-22	29-Mar-24
191	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	17-Feb-23
192	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22
193	KD-1240	Execute Federal Operations Agreement	0		30-Dec-22
194	KD-1250	Execute State Operations Agreement	0		30-Dec-22
195	KD-1340	Federal ESA - Receive Biological Opinions	0		30-Dec-22
196	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		20-Jan-23
197	KD-1350	Section 106 - Final Programmatic Agreement	0		25-Jan-23
198	KD-1390	CWA 404/401 - Submit Final Permit Applications	0		21-Feb-23
199	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		31-Mar-23
200	KD-1370	Incidental Take Permit - Construction ITP Issued	0		11-May-23
201	KD-1380	Incidental Take Permit - Operations ITP Issued	0		11-May-23
202	KD-1420	Streambed Alteration Agreement	0		11-May-23
203	KD-1400	CWA 404/401 - Permits Issued	0		16-May-23
204	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		17-Oct-23
205	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23
206	KD-1440	Eagle Permit - Long Term Permit Issued	0		29-Mar-24
207	**Field Surveys**		621	18-Jul-22	31-Dec-24
208	RE-1030	Cultural Surveys	621	18-Jul-22	31-Dec-24
209	RE-1040	Biological Surveys	621	18-Jul-22	31-Dec-24
210	**Federal Agency Agreements & Permits**		499	11-Jan-21 A	29-Mar-24
211	CE-1570	Mitigation Cost Estimate Update	40	21-Feb-23	17-Apr-23



Remaining Level of Effort
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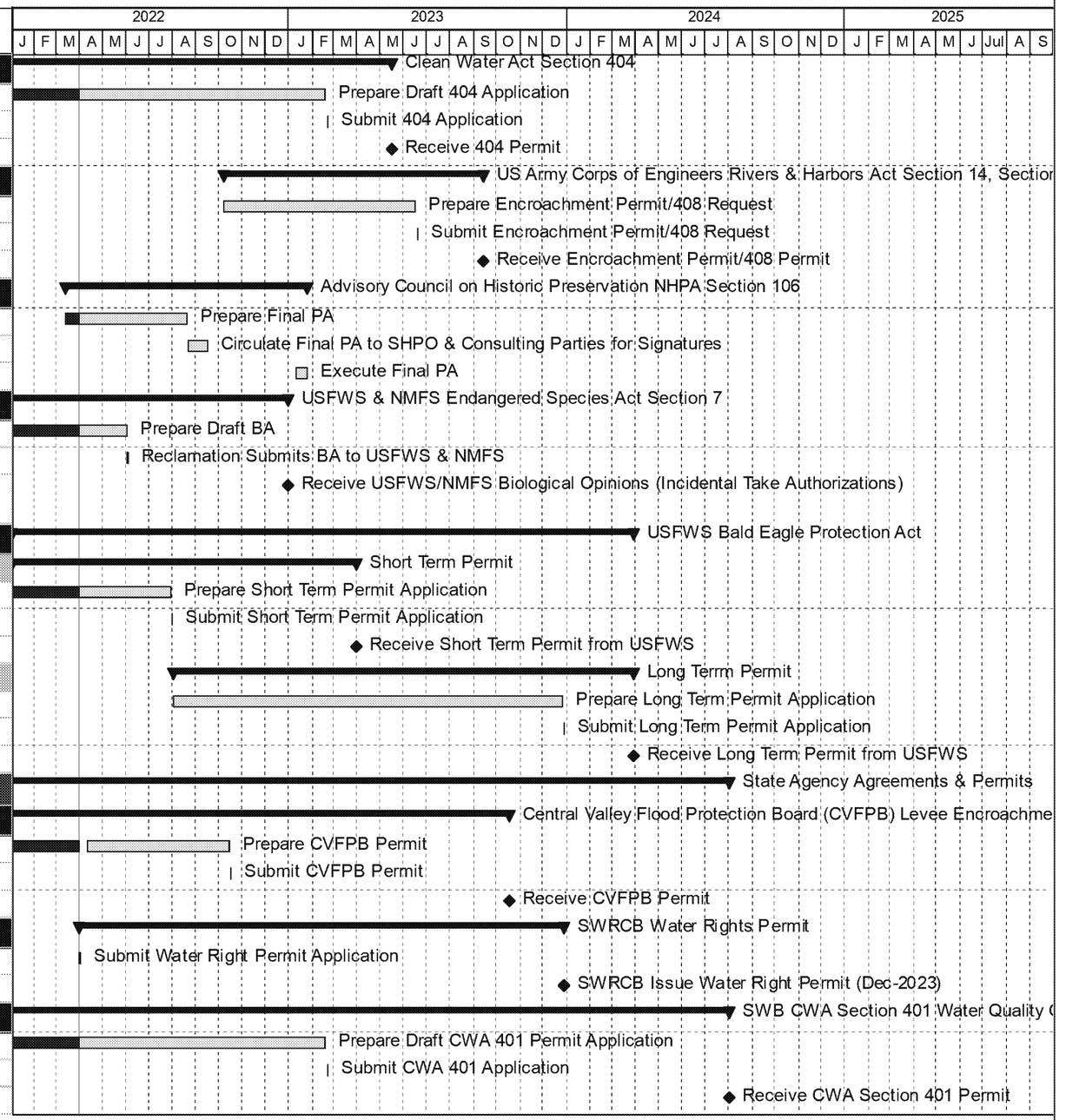
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
212		**Clean Water Act Section 404**	282	04-Feb-21 A	16-May-23
213	404-050	Prepare Draft 404 Application	221	04-Feb-21 A	17-Feb-23
214	404-120	Submit 404 Application	1	21-Feb-23	21-Feb-23
215	404-130	Receive 404 Permit	0		16-May-23
216		**US Army Corps of Engineers Rivers & Harbors Act Section 14, Sectior**	233	07-Oct-22	13-Sep-23
217	408-150	Prepare Encroachment Permit/408 Request	172	07-Oct-22	16-Jun-23
218	408-160	Submit Encroachment Permit/408 Request	1	19-Jun-23	19-Jun-23
219	408-170	Receive Encroachment Permit/408 Permit	0		13-Sep-23
220		**Advisory Council on Historic Preservation NHPA Section 106**	204	14-Mar-22 A	25-Jan-23
221	106-081	Prepare Final PA	99	14-Mar-22 A	19-Aug-22
222	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatures	18	22-Aug-22	15-Sep-22
223	106-102	Execute Final PA	10	11-Jan-23	25-Jan-23
224		**USFWS & NMFS Endangered Species Act Section 7**	188	11-Jan-21 A	30-Dec-22
225	BA-200	Prepare Draft BA	44	11-Jan-21 A	02-Jun-22
226	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22
227	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		30-Dec-22
228		**USFWS Bald Eagle Protection Act**	499	03-Jan-22 A	29-Mar-24
229		**Short Term Permit**	250	03-Jan-22 A	31-Mar-23
230	USFWS-110	Prepare Short Term Permit Application	84	03-Jan-22 A	29-Jul-22
231	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22
232	USFWS-130	Receive Short Term Permit from USFWS	0		31-Mar-23
233		**Long Terrm Permit**	414	02-Aug-22	29-Mar-24
234	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	27-Dec-23
235	USFWS-150	Submit Long Term Permit Application	1	28-Dec-23	28-Dec-23
236	USFWS-160	Receive Long Term Permit from USFWS	0		29-Mar-24
237		**State Agency Agreements & Permits**	587	04-Jan-21 A	01-Aug-24
238		**Central Valley Flood Protection Board (CVFPB) Levee Encroachment**	381	13-Dec-21 A	17-Oct-23
239	CVFPB-200	Prepare CVFPB Permit	130	13-Dec-21 A	14-Oct-22
240	CVFPB-210	Submit CVFPB Permit	1	17-Oct-22	17-Oct-22
241	CVFPB-220	Receive CVFPB Permit	0		17-Oct-23
242		**SWRCB Water Rights Permit**	436	01-Apr-22	28-Dec-23
243	WRP-110	Submit Water Right Permit Application	1	01-Apr-22	01-Apr-22
244	WRP-120	SWRCB Issue Water Right Permit (Dec-2023)	0		28-Dec-23
245		**SWB CWA Section 401 Water Quality Certification**	587	04-Jan-21 A	01-Aug-24
246	401-200	Prepare Draft CWA 401 Permit Application	221	04-Jan-21 A	17-Feb-23
247	401-210	Submit CWA 401 Application	1	21-Feb-23	21-Feb-23
248	401-220	Receive CWA Section 401 Permit	0		01-Aug-24



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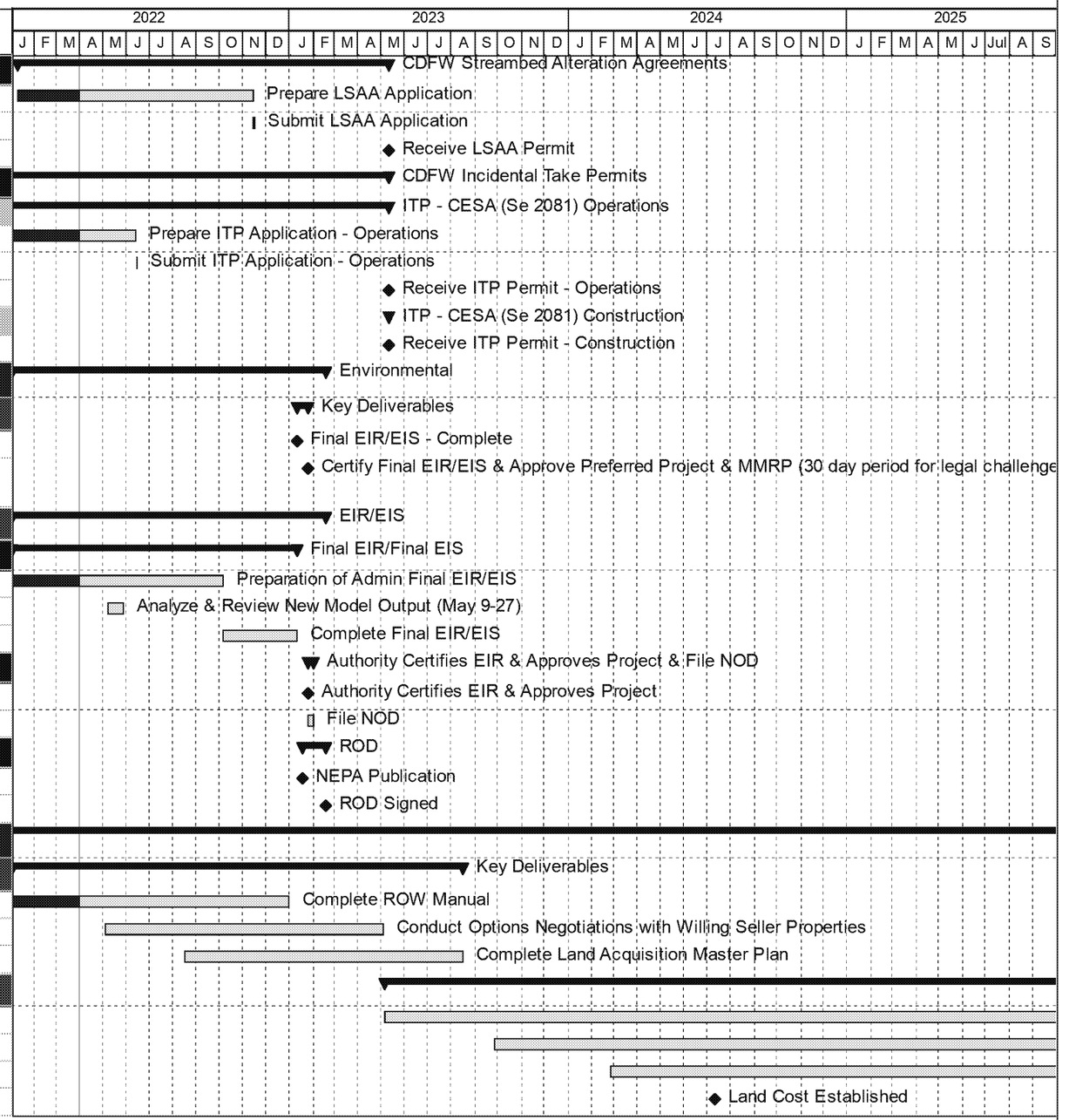
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
249		**CDFW Streambed Alteration Agreements**	279	10-Jan-22 A	11-May-23
250	1600-200	Prepare LSAA Application	157	10-Jan-22 A	14-Nov-22
251	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22
252	1600-220	Receive LSAA Permit	0		11-May-23
253		**CDFW Incidental Take Permits**	279	11-Jan-21 A	11-May-23
254		**ITP - CESA (Se 2081) Operations**	279	11-Jan-21 A	11-May-23
255	2081-100	Prepare ITP Application - Operations	51	11-Jan-21 A	13-Jun-22
256	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22
257	2081-120	Receive ITP Permit - Operations	0		11-May-23
258		**ITP - CESA (Se 2081) Construction**	0	11-May-23	11-May-23
259	2081-220	Receive ITP Permit - Construction	0		11-May-23
260		**Environmental**	221	03-Jan-22 A	17-Feb-23
261		**Key Deliverables**	10	10-Jan-23	25-Jan-23
262	KD-1470	Final EIR/EIS - Complete	0		10-Jan-23
263	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP (30 day period for legal challenge)	0		25-Jan-23
264		**EIR/EIS**	221	03-Jan-22 A	17-Feb-23
265		**Final EIR/Final EIS**	194	03-Jan-22 A	10-Jan-23
266	EIR-210	Preparation of Admin Final EIR/EIS	131	03-Jan-22 A	05-Oct-22
267	EIR-220	Analyze & Review New Model Output (May 9-27)	15	09-May-22	27-May-22
268	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	10-Jan-23
269		**Authority Certifies EIR & Approves Project & File NOD**	5	25-Jan-23	01-Feb-23
270	EIR-370	Authority Certifies EIR & Approves Project	0		25-Jan-23
271	EIR-380	File NOD	5	26-Jan-23	01-Feb-23
272		**ROD**	22	18-Jan-23	17-Feb-23
273	EIR-440	NEPA Publication	0		18-Jan-23
274	EIR-450	ROD Signed	0		17-Feb-23
275		**Real Estate**	1774	02-Nov-20 A	19-Feb-29
276		**Key Deliverables**	346	03-Jan-22 A	16-Aug-23
277	KD-1495	Complete ROW Manual	188	03-Jan-22 A	30-Dec-22
278	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	05-May-22	04-May-23
279	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	16-Aug-23
280		**Land Acquisition**	1500	05-May-23	19-Feb-29
281	RE-1060	Construction Package 1 - Land Acquisition	1500	05-May-23	19-Feb-29
282	RE-1070	Construction Package 2 - Land Acquisition	1400	27-Sep-23	19-Feb-29
283	RE-1080	Construction Package 3 - Land Acquisition	1300	26-Feb-24	19-Feb-29
284	RE-1050	Land Cost Established	0		11-Jul-24



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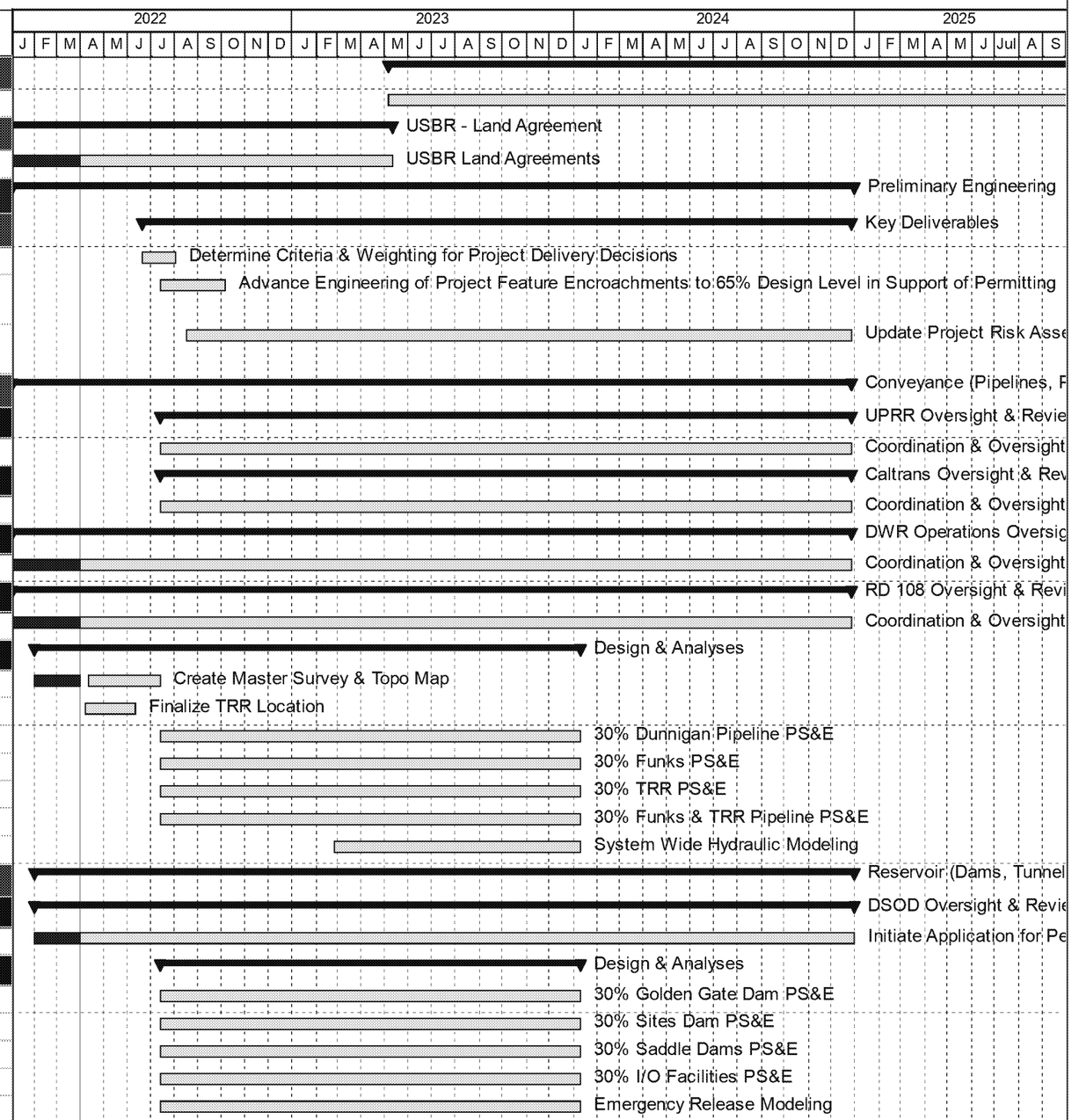
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
285	**Relocation**		1500	05-May-23	01-Feb-29
286	RE-1100	Relocation Assistance, as Needed	1500	05-May-23	01-Feb-29
287	**USBR - Land Agreement**		278	02-Nov-20 A	10-May-23
288	FED-100	USBR Land Agreements	278	02-Nov-20 A	10-May-23
289	**Preliminary Engineering**		694	03-Jan-22 A	30-Dec-24
290	**Key Deliverables**		637	21-Jun-22	27-Dec-24
291	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22
292	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	14-Jul-22	06-Oct-22
293	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	597	17-Aug-22	27-Dec-24
294	**Conveyance (Pipelines, Pump Stations, Canals)**		693	03-Jan-22 A	27-Dec-24
295	**UPRR Oversight & Review**		621	14-Jul-22	27-Dec-24
296	A1110	Coordination & Oversight with UPRR	621	14-Jul-22	27-Dec-24
297	**Caltrans Oversight & Review**		621	14-Jul-22	27-Dec-24
298	A1120	Coordination & Oversight with Caltrans	621	14-Jul-22	27-Dec-24
299	**DWR Operations Oversight & Review (KLOG)**		693	03-Jan-22 A	27-Dec-24
300	A1130	Coordination & Oversight with Department of Water Resources	693	03-Jan-22 A	27-Dec-24
301	**RD 108 Oversight & Review**		693	03-Jan-22 A	27-Dec-24
302	A1140	Coordination & Oversight with Reclamation District 108	693	03-Jan-22 A	27-Dec-24
303	**Design & Analyses**		440	01-Feb-22 A	10-Jan-24
304	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	13-Jul-22
305	KD-1150	Finalize TRR Location	46	07-Apr-22	10-Jun-22
306	KD-1630	30% Dunnigan Pipeline PS&E	372	14-Jul-22	10-Jan-24
307	KD-2010	30% Funks PS&E	372	14-Jul-22	10-Jan-24
308	KD-2020	30% TRR PS&E	372	14-Jul-22	10-Jan-24
309	KD-2030	30% Funks & TRR Pipeline PS&E	372	14-Jul-22	10-Jan-24
310	KD-2080	System Wide Hydraulic Modeling	220	24-Feb-23	10-Jan-24
311	**Reservoir (Dams, Tunnels)**		694	01-Feb-22 A	30-Dec-24
312	**DSOD Oversight & Review**		694	01-Feb-22 A	30-Dec-24
313	KD-1100	Initiate Application for Permit to Construct from DSOD	694	01-Feb-22 A	30-Dec-24
314	**Design & Analyses**		372	14-Jul-22	10-Jan-24
315	KD-1660	30% Golden Gate Dam PS&E	372	14-Jul-22	10-Jan-24
316	KD-2040	30% Sites Dam PS&E	372	14-Jul-22	10-Jan-24
317	KD-2050	30% Saddle Dams PS&E	372	14-Jul-22	10-Jan-24
318	KD-2060	30% I/O Facilities PS&E	372	14-Jul-22	10-Jan-24
319	KD-2070	Emergency Release Modeling	372	14-Jul-22	10-Jan-24



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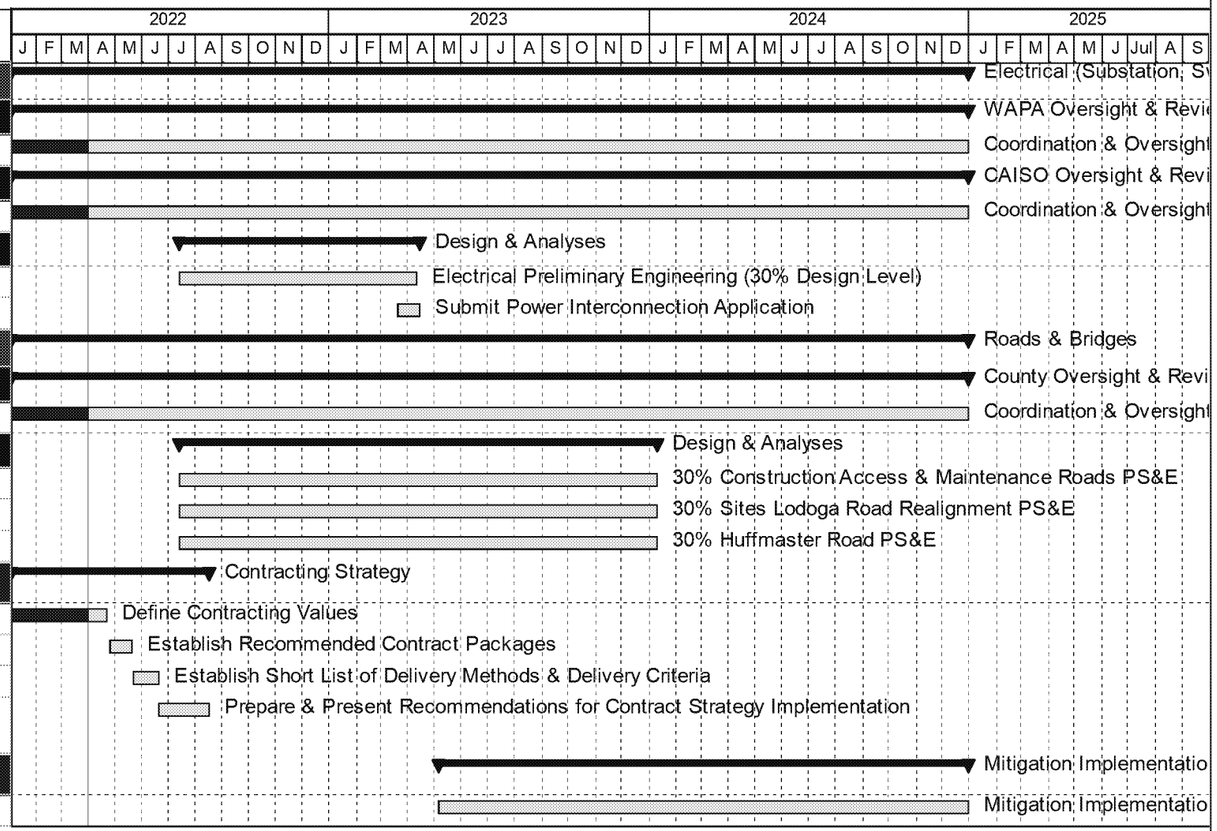
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
320		**Electrical (Substation, Switchyard, Transmission Line)**	694	03-Jan-22 A	30-Dec-24
321		**WAPA Oversight & Review**	694	03-Jan-22 A	30-Dec-24
322	A1150	Coordination & Oversight with WAPA	694	03-Jan-22 A	30-Dec-24
323		**CAISO Oversight & Review**	694	03-Jan-22 A	30-Dec-24
324	A1160	Coordination & Oversight with CAISO	694	03-Jan-22 A	30-Dec-24
325		**Design & Analyses**	188	14-Jul-22	14-Apr-23
326	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	14-Jul-22	11-Apr-23
327	KD-1200	Submit Power Interconnection Application	20	20-Mar-23	14-Apr-23
328		**Roads & Bridges**	694	03-Jan-22 A	30-Dec-24
329		**County Oversight & Review**	694	03-Jan-22 A	30-Dec-24
330	A1170	Coordination & Oversight with County Authorities	694	03-Jan-22 A	30-Dec-24
331		**Design & Analyses**	372	14-Jul-22	10-Jan-24
332	KD-1650	30% Construction Access & Maintenance Roads PS&E	372	14-Jul-22	10-Jan-24
333	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	14-Jul-22	10-Jan-24
334	KD-2100	30% Huffmaster Road PS&E	372	14-Jul-22	10-Jan-24
335		**Contracting Strategy**	96	03-Jan-22 A	16-Aug-22
336	CS-1100	Define Contracting Values	16	03-Jan-22 A	22-Apr-22
337	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22
338	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22
339	CS-1400	Prepare & Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22
340		**Mitigation Implementation**	420	05-May-23	30-Dec-24
341	MI-1100	Mitigation Implementation (more information needed to expand detail)	420	05-May-23	30-Dec-24



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From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/11/2022 8:09:00 AM
To: David Hubbard [Dhubbard@BrwnCald.com]; mmaltby@brwncald.com
Subject: Re: Sites Key Deliverables_2022.04.08.xlsx

Marcus, very useful exercise. Broadly, the dates now look more reflective of reality, but I think Jerry may push back a bit. This is really where the rubber hits the road with the RC/AB. Each of these tells a bit of a story and we should be ready with that. A few notes on the red-yellow-green table:

- The "final federal funding request" determined does appear in the schedule, but it has been named "Authority Submits Letter of Funding to Reclamation".
- "Complete Loan Applications" should be changed to track the WIFIA loan application (WIFIA-110 through WIFIA-140)
- It is unclear to me what we meant by "Obtain Local Agency Agreements and Permits" initially. Marcus, can you dig a bit deeper on that? I wonder if it isn't meant to be more like the agreements necessary to use local facilities (i.e. Facilities Use Agreements). If that is the case, we can tie it to other activities in the schedule.

Dave: I agree with your comments on the master schedule logic. Generally, I also agree that the EPC contractors will likely take on many of the local permits but want to confirm what we meant by this activity in the work plan (bullet three above).

Thanks,
JP

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Monday, April 11, 2022 5:53 AM
To: mmaltby@brwncald.com <mmaltby@brwncald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

KD-1130 was being driven by the Land Acquisition Plan out in Aug-2023, so I've removed that and let the Contracting Strategy drive it. We'll make assumptions based on the Contracting Strategy and adjust as needed going forward. This moves it to 21-Oct-22.

KD-1450 was removed during a session with JP and Cheyanne. No Local (County) Agency Agreements/Permits could be identified during the A3 timeframe and consensus leans towards the EPC contractors having responsibility in the future.

Dave Hubbard
Project Controls
Brown and Caldwell
Cell: 832.840.1789
dhubbard@brwncald.com



From: Marcus Maltby <mmaltby@BrwnCald.com>
Sent: Sunday, April 10, 2022 8:35 PM
To: David Hubbard <Dhubbard@BrwnCald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

@David Hubbard -
I'm redlining the milestone calendar (green, yellow, red) and I have a couple items that I think we should update:

- KD-1130 Updated Master Project Schedule (baseline established) – Shows ending October 2023. I think that should be October 2022. Are there any predecessors/successors tied to this? I imagine just the contract strategy plus a lag.
- KD-1450 "Obtain Local Agency Agreements and Permits" Does not show up on the KD list you provided. It was on the schedule that John provided comments to on April 1st. Did someone decide to move it off the key deliverables list?

@JP Robinette – During one of our calls last week, I think you requested a redlined version of the stoplight table. See attached. At the end there are two text boxes, one that shows new key deliverables and one that shows removed key deliverables. Generally activities have been pushed back (which isnt unexpected) and now I'm starting to wonder about what this will mean for TO Budgets for 2023 and 2024.

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Friday, April 8, 2022 2:30 PM
To: Marcus Maltby <mmaltby@BrwnCald.com>
Subject: Sites Key Deliverables_2022.04.08.xlsx

KD's attached.

From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/11/2022 8:36:45 AM
To: David Hubbard [Dhubbard@BrwnCald.com]
CC: mmaltby@brwncald.com
Subject: Re: Sites Key Deliverables_2022.04.08.xlsx

That makes sense. Thanks!

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Monday, April 11, 2022 8:35 AM
To: JP Robinette <jrobinette@sitesproject.org>
Cc: mmaltby@brwncald.com <mmaltby@brwncald.com>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

Okay, I have added back the KD-1255 "Complete Loan Applications" and tied it only to the WIFIA Loan WIFIA-140 "Submittal of Final WIFIA Application" at 20-Mar-23.
It's not tied to the USDA L:oan.

Dave Hubbard
Project Controls
Brown and Caldwell
Cell: 832.840.1789
dhubbard@brwncald.com



From: JP Robinette <jrobinette@sitesproject.org>
Sent: Monday, April 11, 2022 10:09 AM
To: David Hubbard <Dhubbard@BrwnCald.com>; Marcus Maltby <mmaltby@BrwnCald.com>
Subject: Re: Sites Key Deliverables_2022.04.08.xlsx

Marcus, very useful exercise. Broadly, the dates now look more reflective of reality, but I think Jerry may push back a bit. This is really where the rubber hits the road with the RC/AB. Each of these tells a bit of a story and we should be ready with that. A few notes on the red-yellow-green table:

- The "final federal funding request" determined does appear in the schedule, but it has been named "Authority Submits Letter of Funding to Reclamation".
- "Complete Loan Applications" should be changed to track the WIFIA loan application (WIFIA-110 through WIFIA-140)
- It is unclear to me what we meant by "Obtain Local Agency Agreements and Permits" initially. Marcus, can you dig a bit deeper on that? I wonder if it isn't meant to be more like the agreements necessary to use local facilities (i.e. Facilities Use Agreements). If that is the case, we can tie it to other activities in the schedule.

Dave: I agree with your comments on the master schedule logic. Generally, I also agree that the EPC contractors will likely take on many of the local permits but want to confirm what we meant by this activity in the work plan (bullet three above).

Thanks,
JP

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Monday, April 11, 2022 5:53 AM
To: mmaltby@brwncald.com <mmaltby@brwncald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

KD-1130 was being driven by the Land Acquisition Plan out in Aug-2023, so I've removed that and let the Contracting Strategy drive it. We'll make assumptions based on the Contracting Strategy and adjust as needed going forward. This moves it to 21-Oct-22.

KD-1450 was removed during a session with JP and Cheyanne. No Local (County) Agency Agreements/Permits could be identified during the A3 timeframe and consensus leans towards the EPC contractors having responsibility in the future.

Dave Hubbard
Project Controls
Brown and Caldwell
Cell: 832.840.1789
dhubbard@brwncald.com



From: Marcus Maltby <mmaltby@BrwnCald.com>
Sent: Sunday, April 10, 2022 8:35 PM
To: David Hubbard <Dhubbard@BrwnCald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

@David Hubbard -
I'm redlining the milestone calendar (green, yellow, red) and I have a couple items that I think we should update:

- KD-1130 Updated Master Project Schedule (baseline established) – Shows ending October 2023. I think that should be October 2022. Are there any predecessors/successors tied to this? I imagine just the contract strategy plus a lag.
- KD-1450 "Obtain Local Agency Agreements and Permits" Does not show up on the KD list you provided. It was on the schedule that John provided comments to on April 1st. Did someone decide to move it off the key deliverables list?

@JP Robinette – During one of our calls last week, I think you requested a redlined version of the stoplight table. See attached. At the end there are two text boxes, one that shows new key deliverables and one that shows removed key deliverables. Generally activities have been pushed back (which isnt unexpected) and now I'm starting to wonder about what this will mean for TO Budgets for 2023 and 2024.

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Friday, April 8, 2022 2:30 PM
To: Marcus Maltby <mmaltby@BrwnCald.com>
Subject: Sites Key Deliverables_2022.04.08.xlsx

KD's attached.

Meeting: **Sites Reservoir Committee (RC), Coordination Workgroup**

Locations: Maxwell Project Office, 122 Old Highway 99W, Maxwell, CA 95955
See below for alternate meeting locations.

Call in: **1-916-538-7066** Code: **372 979 656#** Click here to join the meeting

Workgroup Chair: Thad Bettner (RC Chair/Glenn-Colusa Irrigation District)

Workgroup Vice-Chair: Valerie Pryor (RC Vice-Chair/Zone 7 Water Agency)

Staff Lead: Jerry Brown, Executive Director

AGENDA

Wednesday, April 14, 2022; 9:00 – 10:00 am

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions.
- Period for Public Comment.

1. Discussion and Information Items:

1.1 Board Meeting Agenda Planning

1.2 General Coordination Among Committees and Workgroups

1.3 Workgroup/Committee Chair Assignments

1.4 Rebalancing - Preliminary Results

1.5 Plan of Finance – Update on WIFIA Related Activities

2. Upcoming Meetings:

Reservoir Committee
Friday, April 22, 2022 (9:00 am – 12:00 pm)

Authority Board
Wednesday, April 27, 2022 (1:30 – 4:00 pm)

Coordination Workgroup
Wednesday, May 12, 2022 (9:00 – 10:00 am)

Virtual Information will be provided before all meetings at Sitesproject.org.

ADJOURN

PERIOD OF PUBLIC COMMENT: Any person may speak about any subject of concern, provided it is within the jurisdiction of the Reservoir Committee and is not already on today's agenda. The total amount of time allotted for receiving such public communication shall be limited to a total of 10 minutes per issue and each individual or group will be limited to no more than 3 minutes each within the 10 minutes allocated per issue. **Note:** No action shall be taken on comments made under this comment period.

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

Alternate Meeting Locations:

Coachella Valley Water District, 51501 Tyler Street, Coachella, CA 92236

Colusa County, 1215 Market Street, Colusa, CA 95932

Davis Water District, 1717 5th Street, Davis, CA 95616

Glenn-Colusa Irrigation District, 344 East Laurel Street, Willows, CA 95988

San Bernardino Valley Municipal WD, 380 E. Vanderbilt Way, San Bernardino, CA 92408

Wheeler Ridge-Maricopa Water Storage District, 12109 Hwy 166, Bakersfield, CA 93313

Zone 7 Water Agency, 100 North Canyons Parkway, Livermore, CA 94551

Meeting: **Sites Reservoir Committee, Operations & Engineering Workgroup**

Locations: Maxwell Project Office, 122 Old Highway 99W, Maxwell, CA 95955
See below for alternate meeting locations.

Call in: **1-213-379-5743** Code: **223 227 280#** Click here to join the meeting

Workgroup Chair: Robert Kunde (Wheeler Ridge Maricopa WSD)

Workgroup Vice Chair: Mike Azevedo (Colusa County)

Staff Lead: JP Robinette, Engineering & Construction Manager

AGENDA

Wednesday, April 13, 2022; 1:30 – 3:30 pm

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions.
- Period for Public Comment.

1. Discussion and Information Items:

1.1 Review and comment on updated workgroup charter and guidelines.

1.2 Review and comment on initial modeling results related to the Biological Assessment and Operations Incidental Take Permit.

1.3 Receive an update from the Contract Strategy Sub-Workgroup on progress and next steps.

1.4 Review and comment on the engineering and geotech activities in the project schedule for the Amendment 3 work period.

2. Engineering and Construction Manager Report

3. Upcoming Meetings:

Joint Sites Ag District Structuring Workshop
Friday, April 15, 2022 (9:00 am – 10:30 am)

Reservoir Committee
Friday, April 22, 2022 (9:00 am – 12:00 pm)

Authority Board
Wednesday, April 27, 2022 (1:30 – 4:00 pm)

Operations & Engineering Workgroup
Wednesday, June 8, 2022 (1:30 – 3:30 pm)

Virtual Information will be provided before all meetings at Sitesproject.org.

ADJOURN

PERIOD OF PUBLIC COMMENT: Any person may speak about any subject of concern, provided it is within the jurisdiction of the Reservoir Committee and is not already on today's agenda. The total amount of time allotted for receiving such public communication shall be limited to a total of 10 minutes per issue and each individual or group will be limited to no more than 3 minutes each within the 10 minutes allocated per issue. **Note:** No action shall be taken on comments made under this comment period.

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

Alternate Meeting Locations:

Colusa County, 1215 Market Street, Colusa, CA 95932

Glenn-Colusa Irrigation District, 344 East Laurel Street, Willows, CA 95988

Coachella Valley water District, 51501 Tyler Street, Coachella, CA 92236

San Bernardino Valley Municipal WD, 380 E. Vanderbuilt Way, San Bernardino, CA 92408

Reclamation District 108, 975 Wilson Bend Road, Grimes, CA 95950

Wheeler Ridge-Maricopa Water Storage District, 12109 Hwy 166, Bakersfield, CA 93313

Westside Water District, 5005 State Hwy 20, Williams, CA 95987

Metropolitan Water District, 700 North Alameda Street, Los Angeles, CA 90012

Santa Clarita Valley Water Agency, 27235 Bouquet Canyon Road, Santa Clarita, CA 91551

Meeting Notes

Project:	**Sites Project**
Subject:	Project Delivery Methods Metric Work Sub-Group
Date:	Thursday, April 07, 2022
Location:	Teams
Attendees:	William Vanderwaal, Robert Cheng, Randall Neudeck, Mike Azevedo, Jamie Traynham, Cindy Saks, Howard Lum, Jeff Sutton, JP Robinette, Henry Luu, Guy Voss, Cheyanne Harris, Mark Salmon

- JP introduced the standing committee members and welcomed Janie Traynham and Cindy Saks from the Budget and Finance Committee. Howard Lum was also a new participant invited by Randall Neudeck. Howard is Met's Design Section Manager and described himself as a "technical guy."

- JP explained the objectives of this meeting:
  1) Review the past meeting and involve the new attendees.
  2) Review survey responses – Budget and Finance added responses since the March 3 meeting.
  3) Staff added a blue marker to each value's survey response scale to show where we thought the "consensus" response lay. Review those markers and confirm they were representative of the Sub-Workgroup's individual responses.
  4) Present staff's understanding of key takeaways from the previous meeting (value slides 10-14) and confirm that we were consistent with the Sub-Workgroup.
  5) Discuss and develop takeaways from value slides 15-20

- JP – we got a lot done in the past month
  Delivery methods will greatly affect schedule, land acquisition, etc.
  Goals are to recommend packages and delivery methods.
  The feasibility stage was the "why", this stage is the "how."

Slide 3 (JP) – packaging will have large commercial impact
there are currently 22 packages on the list – needs to be revised -most likely fewer packages.

Slide 4 (JP) - we currently have several procurement/delivery method options available to us
JPA's values and JPA's role in procurement and delivery method will be a large influence.
We understand DSOD is supportive only of traditional DBB.

Slide 7 (Henry) - The flow chart looks different from past meetings because O&E Work Subgroup and the Budget and Finance Committee representation are combined now. We were able to eliminate the one path from the flowchart.
We are at the first step in the flow chart - "Values."

Slide 8 (Henry) - Timeline is unchanged.
June/July target for Draft Contract Strategy
July/August target for adoption by the JPA
Master Project Schedule in October. Contract strategy informs the schedule. Packaging & delivery strategies choices will be apparent in the Master Schedule.
Adjustments to scopes of work may be necessary at that time, e.g. if a given contract package is to be delivered by Design-Build rather than design-bid-build, the design engineer's role would be different.

Slide 9 (Guy) - beginning of values slides. We want this to be a conversation. We want to understand your values.

Slide 10 (Guy) - Staffing Oversight – the slides now include the responses we received from Budget and Finance. We added a blue marker to the graphic scale to represent our sense of the "consensus" of the responses. We also added our "key takeaway" from our last discussion with you of these values. We want you to tell us if you think we misunderstood the "consensus" or the "key takeaway."

Some increase in JPA staffing is necessary as we move into design and construction. Adding staff early in the process will be more beneficial than later, particularly with respect to operations staff. Packing and delivery method choices will have an influence on the best time to add staff.

R. Cheng stated our takeaway was correct.

Slide 11 (Guy) - Package Number and Size – 22 contract packages are too many. It will be difficult to manage so many contracts. We understand that the JPA strongly values contractors with the qualifications and experience that can manage the scope and risk associated with large contracts. Staff stated that we'll find ways to include smaller, local contractors.

Howard L. asked if the JPA prequalifies contractors - we had a fairly long discussion on this topic.
JP – we haven't built anything yet and haven't been through the procurement process.
Howard L. supports prequalifying. Met has a process for prequalifying specialty contractors, e.g. prestressed pipe, which has been successful for risky projects. Contractors seem to like prequalifying. Prequalifying or including an element of quals-based selection is a standard part of alternative project delivery (APD) procurement, so it would be easy to include it there.
Howard L. will send us (Bill V. and Henry L.) examples of DBB prequalifying that Met has used.
Howard L. confirmed to Bill V. that Met's prequal lists are living, ongoing lists.
Howard L. also clarified that in the end, low bid is still the major selection criterion.

Slide 12 (Guy) – Local Contractors - takeaway is use qualified contractors. Qualified contractors are more important that focusing on local contractors or spreading the work around.

Slide 13 (Guy) – Spreading Work – see Slide 12 for takeaway

Slide 14 (Guy) – Relative Importance of Cost Changes – takeaway – early cost certainty is important. Also $750-$850 /AF annual average yield ceiling is important. Can't have the project cost increasing as we progress.

Slide 15 (Guy) - Relative Importance of Schedule Changes – slides 15-21 were value slides not covered at March meeting.
Change in 2030 target date – how important is the target date? Some think it is largely out of our control due to permitting. This project is different from a project where the design and construction schedule are driven by a consent decree. The KPI on the project is $750-$850/af.
JP – have people's thoughts changed regarding 2030 – does drought increase urgency?
Jamie – how do we compress design and construction to compensate for extended permitting time?
Guy – some APDs can include schedule incentives and owner can collaborate with contractors to identify where progress can be made. Schedule urgency would drive us toward APD.
Jamie – The sooner we operate, the sooner we can repay financing.
Bill – the longer a project takes, the more it costs.
JP – prioritizing schedule could cause problems. Balance cost and schedule. Biggest incentive could remain the KPI ($750-$850)
Howard – schedule factor is key. CEQA and financing working against us. Giving environmental community more chances to find flaws in our project, or having permits expire is a risk. May not be a bright shiny deadline, but compressing schedule is always a benefit.
Guy – compressing schedule could come with a cost – moving earth much faster could cost $millions.
Jeff S. – (spoke for the first time) hurry up and wait is bad. Reclamation needs to be brought along and define their participation. Agrees that faster is better. I've been listening – I appreciate the horsepower and I've heard lots of agreement.
JP - what other implications are there to accelerated schedule? We've been invited to WIFIA – we haven't explored deferring repayment of principal. NEAP/CEQA and financing could both have an effect. Interest-only repayment could also affect schedule.
Key takeaway – faster is better
Bill – there are some realities to cope with.
JP – at some point we will have these hurdles behind us and then schedule will be up to us.
Bill – once permits are behind us it's peddle to the metal.

Slide 16 (Guy) - Relative Importance of Cost/Schedule – more important to hold the line on cost or schedule?

Jamie - $750-$850 is a ceiling. We would pressure ag participants if costs went up significantly.
Jeff – some participants are on a razor's edge for participation. Cost is more important than schedule.
Guy – contractors can help us stay on cost.
JP asked Guy, "from your perspective, what would a contractor want from an owner to provide more cost/schedule certainty?"
Guy – Permits/land/subsurface conditions – if they're out of contactor's control – no dice. Contractors can help us understand how to deal with our constraints.

Slide 17 (Guy) - Interface Risks Between Projects – it's a balance. Key takeaway – *transfer* is not the goal, *balance* is the goal.
Howard - let's deal with risk together with contractor. Need to be fair – delays have a cost. Partnering is the way. Open continuous communication between JPA and upper management is needed.
Jeff – partnership, trust, working together, *sharing* risk.
Guy – if this attitude gets out, the best teams will show up to work with you.
JP – wanted to revisit Randall's statement from last meeting that "Met could afford more risk than the little guys." Randall asked Howard to comment, Howard demurred. Randall clarified – we're big, we have lots of staff, deep pockets – the JPA does not.
Howard – quantify risk and apply a rational process. Mitigating risk means sharing not dumping it on one side or the other. Don't just go with your gut on pushing risk onto contractor.

Slide 19 (Guy) – Disputes – key takeaway – partnership

Slide 20 (Guy) – Contract Administration
Jamie - from Budget and Finance perspective, we would try to handle it internally – grow staff – need to move from consultant accounting to internal.
Cindy agrees – must move in-house responsibility for consistency.
Bill – do you mean change orders and progress payments? Jamie – yes.
Kevin's department needs to grow. It will be agencies' responsibility.
Bill – there is a balance – we don't need a lot of staff to lay of when construction is done.
JP – Sites has to handle certain core competencies.
JP – some delivery methods are easier to manage than others.
Bill - day-to-day contract admin would be consultants.
Jeff – must have some of both – for instance, the technical side of a change order would be consultant's job.
Bill – need an operator to stay on after construction. Follow TCID model for fish screens.
Guy – what about RFPs and contract negotiations?
Jeff – we've already done some of that, but not sure how it will be done in the future.
JP – core competencies for JPA would be a good criterion for APD selection.
Guy – the contract terms will determine who bids. We need to get the terms in front of contractors early.

Slide 22 (Henry) – Next Steps – Doodle poll for the week of the 25th is coming.
Robert – do you see any conflicts in what we've done? Any stark opposition of one value to another? We need to dive into the tradeoffs - stop asking

questions and give us some recommendations.

Sites Reservoir Project

Colusa County
Board of Supervisors Meeting

March 15, 2022

Sites

Outline

Project Overview and Investment to Date

The "Three Big Questions"

- What does it cost? Feasibility Project Cost Estimate
- What do we get? Affordability, Storage, and Benefits
- How do we pay for it? Project Funding, Plan of Finance

Next Steps

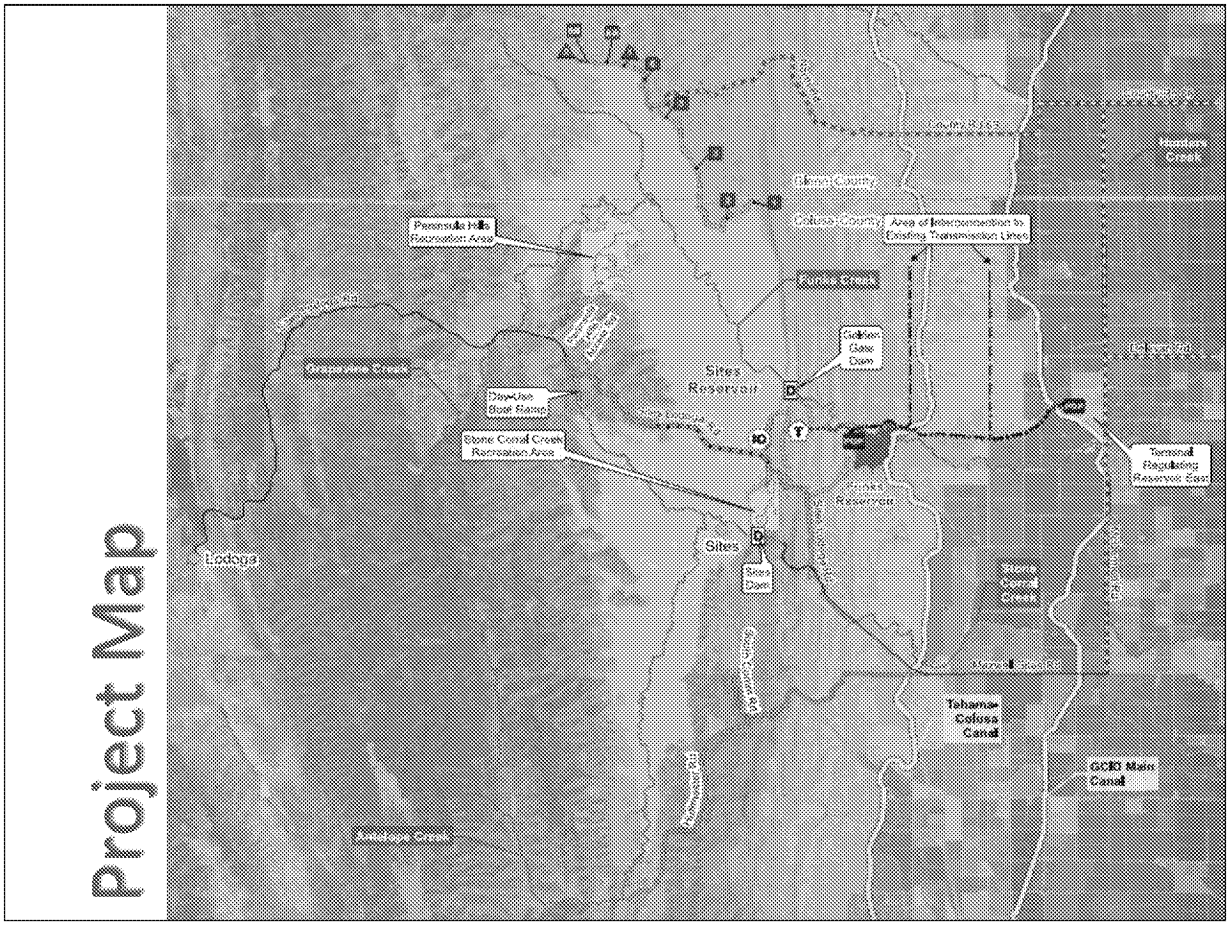
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Project Overview

Overview and Investment to Date

Sites

Project Map


Peninsula Hills Recreation Area
Golden Gate Dam
Sites Reservoir
Dam/Dike Boat Ramp
Stone Corral Creek Recreation Area
Sites
Sites Dam
Terminal Regulating Reservoir East
Tehama-Colusa Canal
GCID Main Canal
Colusa County
Glenn County
Area of Interconnection to Existing Transmission Lines
Funks Creek
Hunters Creek
Logan Creek
Stone Corral Creek
Peatman Creek
Antelope Creek
Funks Reservoir
Funks Reservoir Dam
Antelope Dam
Indian Valley Reservoir
Indian Valley Dam
Indian Creek
Eddy Creek
Eddy Creek Reservoir
Eddy Creek Dam
Eddy Creek Boat Ramp
Eddy Creek Recreation Area

Investment to Date

Phase 1: Apr 2016 – Mar 2019 (Complete)

- $60/AF initial cash call ($48.50 actual)
- Funded State Prop 1 Application
- Successful application award $816 million

Phase 2A: Apr 2019 – June 2020 (Complete)

- $60/AF cash call
- Value Planning resulting in smaller reservoir size and new "foot-print" with anticipated cost savings

Phase 2B: July 2020 – Dec 2021 (Complete)

- $100/AF cash call
- Updated environmental documents, feasibility study; permitting and water right; remained eligible for $836M in state funding

Amendment 3/Phase 2C: Jan 2022 – Dec 2024 (In Progress)

- Up to $400/AF cash call ($100/AF in 2022; $140/AF in 2023; $160/AF in 2023)
- Secure critical permits/water rights
- Complete Environmental review
- Advance design & pre-construction
- Ready to Finance

Pre-Decisional Working Document – Not Decision Relevant Only

A3 Costs: up to $400/AF *releases*

What does it cost?

Feasibility Project Cost Estimate

Sites

Feasibility Project Cost Estimate
approved June 2021

Serving California's environment, families, and farms takes:

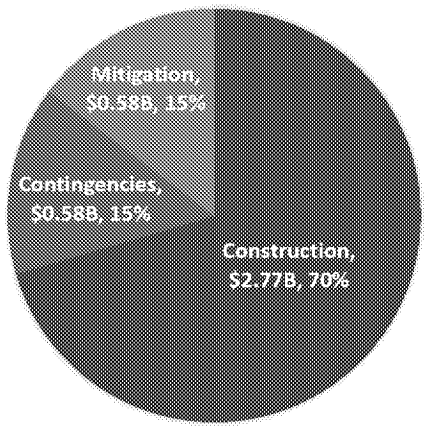
1.5 million acre-ft of storage

9 new dams

23 miles of big pipes (9-23ft)

20 million cubic yards of fill

ESTIMATED PROJECT COSTS
($3.9B, 2021$)



Estimated construction costs are based on the class 4 cost estimate for alternative 1 approved by the Reservoir Committee and Authority Board in June 2021

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Sites cost components

Fixed Costs

Every year, regardless of water supply benefits ($/yr)

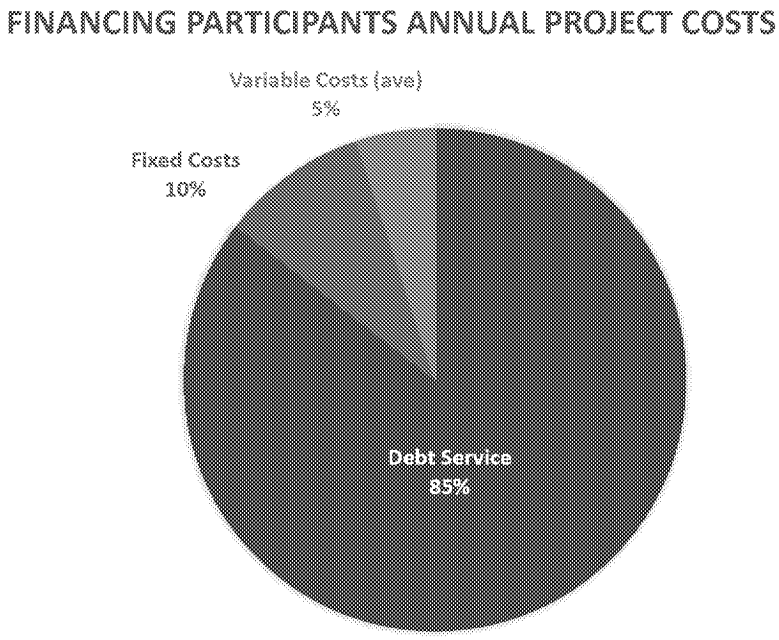
- Debt service (finance participants)
- Admin and General
- Operations and Maintenance
- Replacements
- Sufficiency reserves

Variable Costs

Varies based on water supply benefits ($/AF)

- Power consumption (pumping)
- Power generation (releasing, revenue)
- Wheeling costs

Debt service is the biggest annual cost



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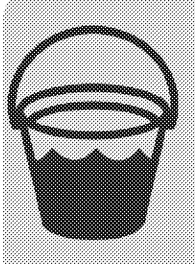
What do we get?

Storage, Benefits, and Affordability



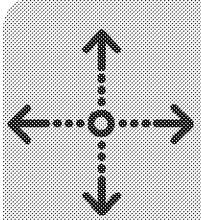
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Storage Allocation

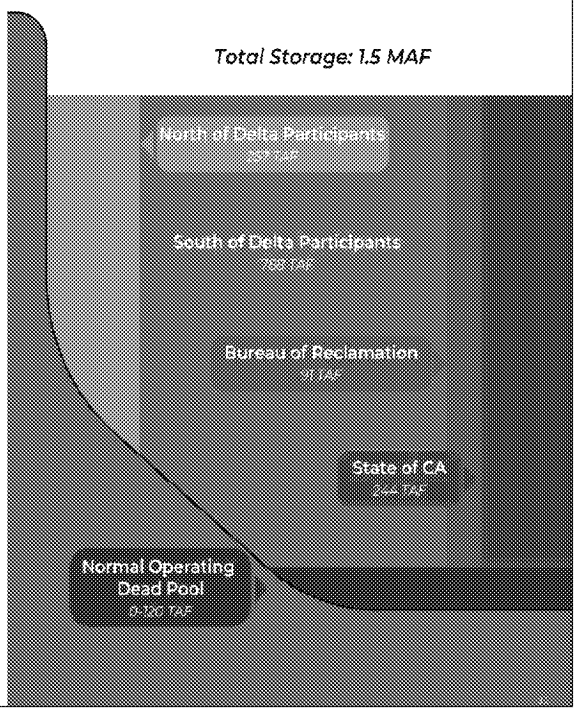


Storage space: your own bucket

Proportion of diversions to storage until your bucket is full



Ability to manage your storage to meet your agency's needs



Preliminary Working Document – For Discussion Purposes Only

County of Origin Discussion

Memorandum of Understanding (MOU) developed in 2021

General terms:

- "The Sites Project Authority and the County will develop a mutually agreeable method for determining and measuring the annual amount of water from Funks Creek and Stone Corral Creek that is diverted to storage and impounded by the Project"
- "The Sites Project Authority will coordinate and collaborate with Colusa County in developing the proposed downstream conditions in those creeks pursuant to the Authority's expected water right"
- "The County and the Sites Project Authority desire to cooperate…and demonstrate the County's support for the Project.

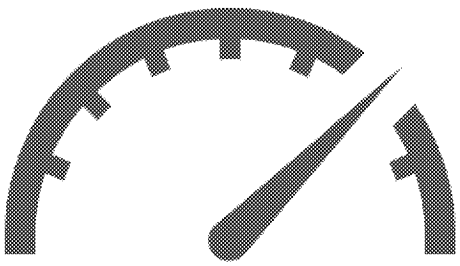
What moves the needle on benefits?

Amount of Storage

- Storage allocated to your agency determines proportion of diversions you receive

Operating Decisions

- Operating for long-term average versus dry-year supply
- Finding ways to use or sell water in wet and above normal years



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Agency way of looking at affordability

Annual costs

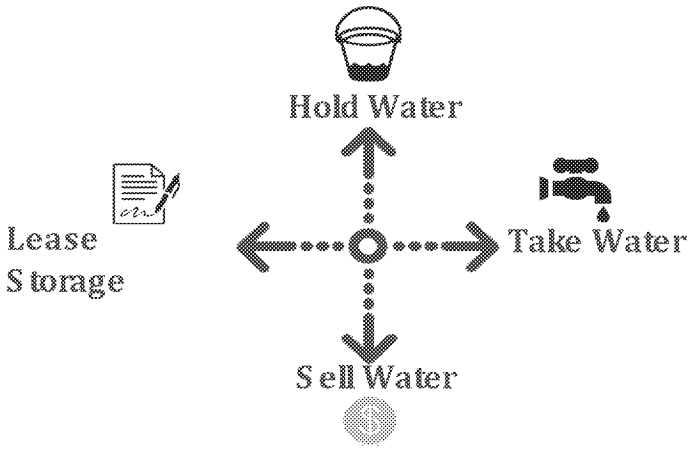
- Fixed costs
- Variable costs

Annual revenues

- Water sales
- Storage leasing
- Avoided costs

Annual benefits

- Storage: hydrology-based
- Deliveries: operating decisions-based



You decide.

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Colusa County sample affordability

1. A2 participation 10,000AF * 6.234 = storage account: 62,340 AF
2. Share of base facilities, 4.4% of $4.3B: $192M, annual debt service $6.8M
3. Average annual costs (financed): $7.7M
4. Average release target: 10,000 AF

Colusa County does not use Downstream Facilities (i.e. Dunnigan Pipeline)
Debt service based on 3 year work plan, case 3

The long-term average cost for water for Colusa County is about

$770/AF

Colusa County affordability "optimized"

1. Average annual costs (financed): $7.7M
2. Average annual release (use): 10,000 AF
3. High-end annual wet year NOD transfer water: 8,500 AF
4. Price (net of variable costs) for NOD transfer wet year water: $200/AF
5. Cost offset: $1.7M/yr, Colusa County out of pocket cost $6M

Higher risk of running out of water in storage!

The long-term average cost for water for Colusa County is about

$600/AF

Important to note:
10,000 AF base supply is at risk in this scenario
Highly sensitive to quantity of water and the price. Interesting

Saves $170/AF

Ability to offset costs varies by water year type

Recent Examples - SOD transfers:

- 2021 State Water Contractors Dry Year Water Transfers Program: $600 – 675/AF
  - 2022 negotiations forthcoming
- 2022 San Luis Delta Mendota Water Agency - $625/AF

State Feasibility Report (2021) also includes representative SOD unit benefit values: ~$1300/AF

Pre-Decisional Working Document - For Discussion Purposes Only

What moves the needle on affordability?

Operating Decisions: Increased Demand

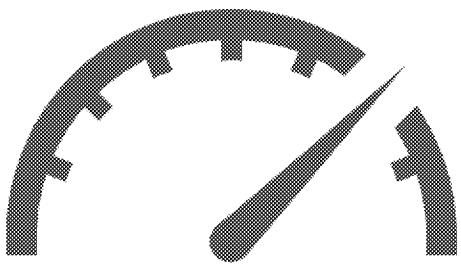
- Transfers: delivered and within reservoir
- Use of water in wetter year types

Costs

- Debt service
- Avoided costs

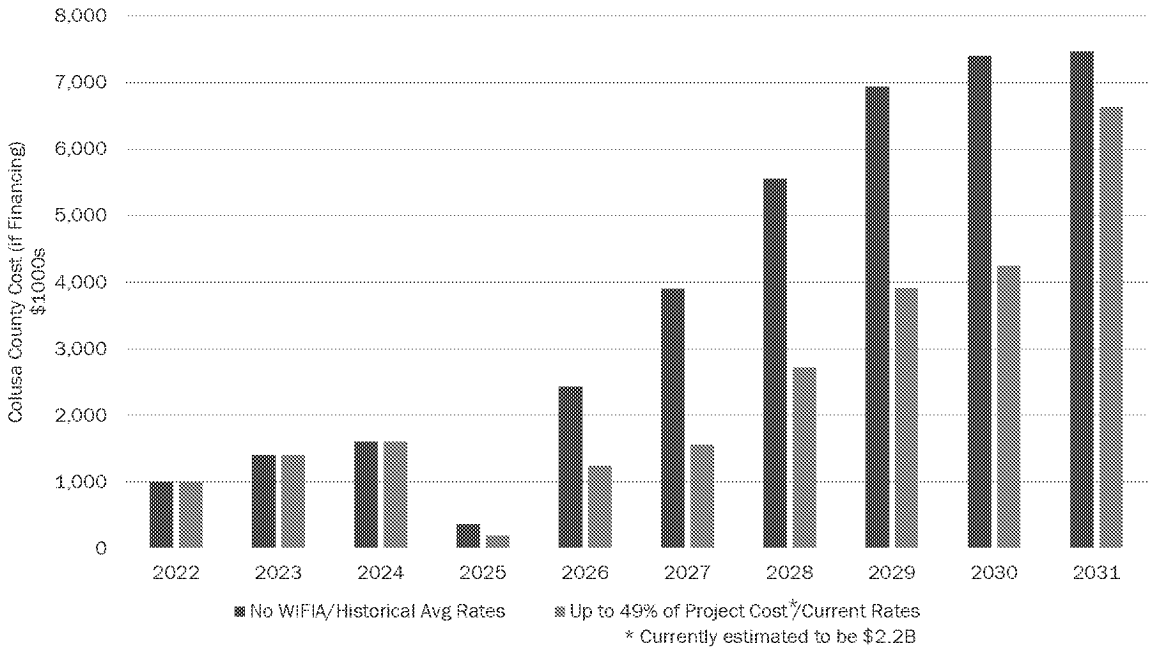
Revenues

- Transfer pricing
- Leasing storage



Construction Cash Flow

Range of Costs by Year



How do we pay for it?

Funding and Plan of Finance

Sites

Future of Funding & Plan of Finance

State and Federal

State

- $836M in Prop 1 Funding ($40.8M Early Funding)

Federal

- WIIN Act – over $100M committed to date ($80M appropriation for FY 2022)
- Infrastructure Bill - $1.15B for western water storage

Participants

Short Term

- Cash Calls: $608.50/AF (2016-2024)
- Possibility of early financing if permitting & water right application are complete

Long Term (Phases 3-5)

- WIFIA Loan - up to 49% of project cost (currently estimated to be $2.2B)
- USDA Loan ($449M)
- Fixed Rate Bonds
- Pay-Go

Next Steps

Draft_0016409

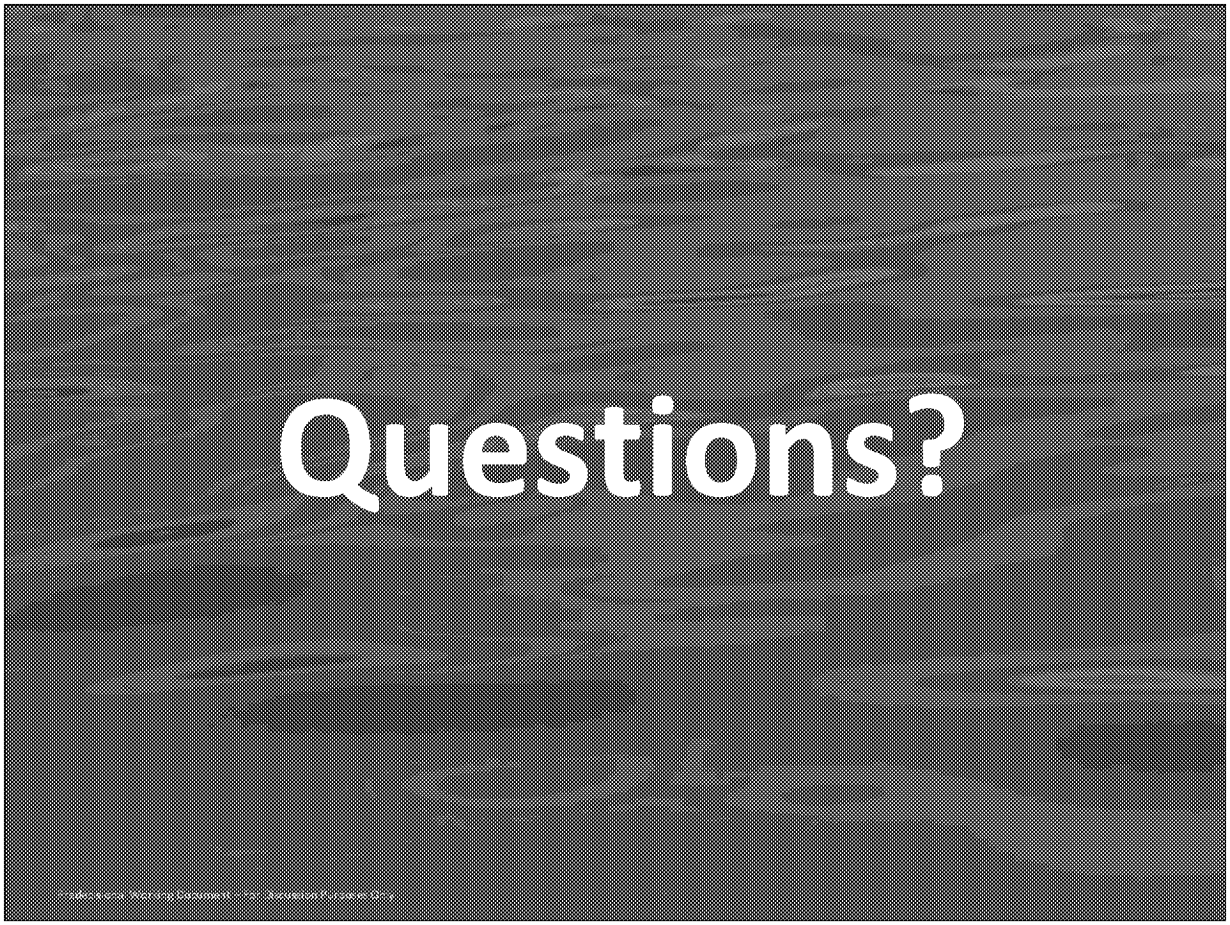
Next Steps

Complete Amendment 3 Sites Participation Agreement

- Committing to AF of water @ $400/AF

Rebalancing –

- Decreasing AF can happen now or before entering financing agreement (Phase 3).
- Increasing AF is dependent on decreases made by others, active participants will have "first right of refusal" before new participants are given opportunity.


Questions?

This table reflects the milestones identified in the Amendment Work Plan for the 3-year work period. The project team will be developing over the next couple of months a more detailed planning level critical path method schedule to cover the work period. In preparing this analysis, changes will likely occur to start and finish dates shown below. Also, the detailed schedule will provide interim milestones for multi-year activities so that the Board will be able to track progress on the entire work plan as well as interim milestones within the year. The more detailed planning schedule will be incorporated to the monthly Board reporting after review and concurrence by the O&E workgroup which is expected to occur in April 2022.

Table 1. Work Plan Key Deliverables
Reporting Period: March 2022

Deliverable	Start	Finish	Status	Notes, New Issues or Potential Impacts
Initiate Application for Permit to Construct from DSOD	Feb-2022 Jan-2022	Dec-2023 Dec-2024		
Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	Jul-2022 Jan-2022	Jun-2023 Oct-2022		Target date of June 2023 for key permits. Additional effort in support of secondary permits will continue through Dec 2024.
Determine Criteria and Weighting for Project Delivery Decisions	Jun-2022 **Jan-2022**	**Jun-2022** Aug-2022		
Complete Updated Master Project Schedule	**Jan-2022**	**Oct-2022**		
Create Master Survey & Topo Map	Feb-2022 **Jan-2022**	**Jul-2022**		
Finalize TRR Location	Apr-2022 **Jan-2022**	**Jun-2022**		
P1A Geotechnical Investigations	Jul-2022 Mar-2022	Dec-2023		
P1B Geotechnical Investigations	Jun-2023 Mar-2023	Dec-2024 Jun-2024		
Preliminary Engineering (30% design level)	Jan-2022	Dec-2023 Jan-2024		
Update to Class 3 Construction Cost Estimate	Dec-2023	Mar-2024 Jul-2024		A "rolling" class 4 estimate will be kept in the interim as changes occur.
Submit Power Interconnection Application	Mar-2023 Jul-2022	Apr-2023		Target date of April 2023 to align with potential CAISO application window
Update Project Risk Assessments (ongoing)	Aug-2022 Jan-2022	Dec-2024		
Negotiate and Execute Benefits Contracts with DWR & CDFW	Jun-2022	Jun-2023 Jul-2023		Changed to "Agreements for Administration of Public Benefits Executed"
Execute Final Facilities Use Agreements	Jan-2022	Jun-2023 Jul-2023		
Execute Federal Operations Agreement	**Jan-2022**	**Dec-2022**		
Execute State Operations Agreement	**Jan-2022**	**Dec-2022**		
Final Federal Funding Request Determined	Jan-2022	Apr-2023		
Complete Loan Applications	Jan-2022	Oct-2023		

Table 1. Work Plan Key Deliverables
Reporting Period: March 2022

Deliverable	Start	Finish	Status	Notes, New Issues or Potential Impacts
Execute Loan Docs	Oct-2023	Dec-2023	Aug-2024	
Formalize AB/RC Governance and Delegation of Autho Phase 3	Aug-2022 Jun-2022	Jun-2023	Oct-2022	
Execute Benefits and Obligations Contracts with Participants	Jan-2022	Oct-2023	Jun-2023	Would be completed after the water right permit is received.
Receive WSIP Final Award from CWC	Jan-2022	Nov-2023	Aug-2024	
Water Right – Complete Protest Resolution Period and Resolve as Many Protests as Possible	**May-2022**	**Dec-2022**	Jan-2023	
Water Right – Receive Water Right Order and Permit	Sept-20	Oct-2023	Dec-2023	
Federal ESA – Receive Biological Opinions	**Oct-2020**	**Dec-2022**		
Section 106 – Final Programmatic Agreement	**Sep-2020**	**Oct- 2022**	Jan-2023	Ongoing meetings and coordination, draft PA in process of being finalized and sent out by Reclamation to signature and consulting parties.
Section 106 – Programmatic Historic Properties Management Plan Development	**Dec-2021**	**Dec-2022**	Sep-2022	
ITP – Construction ITP Issued	**Sep-2020**	**Dec-2022**	Mar-2023	
ITP – Operations ITP Issued	**Sep-2020**	**Dec-2022**	Mar-2023	
CWA 404/401 – Submit Final Permit Applications	**Sep-2020**	**Oct-2022**	Feb-2023	Timed with release of the Final EIR/EIS
CWA 404/401 – Permits Issued	Oct-2022	June-2023	May-2023	
Levee and Flood Permits – Section 408 and CVFPB Encroachment Permits Issued	Feb-2022	Apr-2023	Oct-2023	
Streambed Alteration Agreement	Jan-2022	Jun-2023	May-2023	Will be phased with access, likely multiple needed
Eagle Permit – Short Term and Nest Permit Issued	Oct-2020	Jun-2023	Mar-2023	
Eagle Permit – Long-term Permit Issued	Oct-2020	Dec-2024	Mar-2024	
Obtain Local Agency Agreements & Permits	Jul-2022	Dec-2023		
Develop Mitigation Acquisition Master Plan Aug-2022	**Jan-2022**	**Dec-2022**	Feb-2023	
Final EIR/EIS – Complete	**Dec-2021**	**Oct-2022**	Jan-2023	

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Reporting Period: March 2022

Deliverable	Start	Finish	Status	Notes, New Issues or Potential Impacts
Certify Final EIR/EIS and approve preferred project and MMRP (30 day period for legal challenge)	**Oct-2022**	**Dec-2022** Jan-2023		
Approve ~~Land Acquisition Master Plan and~~ ROW Manual	**Jan-2022**	**Dec 2022**		
Complete Landowner Negotiations with "Willing Seller" Properties (Options Negotiations)	May-2022 Jan-2023	Dec-2024 May-2023		
Operations Plan, Version 2	Jan-2024 Jul-2023	Jul-2024 Aug-2024		

Bold = Anticipated Finish Date in 2022 **= On Track** **= Area of Potential Concern** **= Delayed** **= Completed**

New Activities:
- Emergency Release Modeling **[7/22 - 1/24]**
- System Wide Hydraulic Modeling **[2/23 - 1/24]**
- Land Acquisition Master Plan (split out to own activity) **[8/22 - 8/23]**
- Reclamation Benefits Agreement Executed **[end 6/23]**
- Early Evaluation Geotech Investigations & Report **[3/22 - 4/22]**

Activities Removed from Key Deliverables:
- Obtain Local Agency Agreements and Permits
- Complete Loan Applications (*Execute Loan Docs still exists*)
- Final Federal Request Determined

From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 4/12/2022 8:28:04 AM
To: Spranza, John [john.spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: [EXTERNAL] Materials for Sites CalSim Review 3/30/22
Attachments: SPJPA_Sites_SALMOD_SummaryResults_rev01_20220411__ALT3_020121_ALT3BR_032321_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf

Wow – take a look at changes in mortality under our revised Alt 3 vs. last year. This is with climate change, but still.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Monday, April 11, 2022 8:25 PM
To: King, Vanessa M <vking@usbr.gov>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
Subject: RE: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Vanessa,

Summary SALMOD results for ALT3A 032922 2035CT and ALT3B 032922 2035CT are provided in attached pdf.

Please let me know if you have any questions.

Best,
Steve

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Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
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Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
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- Mortality results by water year type
- Comparison of results with Alt 3 and Alt 3BR

Thanks,

Vanessa

Vanessa King
Hydrologist and Interim Project Manager for Sites Reservoir Project
Bureau of Reclamation, Interior Region 10 · California-Great Basin, Division of Planning
Office: 916-978-5077

From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Tuesday, April 5, 2022 3:06 PM
To: King, Vanessa M <vking@usbr.gov>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>; Saadat, Samaneh <Samaneh.Saadat@jacobs.com>
Subject: RE: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Hi Vanessa,

As a follow-up to our meeting last week, we conducted Sacramento River temperature (HEC5Q) and mortality (Anderson/Martin) simulations.
The following results files are attached:

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  - Trend reporting spreadsheet with Sacramento River temperature results for:
    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- **Sites_MartinMortalityExceedancePlots_rev03_20220405_NAA_011221_ALT1B_011221_ALT3_020121_ALT3BR_032321_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf**
  - Monthly temperature-dependent mortality (as estimated with the Martin Model) exceedance plots for:
    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT1B 011221,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.
- **Sites_AndersonMortalityExceedancePlots_rev03_20220405_NAA_011221_ALT1B_011221_ALT3_020121_ALT3BR_032321_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf**
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    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT1B 011221,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and

- ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.

I posted these materials and raw Anderson/Martin results to the link below:
20220405_ALT3A_032922_2035CT_ALT3B_032922_2035CT_HEC5Q_MartinAnderson

Please let me know if you have any questions.

Best,
Steve

From: King, Vanessa M <vking@usbr.gov>
Sent: Tuesday, April 5, 2022 2:18 PM
To: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: Re: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Thanks for clarifying.

Vanessa King
Hydrologist and Interim Project Manager for Sites Reservoir Project
Bureau of Reclamation, Interior Region 10 · California-Great Basin, Division of Planning
Office: 916-978-5077

From: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>
Sent: Tuesday, April 5, 2022 2:16 PM
To: King, Vanessa M <vking@usbr.gov>; Micko, Steve/SAC <steve.micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: RE: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

My apologies, it seems that I misspoke. I am expecting releases to be higher under climate change vs historical hydrology. Deliveries should be similar or higher. We are not expecting a reduction. Models will be available soon. -Rob

---

From: King, Vanessa M <vking@usbr.gov>
Sent: Tuesday, April 5, 2022 11:49 AM

To: Micko, Steve/SAC <Steve.Micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: Re: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Hi Steve/Rob,

I wanted to follow up on a comment Rob made at last week's meeting about the deliveries being higher under historical climate than with climate change. Can you confirm that that's correct (or at least that you're anticipating it to be correct - I understand you're still doing QA/QC on the historical climate model)? If so, can you provide a little more context on why that is, and whether it all types of deliveries are reduced with climate change or only certain ones? I think we were expecting that the project would perform better with climate change, so I'd like to better understand why it isn't.

Thanks,

Vanessa

Vanessa King
Hydrologist and Interim Project Manager for Sites Reservoir Project
Bureau of Reclamation, Interior Region 10 · California-Great Basin, Division of Planning
Office: 916-978-5077

From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Wednesday, March 30, 2022 12:37 PM
To: King, Vanessa M <vking@usbr.gov>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hi Vanessa and Derya,

In preparation for our meeting, I've prepared the following material:

- SitesMetrics_rev27_5scn__ALT1B_011221_ALT3_020221_ALT3BR_032321_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf
  - Contains results of:
    - ALT1B 011221 as compared to NAA 011221,
    - ALT3 020221 as compared to NAA 011221,
    - ALT3BR 032321 as compared to NAA 011221,
    - ALT3A 032922 2035CT as compared to NAA 032822 2035CT, and
    - ALT3B 032922 2035CT as compared to NAA 032822 2035CT.
- NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_011221_NAA_032822_2035CT_ALT3_020121_ALT3BR_020321_ALT3A_032922_2035CT_ALT3B_032922_2035CT.xlsm
  - Contains results of:
    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- Sites_BA_AssumptionMatrix_032922.xlsx
  - Details Sites assumptions for:
    - ALT1B 011221,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- SPJPA_Sites_CalSimII_UpdatesSinceRDEIR-SDEIS_rev02_20220329.docx
  - Details changes to the CalSim II model since the RDEIR/SDEIS

Looking forward to discussing with you this afternoon.

Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

Upcoming PTO: Apr 1 – Apr 3

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message by unintended recipients is strictly prohibited. If you have received this message in error, please notify us immediately by replying to the message and deleting it from your computer.

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File Provided Natively

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/12/2022 10:41:08 AM
To: Heydinger, Erin [erin.heydinger@hdrinc.com]; Spranza, John [john.spranza@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Wow indeed ! Climate change numbers are important part of the story.

From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Tuesday, April 12, 2022 8:28 AM
To: Spranza, John <John.Spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Wow – take a look at changes in mortality under our revised Alt 3 vs. last year. This is with climate change, but still.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

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Steve

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Thanks,

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    - ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.
- **Sites_AndersonMortalityExceedancePlots_rev03_20220405_NAA_011221_ALT1B_011221_ALT3_020121_ALT3BR_032321_NAA_032822_2035CT_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf**
  - Monthly temperature-dependent mortality (as estimated with the Anderson Model) exceedance plots for:
    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT1B 011221,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
  - Please note that the first six pages show the full x-axis range of exceedance. Pages 7 – 12 show the 0 – 20 percent range of exceedance (on the x-axis). The 0 – 20 percent range allows focused review of years with greater temperature-dependent mortality.

I posted these materials and raw Anderson/Martin results to the link below:
20220405_ALT3A_032922_2035CT_ALT3B_032922_2035CT_HEC5Q_MartinAnderson

Please let me know if you have any questions.

Best,
Steve

From: King, Vanessa M <vking@usbr.gov>
Sent: Tuesday, April 5, 2022 2:18 PM
To: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: Re: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Thanks for clarifying.

Vanessa King
Hydrologist and Interim Project Manager for Sites Reservoir Project

Bureau of Reclamation, Interior Region 10 · California-Great Basin, Division of Planning
Office: 916-978-5077

From: Leaf, Rob/SAC <Rob.Leaf@jacobs.com>
Sent: Tuesday, April 5, 2022 2:16 PM
To: King, Vanessa M <vking@usbr.gov>; Micko, Steve/SAC <steve.micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: RE: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

My apologies, it seems that I misspoke. I am expecting releases to be higher under climate change vs historical hydrology. Deliveries should be similar or higher. We are not expecting a reduction. Models will be available soon. -Rob

---

From: King, Vanessa M <vking@usbr.gov>
Sent: Tuesday, April 5, 2022 11:49 AM
To: Micko, Steve/SAC <Steve.Micko@jacobs.com>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: Re: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

Hi Steve/Rob,

I wanted to follow up on a comment Rob made at last week's meeting about the deliveries being higher under historical climate than with climate change. Can you confirm that that's correct (or at least that you're anticipating it to be correct - I understand you're still doing QA/QC on the historical climate model)? If so, can you provide a little more context on why that is, and whether it all types of deliveries are reduced with climate change or only certain ones? I think we were expecting that the project would perform better with climate change, so I'd like to better understand why it isn't.

Thanks,

Vanessa

Vanessa King
Hydrologist and Interim Project Manager for Sites Reservoir Project
Bureau of Reclamation, Interior Region 10 · California-Great Basin, Division of Planning
Office: 916-978-5077

From: Micko, Steve/SAC <Steve.Micko@jacobs.com>
Sent: Wednesday, March 30, 2022 12:37 PM
To: King, Vanessa M <vking@usbr.gov>; Sumer, Derya <dsumer@usbr.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>; Thayer, Reed/SAC <Reed.Thayer@jacobs.com>
Subject: [EXTERNAL] Materials for Sites CalSim Review 3/30/22

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hi Vanessa and Derya,

In preparation for our meeting, I've prepared the following material:

- SitesMetrics_rev27_5scn__ALT1B_011221_ALT3_020221_ALT3BR_032321_ALT3A_032922_2035CT_ALT3B_032922_2035CT.pdf
  - Contains results of:
    - ALT1B 011221 as compared to NAA 011221,
    - ALT3 020221 as compared to NAA 011221,
    - ALT3BR 032321 as compared to NAA 011221,
    - ALT3A 032922 2035CT as compared to NAA 032822 2035CT, and
    - ALT3B 032922 2035CT as compared to NAA 032822 2035CT.
- NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_011221_NAA_032822_2035CT_ALT3_020121_ALT3BR_020321_ALT3A_032922_2035CT_ALT3B_032922_2035CT.xlsm
  - Contains results of:
    - NAA 011221,
    - NAA 032822 2035CT,
    - ALT3 020221,
    - ALT3BR 032321,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- Sites_BA_AssumptionMatrix_032922.xlsx
  - Details Sites assumptions for:
    - ALT1B 011221,
    - ALT3A 032922 2035CT, and
    - ALT3B 032922 2035CT.
- SPJPA_Sites_CalSimII_UpdatesSinceRDEIR-SDEIS_rev02_20220329.docx
  - Details changes to the CalSim II model since the RDEIR/SDEIS

Looking forward to discussing with you this afternoon.

Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

Upcoming PTO: Apr 1 – Apr 3

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Meeting:	**Sites Reservoir Committee, Environmental Planning and Permitting Workgroup**
Locations:	Maxwell Project Office, 122 Old Highway 99W, Maxwell, CA 95955 See below for alternate meeting locations.

Call in: **1-833-255-2803** Code: 512623326# Click here to join the meeting

Workgroup Chair:	Thad Bettner (GCID)
Workgroup Vice-Chair:	Heather Dyer (SBVMWD)
Staff Lead:	Ali Forsythe, Environmental Planning and Permitting Manager

AGENDA

Wednesday, April 20, 2022; 1:00 pm – 2:30 pm

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions.
- Period for Public Comment.

1. Discussion and Information Items:

1.1 Review and comment on the initial modeling results for the Biological Assessment and Operations ITP analyses.

1.2 Review and comment on Amendment 3 schedule development for planning and permitting.

2. Environmental Planning and Permitting Manager Report

- Key Planning and Permitting Activities Report
- Geotechnical Report

3. Upcoming Meetings:

Reservoir Committee
Friday, April 22, 2022 (9:00 am – 12:00 pm)

Authority Board
Wednesday, April 27, 2022 (1:30 – 4:00 pm)

Environmental Planning and Permitting Workgroup
Thursday, May 12, 2022 (1:00 – 2:30 pm)

Virtual Information will be provided before all meetings at Sitesproject.org.

ADJOURN

PERIOD OF PUBLIC COMMENT: Any person may speak about any subject of concern, provided it is within the jurisdiction of the Reservoir Committee and is not already on today's agenda. The total amount of time allotted for receiving such public communication shall be limited to a total of 10 minutes per issue and each individual or group will be limited to no more than 3 minutes each within the 10 minutes allocated per issue. **Note:** No action shall be taken on comments made under this comment period.

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

Alternate Meeting Locations:

Glenn-Colusa Irrigation District, 344 East Laurel St, Willows, CA 95988

San Bernardino Valley Municipal WD, 380 E. Vanderbilt Way, San Bernardino, CA 92408

Colusa County, 1215 Market St., Colusa CA 95932

Coachella Valley Water District, 51501 Tyler Street, Coachella CA 92236

Reclamation District 108, 975 Wilson Bend Rd., Grimes, CA 95950

Wheeler Ridge-Maricopa Water Storage District, 12109 Hwy 166, Bakersfield, CA 93313

From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/13/2022 7:31:18 AM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: Re: MWD Vote Results

Thanks Jerry. This is great news.

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Tuesday, April 12, 2022 4:19 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Joe Trapasso <jtrapasso@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; JP Robinette <jrobinette@sitesproject.org>
Subject: MWD Vote Results

FYI – MWD board just completed their vote to continue in the Sites project @ 50taf. Motion passed 54.66%. Head count vote was ~22 to 7 with 3 abstain. Their weighting is by property value. This secures their A3 participation. The MWD team did a fantastic job in their efforts to get this across the finish line. Most of the opposition was from the NGO community and tribal concerns. I would I didn't hear any new concerns though. But several on the MWD board that voted in favor want to see some additional outreach to the opposition.

From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/13/2022 9:16:07 AM
To: mmaltby@brwncald.com
Subject: Re: Sites Key Deliverables_2022.04.08.xlsx

Oh, ok, agree that is not a good name. Henry is the point on that and I am not in the loop.

As for the Reclamation agreement, please check with Erin, but I think you could say it starts after the letter is submitted to them requesting their participation amount. (WIIN-1160)

From: Marcus Maltby <mmaltby@BrwnCald.com>
Sent: Tuesday, April 12, 2022 10:17 PM
To: JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

For the 3rd bullet (Obtain Local Agency Agreements and Permits), this is where it came from. This is an excerpt from the Goals and Objectives. Would this be your area? Does it need to be a Key Deliverable? I'm guessing if so, a more descriptive name would probably make sense.

> e. Complete and obtain local agency agreements and permits along with any required city or county actions necessary to support long lead activities necessary for the next Phase.

Also, would you happen to have a start date for "Reclamation Benefits Agreement Executed" key deliverable? The end date is June 2023 if that helps.

From: JP Robinette <jrobinette@sitesproject.org>
Sent: Monday, April 11, 2022 9:09 AM
To: David Hubbard <Dhubbard@BrwnCald.com>; Marcus Maltby <mmaltby@BrwnCald.com>
Subject: Re: Sites Key Deliverables_2022.04.08.xlsx

Marcus, very useful exercise. Broadly, the dates now look more reflective of reality, but I think Jerry may push back a bit. This is really where the rubber hits the road with the RC/AB. Each of these tells a bit of a story and we should be ready with that. A few notes on the red-yellow-green table:

- The "final federal funding request" determined does appear in the schedule, but it has been named "Authority Submits Letter of Funding to Reclamation".
- "Complete Loan Applications" should be changed to track the WIFIA loan application (WIFIA-110 through WIFIA-140)
- It is unclear to me what we meant by "Obtain Local Agency Agreements and Permits" initially. Marcus, can you dig a bit deeper on that? I wonder if it isn't meant to be more like the agreements necessary to use local facilities (i.e. Facilities Use Agreements). If that is the case, we can tie it to other activities in the schedule.

Dave: I agree with your comments on the master schedule logic. Generally, I also agree that the EPC contractors will likely take on many of the local permits but want to confirm what we meant by this activity in the work plan (bullet three above).

Thanks,

JP

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Monday, April 11, 2022 5:53 AM
To: mmaltby@brwncald.com <mmaltby@brwncald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

KD-1130 was being driven by the Land Acquisition Plan out in Aug-2023, so I've removed that and let the Contracting Strategy drive it. We'll make assumptions based on the Contracting Strategy and adjust as needed going forward. This moves it to 21-Oct-22.

KD-1450 was removed during a session with JP and Cheyanne. No Local (County) Agency Agreements/Permits could be identified during the A3 timeframe and consensus leans towards the EPC contractors having responsibility in the future.

Dave Hubbard
Project Controls
Brown and Caldwell
Cell: 832.840.1789
dhubbard@brwncald.com



From: Marcus Maltby <mmaltby@BrwnCald.com>
Sent: Sunday, April 10, 2022 8:35 PM
To: David Hubbard <Dhubbard@BrwnCald.com>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Sites Key Deliverables_2022.04.08.xlsx

@David Hubbard -
I'm redlining the milestone calendar (green, yellow, red) and I have a couple items that I think we should update:

- KD-1130 Updated Master Project Schedule (baseline established) – Shows ending October 2023. I think that should be October 2022. Are there any predecessors/successors tied to this? I imagine just the contract strategy plus a lag.
- KD-1450 "Obtain Local Agency Agreements and Permits" Does not show up on the KD list you provided. It was on the schedule that John provided comments to on April 1st. Did someone decide to move it off the key deliverables list?

@JP Robinette – During one of our calls last week, I think you requested a redlined version of the stoplight table. See attached. At the end there are two text boxes, one that shows new key deliverables and one that shows removed key deliverables. Generally activities have been pushed back (which isnt unexpected) and now I'm starting to wonder about what this will mean for TO Budgets for 2023 and 2024.

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Friday, April 8, 2022 2:30 PM
To: Marcus Maltby <mmaltby@BrwnCald.com>
Subject: Sites Key Deliverables_2022.04.08.xlsx

KD's attached.

UPDATED April 25, 2022

Milestones and Dates Involving State Agencies for the Sites Reservoir Project

Description	Needed Completion Date	Agency(ies) Involved
Activities Related to Prop 1		
Initiate public review of RDEIR/SDEIS	November 12, 2021	Sites
Complete State Feasibility Determination	December 15, 2021	CWC
Confirm 75% Non-Public Benefit Cost Share Commitment	December 15, 2021	DWR
Complete Final EIR/EIS, CEQA Findings, and Adopt Project	~~September 2022~~ January 2023	Sites
Initiate Benefit Agreements	~~January 2022~~ May 2022	Sites, DWR, CDFW
Consider increasing the amount of early funding levels for eligible Prop 1 projects	March 2022	CWC
Complete Benefit Agreements and Final Award of Prop 1 Funds	~~June 2023~~ July 2023	DWR, CDFW, CWC
Activities Related to Water Rights		
Submit Sites Water Right Application	~~February 28, 2022~~ May 10, 2022	Sites
Complete Application Review and Issue Public Notice	~~April 29, 2022~~ July 11, 2022	SWRCB
Complete Resolution of Protests	~~December 2022~~ March 2023	Sites, SWRCB
Conduct Hearing on Any Remaining Issues	~~March 2023~~ July 2023	SWRCB
Issue Final Order and Water Right Permit	~~July 2023~~ December 2023	SWRCB
Activities Related to Critical Permits		
State Incidental Take Permits		
Develop and Submit ITP Construction Application	~~December 20, 2021~~ March 21, 2022	Sites, CDFW
Develop and Submit ITP Operations Application	~~March 31, 2022~~ June 2022	Sites, CDFW
Issue Incidental Take Permits	~~November 2022~~ March 2023	CDFW
401 Water Quality Certification		
Develop and Submit Draft Permit Application	~~March 2022~~ May 2022	Sites, SWRCB
Review and Refinement of Draft Application	October 2022	Sites, SWRCB
Submit Application	~~September 2022~~ February 2023	Sites
401 Certification Issued	~~January 2023~~ October 2023	SWRCB
Permit to Construct Dams		
Concurrence with Design Approach	June 2023	DWR/DSOD
Activities Related to Operations Coordination		
Confirm State Water Project Contract modifications needed for Sites	October 29, 2021	DWR
Execute Agreement to Coordinate Operations of SWP and Sites	December 2022	DWR

From: Sara M. Katz [skatz@katzandassociates.com]
Sent: 4/13/2022 10:35:19 AM
To: Sharon Han [shan@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]
CC: Kevin Spesert [kspesert@sitesproject.org]
Subject: RE: Notes from today

Thanks.

I added some additional content. Helpful to keep us on track given there is so much going on.

Sara

K&A
KATZ & ASSOCIATES

Sara M. Katz
Founder/CEO
mobile: 619.813.9551
San Diego · Los Angeles · San Francisco

From: Sharon Han <shan@katzandassociates.com>
Sent: Wednesday, April 13, 2022 10:07 AM
To: Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>; Ann Newton <anewton@katzandassociates.com>
Subject: Notes from today

Some notes below!

Thank you,
Sharon
--

- MWD had meeting yesterday – approved participation at current level. Opposition was from NGO's and some tribes, focusing on environmental concerns and connection to the Delta tunnels AND overall concerns of affordability.
  - Sone Board Members said they want to do more engagement with NGO's and tribes given public concerns
- Sharon to listen to yesterday's board meeting – find if there are any new themes
  - Identify who said what and are there any new comments that need to be noted or addressed
- ACWA – May 3rd
  - Looking for a larger conference room (Sara to f-up with Marcia)
  - Ann/Sharon to draft up email invite -- need by 4/15
    - Contact Marcia with logistics / timing (Sara)
- General information materials to be placed on thumb drive to handout at session (electronic media/information kit)
- Hard copies of 2021 Highlights one-pager to be handed out
- Time permitting, posters of front and back of 2021 Highlights page
- Easels
- A/V
- Beverages and light food
- Microphones and speakers
- Contact list with names, phone numbers, email addresses
- Sara Katz to handle SoCal, Kevin will contact everyone in the Bay Area/north of Sacramento

- SCWC Podcast
  - Heather, Jerry, Nina (or someone else from MWD) – Sara to reach out to Heather and Nina, after Ann/Sharon suggest this line-up to Charlie W.
  - Discussion of a video intro by Fritz – nice to have if possible
  - Ann to follow up with Charley
- Videos
  - Sharon to move forward animation scripts to graphics
  - Sharon/Ann working on story board for Sites virtual tour/Kevin to discuss with Steve C (Nor Cal videographer)
  - Send Kevin draft animation clip by EOW (Sharon)
  - Kevin to share thumbdrive of video with Sara (during ACWA conference)
  - Discussion re video/animation to address "another dry hole" comments

K&A
KATZ & ASSOCIATES

Sharon Han
(she/her/hers)
Senior Account Executive
c: 213.220.5917
San Diego · Los Angeles · San Francisco

From: Micko, Steve/SAC[Steve.Micko@jacobs.com]

Sent: Wed 4/13/2022 12:46:42 PM (UTC-07:00)

To: Heydinger, Erin[erin.heydinger@hdrinc.com]

Cc: Alicia Forsythe[aforsythe@sitesproject.org]; Leaf, Rob/SAC[Rob.Leaf@jacobs.com]; Thayer, Reed/SAC[Reed.Thayer@jacobs.com]; Saadat, Samaneh[Samaneh.Saadat@jacobs.com]

Subject: SPJPA Sites: ALT3 041221 and ALT3B 041222

Attachment: SitesMetrics_rev28_2scn__ALT3A_041222_ALT3B_041222.pdf

Attachment: SitesMetrics_rev28_4scn__ALT3A_041222_ALT3A_041122_2035CT_ALT3B_041222_ALT3B_041122_2035CT.pdf

Attachment: NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_041222_ALT3A_041222_ALT3B_041222.xlsm

Attachment: NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_041222_NAA_041122_2035CT_ALT3A_041222_ALT3A_041122_2035CT_ALT3B_041222_ALT3B_041122_2035CT.xlsm

Hi Erin,

Sites metrics pdfs and trend reporting spreadsheets for ALT3A 041222 and ALT3B 041222 are attached.
I'm providing two sets of Sites metrics pdfs and trend reporting spreadsheets (alternatives at historical hydrology, as well as alternatives at historical and 2035CT hydrologies).

Sites metrics:

- SitesMetrics_rev28_4scn__ALT3A_041222_ALT3B_041222.pdf
  - ALT3A 041222 (as compared to NAA 041222)
  - ALT3B 041222 (as compared to NAA 041222)
- SitesMetrics_rev28_4scn__ALT3A_041222_ALT3A_041122_2035CT_ALT3B_041222_ALT3B_041122_2035CT.pdf
  - ALT3A 041222 (as compared to NAA 041222)
  - ALT3A 041122 2035CT (as compared to NAA 041122 2035CT)
  - ALT3B 041222 (as compared to NAA 041222)
  - ALT3B 041122 2035CT (as compared to NAA 041122 2035CT)

Trend reporting:

- NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_041222_ALT3A_041222_ALT3B_041222.xlsm
  - NAA 041222
  - ALT3A 041222
  - ALT3B 041222
- NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_041222_NAA_041122_2035CT_ALT3A_041222_ALT3A_041122_2035CT_ALT3B_041222_ALT3B_041122_2035CT.xlsm
  - NAA 041222
  - NAA 041122 2035CT
  - ALT3A 041222
  - ALT3A 041122 2035CT
  - ALT3B 041222
  - ALT3B 041122 2035CT

Do you have time tomorrow to walk through these results and coordinate on ops modeling efforts?

I'm available from 8:30 AM to 10 AM, 11:30 AM to 2 PM, and after 3:30 PM.

Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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CVP/SWP Deliveries Table

Deliveries (TAF/year) (change from No Project Alternative conditions) [a]	ALT 3A 041222		ALT 3B 041222	
	Average	**Dry and Critical**	**Average**	**Dry and Critical**
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	
CVP OpFlex Deliveries	**24**	**42**	**14**	**19**
NOD Ag	0	7	-1	2
NOD M&I	1	2	1	1
SOD Ag	22	32	15	16
SOD M&I	1	1	0	1
CVP Shasta Operations	**55**	**22**	**57**	**35**
Fall Flow Stability	23	18	25	34
Spring Pulse Flow	32	4	31	1
CVP Refuge Water Supply	**1**	**1**	**0**	**1**
NOD (Level 2)	0	1	0	1
SOD (Level 2)	0	0	0	0
SWP Deliveries	**0**	**17**	**-4**	**3**
SWP SOD Ag (Table A)	2	5	1	2
SWP SOD M&I (Table A)	4	14	-1	5
SWP SOD Interruptible (Article 21)	-6	-2	-3	-4
Total change in CVP/SWP Deliveries[b]	**24**	**60**	**10**	**23**

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*

[b] *Values do not include CVP Shasta Operations*

Results are dependent on storage allocations (see storage allocation table)

Authority Deliveries Table

Deliveries (TAF/year) (change from No Project Alternative conditions) [a]	ALT 3A 041222		ALT 3B 041222	
	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	
Authority PWA Deliveries	**91**	**209**	**101**	**230**
NOD	21	38	22	42
SOD	71	171	79	188
CVP Operational Flexibility	**24**	**42**	**14**	**19**
Sub-Total Supplemental Deliveries for Water Supply	**115**	**251**	**115**	**249**
Refuge Water Supply	**16**	**28**	**17**	**29**
NOD (Level 4)	4	5	4	5
SOD (Level 4)	12	23	12	24
Yolo Bypass Habitat Water Supply	**32**	**10**	**33**	**9**
Total Authority Deliveries	**164**	**289**	**165**	**287**
Percentage of Total Authority Deliveries				
Authority PWA Deliveries - North of Delta	13%	13%	14%	15%
Authority PWA Deliveries - South of Delta	43%	59%	48%	66%
CVP Deliveries - Operational Flexibility	14%	14%	8%	7%
Refuge Water Supply	10%	10%	10%	10%
Yolo Bypass Habitat Water Supply	20%	4%	20%	3%
Consideration of Incidental Change to CVP and SWP Deliveries				
Incidental Change to SWP Deliveries	0	17	-4	3
Total Authority, CVP OpFlex and SWP Deliveries	163	306	161	290
Incremental Change as a Percentage of Total Authority Deliveres	0%	6%	-2%	1%
Incremental Change as a Percentage of Total Authority, CVP OpFlex and SWP Delivere	0%	6%	-3%	1%

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*

Results are dependent on storage allocations (see storage allocation table)

Storage Table

Storage Increases (TAF) (above No Project Alternative conditions)[a]	ALT 3A 041222		ALT 3B 041222	
	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	
Additional end-of-September storage	**132**	**191**	**109**	**164**
Trinity	0	0	0	0
Shasta	110	156	88	129
CVP OpFlex Storage	*103*	*154*	*84*	*136*
Storage exchanged from Sites	*6*	*2*	*4*	*-7*
Oroville	11	31	13	33
SWP Storage	*0*	*8*	*1*	*8*
Sites Delta Participants Storage	*11*	*24*	*12*	*25*
Folsom (CVP OpFlex)	12	4	7	2
Percentage of Total Additional End-of-September Storage				
Portion of total additional end-of-September storage				
Trinity	0%	0%	0%	0%
Shasta	83%	82%	81%	79%
Oroville	8%	16%	12%	20%
Folsom	9%	2%	7%	1%

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*

Results are dependent on storage allocations (see storage allocation table)

Sites Releases Table

Releases (TAF/year)	ALT 3A 041222		ALT 3B 041222	
	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	
Releases for Authority PWA Deliveries - North of Delta	21	38	22	42
Assumed transfer from North of Delta to South of Delta	3	3	5	4
Releases for Authority PWA Deliveries - South of Delta	86	193	98	222
Releases for CVP Deliveries - Operational Flexibility	89	90	59	59
Releases for Refuge Water Supply	19	34	20	34
Releases for Yolo Bypass Habitat Water Supply	37	12	38	10
Total Releases	**255**	**370**	**242**	**372**
Percentage of Total Releases from Sites				
Releases for Authority PWA Deliveries - North of Delta	8%	10%	9%	11%
Assumed transfer from North of Delta to South of Delta	1%	1%	2%	1%
Releases for Authority PWA Deliveries - South of Delta	34%	52%	41%	60%
Releases for CVP Deliveries - Operational Flexibility	35%	24%	25%	16%
Releases for Refuge Water Supply	8%	9%	8%	9%
Releases for Yolo Bypass Habitat Water Supply	15%	3%	16%	3%

Notes:

Results are dependent on storage allocations (see storage allocation table)

Sites Fills Table

Fills (TAF/year)	ALT 3A 041222		ALT 3B 041222	
	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	
Fills for Authority PWA - North of Delta	30	13	34	15
Fills for Authority PWA - South of Delta	95	38	109	45
Fills for CVP Operational Flexibility	91	33	60	23
Fills for Refuge Water Supply	21	8	21	8
Fills for Yolo Bypass Habitat Water Supply	39	9	40	9
Total Fill	**275**	**101**	**264**	**100**
Percentage of Total Fills				
Fills for Authority PWA - North of Delta	11%	13%	13%	15%
Fills for Authority PWA - South of Delta	35%	38%	41%	45%
Fills for CVP Operational Flexibility	33%	32%	23%	23%
Fills for Refuge Water Supply	8%	8%	8%	8%
Fills for Yolo Bypass Habitat Water Supply	14%	9%	15%	9%

Notes:

Results are dependent on storage allocations (see storage allocation table)

Sites Storage Allocation Table

Storage Volumes (TAF)	ALT 3A 041222	ALT 3B 041222
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate
Authority PWA - North of Delta	205	238
TCCA	*109*	*126*
GCID	*25*	*29*
RD108	*21*	*25*
Other Sacramento Valley	*50*	*58*
Authority PWA - South of Delta	631	728
CVP Operational Flexibility	360	230
Refuge Water Supply	124	124
Yolo Bypass Habitat Water Supply	120	120
Dead Pool Storage	60	60
Total Storage	**1500**	**1500**
Percentage of Total Storage Capacity		
Authority PWA - North of Delta	14%	17%
Authority PWA - South of Delta	44%	51%
CVP Operational Flexibility	25%	16%
Refuge Water Supply	9%	9%
Yolo Bypass Habitat Water Supply	8%	8%

Notes:

Results are dependent on storage allocations

CVP/SWP Deliveries Table

Deliveries (TAF/year) (change from No Project Alternative conditions) [a]	ALT 3A 041222		ALT 3A 041122 2035CT		ALT 3B 041222		ALT 3B 041122 2035CT	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	
CVP OpFlex Deliveries	**24**	**42**	**19**	**23**	**14**	**19**	**7**	**3**
NOD Ag	0	7	0	5	-1	2	-1	3
NOD M&I	1	2	0	1	1	1	0	0
SOD Ag	22	32	18	16	15	16	7	-2
SOD M&I	1	1	1	2	0	1	0	0
CVP Shasta Operations	**55**	**22**	**52**	**19**	**57**	**35**	**46**	**12**
Fall Flow Stability	23	18	26	13	25	34	20	7
Spring Pulse Flow	32	4	26	5	31	1	26	5
CVP Refuge Water Supply	**1**	**1**	**1**	**1**	**0**	**1**	**0**	**0**
NOD (Level 2)	0	1	0	0	0	1	0	0
SOD (Level 2)	0	0	0	1	0	0	0	-1
SWP Deliveries	**0**	**17**	**20**	**9**	**-4**	**3**	**14**	**-1**
SWP SOD Ag (Table A)	2	5	4	6	1	2	1	-1
SWP SOD M&I (Table A)	4	14	6	1	-1	5	5	-2
SWP SOD Interruptible (Article 21)	-6	-2	10	2	-3	-4	8	1
Total change in CVP/SWP Deliveries[b]	**24**	**60**	**40**	**33**	**10**	**23**	**22**	**1**

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*

[b] *Values do not include CVP Shasta Operations*

Results are dependent on storage allocations (see storage allocation table)

Authority Deliveries Table

Deliveries (TAF/year) (change from No Project Alternative conditions)[a]	ALT 3A 041222		ALT 3A 041122 2035CT		ALT 3B 041222		ALT 3B 041122 2035CT	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	
Authority PWA Deliveries	**91**	**209**	**107**	**223**	**101**	**230**	**115**	**240**
NOD	21	38	26	40	22	42	27	42
SOD	71	171	81	183	79	188	88	198
CVP Operational Flexibility	**24**	**42**	**19**	**23**	**14**	**19**	**7**	**3**
Sub-Total Supplemental Deliveries for Water Supply	**115**	**251**	**126**	**246**	**115**	**249**	**122**	**243**
Refuge Water Supply	**16**	**28**	**17**	**26**	**17**	**29**	**18**	**27**
NOD (Level 4)	4	5	4	5	4	5	4	5
SOD (Level 4)	12	23	13	20	12	24	13	21
Yolo Bypass Habitat Water Supply	**32**	**10**	**34**	**10**	**33**	**9**	**35**	**11**
Total Authority Deliveries	**164**	**289**	**177**	**282**	**165**	**287**	**175**	**281**
Percentage of Total Authority Deliveries								
Authority PWA Deliveries - North of Delta	13%	13%	15%	14%	14%	15%	16%	15%
Authority PWA Deliveries - South of Delta	43%	59%	46%	65%	48%	66%	50%	71%
CVP Deliveries - Operational Flexibility	14%	14%	11%	8%	8%	7%	4%	1%
Refuge Water Supply	10%	10%	10%	9%	10%	10%	10%	9%
Yolo Bypass Habitat Water Supply	20%	4%	19%	4%	20%	3%	20%	4%
Consideration of Incidental Change to CVP and SWP Deliveries								
Incidental Change to SWP Deliveries	0	17	20	9	-4	3	14	-1
Total Authority, CVP OpFlex and SWP Deliveries	163	306	197	290	161	290	189	280
Incremental Change as a Percentage of Total Authority Deliveres	0%	6%	11%	3%	-2%	1%	8%	0%
Incremental Change as a Percentage of Total Authority, CVP OpFlex and SWP Delivere	0%	6%	10%	3%	-3%	1%	8%	0%

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*
Results are dependent on storage allocations (see storage allocation table)

Storage Table

Storage Increases (TAF) (above No Project Alternative conditions) [a]	ALT 3A 041222		ALT 3A 041122 2035CT		ALT 3B 041222		ALT 3B 041122 2035CT	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	
Additional end-of-September storage	**132**	**191**	**136**	**196**	**109**	**164**	**104**	**152**
Trinity	0	0	0	0	0	0	0	0
Shasta	110	156	124	184	88	129	92	136
CVP OpFlex Storage	*103*	*154*	*119*	*179*	*84*	*136*	*85*	*131*
Storage exchanged from Sites	*6*	*2*	*5*	*5*	*4*	*-7*	*7*	*5*
Oroville	11	31	8	9	13	33	10	14
SWP Storage	*0*	*8*	*-6*	*-8*	*1*	*8*	*-8*	*-10*
Sites Delta Participants Storage	*11*	*24*	*14*	*17*	*12*	*25*	*18*	*23*
Folsom (CVP OpFlex)	12	4	3	2	7	2	2	3
Percentage of Total Additional End-of-September Storage								
Portion of total additional end-of-September storage								
Trinity	0%	0%	0%	0%	0%	0%	0%	0%
Shasta	83%	82%	92%	94%	81%	79%	88%	89%
Oroville	8%	16%	6%	5%	12%	20%	10%	9%
Folsom	9%	2%	3%	1%	7%	1%	2%	2%

Notes:

[a] *Values shown are the net change between the Project Alternative and No Project Alternative*

Results are dependent on storage allocations (see storage allocation table)

Sites Releases Table

Releases (TAF/year)	ALT 3A 041222		ALT 3A 041122 2035CT		ALT 3B 041222		ALT 3B 041122 2035CT	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	
Releases for Authority PWA Deliveries - North of Delta	21	38	26	40	22	42	27	42
Assumed transfer from North of Delta to South of Delta	3	3	5	3	5	4	7	4
Releases for Authority PWA Deliveries - South of Delta	86	193	104	212	98	222	119	240
Releases for CVP Deliveries - Operational Flexibility	89	90	88	83	59	59	58	54
Releases for Refuge Water Supply	19	34	21	31	20	34	21	32
Releases for Yolo Bypass Habitat Water Supply	37	12	39	12	38	10	40	13
Total Releases	**255**	**370**	**283**	**381**	**242**	**372**	**271**	**386**
Percentage of Total Releases from Sites								
Releases for Authority PWA Deliveries - North of Delta	8%	10%	9%	10%	9%	11%	10%	11%
Assumed transfer from North of Delta to South of Delta	1%	1%	2%	1%	2%	1%	2%	1%
Releases for Authority PWA Deliveries - South of Delta	34%	52%	37%	56%	41%	60%	44%	62%
Releases for CVP Deliveries - Operational Flexibility	35%	24%	31%	22%	25%	16%	21%	14%
Releases for Refuge Water Supply	8%	9%	7%	8%	8%	9%	8%	8%
Releases for Yolo Bypass Habitat Water Supply	15%	3%	14%	3%	16%	3%	15%	3%

Notes:

Results are dependent on storage allocations (see storage allocation table)

Sites Fills Table

Fills (TAF/year)	ALT 3A 041222		ALT 3A 041122 2035CT		ALT 3B 041222		ALT 3B 041122 2035CT	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate		1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	
Fills for Authority PWA - North of Delta	30	13	36	15	34	15	39	16
Fills for Authority PWA - South of Delta	95	38	113	51	109	45	130	58
Fills for CVP Operational Flexibility	91	33	90	33	60	23	59	21
Fills for Refuge Water Supply	21	8	22	9	21	8	23	10
Fills for Yolo Bypass Habitat Water Supply	39	9	40	9	40	9	41	9
Total Fill	**275**	**101**	**302**	**118**	**264**	**100**	**292**	**115**
Percentage of Total Fills								
Fills for Authority PWA - North of Delta	11%	13%	12%	13%	13%	15%	13%	14%
Fills for Authority PWA - South of Delta	35%	38%	38%	44%	41%	45%	44%	51%
Fills for CVP Operational Flexibility	33%	32%	30%	28%	23%	23%	20%	19%
Fills for Refuge Water Supply	8%	8%	7%	8%	8%	8%	8%	8%
Fills for Yolo Bypass Habitat Water Supply	14%	9%	13%	8%	15%	9%	14%	8%

Notes:

Results are dependent on storage allocations (see storage allocation table)

Sites Storage Allocation Table

Storage Volumes (TAF)	ALT 3A 041222	ALT 3A 041122 2035CT	ALT 3B 041222	ALT 3B 041122 2035CT
	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) Historic Climate	1.5 MAF Reservoir Dunnigan Pipeline (outlet to CBD) 2035 CT Climate
Authority PWA - North of Delta	205	205	238	238
TCCA	*109*	*109*	*126*	*126*
GCID	*25*	*25*	*29*	*29*
RD108	*21*	*21*	*25*	*25*
Other Sacramento Valley	*50*	*50*	*58*	*58*
Authority PWA - South of Delta	631	631	728	728
CVP Operational Flexibility	360	360	230	230
Refuge Water Supply	124	124	124	124
Yolo Bypass Habitat Water Supply	120	120	120	120
Dead Pool Storage	60	60	60	60
Total Storage	**1500**	**1500**	**1500**	**1500**
Percentage of Total Storage Capacity				
Authority PWA - North of Delta	14%	14%	17%	17%
Authority PWA - South of Delta	44%	44%	51%	51%
CVP Operational Flexibility	25%	25%	16%	16%
Refuge Water Supply	9%	9%	9%	9%
Yolo Bypass Habitat Water Supply	8%	8%	8%	8%

Notes:

Results are dependent on storage allocations

File Provided Natively

File Provided Natively

From: Marcia Kivett [MKivett@sitesproject.org]
Sent: 4/14/2022 8:56:01 AM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: Fw: Sites Conveyance Features
Attachments: Sites Project Conveyance Features.xlsx

The attached is now here - Jerry's Working Documents

Marcia Kivett
Sites Project Admin
561.843.9740
mkivett@sitesproject.org
P.O. Box 517
122 Old Hwy 99W
Maxwell, CA 95955

From: Cheyanne Harris <CHarris@BrwnCald.com>
Sent: Thursday, April 14, 2022 7:17 AM
To: Marcia Kivett <MKivett@sitesproject.org>
Subject: RE: Sites Conveyance Features

File is attached (was originally on my BC OneDrive). Thanks!

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Wednesday, April 13, 2022 6:13 PM
To: Cheyanne Harris <CHarris@BrwnCald.com>
Subject: Fw: Sites Conveyance Features

Hi!

Can you send me a link to the below document? The link below has expired and I could not find it in his inbox from September.

Marcia Kivett
Sites Project Admin
561.843.9740
mkivett@sitesproject.org
P.O. Box 517
122 Old Hwy 99W
Maxwell, CA 95955

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Wednesday, April 13, 2022 5:21 PM
To: Marcia Kivett <MKivett@sitesproject.org>
Subject: FW: Sites Conveyance Features

Can you make a copy of this doc and put it in my jerry working documents folder on sharepoint? Shoot me a link when done. thanks

---

From: Cheyanne Harris <CHarris@BrwnCald.com>
Date: Thursday, September 23, 2021 at 10:42 AM

To: Jerry Brown <jbrown@sitesproject.org>
Cc: JP Robinette <jrobinette@brwncald.com>
Subject: Sites Conveyance Features

Cheyanne Harris has shared a OneDrive for Business file with you. To view it, click the link below.

Sites Project Conveyance Features.xlsx

Jerry,

The attached (or linked here) is a breakdown of the Sites Project Conveyance features (existing + new) – based on the info that was readily available (few Engineering TMs, an outdated version of the Preliminary Project Description, etc).

Some tweaks may be needed (e.g., I'm not up to speed on whether TRR West is unique to one of the alternatives or just a separate option under consideration), but in the meantime I'll put some thought into some sort of graph that could help convey this information.

Thanks.

Cheyanne Harris
Brown and Caldwell | Sacramento, CA
CHarris@brwncald.com
T 916.853.5349
Pronouns: she/her/hers

File Provided Natively

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 4/15/2022 9:43:50 AM
To: Luu, Henry [henry.luu@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Alexander, Jeriann [jalexander@fugro.com]; Kevin Spesert [kspesert@sitesproject.org]; conner [conner@cmdwest.com]; JP Robinette [jrobinette@sitesproject.org]
CC: Arsenijevic, Jelica [Jelica.Arsenijevic@hdrinc.com]; Briard, Monique [monique.briard@icf.com]; Norton, Brad [Brad.Norton@icf.com]; Tannourji, Danielle [Danielle.Tannourji@icf.com]
Subject: Eagle Survey #2 Preliminary Results
Attachments: Geotech_ExplorationPoints_intersect20220407NestBuffers.xls; Geotech.kmz; ICF Eagle Survey Results Visit 2.kmz

Hello,

Below is a summary of the April survey results and a screenshot of the eagle nest locations and P1 geotechnical borings. I have also attached KMZs of the nest locations with and without P1 geotech locations, as well as a table identifying the geotech locations that are within the eagle nest buffers.

Eagle Survey Summary of Results – Visit 2:

- In general, there was some shuffling of nest locations among the golden eagles including some previously active nests being no longer active and some new active and inactive nests
- 3 bald eagle nests (one east of I-5 as provided by USFWS)
  - Same nests and status as those identified in January survey
- 5 active golden eagle nests
  - 1 continuing nest (Antelope Creek)
  - 1 new nest (Howard Creek)
  - 1 previously inactive nest becoming active (Sites Canyon golden eagle nest #1)
  - 2 previously identified "probable golden eagle nests" now confirmed as active (Cell tower and Glenn Valley)
  - 1 previously active nest is no longer active (Peninsula Hills)
  - 2 previously identified "probable golden eagle nests" modified to inactive status (Sites Canyon 2 and Lurline Canyon)
- Numerous new and previously identified inactive bald (n=1) and golden eagle (n= 8) nest structures
- Although unlikely, it is still possible unoccupied nests could become active later in the season and there remains a slight (albeit unlikely) chance that new active nests would be identified
- There was also one Swainson's hawk nest identified along Stone Corral Creek, we are expecting additional nests as the hawks are just starting to arrive from migration

The third and final 2022 survey is scheduled for July, and formal pdf maps are being worked up by ICF. As we have done previously, we will be discussing these results in our team meetings, if you have any questions please let me know.



Summary Table of Eagle Survey 1 and Survey 2 Results

Type	LocName	Visit1_Obs	Visit2_Obs
Active Bald Eagle Nest	Tehama Canal Bald Eagle	Bald Eagle adult on nest	Bald Eagle on nest in brood position
Active Bald Eagle Nest	Golden Gate Bald Eagle	Unoccupied Bald Eagle Nest	2 young (gray pin feathered) in nest, adult flying
Active Bald Eagle Nest	Lurline Creek 1 Bald Eagle	Unoccupied Eagle Nest	Bald Eagle pair in nest
Active Golden Eagle Nest	Sites Canyon 1 Golden Eagle	Unoccupied Eagle Nest	Golden Eagle in brood position with 2nd adult

Active Golden Eagle Nest	Cell Tower Golden Eagle	Probable Golden Eagle Active Nest	Adult Golden Eagle on nest in brood position
Active Golden Eagle Nest	Glenn Valley Golden Eagle	Probable Golden Eagle Active Nest	Adult Golden Eagle in nest 2nd adult near
Active Golden Eagle Nest	Antelope Creek Golden Eagle	Active Golden Eagle Nest	1 young and adult Golden Eagle near
Active Golden Eagle Nest	Howard Creek Golden Eagle	n/a	Golden Eagle in brood position
Active Swainson's Hawk Nest	Stone Corral Creek Swainson's Hawk	n/a	Swainson's Hawk in brood position
Inactive Bald Eagle Nest	Lurline Creek 2	Unoccupied Eagle Nest	No nest structure observed
Inactive Golden Eagle Nest	Peninsula Hills Golden Eagle	Golden Eagle Active Nest	No eggs/young/adults or fresh material
Inactive Golden Eagle Nest	Sites Canyon 2 Golden Eagle	Probable Golden Eagle Active Nest	No eggs/young/adults or fresh material, 2nd nest
Inactive Golden Eagle Nest	Lurline Canyon Golden Eagle Nest	Probable Golden Eagle Active Nest	Unoccupied nest with no fresh material
Inactive Golden Eagle Nest	High Peak Eagle Nest	n/a	Unoccupied eagle nest with no fresh material
Inactive Golden Eagle Nest	Eggman Canyon Eagle Nest	n/a	Unoccupied Golden Eagle Nest
Inactive Golden Eagle Nest	Blanchard Valley Eagle Nest	n/a	Old golden eagle nest
Inactive Golden Eagle Nest	Boxer Valley Eagle Nest	n/a	Golden Eagle nest with no fresh material
Inactive Golden Eagle Nest	Sites Canyon 3	n/a	Large structure with old material

John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916.679.8858 M 818.640.2487
john.spranza@hdrinc.com

hdrinc.com/follow-us
hdrinc.com/follow-us

File Provided Natively

Meeting:	**Sites Reservoir Committee, Environmental Planning and Permitting Workgroup**
Locations:	Maxwell Project Office, 122 Old Highway 99W, Maxwell, CA 95955 See below for alternate meeting locations.

Call in: **1-833-255-2803** Code: 512623326# Click here to join the meeting

Workgroup Chair:	Thad Bettner (GCID)
Workgroup Vice-Chair:	Heather Dyer (SBVMWD)
Staff Lead:	Ali Forsythe, Environmental Planning and Permitting Manager

AGENDA

Wednesday, April 20, 2022; 1:00 pm – 2:30 pm

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions.
- Period for Public Comment.

1. Discussion and Information Items:

1.1 Review and comment on the initial modeling results for the Biological Assessment and Operations ITP analyses.

1.2 Review and comment on Amendment 3 schedule development for planning and permitting.

2. Environmental Planning and Permitting Manager Report

- Key Planning and Permitting Activities Report
- Geotechnical Report

3. Upcoming Meetings:

Reservoir Committee
Friday, April 22, 2022 (9:00 am – 12:00 pm)

Authority Board
Wednesday, April 27, 2022 (1:30 – 4:00 pm)

Environmental Planning and Permitting Workgroup
Thursday, May 12, 2022 (1:00 – 2:30 pm)

Virtual Information will be provided before all meetings at Sitesproject.org.

ADJOURN

PERIOD OF PUBLIC COMMENT: Any person may speak about any subject of concern, provided it is within the jurisdiction of the Reservoir Committee and is not already on today's agenda. The total amount of time allotted for receiving such public communication shall be limited to a total of 10 minutes per issue and each individual or group will be limited to no more than 3 minutes each within the 10 minutes allocated per issue. **Note:** No action shall be taken on comments made under this comment period.

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

Alternate Meeting Locations:

Glenn-Colusa Irrigation District, 344 East Laurel St, Willows, CA 95988

San Bernardino Valley Municipal WD, 380 E. Vanderbilt Way, San Bernardino, CA 92408

Colusa County, 1215 Market St., Colusa CA 95932

Coachella Valley Water District, 51501 Tyler Street, Coachella CA 92236

Reclamation District 108, 975 Wilson Bend Rd., Grimes, CA 95950

Wheeler Ridge-Maricopa Water Storage District, 12109 Hwy 166, Bakersfield, CA 93313

From: Briard, Monique [Monique.Briard@icf.com]
Sent: 4/15/2022 3:08:59 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Williams, Nicole [Nicole.Williams@icf.com]; Hendrick, Mike [Mike.Hendrick@icf.com]
CC: Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Hi Ali,

The write-up is almost complete – it is currently in senior review/QC stage so we will be sending it to you early next week.

Thank you,
Monique

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 4, 2022 9:28 AM
To: John Spranza <John.Spranza@hdrinc.com>; Briard, Monique <Monique.Briard@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I think this all sounds good Monique. I am good with them reaching out to Steve. Thanks for the heads up on schedule. That sounds good to me.

I am good with adding them to the contract also.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Sunday, April 3, 2022 10:51 AM
To: Briard, Monique <Monique.Briard@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I will keep an eye out for the approvals.

John Spranza

D 916.679.8858 M 818.640.2487

From: Briard, Monique <Monique.Briard@icf.com>
Sent: Friday, April 1, 2022 2:01 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Ali,

Gregg and Matty are on-board to provide you the requested write-up. They'll need to reach out to Steve Micko to talk with him about some of the details. I'm assuming that is acceptable, please let me know otherwise. Also, they've requested additional time that will push the delivery of the write up to the 15th.

Lastly, I'll need to add them to the project so John, please keep an eye out for the approval request.

Thanks,
Monique

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To: Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: John Spranza <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Hi Ali,

I've reached out to Matty and Gregg to ask for input from them and will let you know if they have any questions or need more time once I hear back from them.

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Cc: John Spranza <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Hi ICF team – We are working to determine if our water would move within or separate from "transfer water" as defined/covered in the ROC on LTO. To figure this out, we could use some more background on how transfer water was covered in the ROC on LTO NEPA and ESA efforts. It looks like Gregg Ellis and Matilda Evoy-Mount from ICF were the project managers for the ROC efforts. I am wondering if ICF can put together a one or two page summary of how transfers were covered in ROC on LTO NEPA and ESA? Things I am thinking of –

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It would be wonderful to have this by end of next week. Let me know if you need more time.

I will be on vacation starting next Friday, April 8 (starting the afternoon), so please also send to Erin and John. Thank you!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Kevin Spesert [kspesert@sitesproject.org]
Sent: 4/15/2022 5:09:10 PM
To: Edward Ring [ed@edwardring.com]
CC: Jerry Brown [jbrown@sitesproject.org]; Jeff Sutton (jsutton@tccanal.com) [jsutton@tccanal.com]; Keith Dunn (keithdunn@me.com) [keithdunn@me.com]
Subject: Re: Questions about the Sites Project

Mr. Ring,

Here are the answers to your questions from the email below.

1 - The Authority...since its founding in 2010 and through its development of the project...has proposed and worked to advance a 1.8-million-acre foot reservoir as its maximum sized project.

2 - The Authority proposed a 1.8-million-acre foot reservoir as part of its Proposition 1 WSIP proposed project

3 - As part of a value planning process conducted in 2019-2020, the Authority right-sized the project to address project affordability, permitting and constructability challenges. This process resulted in an Authority proposed 1.5 million-acre-foot reservoir...which is the reservoir size the Authority is currently advancing.

3A - There are 2 major dam sites for the project. The Sites Dam is approximately 267 feet high and the Golden Gate Dam is approximately 287 feet high. It is important to note that we are still in the preliminary engineering phase of the project and the sizes of the dam structures could change. The current estimated project cost is approximately $4.0 billion, however this number will continue to be refined as more project development activities are completed over the next couple of years (engineering, design, geotechnical investigations, permitting, etc.)

4 - Pump storage was included in the Authority's WSIP proposed project. However, as part of the value planning process mentioned in answer 3…it was removed from the project due to affordability, permitting and constructability concerns.

Here is a link to our website that includes links to several of the resource documents for the project https://sitesproject.org/project-documents/

And here is a link to our recirculated revised draft EIR/EIS…there is a lot of background information located here https://sitesproject.org/environmental-review/

Please feel free to give me a call if you have any additional questions.

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone (530) 632-4071

From: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, April 15, 2022 12:42 PM
To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Subject: Re: Questions about the Sites Project

Edward, I would direct these questions to the Sites JPA staff. I haves cc'ed the Executive Director Jerry Brown hereto.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
P.O. Box 1025
Willows, CA 95988
Ph: (530) 934-2125
Cell: (530) 301-1030
jsutton@tccanal.com

Sent from my I Phone

On Apr 15, 2022, at 12:18 PM, Edward Ring <ed@edwardring.com> wrote:

Jeffrey,

This email is to ask you some questions about the Sites Reservoir project that I cannot find on your website. You may recall I worked last year on an attempt to qualify an initiative to fund water projects. I am working now on a report in support of the Sites Project and other water projects and need some information. It seems to me that you or someone you can refer me to would know the answers to these few questions. I am on a deadline and am hoping to get some answers in the next few days which is why I am contacting you. Here they are:

1 - What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?

2 - What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?

3 - What is the current proposed storage capacity?

If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

For all three questions, I'm not asking about the projected annual yield. I'm asking how much water would the reservoir hold if it was full.

Also,

4 - Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?

Any details and any source documents you can provide either via PDF or URLs would be much appreciated.

Thank you,

Edward Ring
916-524-7534

From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/15/2022 6:29:38 PM
To: Luu, Henry [Henry.Luu@hdrinc.com]
Subject: Re: Call came in about Sites

This email is an excellent resource. Thanks Henry.

Get Outlook for iOS

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Friday, April 15, 2022 1:27:26 PM
To: JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Call came in about Sites

JP, draft responses are as follows:

1. What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?
   a. The maximum usable storage capacity is about 1.5 million acre feet (refer to 2021 RDEIR-SDEIS Chapter 2: https://sitesproject.org/revised-draft-environmental-impact-report-supplemental-draft-environmental-impact-statement/)

(JP – note this does not include storage to mitigate potential emergency scenarios, e.g. Probable Maximum Flood storage provides an additional 79,375 acre-feet)

2. What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?
   a. The maximum considered storage capacity was 1.8 million acre feet (refer to 2017 DEIR/EIS Chapter 3: https://sitesproject.org/environmental-review/draft-environmental-impact-report-environmental-impact-statement/)

(JP – unofficially I believe the Authority looked at options between 1.0 MAF and 2.1 MAF, however DWR and Reclamation also evaluated a number of different alternative reservoir sizes throughout the years)

3. What is the current proposed storage capacity?
   a. About 1.5 million acre feet; maximum dam heights above streambed are shown within Table 2-3 of the 2021 RDEIR-SDEIS (https://sitesproject.org/revised-draft-environmental-impact-report-supplemental-draft-environmental-impact-statement/)
4. Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?
   a. Pumpback hydropower storage was considered prior to the Value Planning efforts completed in April 2020. As part of the Value Planning analysis, the Authority decided to remove facilities related to pumpback generation to recognize significant project cost savings. (Value Planning Report: https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2020/04/INT-REP-Value-Planning-Appraisal-Report-FinalV2Compressed.pdf)

The updated feasibility project cost estimate was presented during the June 23, 2021 Joint Authority Board and Reservoir Committee Meeting and can be found at the following links:

- Staff report, https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2021/01/02-01-Updated-Feasibility-Total-Project-Cost-Estimate.pdf
- Presentation, https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2021/01/02-01P-Updated-Feasibility-Total-Project-Cost-Estimate.pdf

Henry N. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: JP Robinette <jrobinette@sitesproject.org>
Sent: Friday, April 15, 2022 11:35 AM

To: Luu, Henry <henry.luu@hdrinc.com>
Subject: Fw: Call came in about Sites

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Henry,

I am running between meetings, can you take a cut at a response to the below, please?

Thanks,
JP

From: Sandra Yarbrough <syarbrough@sitesproject.org>
Sent: Friday, April 15, 2022 7:33 AM
To: Kevin Spesert <kspesert@sitesproject.org>
Cc: JP Robinette <jrobinette@sitesproject.org>
Subject: RE: Call came in about Sites

Will do.

Thanks,

Sandra

From: Kevin Spesert <kspesert@sitesproject.org>
Sent: Friday, April 15, 2022 7:33 AM
To: Sandra Yarbrough <syarbrough@sitesproject.org>
Subject: Re: Call came in about Sites

Ask JP to respond...mostly engineering questions

From: Sandra Yarbrough <syarbrough@sitesproject.org>
Sent: Friday, April 15, 2022 7:30 AM
To: Kevin Spesert <kspesert@sitesproject.org>
Subject: Call came in about Sites

Good morning, Kevin,

I got a call from this guy before I left last night. I gave him my email so I could forward his questions along.

Thanks,

Sandra

Thank you,

Ed

916-524-7534

On 4/14/2022 5:13 PM, Edward Ring wrote:
> Sandra,
>
> Thank you for taking my call today. Here are my questions about Sites:
>
> 1 - What is the maximum potential storage capacity in the area where
> the Sites Reservoir is planned?
>
> 2 - What was the original proposed storage capacity, as it appeared in
> the earliest official Sites Project Proposal?

>
> 3 - What is the current proposed storage capacity?

>
If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

> For these three questions, I'm not asking about the projected annual
> yield. I'm asking how much water would the reservoir hold if it was full.
>
> Also,
>
> 4 - Was pump storage part of the original proposal, and if it is no
> longer part of the current proposal, why not?
>
> Any details and any source documents you can provide either via PDF or
> URLs would be much appreciated.
>
> Thank you,
>
> Edward Ring
> 916-524-7534
>

From: Briard, Monique [Monique.Briard@icf.com]
Sent: 4/19/2022 8:16:30 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Williams, Nicole [Nicole.Williams@icf.com]; Hendrick, Mike [Mike.Hendrick@icf.com]
CC: Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO
Attachments: ROC on LTO Water Transfer Summary_ICF_Memorandum_041822.docx

Flag: Follow up

Good morning,

Attached is the memo summarizing how transfers were covered in ROC on LTO NEPA and ESA.

Thanks,
Monique

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 4, 2022 9:28 AM
To: John Spranza <John.Spranza@hdrinc.com>; Briard, Monique <Monique.Briard@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I think this all sounds good Monique. I am good with them reaching out to Steve. Thanks for the heads up on schedule. That sounds good to me.

I am good with adding them to the contract also.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I will keep an eye out for the approvals.

John Spranza

D 916.679.8858 M 818.640.2487

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I will be on vacation starting next Friday, April 8 (starting the afternoon), so please also send to Erin and John. Thank you!

Ali

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 4/19/2022 9:43:36 AM
To: Marcia Kivett [MKivett@sitesproject.org]; Randal Neudexk [rneudeck@mwdh2o.com]; Wolder, Natalie L [ntaylor@usbr.gov]; Miller, Aaron@DWR [aaron.miller@water.ca.gov]; White, Molly@DWR [molly.white@water.ca.gov]; WELSH, RICHARD A. [rwelsh@usbr.gov]; King, Vanessa M [vking@usbr.gov]; Leahigh, John@DWR [John.Leahigh@water.ca.gov]; Dhillon, Devinder@DWR [Devinder.Dhillon@water.ca.gov]; 'druiz@westsidewd.com' [druiz@westsidewd.com]; White, Kristin N [knwhite@usbr.gov]; Okita, David@DWR [David.Okita@water.ca.gov]; Johnson, Levi E [lejohnson@usbr.gov]; Heydinger, Erin [erin.heydinger@hdrinc.com]; William Vanderwaal [wvanderwaal@rd108.org]; Cooke, Robert@DWR [Robert.Cooke@water.ca.gov]; Jeff Sutton [jsutton@tccanal.com]; Rob Kunde [rkunde@wrmwsd.com]; Maroney, Jagruti@DWR [Jagruti.Maroney@water.ca.gov]; DBader@usbr.gov; Jerry Brown [jbrown@sitesproject.org]
CC: Stroup, Duane [DStroup@usbr.gov]; Marcia Kivett [MKivett@sitesproject.org]
Subject: RE: Operations Agreement Technical Team
Attachments: 04.21.22 DWR-USBR-Sites Ops Tech Discusssions-AGN.docx; Sites-Reclamation-DWR Draft Term Sheet 10-18-21 (3).docx; FromUSBR-Clean-Draft_Sites_CarriageWaterAnnex_202108201 (1).docx; Sites Close Excess - term sheet - 20220307.docx; Power Annex-20210705[1].docx

Good morning,

Attached is the proposed agenda for Thursday's meeting. The objectives for the meeting are as follows:

- Agree that the term sheet and annexes as developed last year will be used as a starting point for this year's discussions and ultimate operating agreement
- Develop and prioritize/order a complete list of topics that need to be further discussed over the course of the year. As noted in the agenda, here is a starter list the Sites team developed:
  - Close excess
  - Annual process for exchanges
  - Accounting for exchanges (within COA or otherwise)
  - Carriage water
  - Scheduling deliveries for export within Transfer Window

We hope to discuss this list and add any other topics that DWR and Reclamation think should be considered for inclusion in the operating agreement.

I've also attached the latest version of the term sheet along with the annexes. I did not include the water rights annex because I think it is superseded by the sections of the water right application that both DWR and Reclamation's water rights team have reviewed.

Thanks and looking forward to our discussion,

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

-----Original Appointment-----
From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Thursday, March 17, 2022 12:39 PM
To: Marcia Kivett; Randal Neudexk; Wolder, Natalie L; aaron.miller@water.ca.gov; molly.white@water.ca.gov; WELSH, RICHARD A.; King, Vanessa M; Leahigh, John@DWR; Dhillon, Devinder@DWR; 'druiz@westsidewd.com'; White, Kristin N; Okita, David@DWR; Johnson, Levi E; Heydinger, Erin; 'WVanderwaal@rd108.org'; Cooke, Robert@DWR; Jeff Sutton; Rob Kunde; Maroney, Jagruti@DWR; DBader@usbr.gov; Jerry Brown
Cc: Stroup, Duane

Subject: Operations Agreement Technical Team
When: Thursday, April 21, 2022 3:00 PM-4:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where:

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

I've changed the name of this meeting.

The purpose of this discussion is to:

- Review current status of term sheets.
- Discuss topics and areas that will be focused on over the coming months – Sites will provide a "starter list".
- Develop an overall process for how to approach the agreement schedule.

Microsoft Teams meeting

Join on your computer or mobile app
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+1 916-538-7066,,852367313# United States, Sacramento
Phone Conference ID: 852 367 313#
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Sites-DWR-Reclamation Operations Agreement Technical Discussions Agenda

Affordable Water, Sustainably Managed

Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity and Inclusivity
Our Commitment – To live up to these values in everything we do

Meeting Information:

Date:	April 18, 2022	**Location:**	Microsoft Teams
Start Time:	3:00 p.m.	**Finish Time:**	4:30 p.m.
Purpose:	Kickoff 2022 discussions on developing an operating agreement between the Sites JPA, Bureau of Reclamation, and California Department of Water Resources		

Meeting Participants:

Jerry Brown, Executive Director	Robert Cooke, DWR	Natalie Taylor, Reclamation
Robert Kunde, Member (WRMWSD)	John Leahigh, DWR	Richard Welsh, Reclamation
Randall Neudeck, Member (MWD)	Aaron Miller, DWR	Vanessa King, Reclamation
Bill Vanderwaal, Member (RD108)	David Okita, DWR	Kristin White, Reclamation
Jeff Sutton, Member (TCCA)	Devinder Dhillon, DWR	Levi Johnson, Reclamation
Dan Ruiz, Member (WWD)	Jagruti Maroney, DWR	Don Bader, Reclamation
Erin Heydinger, HDR, Integration Lead	Molly White, DWR	Duane Stroup, Reclamation

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Overview a. Introductions b. Objectives	Brown	10 min
2. Review Status of Term Sheets Objective: agree that term sheets from Nov. 2021 represent starting point for 2022 discussions	Heydinger	15 min
3. Brainstorm topics and focus areas for coming months Objective: develop full list of all topics to be covered from which a schedule/process can be developed.	All	45 min

Initial list:

- Close excess
- Annual process for exchanges
- Accounting for exchanges (within COA or otherwise)

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	• Carriage water • Scheduling deliveries for export within Transfer Window		
4.	Discuss Priorities or Logical Order of Topics Objective: determine an order that makes sense to approach list developed under agenda item no. 3	All	15 min
5.	Action Items & Next Steps	Heydinger	5 min

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DRAFT, subject to change

Sites Reservoir Project Diversions in Close Excess Conditions

The Sites Project will divert when the Delta is in excess conditions as defined under COA[1]. However, there are occurrences when excess conditions is specified in hindsight. For the purposes of this term sheet, "close excess" conditions occur when it's unclear that the Delta is currently in excess conditions. The Sites Project may divert under close excess conditions if: 1) all other diversion criteria, as identified in the Authority's permits and water right, are met; 2) there is a reasonable likelihood that the Delta is in excess; 3) it is anticipated that excess conditions are preserved after Sites Project diversions. If it is determined that the Authority diverted water under its water right when the Delta was not in excess, the quantity of water diverted will be estimated and returned to DWR and/or Reclamation either via exchange or through transfer into Reclamation's storage allocation in Sites Reservoir. The method by which water is returned is to be determined jointly by DWR and Reclamation.

[1]COA defines excess conditions as follows (article 3(c)): "Excess water conditions" are period when it is agreed [by DWR and Reclamation] that releases from upstream reservoirs plus unregulated flow exceed Sacramento Valley in-basin uses, plus exports.

THIRD AMENDMENT TO 2019 RESERVOIR PROJECT AGREEMENT

BY AND AMONG

SITES PROJECT AUTHORITY

and

THE PROJECT AGREEMENT MEMBERS LISTED HEREIN

Dated as of January 1, 2022

THIS THIRD AMENDMENT TO 2019 RESERVOIR PROJECT AGREEMENT (this "Third Amendment"), dated as of January 1, 2022, by and among SITES PROJECT AUTHORITY, a joint powers authority duly organized and existing under the laws of the State of California (the "Authority"), and the project agreement members listed in the Agreement referenced below (the "Project Agreement Members") amends that certain 2019 Reservoir Project Agreement dated as of April 1, 2019 (the "Original Agreement"), as previously amended by the First Amendment to 2019 Reservoir Project Agreement dated as of January 1, 2020 (the "First Amendment") and by the Second Amendment to 2019 Reservoir Project Agreement dated as of July 1, 2020 (the "Second Amendment" and, together with the Original Agreement, the First Amendment and the Second Amendment, the "Agreement"), each by and among the Authority and the Project Agreement Members;

WITNESSETH:

WHEREAS, Authority and the Project Agreement Members have determined to approve an Amendment 3 Work Plan and to extend the term of the Agreement to December 31, 2024; and

WHEREAS, under Section 11 of the Agreement, the Agreement may be amended by a writing executed by the Authority and at least 75% of the total weighted vote of the then current Committee members as provided in Subsection 3(g); and

WHEREAS, except as provided below in Section 2.07 below, all acts, conditions and things required by law to exist, to have happened and to have been performed precedent to and in connection with the execution and the entering into of this Third Amendment do exist, have happened and have been performed in regular and due time, form and manner as required by law, and the parties hereto are now duly authorized to execute and enter into this Third Amendment;

NOW, THEREFORE, THIS THIRD AMENDMENT WITNESSETH, the Authority and the Project Agreement Members agree, as follows:

ARTICLE I

DEFINITIONS

Section 1.01. **Definitions.** All capitalized terms not otherwise defined herein shall have the meaning set forth in the Agreement.

ARTICLE II

AMENDMENTS TO AGREEMENT

Section 2.01. **Project Agreement Members**.

(a) Effective January 1, 2022, Exhibit A to the Agreement titled "Project Agreement Members" shall be removed and replaced with Exhibit A to this Third Amendment titled "Project Agreement Members."

Section 2.02. **Work Plan**.

(a) Effective January 1, 2022, the Amendment 2 Work Plan attached as Exhibit B to the Second Agreement shall be supplemented by the Work Plan attached hereto as Exhibit B (the "Amendment 3 Work Plan").

Section 2.03. **Funding**.

The Agreement is hereby amended to remove Section 4(a) in its entirety and replace it with the following:

"(a) Budget. The Committee shall, in cooperation with the Authority's Board, provide and approve both a Fiscal Year operating budget and reestablish a Phase 2 budget target, annually or more frequently as needed. The Project Agreement Members shall contribute their respective pro-rata share of the budgeted sums reflected in the Amendment 3 Work Plan in accordance with Section 5 of this Project Agreement. The contribution with respect to the pro-rata budgeted sums reflected in the Amendment 3 Work Plan shall be payable by each Project Agreement Member in three installments. The first installment shall be in an amount equal to $100 per acre-foot and shall be payable by no later than May 1, 2022. The second installment shall be in an amount equal to up to $140 per acre-foot and shall be payable by no later than January 1, 2023. The third installment shall be in an amount equal to up to $160 per acre-foot and shall be payable by no later than January 1, 2024. The obligation of the Project Agreement Members to make the second installment and third installment shall be conditioned upon the Authority and the Committee reapproving the Amendment 3 Work Plan or approving an amendment thereto by (i) an affirmative vote of at least 75% of the total number of Directors of the Authority Board and (ii) an affirmative vote of at least 75% of the total weighted vote as provided at Subsection 3(g) of the then-current Committee members, prior to January 1, 2023 or January 1, 2024, as applicable."

Section 2.04. **Future Development of the Proposed Sites Reservoir Project**.

The Agreement is hereby amended to add the below Sections 6(c), 6(d) and 6(e):

"(c) On or prior to March 31, 2022, each Project Agreement Member shall provide the Authority with a completed Project Agreement Member Project Payment Annex in the form attached hereto as Exhibit C. The Project Agreement Members, upon written request of the Authority, will meet with Authority staff from time to time, but not more often than once per calendar quarter, at which meeting, Authority staff will provide such Project Agreement Members with information regarding the then-current financing options being considered by the Authority and the expected terms of such financing options and the Project Agreement Member will provide updates regarding the status of the items identified in the Project Agreement Member Project Payment Annex.

(d) On or prior to June 30, 2023, each Project Agreement Member shall provide the Authority with a written update (the "Project Agreement Member Update") with respect to the progress in the implementation of such repayment option, the remaining actions to be taken and the estimated completion dates.

For those Project Agreement Members that identified special benefit assessments or land based charges imposed in an improvement district as a source of repayment for an Authority financing in its Project Agreement Member Payment Annex, the Project Agreement Member Update

will also include a confirmation that such Project Agreement Member has the legal or contractual authority to discontinue water service to a water user that is delinquent in the payment of such special benefit assessment or land based charge, as applicable.

The Project Agreement Member Update will also include a confirmation that the Project Agreement Member has adopted a debt management policy that is compliant with California Government Code Section 8555(i), or, if such Project Agreement Member has not adopted such a debt management policy, the Project Agreement Member Update will include a statement that such Project Agreement Member expects to adopt such a debt management policy or an opinion from the general counsel to such Project Agreement Member to the effect that such a debt management policy is not required to be adopted by the Project Agreement Member to finance its share of the Project.

The Project Agreement Member Update shall also identify any change in the proposed source of repayment from the source identified in the Project Agreement Member Payment Annex previously submitted to the Authority.

(e) The Project Agreement Members that identified the repayment options of either special benefit assessments or land based charges imposed in an improvement district in their respective Project Agreement Member Payment Annexes agree to use best efforts to complete the necessary procedures to comply with the applicable requirements of Proposition 218 by no later than June 30, 2023."

Section 2.05. **Term**. The Agreement is hereby amended to remove Section 8(b) in its entirety and replace it with the following:

"(b) The term of this Project Agreement shall continue until December 31, 2024. In the event that this Third Amendment is not approved by Project Agreement Members with the requisite percentage of the total weighted vote as set forth in the Agreement by March 31, 2022, the Agreement shall be revived immediately upon approval by such requisite percentage, without any additional approval of the Project Agreement Members, and this Third Amendment shall become effective."

Section 2.06. **Admission of New Project Agreement Members**. The Agreement is hereby amended to add the following sentence to end of the paragraph included under Section 10 of the Agreement:

"The Authority shall have the right to charge Project Agreement Members executing the Agreement after a date determined by the Board a fee, which such fee shall be established by the Board, to compensate Project Agreement Members who executed the Agreement prior to a date determined by the Board, for providing funding for the initial phases of the Project."

Section 2.07. **California Environmental Quality Act**. The Agreement is hereby amended to add the following Section 18:

"Section 18 California Environmental Quality Act

Notwithstanding any provision of this Agreement, the Authority and the Project Agreement Members fully reserve all of their respective rights, powers, authority and discretion with respect to the proposed Project pursuant to the agencies' respective obligations and responsibilities under the

California Environmental Quality Act ("CEQA"). This includes: (A) the power and discretion of the Authority as the lead agency, upon the completion of its CEQA review, to adopt feasible mitigation measures or a feasible project alternative, to approve the proposed Project based on the requisite CEQA findings, or to disapprove the proposed Project; and (B) the powers and discretion of the Project Agreement Members concerning the specific matters within their respective jurisdiction and authority acting as responsible agencies under CEQA. Any future decisions on whether to issue an approval of the proposed Project, and if so, how to issue such approval, will not be made until the agency making the decision has first completed its CEQA review of the proposed Project."

ARTICLE III

PROJECT AGREEMENT MEMBER PARTICIPATION

Section 3.01. **Project Agreement Participation.** Each Project Agreement Member shall specify its participation in the Sites Reservoir Project by indicating its storage amount in the Sites Reservoir Project on the signature page to this Third Amendment. Based upon the respective participation elections of the Project Agreement Members, the Authority shall update Exhibit A pursuant to Section 5 of the Agreement.

ARTICLE IV

MISCELLANEOUS

Section 4.01. **Effectiveness of Agreement**. Except as expressly amended by this Third Amendment, the Agreement is hereby ratified and confirmed and shall continue in full force and effect in accordance with the terms and provisions thereof. The amendments set forth in this Third Amendment shall be incorporated as part of the Agreement upon their effectiveness in accordance with Section 11 of the Agreement.

Section 4.02. **Execution in Several Counterparts**. This Third Amendment may be executed in any number of counterparts and each of such counterparts shall for all purposes be deemed to be an original; and all such counterparts, or as many of them as the Authority and the Project Agreement Members shall preserve undestroyed, shall together constitute but one and the same instrument.

Section 4.03. **Laws Governing Third Amendment**. The effect and meaning of this Third Amendment and the rights of all parties hereunder shall be governed by, and construed according to, the laws of the State.

IN WITNESS WHEREOF, the Authority and Project Agreement Members hereto, pursuant to resolutions duly and regularly adopted by their respective governing bodies, have caused their names to be affixed by their proper and respective officers on the date shown below:

Dated: _____

SITES PROJECT AUTHORITY

By: _____
Name:
Title:

[PROJECT AGREEMENT MEMBER]

Dated: _____

_____

(Authority & Project Agreement Member)

By: _____
Name:
Title:

[PROJECT AGREEMENT MEMBER]
REPRESENTATIVES

The primary and alternate representatives of the [PROJECT AGREEMENT MEMBER] are identified below.

Primary Representative:

Alternate Representative:

ELECTION OF STORAGE AMOUNT

[PROJECT AGREEMENT MEMBER] hereby elects to participate in the Sites Reservoir Project in the below storage amount.

Storage Amount Participation (Acre-Feet):

EXHIBIT A

PROJECT AGREEMENT MEMBERS

Participant	Participation (Third Amendment Annualized Acre-Foot) Preliminary	Percent	Storage Allocation
American Canyon, City of	4,000	2.4%	
Antelope Valley-East Kern Water Agency	500	0.3	
Carter Mutual Water Company #	300	0.2	
Coachella Valley Water District	10,000	6.0	
Colusa County	10,000	6.0	
Colusa County Water District	10,073	6.0	
Cortina Water District	450	0.3	
Davis Water District	2,000	1.2	
Desert Water Agency	6,500	3.9	
Dunnigan Water District	2,972	1.8	
Glenn-Colusa Irrigation District	5,000	3.0	
Irvine Ranch Water District	1,000	0.6	
LaGrande Water District	1,000	0.6	
Metropolitan Water District of S. CA	50,000	29.8	
Reclamation District 108	4,000	2.4	
Rosedale-Rio Bravo Water Storage District	500	0.3	
San Bernardino Valley Municipal Water District	21,400	12.8	
San Gorgonio Pass Water Agency	14,000	8.4	
Santa Clara Valley Water District	500	0.3	
Santa Clarita Valley Water Agency	5,000	3.0	
Westside Water District	5,375	3.2	
Wheeler Ridge-Maricopa Water Storage District	3,050	1.8	
Zone 7 Water Agency	10,000	6.0	
Total:	**167,620**	**100.0**	

Participation Percentages exclude State of California and United States Bureau of Reclamation share of the Project.

# Denotes a non-public agency. Refer to California Corporations Code Section 14300 et. seq. with additional requirements provided in both the Public Utilities Code and Water Code.

EXHIBIT B

AMENDMENT 3 WORK PLAN

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EXHIBIT C

FORM OF PROJECT AGREEMENT MEMBER
PROJECT PAYMENT ANNEX

Project Agreement Member:

Date:

Expected Source(s) of Repayment For Authority Financing (Check Each Box That Applies):	☐ Amounts Collected Through Department of Water Resources State Water Project Annual Statement of Charges	☐ Water Rates and Charges (Proposition 218 Compliance Required)	☐ Water Rates and Charges (Proposition 218 Compliance Not Required)	☐ Special Benefit Assessment-Districtwide	☐ Special Benefit Assessment Levied by District on Certain Lands	☐ Land-Based Charges Imposed Within an Improvement District
If An Improvement District, Has It Been Formed?	☐ Yes	☐ No	**If no, is it anticipated to be formed by June 30, 2023?** ☐ Yes ☐ No			
If A Special Benefit Assessment, Has the Special Benefit Been Approved In An Amount To Pay Debt Service On The Authority Financing?	☐ Yes	☐ No	**If no, is it anticipated to be presented for landowner approval by June 30, 2023?** ☐ Yes ☐ No			
Does the District Have A Debt Management Policy Compliant With Section 8855(i) of the California Government Code?	☐ Yes	☐ No				

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Irvine Ranch
WATER DISTRICT

VIA ELECTRONIC MAIL

October 1, 2020

Mr. Jerry Brown
Executive Director
Sites Project Authority
122 Old Highway 99 West
Maxwell, CA 95955
jbrown@sitesproject.org

Subject: Letter of Intent – Participation in Sites Reservoir Project

Jerry:

The purpose of this letter is to establish the intent of Irvine Ranch Water District (IRWD) to participate in the planning and environmental review of the Sites Reservoir Project (Project). IRWD's participation would correspond to 1,000 acre-feet (AF) of release capacity in the Project. This capacity would allow IRWD to establish a water supply for its Water Banking Projects in Kern County, upon which IRWD relies during major droughts and supply interruptions.

It is our understanding that payment for IRWD's share of the costs associated with Project planning and environmental work would be based on a pro-rata share of the majority of release capacity shares. We also understand that IRWD's participation would be contingent upon payment for a pro-rata share of costs of previous work completed, as well as the current estimated planning and environmental review costs under the Site Reservoir Authority's Amendment 2 Work Plan, which went into effect on September 1, 2020. The Amendment 2 Work Plan includes estimated environmental and planning work through December 31, 2021.

Should IRWD and the Authority enter into a participation agreement, the costs for IRWD's participation in the planning and environment work would be a total of $208.50 per AF of release capacity as follows:

1. Payment 1 in the amount of $168.50/AF is due November 2020, which includes:

   $48.50/AF as catch up reimbursement of previous Phase 1 costs,
   $60.00/AF for Phase 2 work attributable to the 2019 Work Plan, and
   $60.00/AF for Phase 2 work to be completed under Amendment 2 Work Plan.

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2. Payment 2 in an amount up to $40.00/AF is due April 1, 2021, for additional Phase 2 work under the Amendment 2 Work Plan.

This letter of intent does not contain all the material terms of IRWD's participation and is not intended to, nor does it create, a binding agreement. Neither IRWD nor the Authority will have any obligation regarding IRWD's participation until a participation agreement has been executed. IRWD's execution of such an agreement would be subject to the findings of its due diligence investigations. IRWD understands that by entering into the participation agreement, it will secure release capacity shares to which IRWD would have first rights of refusal in any future phase of the Project including construction and Project operations.

Please provide the agreement and any related amendments that would be necessary for IRWD to participate in the planning and environmental review work for the Project. Dependent on legal counsel review and the findings of IRWD's due diligence evaluations, the agreement would be presented to IRWD's Board of Directors for consideration.

IRWD looks forward to evaluating the Project and working with the Sites Project Authority. If you have any questions, please contact Paul Weghorst of my staff at (949) 453-8115.

Sincerely,

Paul A. Cook
General Manager

From: Micko, Steve/SAC [Steve.Micko@jacobs.com]
Sent: 4/20/2022 11:48:23 AM
To: Briard, Monique [monique.briard@icf.com]; Hendrick, Mike [mike.hendrick@icf.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Heydinger, Erin [erin.heydinger@hdrinc.com]; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Thayer, Reed/SAC [Reed.Thayer@jacobs.com]; Saadat, Samaneh [Samaneh.Saadat@jacobs.com]
Subject: Sites BA Sacramento and American River Temperature and Delta Water Quality Models Results
Attachments: NODOS_Trend_Reporting_rev06cye_DV6_2035CT_HEC5Q__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsm; NODOS_Trend_Reporting_rev06cye_DV5_2035CT_DSM2__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsm; Sites_ModelResultsPackage_HEC5Q_DSM2_Apr20_2022.pdf

Hi Monique and Mike,

The following model results files are attached:

- **NODOS_Trend_Reporting_rev06cye_DV6_2035CT_HEC5Q__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsm**
  - Trend reporting spreadsheet with Sacramento and American River temperature results for:
    - NAA 041122 2035CT,
    - ALT3A 041122 2035CT, and
    - ALT3B 041122 2035CT.
- **NODOS_Trend_Reporting_rev06cye_DV5_2035CT_DSM2__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xslm**
  - Trend reporting spreadsheet with Delta water quality results for:
    - NAA 041122 2035CT,
    - ALT3A 041122 2035CT, and
    - ALT3B 041122 2035CT.

I've posted all attached material, HEC5Q models, and post-processed DSM2 results to the SharePoint as well.

Attached pdf briefly describes modeled alternatives, models, and a trend reporting spreadsheet user guide.

Please let me know if you have any questions.

Best,
Steve

Steve Micko, PE | Jacobs | Project Manager and Water Group Leader
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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File Provided Natively

JACOBS

Memorandum

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Sacramento, California 95833-2937
United States
T +1.916.920.0300
F +1.916.920.8463
www.jacobs.com

Project Name	Sites Reservoir Project	
Subject	Model Results to Support the 2022 Biological Assessment: No Action Alternative at 2035CT, Alternative 3A at 2035CT, and Alternative 3B at 2035CT	
Attention	Ali Forsythe/Sites Project Authority	Monique Briard/ICF
	Erin Heydinger/HDR	Mike Hendrick /ICF
From	Robert Leaf/JACOBS	Steve Micko/JACOBS
	Reed Thayer/JACOBS	Samaneh Saadat/JACOBS
Date	April 20, 2022	

1. Introduction

The Sites Reservoir Project team has developed model simulations to support quantitative analysis of Sites long-term operations as part of developing a Biological Assessment, for completion in 2022.

The results of these model simulations are provided for informational and review purposes. If there are any questions regarding the results of these simulations, please contact the modeling team.

2. Modeled Scenarios

Model results are provided for the alternatives tabulated below.

Model Name	**Label Name (as seen in spreadsheet)**	**Description**
No Action Alternative 041122 2035CT	NAA 041122 2035CT	Baseline simulation (Reclamation 2021 Benchmark at 2035CT and 15 cm of sea level rise)
Alternative 3A 041122 2035CT	ALT3A 041122 2035CT	1.5 MAF Reservoir with 345 TAF of Reclamation Investment at 2035CT and 15 cm of sea level rise
Alternative 3B 041122 2035CT	ALT 3B 041122 2035CT	1.5 MAF Reservoir with 230 TAF of Reclamation Investment at 2035CT and 15 cm of sea level rise

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The HEC5Q (Trinity, Sacramento, and American River models) models were used to simulate reservoir and riverine temperature conditions based on the results of the CalSim II models (provided on April 12th, 2022).

The DSM2 model (Hydro and Qual components) was used to simulate Delta hydrodynamics and salinity conditions based on the results of the CalSim II models (provided on April 12th, 2022).

These models (HEC5Q and DSM2) have been jointly developed by Reclamation and the California Department of Water Resources (DWR) over many years. These models are useful so long as the results are interpreted consistent with the model limitations.

3. Model Simulations for Modeled Scenarios

3.1 HEC5Q Simulations

A Trend Reporting spreadsheet, NODOS_Trend_Reporting_rev06cye_DV6_2035CT_HEC5Q__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsm, is provided.

Note that this trend reporting spreadsheet does not include HEC5Q storage, nor flow results. Some storage and flow locations in HEC5Q may coincide with storage and flow locations available in CalSim II. For consistency, please observe storage and flows from CalSim II at boundary condition or controlled flow locations.

3.2 DSM2 Simulations

A Trend Reporting spreadsheet, NODOS_Trend_Reporting_rev06cye_DV5_2035CT_DSM2__NAA_041122_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsm, is provided.

Note that this trend reporting spreadsheet does not include DSM2 flow results. Some flow locations in DSM2 may coincide with flow locations available in CalSim II. For consistency, please observe flows from CalSim II at boundary condition or controlled flow locations.

4. Trend Reporting Spreadsheet

The trend reporting spreadsheet is designed to provide easy viewing of multiple scenarios. Please focus on the "Report - ALL (DASHBOARD)" tab. At this tab, you can select the parameter that you wish to evaluate, the type of statistic that you would like to view (e.g. averages, water-year type averages, dry periods), and the seasonal period (e.g. individual months, water year, CVP contract year, selected seasons). If flow results are presented, there is an option to convert flow data in CFS to volume in TAF/month.

The "Report - ALL (DASHBOARD)" presents data in the following formats:

- Results Table
- Bar chart of results
- Timeseries of selected statistic
- Exceedance plot (displays all data for the selected seasonal period; is not affected by "select statistic")
- Monthly Pattern (displays the selected statistic for each month; is not affected by "select seasonal period")
- Overall timeseries (includes entire timeseries, not affected by "select statistic" or "select seasonal period").

Not all statistics or seasonal periods should be used for all parameters. For example, seasonal averages or annual averages of reservoir storage do not provide value.

If reviewing results by water year type, please note that water year type averages are calculated based on calendar year, not water year.

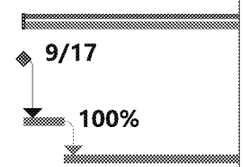
ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
1	**Sites Reservoir Project Schedule for Task Order Amd 3**	**870 days**	**Thu 7/1/21**	**Wed 10/30/24**			**5%**
2	**NEPA/CEQA Process**	**305 days**	**Fri 11/12/21**	**Thu 1/12/23**			**24%**
3	**Revised RDEIR/SDEIS Public Release**	**56 days**	**Fri 11/12/21**	**Fri 1/28/22**			**100%**
10	**Prepare Final EIS/EIR**	**289 days**	**Mon 12/6/21**	**Thu 1/12/23**			**8%**
71	**Permits and Agreements**	**814 days**	**Fri 9/17/21**	**Wed 10/30/24**			**2%**
72	**National Historic Preservation Act Consultation**	**728 days**	**Mon 12/27/21**	**Wed 10/9/24**			**0%**
73	**Prepare Programmatic Agreement**	**273 days**	**Mon 12/27/21**	**Wed 1/11/23**		**305**	**0%**
74	Authority and Integration comple review of Draft PA	0 days	Mon 1/3/22	Mon 1/3/22			100%
75	Reclamation to circulate Draft PA to SHPO, Tribes and consulting parties	29 days	Mon 12/27/21	Thu 2/3/22			0%
76	Receive comments from SHPO, consulting parties and Tribes on Revised Draft PA	1 mon	Fri 2/4/22	Thu 3/3/22	75		0%
77	Prepare Draft Final PA for Reclamation review	8 wks	Fri 3/4/22	Thu 4/28/22	76	8	0%
78	Reclamation Review of Draft Final PA	1 mon	Fri 4/29/22	Thu 5/26/22	77	28	0%
79	Integrate comments and prepare Final PA	8 wks	Fri 5/27/22	Thu 7/21/22	78	68	0%
80	Consult with SHPO and consulting parties on Final PA	4 wks	Fri 7/22/22	Thu 8/18/22	79	88	0%
81	Circulate Final PA to SHPO and consulting parties for signature	1 mon	Fri 8/19/22	Thu 9/15/22	80	108	0%
82	Final PA executed by Reclamation (Needed for the ROD)	0 days	Wed 1/11/23	Wed 1/11/23	69	192	0%
83	**Programmatic Historic Properties Management Plan**	**235 days**	**Tue 2/15/22**	**Mon 1/9/23**			**0%**
84	Submit draft Preliminary Draft PHPMP to Integration	0 days	Tue 2/15/22	Tue 2/15/22			0%
85	Integration review of Preliminary Draft PHPMP	1 mon	Tue 2/15/22	Mon 3/14/22	84		0%
86	Integrate comments and prepare Draft PHPMP for Reclamation review	12 wks	Tue 3/15/22	Mon 6/6/22	85	35	0%
87	Reclamation Review of Draft PHPMP	1 mon	Tue 6/7/22	Mon 7/4/22	86	55	0%
88	Integrate comments and prepare Draft Final PHPMP for SHPO and consulting parties review	12 wks	Tue 7/5/22	Mon 9/26/22	87	115	0%
89	SHPO and consulting parties review	1 mon	Tue 9/27/22	Mon 10/24/22	88	135	0%
90	Integrate comments and prepare Final PHPMP for Integration, Authority, and Reclamation review	10 wks	Tue 10/25/22	Mon 1/2/23	89	185	0%
91	Circulate Final PHPMP to SHPO and consulting parties	1 wk	Tue 1/3/23	Mon 1/9/23	90	190	0%
92	**Implementation of Cultural Compliance**	**723 days**	**Mon 1/3/22**	**Wed 10/9/24**			**0%**



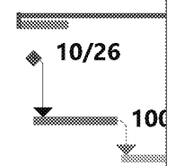
ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
93	Develop an approach with Integration and the Authority for the work plan #1 - cemetery relocation	3 mons	Mon 1/3/22	Fri 3/25/22			0%
94	Prepare work plan #1 for Integration, Authority review	8 wks	Mon 3/28/22	Fri 5/20/22	93	24	0%
95	Integration, Authority review work plan #1	3 wks	Mon 5/23/22	Fri 6/10/22	94	39	0%
96	Integrate comments and prepare work plan #1 for Reclamation review	30 days	Mon 6/13/22	Fri 7/22/22	95	69	0%
97	Reclamation review work plan #1	3 wks	Mon 7/25/22	Fri 8/12/22	96	84	0%
98	Integrate comments and prepare final work plan #1	3 wks	Mon 8/15/22	Fri 9/2/22	97	99	0%
99	Prepare Section 106 PA Annual Report (for 2023 activities)	90 days	Thu 6/6/24	Wed 10/9/24	82FS+365 c	647	0%
100	**Revised draft Biological Assessment**	**248 days**	**Tue 1/25/22**	**Thu 1/5/23**			**1%**
101	**Receive new operations modeling output**	**79 days**	**Tue 1/25/22**	**Fri 5/13/22**			**0%**
102	Jacobs begins new Alt 3 modeling runs	0 days	Tue 1/25/22	Tue 1/25/22			0%
103	Jacobs provides ICF CalSim Modeling	8 wks	Mon 2/28/22	Fri 4/22/22	102	4	0%
104	Jacobs provides ICF USRDOM Upper Sac daily flow data	1 wk	Mon 4/25/22	Fri 4/29/22	103	9	0%
105	Jacobs provides ICF Anderson-Martin Egg Mortality	2 wks	Mon 4/25/22	Fri 5/6/22	103	14	0%
106	Jacobs provides ICF SALMOD	2 wks	Mon 4/25/22	Fri 5/6/22	103	14	0%
107	Jacobs provides ICF Bypass and Side-Channel Inundated Habitat area analysis	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
108	Jacobs provides ICF DSM2 (Hydro & Qual)	1 wk	Mon 4/25/22	Fri 4/29/22	103	9	0%
109	Jacobs provides ICF IOS & DPM (Cramer)	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
110	Jacobs provides ICF OBAN (QEDA)	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
111	Jacobs provides ICF Reservoir Temperature	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
112	Jacobs provides ICF Reclamation Temp Model & HEC5Q for Sacramento River	1 wk	Mon 4/25/22	Fri 4/29/22	103	9	0%
113	ICF produces Salvage Density using CalSim output	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
114	ICF produces Daily Divertible and Storable Flow Tool	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
115	ICF produces Weighted Usable Area using CalSim output	3 wks	Mon 4/25/22	Fri 5/13/22	103	19	0%
116	Analyze new modeling output	10 days	Mon 5/16/22	Fri 5/27/22	115	29	0%
117	Revise chapters with new analysis (Assumes revisions and discussion of early analysis with Integration/Authority/Jacobs)	9 days	Mon 5/30/22	Thu 6/9/22	116	38	0%
118	Jacobs updates appendices with new modeling results	3 wks	Mon 5/16/22	Fri 6/3/22	111	34	0%

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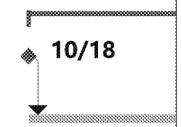
ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
119	Update Terrestrial Sections with programmatic approach, Alt 3, new project description, updated impact acreages	24 days	Tue 1/25/22	Fri 2/25/22			0%
120	Submit Terrestrial Sections to Integration for Review	5 days	Mon 2/28/22	Fri 3/4/22	119		100%
121	Receive Terrestrial Sections comments from Integration Team	0 days	Fri 3/4/22	Fri 3/4/22	120		0%
122	Integrate comments on Terrestrial Sections and submit to Reclamation for review	5 days	Mon 3/7/22	Fri 3/11/22	121		0%
123	Revise mitigation and adaptive management plan	5 days	Fri 6/10/22	Thu 6/16/22	117	43	0%
124	QA/QC and editing of entire BA	5 days	Fri 6/10/22	Thu 6/16/22	117	43	0%
125	Submit BA to Reclamation, legal, Integration and Authority	1 day	Fri 6/17/22	Fri 6/17/22	124,118	44	0%
126	Reclamation, legal team, Integration and Authority review	10 days	Mon 6/20/22	Fri 7/1/22	125	54	0%
127	Integration consolidate comments and submit to ICF	2 days	Mon 7/4/22	Tue 7/5/22	126	56	0%
128	Live edit meeting to review comments and updates to be made	2 days	Wed 7/6/22	Thu 7/7/22	127	58	0%
129	Update BA and submit to Integration	5 days	Wed 7/6/22	Tue 7/12/22	127	61	0%
130	Integration submits BA to Reclamation	5 days	Wed 7/13/22	Tue 7/19/22	129	66	0%
131	Reclamation initiate consultation with FWS and NMFS	10 days	Wed 7/20/22	Tue 8/2/22	130	76	0%
132	Receive Draft Biological Opinion (BO) from FWS and NMFS (135 days for formal consultation following initiation and submittal of BA as long as package is complete)	135 edays	Tue 8/2/22	Thu 12/15/22	131	173	0%
133	Receive Final BO from FWS and NMFS (Needed for ROD)	15 days	Fri 12/16/22	Thu 1/5/23	132	188	0%
134	**CDFW CESA Operations ITP**	**185 days**	**Mon 5/30/22**	**Fri 2/10/23**			**0%**
141	**CDFW CESA Construction ITP**	**262 days**	**Wed 1/19/22**	**Thu 1/19/23**			**0%**
146	**CDFW Lake and Streambed Alteration Agreements**	**269 days**	**Mon 5/2/22**	**Thu 5/11/23**			**0%**
167	**SWB Section 401 Water Quality and Porter Cologne WDR**	**618 days**	**Fri 9/17/21**	**Tue 1/30/24**			**26%**
168	Submit early draft 401 permit application to Integration/Authority for review	0 days	Fri 9/17/21	Fri 9/17/21			100%
169	Receive comments from Integration/Authority	13 days	Fri 9/17/21	Tue 10/5/21	168		100%
170	Integrate comments into early draft application package	85 days	Wed 10/6/21	Tue 2/1/22	169		100%
171	Live edit meeting with Integration to finalize early draft application package	1 day	Wed 2/2/22	Wed 2/2/22	170		100%
172	Integrate comments to prepare draft application package	10 days	Thu 2/3/22	Wed 2/16/22	171		0%
173	Submit draft application package to TCCA & GCID	10 days	Thu 2/17/22	Wed 3/2/22	172		0%
174	Receive comments and integrate into the draft application package	42 days	Thu 3/3/22	Fri 4/29/22	173	9	0%



ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
175	Final review by Integration/Authority/Legal of draft application package	10 days	Mon 5/2/22	Fri 5/13/22	174	19	0%
176	Finalize and post draft application package for Integration to submit to SWB	10 days	Mon 5/16/22	Fri 5/27/22	175,218	29	0%
177	Receive comments from SWB	46 days	Mon 5/30/22	Mon 8/1/22	176	75	0%
178	Address comments received to finalize draft application package	35 days	Tue 8/2/22	Mon 9/19/22	177	110	0%
179	Receive signed forms and assemble application package	5 days	Tue 9/20/22	Mon 9/26/22	178	115	0%
180	Post revised application package for Integration to submit to SWB	1 day	Tue 9/27/22	Tue 9/27/22	179	116	0%
181	SWB issues draft 401/WDR	90 days	Wed 8/23/23	Tue 12/26/23	180,230,67	441	0%
182	Integration/Authority/ICF/Legal/TCCA & GCID reviews draft and makes recommendations for edits/changes	20 days	Wed 12/27/23	Tue 1/23/24	181	461	0%
183	SWB issues Final 401 WQC/WDR (After completion of the FEIR, NOD and MMRP and 408; will need for Water Rights)	5 days	Wed 1/24/24	Tue 1/30/24	182,57,67,:	466	0%
184	**Section 404/10 Permit**	**606 days**	**Mon 10/18/21**	**Tue 2/13/24**			**4%**
185	Submit early draft 404 permit application packet to Integration and Reclamation for review	0 days	Tue 10/26/21	Tue 10/26/21			100%
186	Receive comments from Integration and Reclamation	29 days	Tue 10/26/21	Fri 12/3/21	185		100%
187	Integrate comments and finalize early draft application package	54 days	Mon 12/6/21	Thu 2/17/22	186		0%
188	Live edit meeting to finalize early draft application package	1 day	Fri 2/18/22	Fri 2/18/22	187		0%
189	Integrate comments to prepare draft application package (assumes that the 404 will be sent for review prior to receiving 401 comments due on 3/23 and that they won't be integrated into the 404 until the next deliverable on 5/6)	10 days	Mon 2/21/22	Fri 3/4/22	188		0%
190	GCID/TCCA review of draft application package	10 days	Mon 3/7/22	Fri 3/18/22	189		0%
191	Legal/Authority/Integration review of draft application package	15 days	Mon 3/21/22	Fri 4/8/22	190		0%
192	Finalize and post draft application package for Integration to submit to USACE	15 days	Fri 6/17/22	Thu 7/7/22	191,218,12	58	0%
193	Receive comments from USACE (i.e. compensatory mitigation plan requirements, design drwgs, Dam Safety conditions, 404(b)(1)	35 days	Fri 7/8/22	Thu 8/25/22	192	93	0%
194	Address comments received to finalize draft application package (this task assumes multiple rounds of edits/review with USACE)	3 mons	Fri 8/26/22	Thu 11/17/22	193	153	0%
195	Receive signed forms and assemble application package	5 days	Fri 11/18/22	Thu 11/24/22	194	158	0%

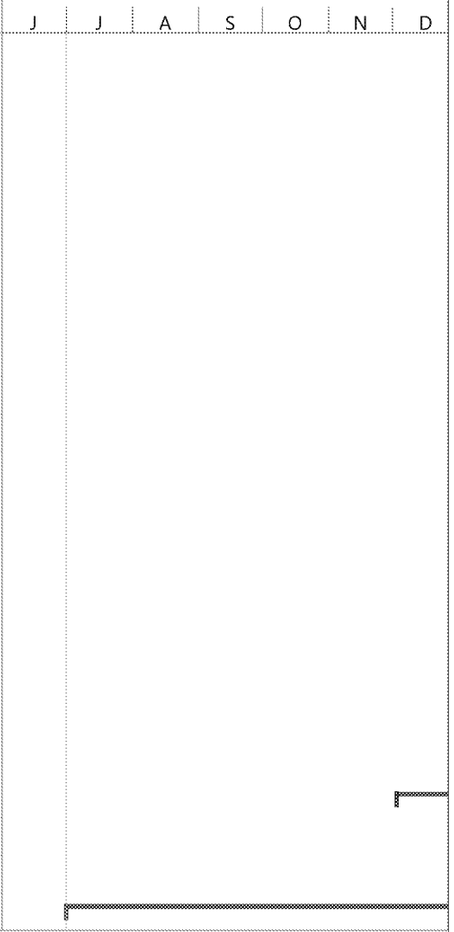


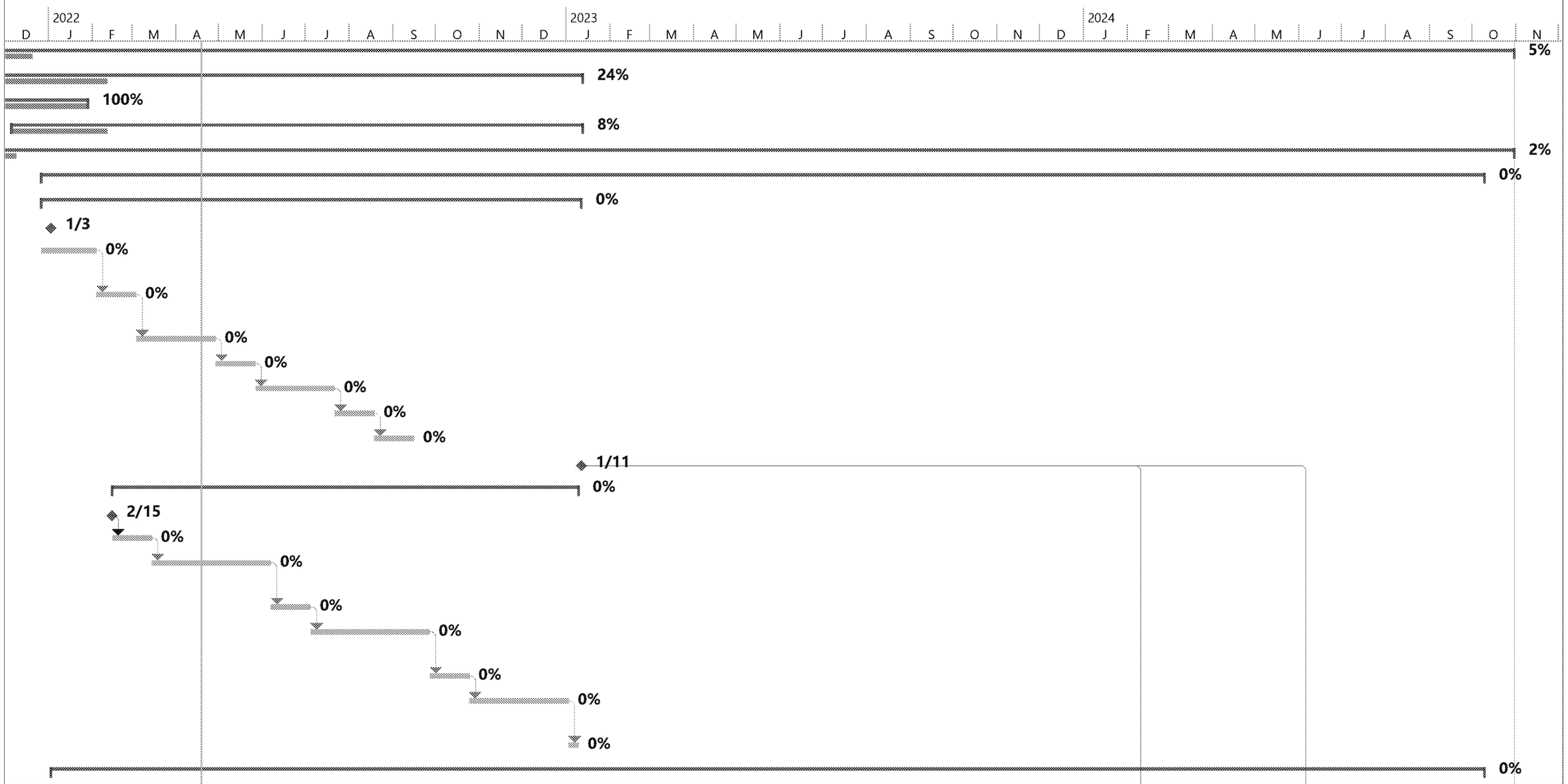
ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
196	Integration submit final application package to USACE (will need to demonstrate compliance with established State Dam Safety Standards- requires input from engineers)	1 day	Fri 11/25/22	Fri 11/25/22	195	159	0%
197	Prepare Draft Public Notice for USACE as requested	8 days	Mon 11/28/22	Wed 12/7/22	196	167	0%
198	USACE Completeness review 15d; Public Notice 15d, could be extended) (Assumes minimal comments and no public hearing)	90 days	Mon 11/28/22	Fri 3/31/23	196	249	0%
199	Receive public comments from USACE and provide technical assistance. Duration assumes minimal comments.	15 days	Mon 4/3/23	Fri 4/21/23	198	264	0%
200	Receive draft permit conditions from USACE for review before permit is issued	1 mon	Mon 4/24/23	Fri 5/19/23	199	284	0%
201	Integration/Authority/ICF/Legal/TCCA & GCID reviews draft and makes recommendations for edits/changes	1 mon	Mon 5/22/23	Fri 6/16/23	200	304	0%
202	USACE issues final 404 (Relies on completion of USC 408, 401/WDR, PJD, ROD, Section 7 and Section 106)	10 days	Wed 1/31/24	Tue 2/13/24	230,183,82	476	0%
203	**404(b)(1) Memorandum**	**358 days**	**Mon 10/18/21**	**Thu 3/2/23**			**0%**
204	Receive comments from Integration and Reclamation on early draft memo	0 days	Mon 10/18/21	Mon 10/18/21			100%
205	Integrate comments and facilitate working sessions to review	109 days	Tue 10/19/21	Fri 3/18/22	204		0%
206	Live edit meeting to finalize	1 day	Mon 3/21/22	Mon 3/21/22	205		0%
207	ICF (and Integration) integrate comments and finalize draft memo	24 days	Tue 3/22/22	Fri 4/22/22	206	4	0%
208	Legal/Authority/Reclamation review memo	10 days	Mon 4/25/22	Fri 5/6/22	207	14	0%
209	Finalize and post draft application package for Integration to submit to USACE	15 days	Fri 6/17/22	Thu 7/7/22	192SS	58	0%
210	Receive comments from USACE/SWB	30 days	Fri 7/8/22	Thu 8/18/22	209	88	0%
211	Address comments received to finalize Memo package	20 days	Fri 8/19/22	Thu 9/15/22	210	108	0%
212	Assemble Memo package	5 days	Fri 9/16/22	Thu 9/22/22	211	113	0%
213	Post Memo package for Integration to submit to USACE/SWB	1 day	Mon 11/28/22	Mon 11/28/22	212,196	160	0%
214	Receive comments from USACE/SWB	25 days	Tue 11/29/22	Mon 1/2/23	213	185	0%
215	Address comments from USACE/SWB	20 days	Tue 1/3/23	Mon 1/30/23	214	205	0%
216	Post Final Memo package for Integration to submit to USACE/SWB	23 days	Tue 1/31/23	Thu 3/2/23	215	228	0%
217	**Aquatic Resources Delineation Surveys**	**368 days**	**Fri 3/25/22**	**Tue 8/22/23**			**0%**
218	Submit early draft Aquatic Resources Delineation Report (ARDR) based on desktop analysis to Integration for review	0 days	Fri 3/25/22	Fri 3/25/22			0%



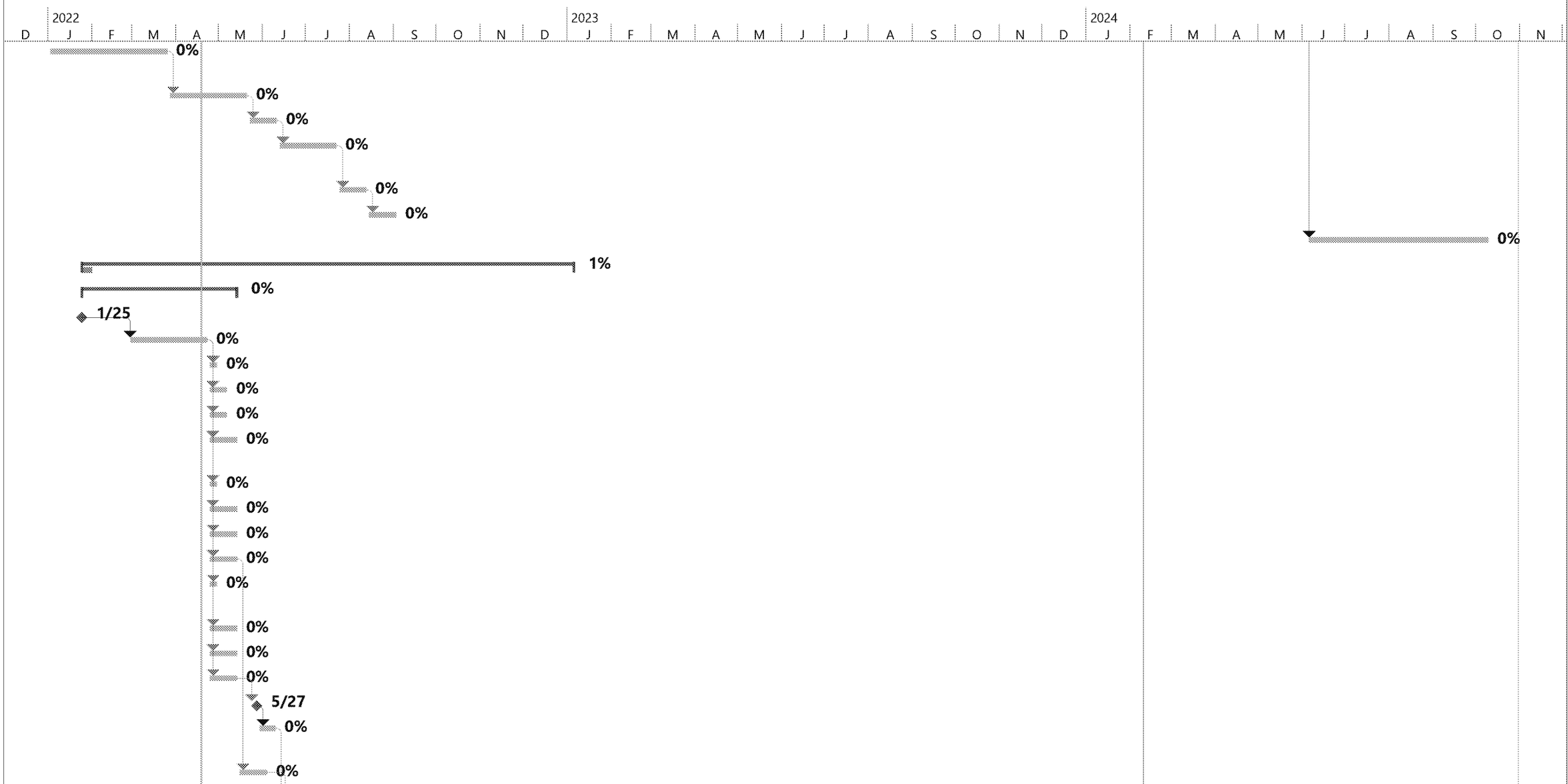
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ID	Task Name	Duration	Start	Finish	Predecessors	Workc Count	% Complet
219	Integration review draft ARDR	16 days	Fri 3/25/22	Fri 4/15/22	218		0%
220	Integrate comments from Integration to submit to Reclamation/Authority/GCID/TCCA/Legal	5 days	Mon 4/18/22	Fri 4/22/22	219	4	0%
221	Reclamation/Authority/GCID/TCCA/Legal review draft ARDR	10 days	Mon 4/25/22	Fri 5/6/22	220	14	0%
222	Integrate comments and facilitate working session to review updates and finalize	10 days	Mon 5/9/22	Fri 5/20/22	221	24	0%
223	Post ARDR report for Integration to submit to USACE	1 day	Thu 7/7/22	Thu 7/7/22	192FF	58	0%
224	Field verification of specific aquatic resources with USACE (USACE has committed to 5 days in the field and have said this is required to issue PJD)	5 days	Mon 4/3/23	Fri 4/7/23		254	0%
225	Update mapping according to USACE comments	10 days	Mon 4/10/23	Fri 4/21/23	224	264	0%
226	Finalize Draft ARDR	15 days	Mon 4/24/23	Fri 5/12/23	225	279	0%
227	Post Draft ARDR for Integration review	20 days	Mon 5/15/23	Fri 6/9/23	226	299	0%
228	Integrate comments and submit Final ARDR to USACE	10 days	Mon 6/12/23	Fri 6/23/23	227	309	0%
229	Request PJD Verification letter from USACE	0 days	Fri 6/23/23	Fri 6/23/23	228	309	0%
230	Receive PJD Verification letter from USACE (USACE review period is 60 calendar days)	60 edays	Fri 6/23/23	Tue 8/22/23	229	351	0%
231	**Encroachment Permit/Section 408 Permission**	**393 days**	**Tue 2/1/22**	**Thu 8/3/23**			**0%**
250	**Eagle Permits and Surveys**	**230 days**	**Mon 1/17/22**	**Fri 12/2/22**			**0%**
254	**Invasive Species Management Plan**	**370 days**	**Thu 6/1/23**	**Wed 10/30/24**			**0%**
259	**Assist with Preparation of Mitigation Banking Request for Proposals**	**37 days**	**Tue 2/1/22**	**Wed 3/23/22**			**0%**
264	**Revise Adaptive Management Plan and Mitigation Plan**	**300 days**	**Fri 12/3/21**	**Thu 1/26/23**			**0%**
275	**Biological Survey Plan**	**120 days**	**Mon 5/2/22**	**Fri 10/14/22**			**0%**
278	**Stone Corral Creek and Funks Creek Flow Plan**	**386 days**	**Fri 4/1/22**	**Fri 9/22/23**			**0%**
291	**Geotechnical Investigations**	**647 days**	**Thu 7/1/21**	**Fri 12/22/23**			**0%**

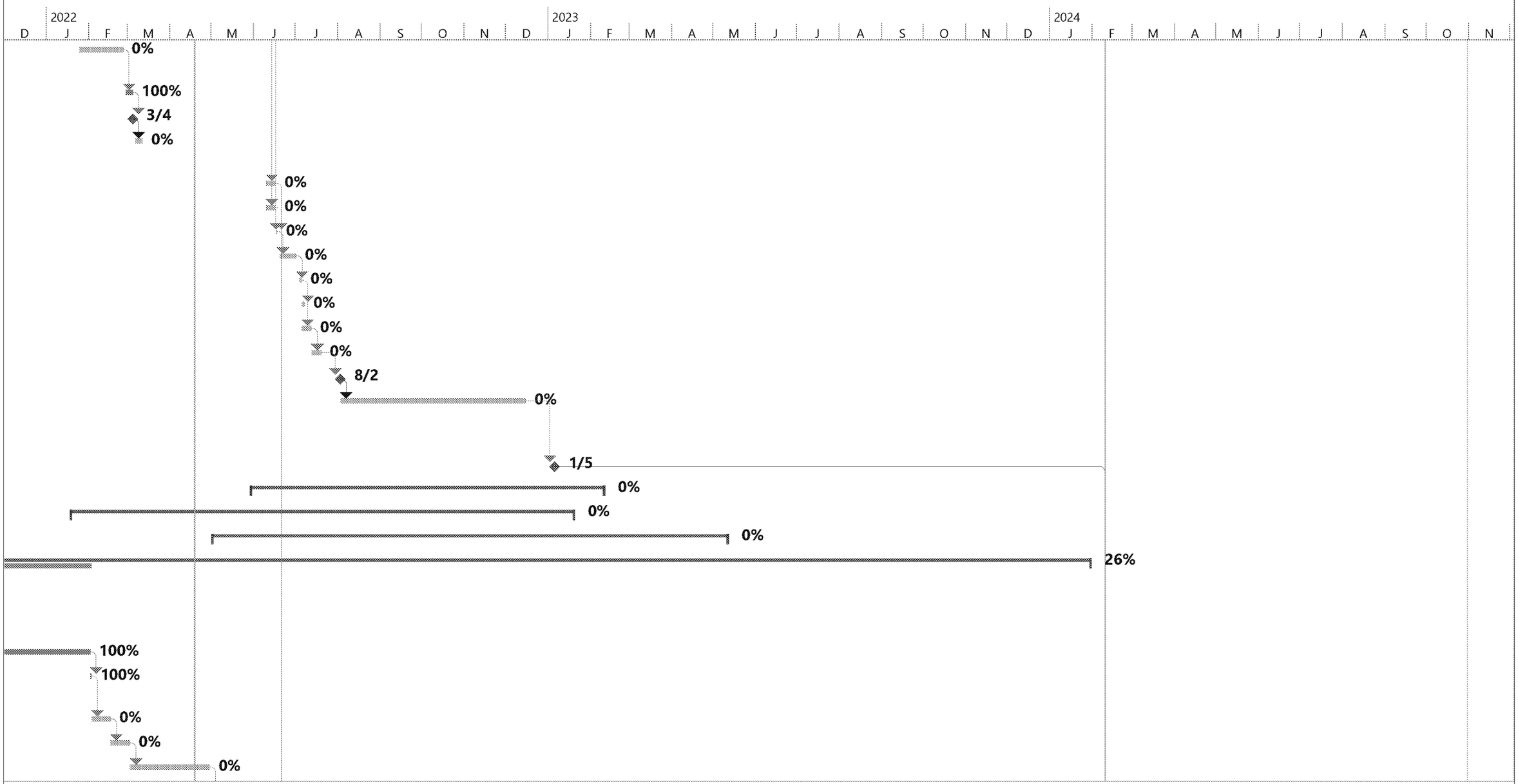




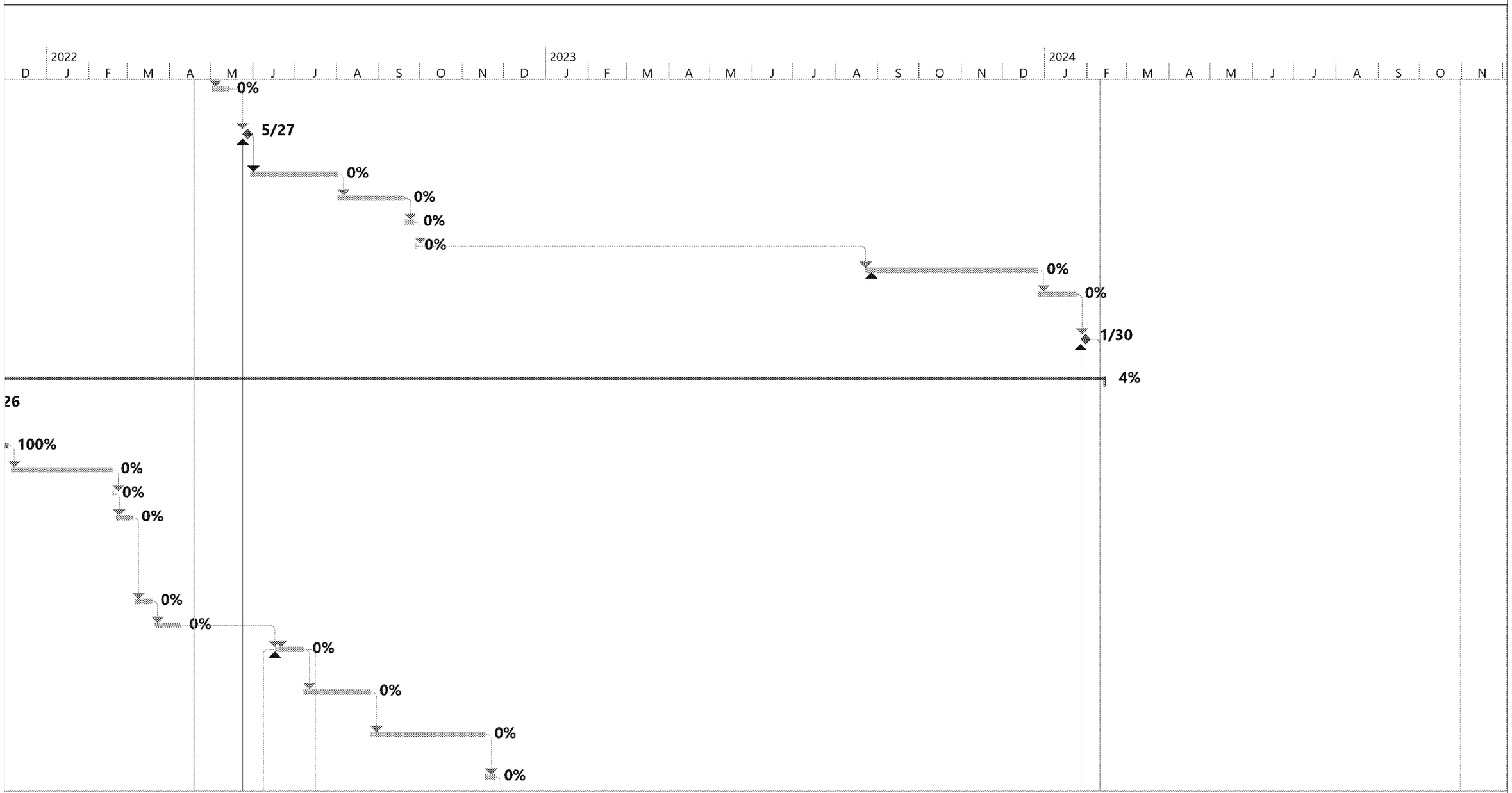
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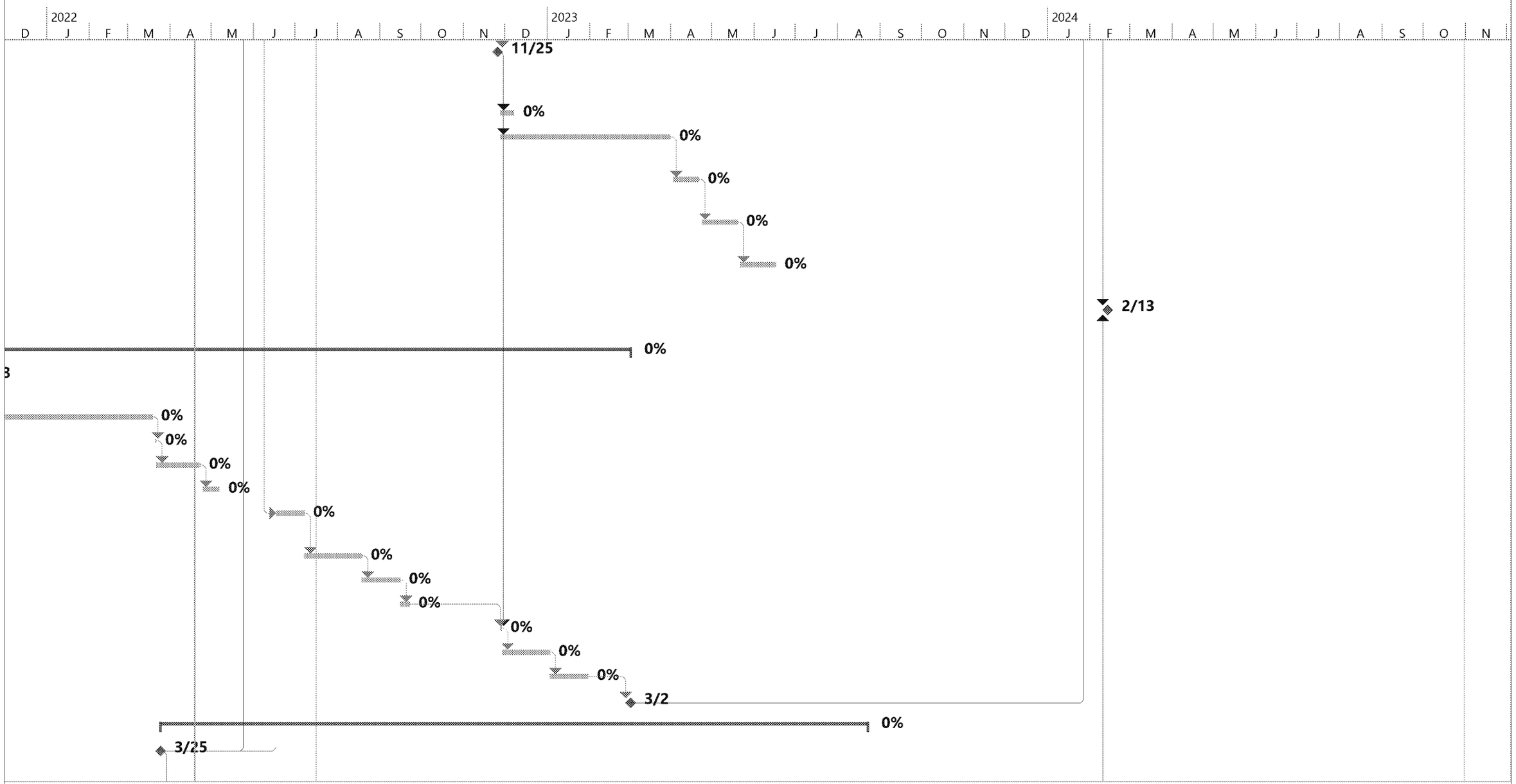
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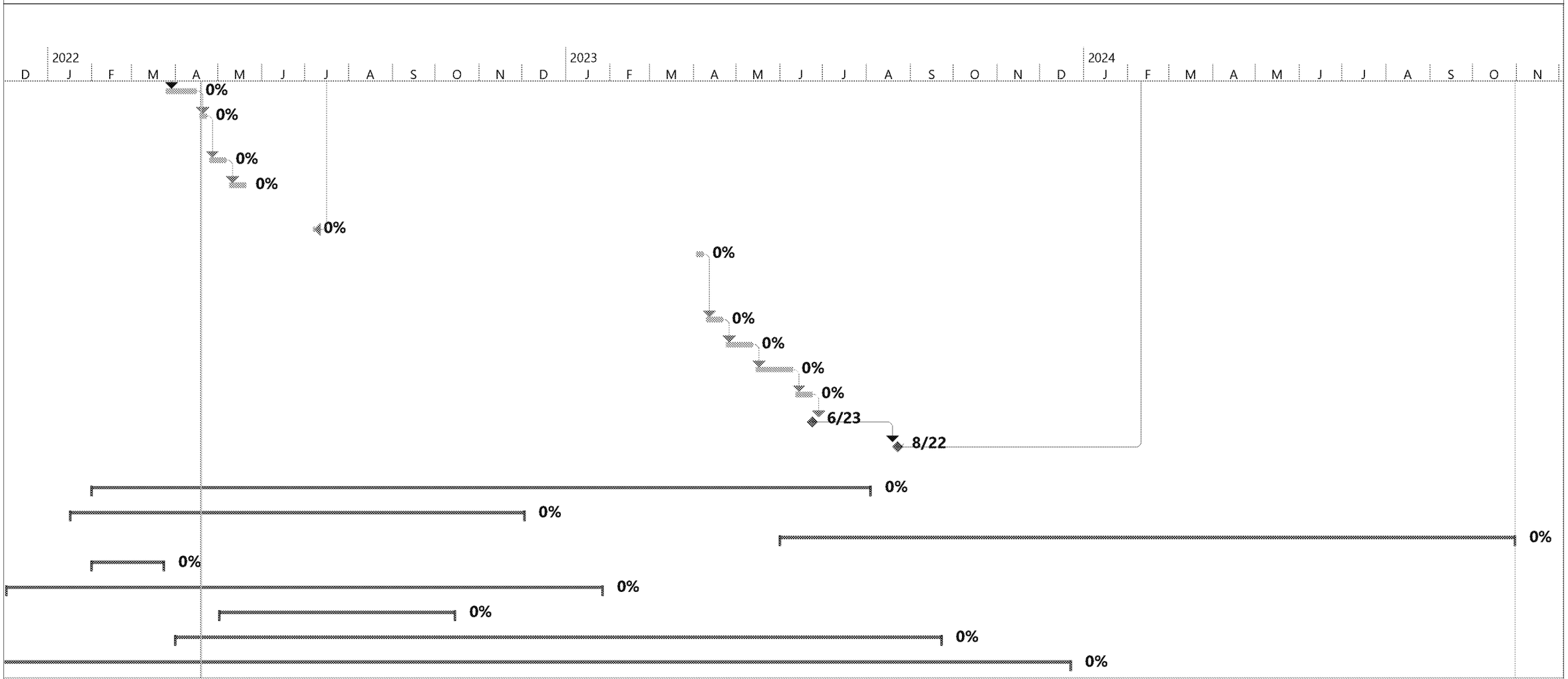
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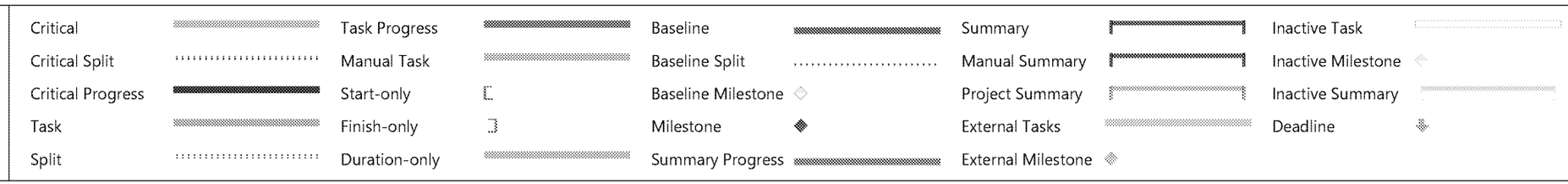
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Critical
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Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Manual Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Deadline

From: Arthur,Damon [Damon.Arthur@redding.com]
Sent: 4/20/2022 6:21:42 PM
To: Kevin Spesert [kspesert@sitesproject.org]
Subject: Sites Reservoir questions

Hi Kevin,
I just wanted to run a few questions by you to clarify a couple things regarding the Sites Reservoir.
Water can be pumped into the reservoir when 10,700 cfs minimum is flowing down the Sacramento River at Wilkins Slough, is that right? Is Wilkins Slough east of Arbuckle? Water is pumped from the Glenn-Colusa and Tehama-Colusa canals to a forebay and then from there to the reservoir? Where and how does the water go from the river into the canals? At the pumping plants in Red Bluff and Hamilton City?
Does the Bureau of Reclamation plan to release more water from Shasta and Keswick reservoirs at certain times of the year so the river will flow at the necessary level to allow you to withdraw water from the Sacramento River?
Is the maximum that can be withdrawn from the river at any time 4,000 cfs?
What happens if pumping 4,000 cfs from the river in Red Bluff drops the river flow below 4,000 cfs at Wilkins Slough?
What are the 23 agencies that will be purchasing water from Sites Reservoir? Can other agencies sign on to receive water from the reservoir? Do you think there will be more agencies signing on to get water from the reservoir?
The environmental impact report lists alternatives on the reservoir. Which alternative is moving forward?
How does the water get out of the reservoir and where does it go? Underground pipes, new canals? Does it go back into the river or into a canal? If it is a canal, which canal?
Are there conditions in the Sacramento River or the Delta under which water must be released from the reservoir back into the Sacramento River, or to wherever it goes when it is released from the reservoir?

Thanks again,

Damon Arthur
Reporter
Record Searchlight | USA TODAY NETWORK
Mobile: 530.338.8834
damon.arthur@redding.com
www.redding.com

Sites

Topic: **Summary of NODOS Biological Resources Surveys** **2021 May 26**

Subject: **Overview and Summary of the NODOS Biological and Botanical Surveys as They Relate to the Sites Reservoir Project Area**

The information in this memo has been excised and summarized from the following documents:

- North of the Delta Offstream Storage (NODOS) Investigation Progress Report to CALFED, July 2000
- North-Of-The-Delta Offstream Storage Investigation Final Initial Alternatives Information Report, May 2006
- Preliminary Administrative Draft North-Of-The-Delta Offstream Storage Project EIR/EIS. California Department of Water Resources (DWR) and U.S Department of the Interior (DOI), Bureau of Reclamation, Mid-Pacific Region (Reclamation). December 2013

Initial surveys were performed in the NODOS "Sites and Colusa Project Area" from approximately 1997 to 2000, additional surveys by the California Department of Water Resources (DWR) and the California Department of Fish and Wildlife (CDFW) were performed from 2001 – 2004, then again in 2010 to 2011 at newer proposed Project facility locations (Delevan Pipeline and associated facilities).

Reptiles and Amphibian

Surveys for reptiles and amphibians were conducted by CDFW from August 1997 through spring 1999 in the Sites and Colusa Project areas. Amphibian and reptile surveys included night driving, dip-netting, seining, ground searches, habitat assessment, consultation with United States Fish and Wildlife (USFWS), and the use of the USFWS and CDFW's protocol guidelines for red-legged frog and California tiger salamander surveys.

The major objectives of these surveys were to search for California red-legged frogs, federally threatened; California tiger salamanders, candidate for federal listing and California Species of Special Concern; and to conduct general herpetology surveys. Four species listed as federal and California State Species of Concern that could potentially occur in the Sites and Colusa Project areas—foothill yellow-legged frogs, western pond turtles, western spadefoot toads, and California horned lizard—were also looked for during the course of this survey.

Results

A total of 2,400 hours in the spring and summer of 1998 and 1999 were spent in the Sites and Colusa Project areas looking for reptiles and amphibians. A total of 19

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species, 5 amphibians and 14 reptiles, were found during this survey. Only one special species targeted by these surveys was found in the Sites Project study area, the western pond turtle. California red-legged frogs and California tiger salamanders were not found.

Mammal Surveys

A variety of field survey methods were used by CDFW biologists in 1998 and 1999 to sample the mammal populations at the Sites Project study area. These methods included small mammal trapping, mist netting, acoustical surveys, roost searches, track plates, camera stations, spotlighting, general habitat measurements and assessment, and incidental observation.

Results for Sites Project Area

No federally or state listed species were found during field surveys in the Sites Project study area. Six mammal California State Species of Special Concern were documented at the four project areas. Table 1 identifies those found within the Sites Reservoir study area.

Table 1. Special Status Mammals Observed in the Sites Project Study Area

Species	Status
American badger	SSC
Pallid bat	SSC
San Joaquin pocket mouse	SSC
Western red bat	SSC

SSC = California Species of Special Concern

Source: North-Of-The-Delta Offstream Storage Investigation Final Initial Alternatives Information Report, May 2006

Avian Surveys

Avian surveys in the Sites Reservoir study area included general line transects and focused bank swallow, yellow-billed cuckoo, and owl surveys. The most relevant studies were confined primarily to the area of the reservoir footprint. However, line transects extended up to 2.5 miles from the reservoir footprint along key drainages. In addition to the surveys in the reservoir footprint, surveys were also initiated at Funks Reservoir to document which state or federally listed avian species would use a reservoir within low elevation grassland habitats. Sites Reservoir data are most comprehensive, being surveyed monthly from March 1997 to at least March 2000.

Results for Sites Project Area

No federally or state listed species identified as potentially occurring were found during field surveys in the Sites Project study area. Eleven avian species classified as either California Species of Special Concern or federal Migratory Nongame Birds of Management Concern were observed during the surveys at Funks Reservoir and are listed in Table 2.

Table 2. Special Status Bird Species Observed at Funks Reservoir

Species	Status
American white pelican	SSC (breeding only)
Common loon	SSC (breeding only)
Golden eagle	FP
Grasshopper sparrow	SSC (breeding only)
Lawrence's goldfinch	MNBMC
Loggerhead shrike	SSC (breeding only)
Long-billed curlew	MNBMC
Northern harrier	SSC (breeding only)
Short-eared owl	SSC (breeding only), MNBMC
Bald eagle	SE
White-tailed kite	FP

SSC = California Species of Special Concern
MNBMC = Migratory Nongame Birds of Management Concern (USFWS)
SE = State Endangered
FP = State Fully Protected

Source: North-Of-The-Delta Offstream Storage Investigation Final Initial Alternatives Information Report, May 2006.

Valley Elderberry Longhorn Beetle (VELB)

A survey of all potential reservoir sites for the VELB and its habitat was conducted during the periods January through July 1998 and April through June 1999. Surveys focused on identifying potential habitat for VELB, the number of elderberry stems found measuring more than one inch, and the presence of exit holes. A total of 45 days was spent field surveying the drainages.

Results for Sites Project Area

Six hundred seventy-two stems were counted within the proposed Sites Project area. Emergence holes were found on 18 individual stems. The plants within this area tend to be individuals with multiple trunks and range from unhealthy stressed plants to occasional large healthy individuals. The majority of plants at this site and the riparian vegetation in general tend to be in poor condition.

Table 3. Elderberry Stems and Emergence Holes Found in the Sites Project Study Area

Number of elderberry stem	672
Number of stems with emergence hole	18
Percentage of stems with emergence holes:	2.7

Vernal Pool Brachiopods

Surveys of potential special status shrimp habitat at the potential reservoir sites were performed in 1998 and 1999. The 1999 surveys were conducted to verify potential special status shrimp habitat mapped in 1998 and to survey in areas where access was unavailable in the previous surveys because of flooded creeks, washed-out roads, and property access limitations.

Special status shrimp include species in the following categories:

- Shrimp listed or proposed for listing as Threatened or Endangered Species under the federal Endangered Species Act (50 Code of Federal Regulations [CFR] 17.11 for listed animals and various Federal Register notices for proposed species).

- Other shrimp species meeting the definition of Rare, Threatened, or Endangered Species under the California Environmental Quality Act (CEQA) Guidelines (Section 15380).

Potential special status shrimp habitat is defined as seasonal wetlands and other temporarily ponded areas of sufficient size (depth and area) and seasonality to support specific vegetation. Grasslands and vernal pools characterize the majority of the potential landcover where special status shrimp could be found within the Sites Reservoir study area.

Results for Sites Project Area

A summary of potential special status shrimp habitat mapped in the 1998 and 1999 surveys is presented in Table 4. The majority of the areas identified as potential habitat was identified as degraded by cattle activity, erosion, and debris from cattle feeding areas.

Table 4: Total Acreage of Potential Special Status Shrimp Habitat in the Sites Project Study Area

Survey Year	Total Extent (Acres) of Potential Habitat
1998	73
1999	71

Plant Surveys

Focused habitat-specific surveys were conducted, using wandering transect methodology, between February and October 1998 and 1999 and within potential routes for conveyances, recreation areas, and road relocations for the Sites Project area in 2000 through 2003. These months coincided with the appropriate flowering and fruiting stages necessary for the identification of most plant species occurring in the area, including all special-status species.

Results for Sites Project Area

No federally or state listed species identified as potentially occurring were found in the Sites Project study area. Five species with California Rare Plant Rank (CNPR) status

were found during field surveys that were conducted within the Primary Study Area. This status is considered for purposes of CEQA analysis.

Table 5. Rare Plant Species Found in the Sites Project Study Area

Species	Status
Adobe lily	CRPR of 1B.2
Bent-flowered fiddleneck	CRPR of 1B.2
Red-flowered bird's-foot trefoil	CRPR of 1B.1
Brittlescale	CRPR of 1B.2
San Joaquin spearscale	CRPR of 1B.2
California Rare Plant Rank: *1B = rare, threatened, or endangered in California and elsewhere* *0.1 = seriously endangered in California* *0.2 = fairly endangered in California*	

Draft_0016513

From: Kevin Spesert [kspesert@sitesproject.org]
Sent: 4/21/2022 10:44:51 AM
To: Jerry Brown [jbrown@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]
Subject: FW: Sites Reservoir questions

Please see the email below…received from the Redding Record Searchlight reporter. We did an interview and site tour with him a few weeks ago.

He has a lot of questions…so I have broken them down to make them easier to answer and taken a first cut at answering some of them…I'm going to need some help with some of the enviro/operations answers…please make any additions/edits…

Thanks!

Kevin

Water can be pumped into the reservoir when 10,700 cfs minimum is flowing down the Sacramento River at Wilkins Slough, is that right? Is Wilkins Slough east of Arbuckle?

Water is pumped from the Glenn-Colusa and Tehama-Colusa canals to a forebay and then from there to the reservoir?

Water conveyed via the Glenn-Colusa Canal would be stored in a newly constructed Terminal Regulating Reservoir (TRR) and then pumped into the Sites Reservoir. Water conveyed via the Tehama-Colusa Canal would be stored in the existing Funks Reservoir and then pumped into Sites Reservoir.

Where and how does the water go from the river into the canals? At the pumping plants in Red Bluff and Hamilton City?

Water from the Sacramento River is pumped into the Glenn-Colusa Canal at the Glenn-Colusa Irrigation District's (GCID) diversion at Hamilton City. Water from the Sacramento River is pumped into the Tehama Colusa Canal at the Tehama Colusa Canal Authority's (TCCA) diversion in Red Bluff.

Does the Bureau of Reclamation plan to release more water from Shasta and Keswick reservoirs at certain times of the year so the river will flow at the necessary level to allow you to withdraw water from the Sacramento River?

Is the maximum that can be withdrawn from the river at any time 4,000 cfs?

What happens if pumping 4,000 cfs from the river in Red Bluff drops the river flow below 4,000 cfs at Wilkins Slough?

What are the 23 agencies that will be purchasing water from Sites Reservoir? Can other agencies sign on to receive water from the reservoir? Do you think there will be more agencies signing on to get water from the reservoir?

The agencies that are participating in the project can be found on our website at the following link - https://sitesproject.org/participants/ - the 23 agencies that are investing in the project for a water supply benefit are listed under the Reservoir Committee.

Additional agencies may participate if water from the project become available. The Authority currently has a waiting list of agencies throughout the state who have expressed in interest in participating/investing in the project.

The environmental impact report lists alternatives on the reservoir. Which alternative is moving forward?

How does the water get out of the reservoir and where does it go? Underground pipes, new canals? Does it go back into the river or into a canal? If it is a canal, which canal?

Water from Sites Reservoir is released back into the TRR via a pipeline where the water is then conveyed through the Glenn-Colusa Canal for delivery to GCID project participants.

Water from Sites Reservoir is released into the existing Funks Reservoir and then conveyed through the Tehama-Colusa Canal for delivery to TCC project participants.

Sites water is delivered to South-of-Delta participants and for environmental purposes (Proposition 1) via the Tehama-Colusa Canal. This water is conveyed to the terminus end of the Tehama-Colusa Canal in the Dunnigan area where it's released into a newly constructed Dunnigan Pipeline which runs east approximately 4 miles and is released into the Colusa Basin Drain. The water then continues down the Colusa Basin Drain approximately 6 miles and releases into the Sacramento River.

Are there conditions in the Sacramento River or the Delta under which water must be released from the reservoir back into the Sacramento River, or to wherever it goes when it is released from the reservoir?

From: Arthur,Damon <Damon.Arthur@redding.com>
Sent: Wednesday, April 20, 2022 6:22 PM
To: Kevin Spesert <kspesert@sitesproject.org>
Subject: Sites Reservoir questions

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Thanks again,

Damon Arthur
Reporter
Record Searchlight | USA TODAY NETWORK
Mobile: 530.338.8834
damon.arthur@redding.com
www.redding.com

Sites Reservoir
2021 Progress Report

Commented [SH1]: Graphic Design: Will be laid out in the same format as the 2020 progress report: https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2021/03/2020_SitesProgressReport-3-25-2021.pdf

2021 was about progress and momentum-building for the Sites Reservoir project. The accomplishments and milestones of last year brought us much closer to the start of construction. It was a jam-packed year – new insights and results were unveiled after a robust Environmental Review and Public Comment process, and the year was bookended by major federal investments and advancements in the project that underscore the significance of Sites Reservoir as a joint local-state-federal project that benefits the environment and Californians statewide.

We also continued the important work of collaborating with stakeholders across the state, with particular focus on connecting with individuals in the local communities where Sites Reservoir will be built. We consulted with Native American tribes, collaborated with resource agencies, engaged with labor unions who represent working families, and continued engagement with the local, state, and federal public agencies that are at the heart of this project.

Looking ahead, in 2022, the Sites Project Authority will be issuing the final Environmental Impact Report, and key regulatory and permitting efforts will continue as we prepare to submit the Sites Reservoir water rights application and other key permits. And as always, we will prioritize outreach and collaboration with stakeholders throughout the state.

2021 Highlights and Milestones

Commented [SH2]: Images will be pulled from 2021 Annual Report: https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2022/03/2021-Sites-Reservoir-Annual-Report.pdf

Each achievement in 2021 kept Sites Reservoir on track to remain affordable, permittable, and buildable, all while upholding our mission and values as an organization.

AFFORDABLE

Completed State Funding Feasibility Requirements

Sites Project Authority conducted nine workshops focused on "three big questions" related to financing and satisfying the Proposition 1 requirement for 75% non-public cost share: What do we get? What does it cost us? And how do we pay for it? Following the Authority's submission of the State Feasibility Report, the California Water Commission deemed the Project feasible, which satisfied a key milestone to advancing toward construction. **OUTCOME:** Leveraging crucial funds, including a $20 million inflation adjustment to the Proposition 1 award, Sites Reservoir remained eligible for $836 million in state funding.

Obtained unprecedented federal funding

Following the Secretary of Interior's Federal Feasibility Determination (qualifying the project for up to 25% cost share under the WIIN Act), the Authority worked with federal partners to meet conditions to remain eligible for and secure additional WIIN Act funds. **OUTCOME**: $80 million in federal appropriations for Fiscal Year 2022 – the largest of the WIIN Act storage projects – bringing the total to $104 million.

PERMITTABLE

Released RDEIR/SDEIS for public review and comment

In coordination with Reclamation, the Authority released the RDEIR/SDEIS in November 2021 for public review and comment through two public meetings. **OUTCOME**: The Authority remains committed to fostering informed public decision making about Sites Reservoir.

Continued permit applications

Key permit applications advanced in coordination with state and federal agencies and included executing staffing agreements to expedite the permitting process. **OUTCOME**: The Authority advanced permitting and water right elements to provide greater certainty to participants and improve understanding with resource agencies.

Worked together with non-governmental organizations (NGOs)

The Authority held small group meetings and workshops with members of NGOs related to water rights, water quality, fisheries, terrestrial species, and project ecosystem benefits. **OUTCOME**: Through transparent discussions, the Authority collaborated with NGOs to advance the RDEIR/ SDEIS and overall permitting.

BUILDABLE

Developed the Feasibility Cost Estimate

Following a collaborative effort with Participants, the Authority developed the Feasibility Cost Estimate in June 2021. This estimate provides participants with improved cost certainty. **OUTCOME**: The Feasibility Cost Estimate gives participants a higher degree of certainty in the Project's affordability.

Advanced facilities to approximately 10% design

Following additional analysis and completion of geotechnical investigations, the Authority advanced the Project facilities to approximately 10% design. **OUTCOME:** The 10% design effort supports completion of permit applications.

EFFECTIVE ORGANIZATION

Continued 5 Years of Successful External Financial Audits

Responsible management of expenses and funding culminated in 5 years of successful external financial audits. **OUTCOME:** The Authority continues to be committed to fiscal responsibility and transparent decision-making.

Promoted efficiency through improved processes

Following completion of the Strategic Plan, the Authority developed the delegation of authority matrix to promote efficient decision making. The Authority also developed policies and procedures to strengthen the organization. OUTCOME: The Authority continues to mature the organization.

Sites Reservoir
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Commented [KS3]: Is the text in these sections taken directly from the Annual Report

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From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/21/2022 2:40:03 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]
Subject: Re: Sites Reservoir questions

These responses look great. The only thing I would suggest, although I do so with great hesitation because the response is already quit lengthy, is for the next to last question about south of delta deliveries, add something along the lines of:

Sites water to South of Delta Participants would be conveyed through the Delta during time windows where there is available pumping capacity in the existing export facilities while also maintaining Delta water quality. Sites operations DOES NOT rely on the proposed Delta tunnel project and the tunnel project DOES NOT rely on the Sites Reservoir being in place – these two projects are independent facilities serving completely different and independent purposes.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Thursday, April 21, 2022 at 1:13 PM
To: Kevin Spesert <kspesert@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>
Cc: "Sara M. Katz" <skatz@katzandassociates.com>
Subject: RE: Sites Reservoir questions

Kevin – below are some responses for your consideration and revision. I stopped trying to make them different color text than yours as it was too much. You should read through all of the responses.

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Kevin Spesert <kspesert@sitesproject.org>
Sent: Thursday, April 21, 2022 10:45 AM
To: Jerry Brown <jbrown@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Sara M. Katz <skatz@katzandassociates.com>
Subject: FW: Sites Reservoir questions

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Thanks!

Kevin

Water can be pumped into the reservoir when 10,700 cfs minimum is flowing down the Sacramento River at Wilkins Slough, is that right? Is Wilkins Slough east of Arbuckle?

Yes, the Authority adopted revised diversion criteria for the Project at its March, 2022 Board meeting. These revised criteria require that there be at least 10,700 cfs in the Sacramento River at Wilkins Slough in the months of October through June and 5,000 cfs in September for the Project to divert. Project diversions would only occur from September 1 to June 15. And yes, Wilkins Slough is a gaging station on the Sacramento River east of Arbuckle.

Water is pumped from the Glenn-Colusa and Tehama-Colusa canals to a forebay and then from there to the reservoir? Where and how does the water go from the river into the canals? At the pumping plants in Red Bluff and Hamilton City?

Yes. Water from the Sacramento River is pumped into the Tehama-Colusa Canal at the Red Bluff Pumping Plant. Once in the Tehama-Colusa Canal, water flows via gravity down the canal to the existing Funks Reservoir. Water for the Project would then be pumped up into Sites Reservoir from Funks Reservoir.

Water from the Sacramento River is pumped into the Glenn-Colusa Irrigation District's (GCID's) Main Canal at GCID's Hamilton City Pump Station. From there, it flows via gravity down the Main Canal and would flow via gravity into the Project's new Terminal Regulating Reservoir. Water for the Project would then be pumped up into Sites Reservoir from the Terminal Regulating Reservoir.

Both the Red Bluff Pumping Plant and GCID's Hamilton City Pump Station have state of the art fish screens at the Sacramento River that meet both National Marine Fisheries Service and CA Department of Fish and Wildlife's fish screening criteria for salmonids.

Does the Bureau of Reclamation plan to release more water from Shasta and Keswick reservoirs at certain times of the year so the river will flow at the necessary level to allow you to withdraw water from the Sacramento River?

No. Water released by Reclamation from Shasta/Keswick is generally Central Valley Project water, developed under Reclamation's water rights and not available for diversion by the Sites Project. The water available for diversion by the Sites Project would primarily come from the streams that flow into the Sacramento River below Keswick. The exception to this is when Shasta/Keswick is releasing flood flows – or water that is not able to be stored in Shasta as the reservoir is reaching its mandatory flood control curve. These flood releases from Shasta, which generally only occur in very wet water year conditions, would be available for diversion by the Sites Project. However, Reclamation would not change its operations to make these flood releases more available for the Sites Project – the Sites Project would simply be able to take advantage of these high flows when the opportunities exist. Diverting flood releases from Shasta into Sites is only a small amount of water that would be diverted into the reservoir – the majority of the water that would be diverted for the Project originates in the streams that flow into the Sacramento River below Keswick.

Is the maximum that can be withdrawn from the river at any time 4,000 cfs?

Generally – the Project's water right will seek a maximum of 4,200 cfs. This is comprised of 2,100 cfs plus losses at the Red Bluff Pumping Plant/Tehama-Colusa Canal and 1,800 cfs plus losses at the Hamilton City Pump Station/GCID Main Canal. We are assuming about 400 cfs losses, combined, in the two canal systems.

What happens if pumping 4,000 cfs from the river in Red Bluff drops the river flow below 4,000 cfs at Wilkins Slough?

The Project's revised diversion criteria require that there be 10,700 cfs in the Sacramento River at Wilkins Slough from October to June for Project diversions to occur. If the Project is diverting 4,000 cfs at Red Bluff and Hamilton City between October to June, and average daily Sacramento River flow at Wilkins Slough drop below 10,700 cfs, then Project diversions will have to reduce such that average daily flows in the Sacramento River at Wilkins Slough stay at or above 10,700 cfs. This may mean that the Project has to reduce diversions (take less than 4,000 cfs) or stop diverting off all together.

What are the 23 agencies that will be purchasing water from Sites Reservoir? Can other agencies sign on to receive water from the reservoir? Do you think there will be more agencies signing on to get water from the reservoir?

The agencies that are participating in the project can be found on our website at the following link - https://sitesproject.org/participants/ - the 23 agencies that are investing in the project for a water supply benefit are listed under the Reservoir Committee.

Additional agencies may participate if water from the project become available. The Authority currently has a waiting list of agencies throughout the state who have expressed in interest in participating/investing in the project.

The environmental impact report lists alternatives on the reservoir. Which alternative is moving forward?

At the Authority's March 2022 Board meeting, the Authority selected Alternative 3 as its preferred alternative for the purposes of CEQA and preparation of the Final EIR/EIS. The Authority Board will make its final decision on the Project after it considers and addresses public comments and prepares and certifies the Final EIR. This final decision on whether or move forward with the Project and if so, which alternative to move forward with, will be reflected in the Authority's adoption of the Project (which occurs after the Authority certifies the Final EIR), currently anticipated to occur in early 2023. So while the Authority's preferred alternative is Alternative 3, the final decision on the Project and alternative will be made in early 2023.

How does the water get out of the reservoir and where does it go? Underground pipes, new canals? Does it go back into the river or into a canal? If it is a canal, which canal?

Water from Sites Reservoir is released back into the Terminal Regulating Reservoir via a pipeline where the water is then conveyed through GCID's Main Canal for delivery to GCID project participants.

Water from Sites Reservoir is released into the existing Funks Reservoir and then conveyed through the Tehama-Colusa Canal for delivery to project participants along the canal.

Sites water is delivered to South-of-Delta participants and for environmental purposes (Proposition 1) via the Tehama-Colusa Canal. This water is conveyed to the terminus end of the Tehama-Colusa Canal in the Dunnigan area where it's released into a newly constructed Dunnigan Pipeline which runs east approximately 4 miles and is released into the Colusa Basin Drain. The water then continues down the Colusa Basin Drain approximately 6 miles and releases into the Sacramento River or flows into the Knights Landing Ridgecut and into the Yolo Bypass.

Are there conditions in the Sacramento River or the Delta under which water must be released from the reservoir back into the Sacramento River, or to wherever it goes when it is released from the reservoir?

We are not sure that we totally understand this question. There is no requirement or condition that water from Sites Reservoir must be released from the reservoir back to the River. We do expect certain safety measures that may require releases from the reservoir as we work with the CA Division of Safety of Dams – but these would be standard dam safety measures and considerations.

When we do release water from the reservoir, we will have conditions for downstream water quality and temperature monitoring. For example, we will monitor the quality and temperature of the releases to ensure that releases are suitable for agricultural uses along the Tehama-Colusa Canal and GCID Main Canal. We will also monitor the quality of releases that flow into the Yolo Bypass to ensure that we are not moving water into the Bypass that would be detrimental to Delta Smelt. We will also monitor the temperature of releases into the Colusa Basin Drain to ensure that we are not raising water temperatures in the drain in a way that would exceed certain water temperature requirements set out by the Regional Water Quality Control Board (and thus, would be detrimental to salmon in the Sacramento River as the drain flows into the River). Overall, there will be extensive water quality and water temperature monitoring in the reservoir and of water released from the reservoir, especially in the early years of the Project.

From: Arthur,Damon <Damon.Arthur@redding.com>
Sent: Wednesday, April 20, 2022 6:22 PM
To: Kevin Spesert <kspesert@sitesproject.org>
Subject: Sites Reservoir questions

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Thanks again,

Damon Arthur
Reporter
Record Searchlight |
Mobile: 530.338.8834
damon.arthur@redding.com
www.redding.com

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 4/21/2022 3:42:14 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Documentation for ratios
Attachments: ValleyElderberryLonghornBeetleFramework-ValleyElderberryLonghornBeetle.pdf; GGS 2.pdf; GGS 3.pdf; GGS 1.pdf; eaccs_pbo.pdf; 08ESMF00-2020-F-2379 California High Speed Rail System San Jose to Merced Project.pdf

FYI

John Spranza

D 916.679.8858 M 816.640.2487

From: Berryman, Ellen <Ellen.Berryman@icf.com>
Sent: Friday, April 15, 2022 12:01 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Subject: Documentation for ratios

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi John,
Here are various documents to justify our ratios:
1. VELB: 2017 framework that talks about riparian mitigation at 3:1 ratio and transplants with associated plantings
2. GGS: three Bos that use the 3:1 ratio
3. CRLF: East Alameda County Programmatic BO, with ratios in Appendix C, Table 3-7. There have been several recent (2021) BO that tiered off of this PBO.

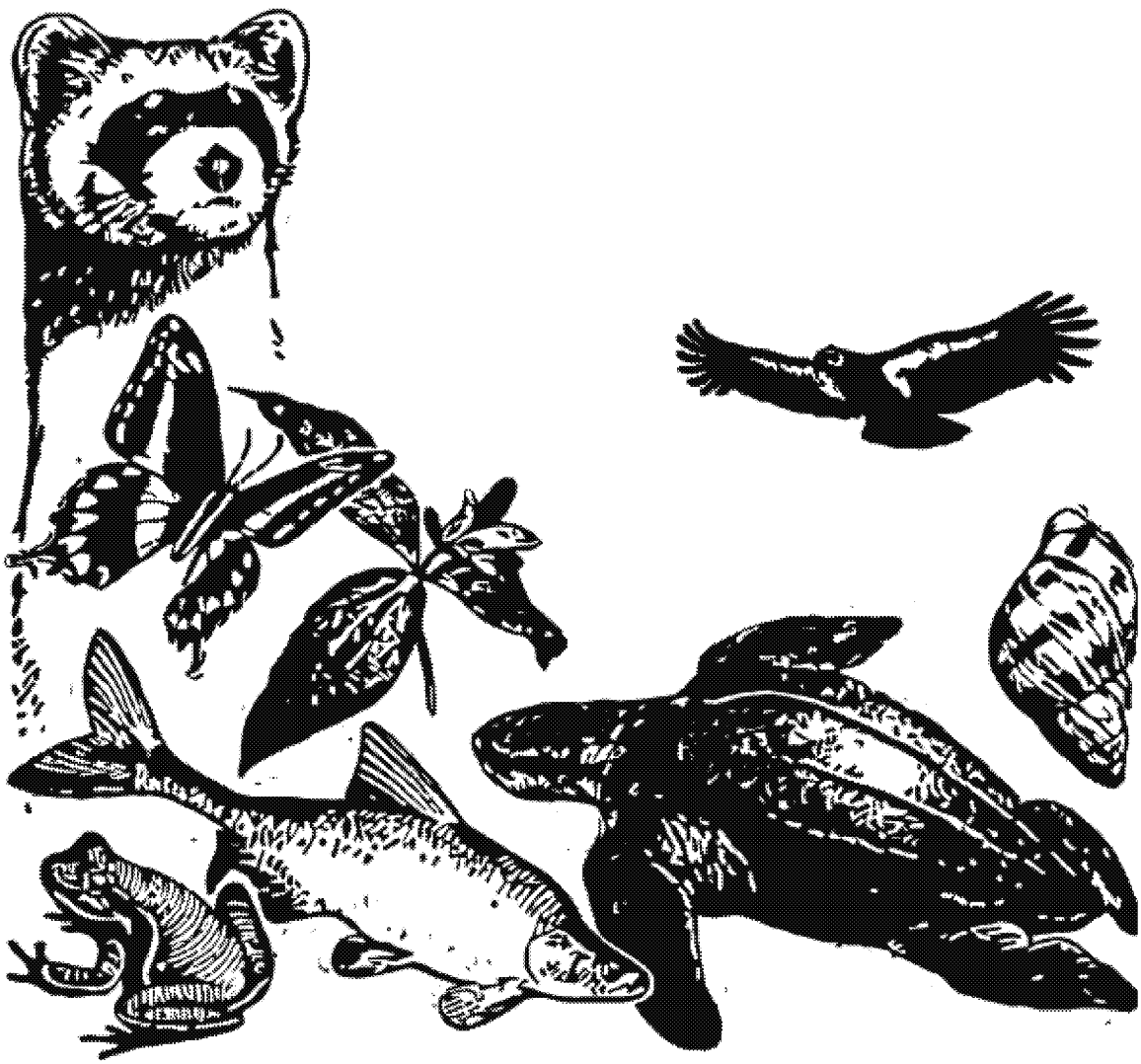
For vernal pool crustaceans, I ran into some recent BOs for small projects that didn't include a restoration/creation component – just 2:1 protection. I'd never seen that before. But I'm digging up a recent High Speed Rail BO that would be more relevant for a larger project and I'll send that when I get it.
Let me know if you have any questions.
Ellen

U.S. Fish & Wildlife Service

Valley Elderberry Longhorn Beetle Framework

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Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle

(*Desmocerus californicus dimorphus*)



May 2017

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Service Contact

The Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (Framework) was prepared by the U.S. Fish and Wildlife Service's Sacramento Fish and Wildlife Office. If you have questions regarding the Framework, please call (916) 414-6600. To download a copy of the Framework please visit:
https://www.fws.gov/sacramento/documents/VELB_Framework.pdf

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1.0 Introduction

The U.S. Fish and Wildlife Service (Service) is issuing this Framework to assist Federal agencies and non-federal parties in evaluating the potential effects of their projects on the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB), listed as threatened under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). This framework can be consulted during the development of any project that may affect VELB or its habitat. It is intended to help project applicants assess potential effects to the VELB and develop measures to avoid, minimize, and compensate for adverse effects to the species or its habitat. It may also help determine whether those projects will require incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit. Proposed projects that will have large landscape level impacts, are likely to provide a net conservation benefit, or will involve riparian restoration may need a different or more detailed analysis than what is provided here. Applicants and agencies proposing these, or similar types of projects, should discuss the project with the Service early in the planning process. The Framework may still provide guidance for an effects analysis, but these projects may exercise more flexibility when implementing conservation measures and compensation.

The primary goal of this document is to articulate a conceptual ecological model for the species. This framework represents the Sacramento Fish and Wildlife Office's current analytical approach for evaluating and assessing adverse effects to the VELB. It will be updated as new information becomes available. As always, the Service welcomes dialog and discussion with our partners in assessing impacts for particular projects and encourages project proponents to consult with the Service early in project development whenever possible.

The VELB is protected under the Act wherever it is found. Visual surveys for the VELB, which includes looking for adults and/or exit holes, are currently the only approved method of surveying for the species and are not entirely reliable for determining presence or absence (see below). Visual surveys, habitat assessments, and mitigation site monitoring do not require a section 10(a)(1)(A) recovery permit. Inquiries about other survey methods, recovery permits, and research should be directed to the Listing and Recovery Division at (916) 414-6600.

1.1 Previous Federal Actions

The VELB was listed as a threatened species under the Act on August 8, 1980 (Federal Register 45: 52803-52807). Concurrent with the final listing rule, two areas in Sacramento County were designated as critical habitat for the VELB (Appendix A). The first area, referred to as the "Sacramento Zone", is enclosed by California State Route 160 to the north, the Western Pacific railroad tracks to the west/southwest, and by Commerce Circle to the east. The second area, referred to as the "American River Parkway Zone", is actually two separate areas along the south bank of the American River in Rancho Cordova. A recovery plan for VELB was completed on June 28, 1984; however, due to a lack of information regarding VELB life history, distribution, and habitat requirements, the recovery plan

only described interim actions and not precise recommendations (Service 1984). For more information about VELB, its designated critical habitat, and the VELB recovery plan, please visit: https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=7850.

On September 10, 2010, the Service was petitioned to delist the VELB and on August 19, 2011, the Service responded with a 90-day finding that determined the petition contained substantial information indicating that delisting VELB may be warranted (Federal Register 76: 51929-51931). On October 2, 2012, the Service published a proposed rule to delist VELB and to remove the species' critical habitat designation (Federal Register 77: 60238-60276). However, after receiving additional information regarding VELB, the Service did not delist the species and published the September 17, 2014, Withdrawal of the Proposed Rule to Remove the Valley Elderberry Longhorn Beetle From the Federal List of Endangered and Threatened Wildlife (Federal Register 79: 55874-55917) (Withdrawal Rule). The August 8, 1980, final listing rule and the Withdrawal Rule both described habitat loss as the primary threat to the species.

2.0 Life History

The VELB is a small (0.5 - 0.8 in.) wood-boring beetle in the *Cerambycid* family. It is sexually dimorphic and the females are indistinguishable from the more widespread California elderberry longhorn beetle (*Desmocerus californicus californicus*). Elderberry shrubs (*Sambucus* spp.) are the obligate larval host plants for the VELB (Collinge et al. 2001, Holyoak 2010) and their larvae go through several developmental stages (instars) within the elderberry shrub (Greenberg 2009). Eggs are laid individually on leaves or at the junctions of the leaf stalk and main stem (Barr 1991). Upon hatching, the larvae bore into the elderberry stem (Halstead and Oldham 1990) and create feeding galleries in the pith (Burke 1921, Barr 1991). Prior to pupation, the larvae creates an exit hole, plugs the hole with wood shavings, and returns to the gallery where it pupates (Halstead and Oldham 1990). Approximately 1 month later, the adult beetle emerges from the stem through the previously created exit hole (Burke 1921). Adult emergence, mating, and egg-laying, occurs in the spring and summer (March to July), typically coinciding with the elderberry flowering period (Burke 1921, Halstead and Oldham 1990). Under laboratory conditions, adult males typically live 4 to 5 days, while females can live up to 3 weeks (Arnold 1984). The only identifiable exterior evidence of elderberry use by VELB is the exit hole created by the larvae.

3.0 Range and Habitat Description

The VELB is protected wherever found. The current presumed range extends throughout the Central Valley (https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=7850). The range extends from approximately Shasta County in the north to Fresno County in the south including the valley floor and lower foothills. The majority of VELB have been documented below 152 meters (500 feet) in elevation. Areas above 152 meters (500 feet) with suitable habitat and known VELB occurrences in that drainage may contain VELB populations in certain circumstances. The Service can assist in determining the likelihood of occupancy above 500 feet.

3.1 Habitat

Historically, the Central Valley had large (3.2-8.0 km wide), undisturbed expanses of riparian vegetation associated with the watersheds that drained the west side of the Sierra Nevada Mountains and the east side of the Coast Mountain Range. These watershed systems were highly dynamic and their floodplains supported a wide corridor of riparian vegetation (Katibah 1984) in a diverse mosaic of structures and species assemblages from early successional to mature gallery forest (Gilbart 2009).

During the last 150 years California's Central Valley riparian forests have experienced extensive vegetation loss due to expansive agricultural and urban development (Katibah 1984), and in many places, have dwindled to discontinuous, narrow corridors. Natural areas bordering the rivers, which once supported vast tracts of riparian vegetation, became prime agricultural land (Thompson 1961). As agriculture and urbanization expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping have further reduced riparian vegetation to small, isolated fragments (Katibah 1984). In many places, flood control levees have been installed adjacent to and parallel with the river, effectively sectioning the riparian forest habitat into discrete communities on either side of the levee. In recent decades, riparian areas in the Central Valley have continued to decline as a result of ongoing agricultural conversion, urban development, stream channelization and channel hardening.

Elderberry shrubs are common in the Central Valley where they grow naturally in a variety of riparian and non-riparian vegetative communities (Vaghti and Greco 2007). Most elderberry presence within the Central Valley is determined by broad scale hydrologic regimes such as the relative elevation of floodplain and floodplain width, and secondarily by sediment texture and topography (Fremier and Talley 2009). Elderberry shrubs are most common on higher and older riparian terraces, where the roots of the plant are able to reach the water table and where the plants are not inundated for long periods (Talley 2005; Vaghti et al. 2009). Elderberry shrubs can be found on historic floodplain terraces above the river, on levees (both on the river and land sides), and along canals, ditches, and areas where subsurface flow provides water to elderberry roots. Elderberry shrubs typically occur in most vegetation communities that occupy historic and current floodplains and terraces, to the top of channel walls in deeply incised rivers (i.e., the Tuolumne and Stanislaus Rivers), and to the top of and on the land-side of levees where woody plants create savannas or patchy woodlands. Elderberry can be a canopy or subcanopy species depending on the hydrology, vegetation composition, or disturbance at a particular site and it can occur as individual shrubs, clumps, clusters, and groves. In non-riparian settings, elderberries occur either singly or in groups in valley oak and blue oak woodland and annual grasslands. It is not known whether elderberries in this setting are also associated with a shallow water table or other shallow water sources. In natural areas, elderberry shrubs have also been shown to grow best with little canopy cover from associated vegetation (Talley 2005).

The historic distribution of the VELB closely matched the distribution of the elderberry host plant, which was patchily found throughout the Central Valley riparian forests and occasionally adjacent uplands (non-riparian). The Service recognizes habitat for VELB as including both riparian and non-riparian areas where elderberry shrubs are present. Riparian habitat includes all areas that are either influenced by surface or subsurface water flows along streams, rivers, and canals (including the landside of levees) and areas that have the vegetation communities similar to those defined below.

Riparian vegetation communities within the California Central Valley can be described as valley-foothill forest habitat, which includes many different forest associations. Non-riparian habitat includes valley oak and blue oak woodland and annual grassland. The following habitat descriptions have been adapted from Mayer and Laudenslayer (1988) (https://www.wildlife.ca.gov/Data/CWHR/Wildlife-Habitats).

Within California, valley-foothill riparian habitats occur in the Central Valley and the lower foothills of the Cascade, Sierra Nevada, and Coast mountain ranges. Riparian habitats show a wide range of both species and structural diversity. The valley-foothill riparian habitat is found in association with riverine, grassland, oak woodland, and agricultural habitats. Canopy height is about 30 meters in a mature riparian forest, with a canopy cover of 20 to 80 percent. Most trees are winter deciduous. There is a subcanopy tree layer and an understory shrub layer. Wild grapes (*Vitis californica*) frequently provide up to 50 percent of the ground cover and festoon trees to heights of 20-30 meters. Herbaceous vegetation constitutes about one percent of the cover, except in open areas where tall forbs and shade-tolerant grasses occur. Many non-native invasive species can also be found, and are sometimes common, in riparian habitat. Oak woodland, oak savanna, and elderberry savanna can occur as both riparian and non-riparian communities.

Dominant riparian canopy layer species include cottonwood (*Populus* sp.), California sycamore (*Platanus racemosa*), willow (*Salix* spp.) black walnut (*Juglans* spp.) and valley oak (*Quercus lobata*). Subcanopy trees include boxelder (*Acer negundo*) and Oregon ash (*Fraxinus latifolia*), and typical understory shrub layer plants include wild grape, wild rose (*Rosa* sp.), blackberry (*Rubus* sp.), poison oak (*Toxicodendron diversilobum*), and buttonbush (*Cephalanthus occidentalis*), and willows. The herbaceous layer consists of sedges (*Carex* sp.), rushes, grasses, miner's lettuce (*Claytonia* sp.), mugwort (*Artemisia* sp.), poison-hemlock (*Conium maculatum*), and hoary nettle (*Urtica dioica*). Many non-native woody species occur with elderberry including tree-of-heaven (*Ailanthus altissima*) and black locust (*Robinia pseudoacacia*)

Elderberry shrubs can be a common understory plant in both non-riparian valley oak and blue oak woodland habitats. Valley oak woodland is generally found at lower elevations than blue oak woodlands, but the two habitat types transition into each other in the lower foothill regions. Annual grasses and forbs dominate the herbaceous layer in both woodland habitat types (Mayer and Laudenslayer 1998) and both intergrade with annual grassland. Valley oak woodland can occur from savanna-like conditions to denser forest-like conditions, with tree density tending to increase along

natural drainages. Valley oak woodlands are almost exclusively dominated by valley oak, but may also contain sycamore, black walnut, blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizeni*), and boxelder. Understory shrubs may include species such as, wild grape, toyon (*Heteromeles arbutifolia*), and California coffeeberry (*Frangula californica*). Blue oak woodlands can also occur from savanna-like conditions to denser forest-like conditions with a nearly closed canopy. Blue oak woodland is comprised of 85 to 100 percent blue oak trees, but may contain interior live oak and valley oak.

Common shrub associates include poison-oak, California coffeeberry, buckbrush (*Ceanothus cuneatus*), California buckeye (*Aesculus californica*), and manzanita (*Arctostaphylos* sp.). Within both of these habitats, elderberry may be found in the understory as well as in small clumps within the upland savanna. Elderberry shrubs are also often found away from riparian areas where ditches, irrigation, groundwater, or other features allow the plant to receive enough moisture and as ornamental plantings in regularly maintained landscaped areas.

3.1.1 Use of Riparian Habitat

Research suggests that the VELB occurs throughout the Central Valley in metapopulations (Collinge et al. 2001). Metapopulations are defined as a system of discrete subpopulations that may exchange individuals through dispersal or migration (Breininger et al. 2012, Nagelkerke et al. 2002). The VELB metapopulation occurs throughout contiguous intact riparian habitat as subpopulations that shift spatially and temporally within drainages, resulting in a patchwork of occupied and unoccupied habitat. Removal of suitable habitat (whether occupied or unoccupied) can increase the distance between occupied and unoccupied patches. Because its physical dispersal capability is limited, this fragmentation decreases the likelihood of successful colonization of unoccupied habitat (Collinge et al. 2001). As a consequence, the subpopulations are more vulnerable to stochastic events that may reduce or eliminate the subpopulation. The loss of multiple subpopulations can have an adverse impact on the long-term persistence and health of the metapopulation. Therefore, maintaining contiguous areas of suitable habitat is critical for maintaining the VELB.

At the local level, it appears that much of the variation in VELB occupancy of elderberry shrubs results from variables such as elderberry condition, water availability, elderberry density, and the health of the riparian habitat (Talley et al. 2007). This research indicates that healthy riparian systems supporting dense elderberry clumps are the primary habitat of VELB (Barr 1991, Collinge et al. 2001, Talley et al. 2006, Talley et al. 2007). Elderberry shrubs typically have a clumped distribution across the landscape (Figure 1) although they can occur singly. Upon emergence, VELB typically stay within the local clump (Talley et al 2007). Talley et al. (2007) found that much of the time, distances between stems with exit holes averaged 25-50 meters (65-165 feet) apart. At larger scales, average distances between these occupied clumps ranged from 200 meters (656 feet) up to 800 meters (2,625 feet) (Figure 1).

Because the elderberry is the sole host plant of the VELB, any activities that adversely impact the elderberry shrub may also adversely impact the VELB. Adverse impacts to elderberry shrubs can occur

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either at a habitat scale or at an individual shrub scale. Activities that reduce the suitability of an area for elderberry plants or elderberry recruitment and increase fragmentation may have adverse impacts to mating, foraging, and dispersal of VELB. The patchy nature of VELB habitat and habitat use makes the species particularly susceptible to adverse impacts from habitat fragmentation.

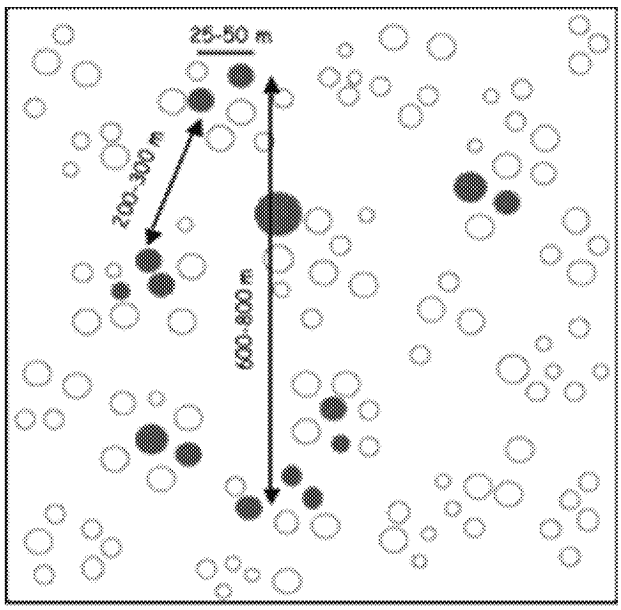


Figure 1. Schematic diagram of the spatial population structure of the valley elderberry longhorn beetle. Open circles represent unoccupied elderberry shrubs, closed circles are occupied by the valley elderberry longhorn beetle. Aggregation sizes and distances used are those found on the American River Parkway, where occupied clumps are approximately 25-50 meters apart, distances between aggregations of occupied clumps are approximately 200-300 meters, and the extent of the cluster of aggregations is 600-800 meters (Talley et al. 2006).

Determining whether an individual plant or clump is occupied by VELB can be challenging. Often the only external evidence that a VELB is present is the small exit hole made by the larva as it leaves the stem. Traditional exit hole surveys can help identify the past use of a particular shrub by VELB, but not its current occupancy. This difficulty makes assessing the likelihood of presence of individual VELB difficult. However, Talley et al. (2007) found that 73% of shrubs with old exit holes also had new exit holes, indicating that presence of an exit hole in the shrub increases the likelihood that that shrub or nearby shrubs are occupied. Therefore, impacts to individual shrubs with exit holes are reasonably likely to result in impacts to individual VELB, but the likelihood of adverse effects may not always be ascertained simply by the presence of exit holes (or the lack of). A more thorough analysis of nearby occurrences, surrounding habitat, and elderberry density is needed to fully address adverse impacts. In general, because of the difficulty in detecting VELB, the patchy nature of its distribution, and the importance of unoccupied habitat to maintain connectivity between VELB metapopulations, any

impacts to riparian habitat with elderberry shrubs present are likely to result in adverse effects to VELB.

3.1.2 Use of Non-Riparian Habitat

Much of the existing research has focused on the VELB's use of riparian habitat. In non-riparian habitats, a patchwork of individual shrubs provides opportunity for VELB occupancy, but it is unknown if the movement and distribution patterns remain consistent with the patterns found in riparian areas. In non-riparian areas, adverse effects to of VELB are likely to occur as a result of impacts to any elderberry shrub with exit holes, and adverse effects may result from disturbance to elderberry shrubs reasonably close to riparian areas or known VELB populations.

4.0 Occupancy Determination in Non-Riparian Habitat and Appropriate Surveys

The decision tree shown in Figure 2 is used by the Sacramento Fish and Wildlife Office to assess the effect of any proposed project on the VELB. It is recommended that proposed project sites within the range of the VELB be surveyed by a qualified biologist for the presence of elderberry shrubs. If elderberry shrubs are found on or within 50 meters (165 feet) of the project site, we recommend that the habitat be assessed to determine if the project area is in riparian or non-riparian habitat. Depending on the size, duration and/or type of proposed project, the larger area surrounding the project site may also be surveyed for the presence and number of elderberry shrubs.

If the project site is non-riparian and contains elderberry shrubs, we use exit hole surveys to evaluate the site for potential occupancy. Exit hole surveys are not essential in riparian areas, but may be conducted in order to assess the level and significance of adverse effects. The presence of exit holes in a shrub increases the likelihood that the shrub is occupied by VELB; however, a lack of exit holes does not preclude occupancy by the VELB. In the absence of exit holes we recommend that a biologist evaluate the project area using the following criteria (also shown in Figure 2):

1. Is there a riparian area, elderberry shrubs, or known VELB records within 800 meters (2,526 feet) of the proposed project?

   Isolated, non-riparian elderberry clumps are less likely to be occupied or become colonized by VELB and those beyond 800 meters (2,526 feet) from the nearest elderberry clump become increasingly less likely to be occupied. Therefore, a qualified biologist can assess the distance of the elderberry shrub from the nearest riparian area, elderberry shrub, and known occupied elderberry location.

2. Was the site continuous with a historical riparian corridor?

   Fragmentation of riparian corridors in the Central Valley has resulted in the isolation of elderberry shrubs or clusters that may provide important linkages between or within riparian corridors. A qualified biologist can evaluate the project location in the context of the historical riparian system. Isolated elderberry clumps that were part of a historic riparian vegetative community may still support VELB.

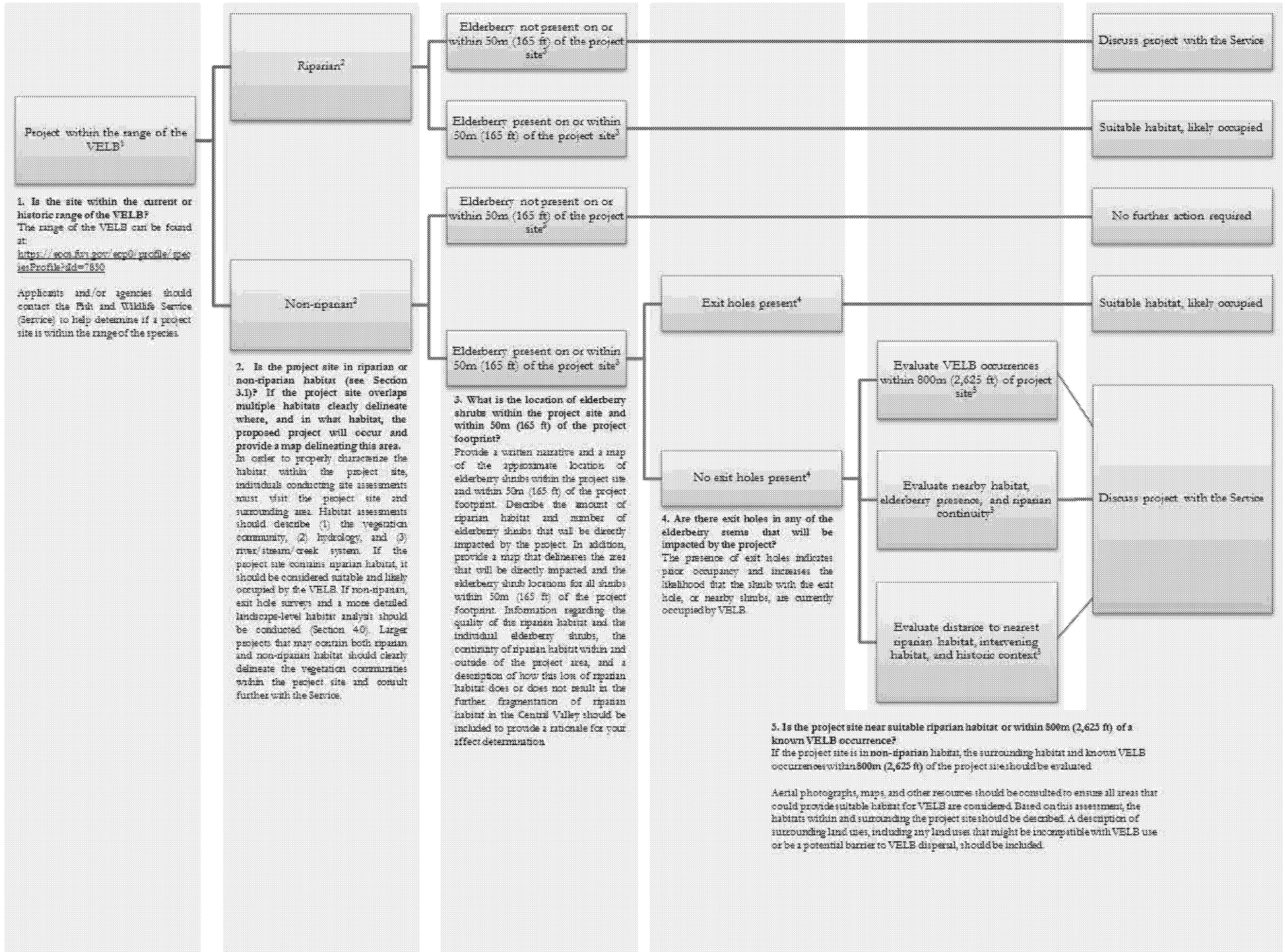


Figure 2. Decision tree to determine the likelihood of a particular elderberry shrub being occupied by valley elderberry longhorn beetle.

5.0 Conservation Measures

We encourage the development of proposed project designs that avoid riparian habitat and/or elderberry shrubs whenever possible. If elderberry shrubs occur on or within 50 meters (165 feet) of the project area, adverse effects to VELB may occur as a result of project implementation. If the project may affect VELB or its habitat, appropriate avoidance and minimization measures are recommended.

5.1 Avoidance and Minimization Measures

The following measures are recommended for incorporation into a proposed project to avoid and minimize effects to VELB and/or its habitat. Not all measures may be appropriate for every project, and agencies/applicants should coordinate with the Service to determine which measures may be needed. The text in this section and Section 5.2 is intended to provide language that may be used by agencies/applicants to describe avoidance and minimization measures for their proposed project.

Fencing. All areas to be avoided during construction activities will be fenced and/or flagged as close to construction limits as feasible.

Avoidance area. Activities that may damage or kill an elderberry shrub (e.g., trenching, paving, etc.) may need an avoidance area of at least 6 meters (20 feet) from the drip-line, depending on the type of activity.

Worker education. A qualified biologist will provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for non-compliance.

Construction monitoring. A qualified biologist will monitor the work area at project-appropriate intervals to assure that all avoidance and minimization measures are implemented. The amount and duration of monitoring will depend on the project specifics and should be discussed with the Service biologist.

Timing. As much as feasible, all activities that could occur within 50 meters (165 feet) of an elderberry shrub, will be conducted outside of the flight season of the VELB (March - July).

Trimming (See 5.3). Trimming may remove or destroy VELB eggs and/or larvae and may reduce the health and vigor of the elderberry shrub. In order to avoid and minimize adverse effects to VELB when trimming, trimming will occur between November and February and will avoid the removal of any branches or stems that are $\geq$ 1 inch in diameter. Measures to address regular and/or large scale maintenance (trimming) should be established in consultation with the Service.

Chemical Usage. Herbicides will not be used within the drip-line of the shrub. Insecticides will not be used within 30 meters (98 feet) of an elderberry shrub. All chemicals will be applied using a backpack sprayer or similar direct application method.

Mowing. Mechanical weed removal within the drip-line of the shrub will be limited to the season when adults are not active (August - February) and will avoid damaging the elderberry.

Erosion Control and Re-vegetation. Erosion control will be implemented and the affected area will be re-vegetated with appropriate native plants.

5.2 Transplanting

In order to protect VELB larvae to the greatest extent possible, we recommend that all elderberry shrubs with stems greater than 1 inch in diameter be transplanted under the following conditions:

1. If the elderberry shrub cannot be avoided.
2. If indirect effects will result in the death of stems or the entire shrub.

Removal of entire elderberry plants without disturbance to the surrounding habitat is uncommon, but may occur on certain projects. The removal may either include the roots or just the removal of the aboveground portion of the plant. We encourage project applicants to attempt to remove the entire root ball and transplant the shrub, if possible. In order to minimize the fragmentation of VELB habitat, the Service encourages applicants to relocate elderberry shrubs as close as possible to their original location. Elderberry shrubs may be relocated adjacent to the project footprint if: 1) the planting location is suitable for elderberry growth and reproduction; and 2) the project proponent is able to protect the shrub and ensure that the shrub becomes reestablished. If these criteria cannot be met, the shrub may be transplanted to an appropriate Service-approved mitigation site. Any elderberry shrub that is unlikely to survive transplanting because of poor condition or location, or a shrub that would be extremely difficult to move because of access problems, may not be appropriate for transplanting. The following transplanting guidelines may be used by agencies/applicants in developing their VELB conservation measures:

Monitor. A qualified biologist will be on-site for the duration of transplanting activities to assure compliance with avoidance and minimization measures and other conservation measures.

Exit Holes. Exit-hole surveys will be completed immediately before transplanting. The number of exit holes found, GPS location of the plant to be relocated, and the GPS location of where the plant is transplanted will be reported to the Service and to the California Natural Diversity Database (CNDDB).

Timing. Elderberry shrubs will be transplanted when the shrubs are dormant (November through the first two weeks in February) and after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the shrub and increase transplantation success.

Transplanting Procedure. Transplanting will follow the most current version of the ANSI A300 (Part 6) guidelines for transplanting (http://www.tcia.org/).

Trimming Procedure. Trimming will occur between November and February and should minimize the removal of branches or stems that exceed 1 inch in diameter.

5.3 Impacts to Individual Shrubs

In certain instances, impacts to elderberry shrubs, but not the surrounding habitat may occur. This could take the form of trimming or complete removal of the plant. Trimming elderberry shrubs may result in injury or death of eggs, larva, or adults depending on the timing and extent of the trimming. Since the larva feed on the elderberry pith while they are developing, any trimming that could affect the health of the plant and cause the loss of stems may kill any larva in those stems. No adverse impacts to the VELB will occur if trimming does not remove stems/branches that are ≥1 inch in diameter and is conducted between November and February. Trimming that occurs outside of this window or removes branches ≥ 1 inch in diameter may result in adverse effects to VELB. In order to assess the risk of take from trimming activities, we recommend the following be evaluated:

1. Conduct an exit hole survey on the plant
2. Evaluate the surrounding habitat (riparian vs. non-riparian).
3. Evaluate the potential suitability of the plant to provide VELB habitat.
    a. Riparian plants are much more likely to be occupied or colonized by VELB.
    b. Plants in non-riparian locations should be evaluated using the criteria in Figure 2.

6.0 Compensatory Mitigation

For all unavoidable adverse impacts to VELB or its habitat, we recommend that lead agencies and project applicants coordinate with the Service to determine the appropriate type and amount of compensatory mitigation. For plants in riparian areas, compensation may be appropriate for any impacts to VELB habitat. In non-riparian areas, compensation is typically appropriate for occupied shrubs (Figure 2). Appropriate compensatory mitigation can include purchasing credits at a Service-approved conservation bank, providing on-site mitigation, or establishing and/or protecting habitat for VELB.

It is recommended that the permanent loss of VELB habitat be replaced with habitat that is commensurate with the type (riparian or non-riparian) and amount of habitat lost. Suitable riparian habitat may be replaced, at a minimum of 3:1 for all acres that will be permanently impacted by the project (Table 1). Suitable non-riparian habitat may be replaced, at a minimum of 1:1 for all acres that will be permanently impacted by the project (Table 1). We typically recommend that any shrub that will be adversely impacted by the project be transplanted to a Service-approved location.

We encourage agencies and/or applicants to propose appropriate compensation for all individual shrubs that will be impacted by the project. Strong compensation proposals consider the location of the plant (riparian or non-riparian) and the potential for the plant to be occupied by VELB (exit

holes present, likely occupied). Projects that only directly affect individual shrubs may consider replacing habitat based on the amount of effects that occur, the location of the shrub (riparian or non-riparian), and the presence of exit holes (non-riparian only) (Table 2). Impacts to individual shrubs in riparian areas may be replaced by the purchase of 2 credits at a Service-approved bank for each shrub that will be trimmed regardless of the presence of exit holes. If the shrub will be completely removed by the activity, the entire shrub may be transplanted to a Service-approved location in addition to the credit purchase. We recommend impacts to individual shrubs in non-riparian areas be replaced through a purchase of 1 credit at a Service-approved bank for each shrub that will be trimmed if exit holes have been found in any shrub on or within 50 meters (165 feet) of the project area. If the shrub will be completely removed by the activity, we suggest that the entire shrub be transplanted to a Service-approved location in addition to a credit purchase.

Table 1. Potential Valley Elderberry Longhorn Beetle Habitat-Level Compensation Examples

Habitat	Compensation Ratio [1]	Total Acres of Disturbance	Acres of Credits	Total Credit Purchase [2]
Riparian	3:1	1.2 acres	3.6 acres	87.8
Non-riparian	1:1	0.5 acre	0.5 acre	12.1

[1] acre(s) of credits: acre(s) of disturbance

[2] One credit (unit) = 1,800 sq. ft.

Table 2. Valley Elderberry Longhorn Beetle Shrub-Level Impact Compensation

Habitat	Compensation Ratio[1]	If the entire shrub will be removed
Riparian	2:1	Transplant the shrub + 2:1 compensation
Non-riparian (exit holes present)	1:1	Transplant the shrub + 1:1 compensation

[1] number of credits: number of shrubs trimmed

[2] One credit (unit) = 1,800 sq. ft. or 0.041 acre

The compensation scenarios in Table 1 are examples of the amount of habitat (riparian or non-riparian) that may be appropriate to compensate for a project's adverse impacts. Additional examples can be found in Appendix B. The amount of compensation deemed appropriate to offset effects to VELB will take into consideration the effects of the project and desired conservation outcome. The compensation examples in this Framework are for illustrative purposes only. Alternative methods for determining compensation should be coordinated with the Service. Currently, compensation at Service-approved VELB banks is partitioned into 1,800 sq. ft. basins.

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Under this scheme, a single credit equals 1,800 sq. ft. or 0.041 acres. In order to calculate the total compensation credits needed for impacts to VELB, the total amount of disturbance in square feet should be calculated, the appropriate ratio applied, and the total number divided by 1,800.

We recommend that any project that occurs in suitable habitat (riparian or non-riparian) compensate for that loss in proportion to the total amount of habitat that will be disturbed as a result of project implementation. The acreage of habitat lost can be assessed based on all permanent surface disturbance including access routes and staging areas.

6.1 Compensatory Mitigation Proposals

If the lead agency or applicant is not purchasing credits at a Service-approved bank, they may compensate for habitat loss through on- or off-site mitigation. The Service has issued interim standards for the long-term management and protection of mitigation sites (https://www.fws.gov/endangered/improving_esa/). Those proposing on-site compensation, off-site habitat creation/enhancement, or those proposing to create a Service-approved conservation bank should work closely with the Service during the planning and development process. It is recommended that all plans adhere to the following criteria that are specific to VELB:

Site Selection and Development. Proposals using a strategic approach to ecosystem protection and restoration that will promote VELB metapopulation dynamics are preferred. Criteria for a suitable mitigation site may include abiotic factors such as soils, water availability, and prior land use as well as the proximity of the site to existing riparian habitat and known VELB records. Appropriate site selection is critical for achieving conservation success. A site that has incompatible soils or hydrology may not be able to meet the success criteria. Proposals that protect or enhance existing riparian habitat are preferred and the proposal should detail what, if any, measures will be needed to restore the site to ensure that it is suitable for elderberry survival.

Planting Plan. We recommend all proposals be designed to meet the desired distribution and density for elderberry shrubs and native associates that will be planted at the mitigation site in accordance with 1-3 below. The planting plan should be specific to the site and factors that will influence the success of the elderberry and native associate plantings. The plan should seek to establish a diverse natural riparian community with a complex vegetation structure. Native associates should include a mix of woody trees, shrubs, and other natives appropriate for the site. Stock of either seedlings or cuttings should be obtained from local sources. The number of elderberry and native associate plantings should be based on the desired distribution and density outcome proposed in the planting plan. The Service encourages planting plans that promote spatial and structural diversity within the mitigation site. We recommend planting plans be designed to meet the following goals:

1. Maximize the number of stems between 2 (0.8 inches) and 12 centimeters (4.7 inches). Talley et al. (2007) found stems within this size range had the largest proportion of VELB exit holes.
2. Minimize competition for sunlight and water. Native associates, particularly trees, can influence the long-term success of the mitigation site. Native associates should be planted at a ratio of 1 native associate for every 3 elderberry plants to avoid competition for sunlight and water with the elderberry plantings.
3. Achieve an average elderberry stem density of 240 stems/acre. This was the average stem density Vaghti et al. (2009) found for elderberry shrubs along the major river systems within the VELB range. The Service and lead agency or applicant should assess this goal after 5 years.

Buffer. A buffer area may be needed between the mitigation site and adjacent lands, depending on adjacent land-use. An appropriate buffer distance can be developed in coordination with the Service when proposing compensation. Although the buffer would be considered part of the mitigation site, the acreage of the buffer may not be considered compensation.

Success Standards. We recommend that the site management plan and/or planting plan specify timelines for achievement of the success standards for the site, as stated below. These timelines should reflect the impacts that the site is intended to compensate for, the specific abiotic factors at the site that could influence establishment, or any credit release criteria that need to be met. Standards for VELB mitigation banks can be found in Appendix C. These standards were developed specifically for mitigation banks, but can be broadly applied to all compensatory mitigation for VELB. Some of the timelines described in the standards may not be applicable in all situations, but agencies and applicants should work with the Service to develop success standards that best meet the goals of their individual compensatory mitigation proposal. We suggest that all compensatory mitigation meet the following:

1. A minimum of 60% of the initial elderberry and native associate plantings must survive over the first 5 years after the site is established. As much as feasible, shrubs should be well distributed throughout the site; however, in some instances underlying geologic or hydrologic issues might preclude elderberry establishment over some portion of the site. If significant die back occurs within the first 3 years, replanting may be used to meet the 60% survival criteria. However, replanting efforts should be concentrated to areas containing surviving elderberry plants. In some instances overplanting may be used to offset the selection of a less suitable site.
2. After 5 years, the site must show signs of recruitment. A successful site should have evidence of new growth on existing plantings as well as natural recruitment of elderberry. New growth is characterized as stems < 3 cm (1.2 inches) in diameter. If

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no signs of recruitment are observed, the agency or applicant should discuss possible remedies with the Service.

Monitoring. Specific monitoring protocols and reporting timelines for the mitigation site should be developed in coordination with the Service. The population of VELB, the general condition of the mitigation site, and the condition of the elderberry and associated native plantings in the mitigation site should be monitored at appropriate intervals. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be conducted by a Service-approved biologist. Surveys must include:

1. A search for VELB exit holes in elderberry stems, noting the precise locations and estimated ages of the exit holes. The location of shrubs with exit holes should be mapped with a GPS. Because adult VELB are rarely encountered, targeted surveys for adults are not required. However, surveyors should record all adult VELB seen. Record photographs should be taken for all observations of adult VELB and their location mapped with a GPS. All exit hole or adult VELB observations should be reported to CNDDB.
2. An evaluation of the success standards outlined above.
3. An evaluation of the adequacy of the site protection (fencing, signage, etc.) and weed control efforts in the mitigation site. Dense weeds and grasses such as Bermuda grass (*Cynodon dactylon*) are known to depress elderberry recruitment and their presence should be controlled to the greatest extent practicable.
4. An assessment of any real or potential threats to VELB and its host plant, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, and excessive weed growth.
5. A minimum of 10 permanent photographic monitoring locations should be established to document conditions present at the mitigation site. Photographs should be included in each report.

Reports. A reporting timeline should also be developed during the development of monitoring protocols for the mitigation site. Reports submitted to the Service should present and analyze the data collected from the monitoring surveys. Copies of original field notes, raw data, photographs, and a vicinity map of the site (including any adult VELB sightings and/or exit hole observations) of the mitigation site must be included with the report. Copies of the report (including any applicable Service file number) must be submitted within 6 months of the survey to the Service (Field Supervisor) at the following address:

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, CA 95825.

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7.0 Other Activities

The Framework may not be applicable for restoration, floodway maintenance, and other large scale habitat modification activities. These activities and the potential effects to VELB and its habitat should be considered on a project-by-project basis and discussed with the Service. We recommend that project proponents consider the effects to the species on a landscape level and ultimately seek to protect, preserve, and restore the continuity of VELB habitat. These and similar activities that may adversely impact the VELB and its habitat at landscape scales should consider avoidance, minimization, and compensation strategies that are appropriate for the specific project. Compensation may not be appropriate for those projects that impact only individual elderberry shrubs or result in a net benefit to VELB. Some possible conservation measures to consider for these large scale projects include:

1. Transplanting all affected elderberries to a similar on-site location.
2. Maintaining patches of appropriate habitat in areas where large-scale removal of elderberry shrubs will occur.
3. Scale trimming, removal, and other activities that allow VELB to persist within the area.

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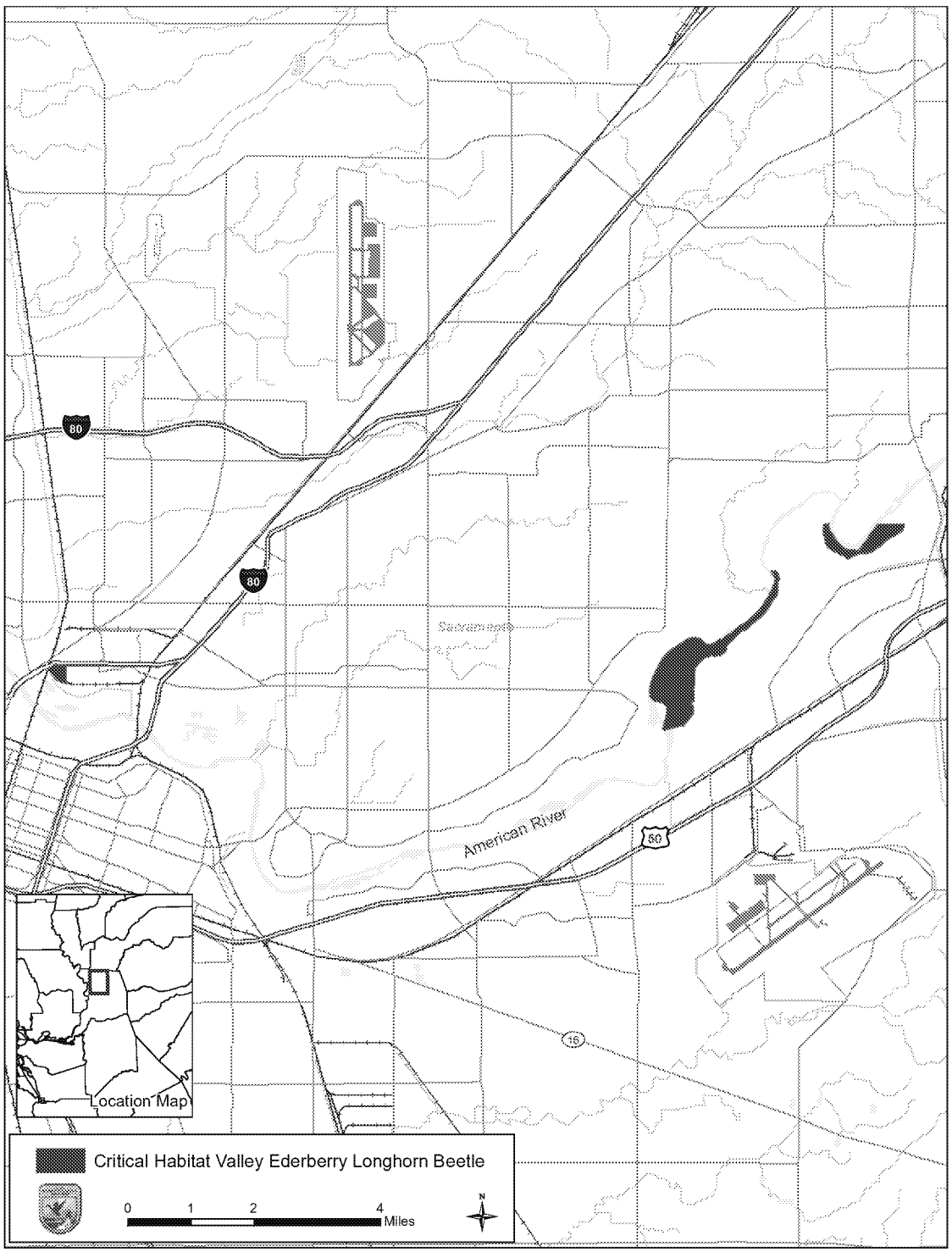
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Appendix A. Valley Elderberry Longhorn Beetle Critical Habitat



Appendix B. Compensation Examples

#1. An applicant is proposing to repair a bridge over Putah Creek. The project will require excavation within the channel and a re-contour of approaches to the new bridge. Pre-construction surveys noted that 3 elderberry shrubs in riparian habitat were within the project area, 2 of these shrubs will be directly impacted by the excavation work. The third shrub will be avoided using the appropriate avoidance and minimization measures. During the project, 0.5 acre of riparian habitat will need to be removed. The applicant has proposed to transplant the 2 directly affected elderberry shrubs to a Service-approved conservation bank and purchase 1.5 acres of credits at the conservation bank.

Conclusion: The project contains 3 elderberry shrubs on or within 50m of the project area. The project will result in the fragmentation of riparian habitat through the loss of 0.5 acres of riparian habitat. The compensation of 3:1 is appropriate for this project because it will be removing riparian habitat. The transplanting of the shrubs is appropriate because they would be directly impacted by the project.

#2. A new bike path will be constructed through an oak woodland/elderberry savanna. Pre-construction surveys identified one elderberry shrub within 0.10 acre of oak woodland/elderberry savanna that will be adversely affected by the proposed action. Exit holes were found on the elderberry shrub. The applicant also identified a conservation area that is suitable for oak woodland/elderberry savanna. Associated natives adjacent to the conservation area are blue oak (Q. douglasii), interior live oak, sycamore, poison oak, and wild grape. The applicant and the Service have agreed that transplanting the elderberry shrub into the conservation area and planting the conservation area with non-riparian habitat at a 1:1 ratio is appropriate to off-set the impacts to the VELB from the construction of this project.

Conclusion: The project contains 1 elderberry shrub on or within 50m of the project area. The project will result in the loss of 0.10 acre of non-riparian, elderberry savanna habitat. The proposed compensation of planting the identified conservation area at a 1:1 ratio using the species listed above is appropriate for the project since it will be removing non-riparian habitat. The transplanting of the one shrub into the conservation area is appropriate because it will be directly impacted by the project and the presence of exit holes suggests it was recently occupied by VELB.

The total area required for the conservation plantings are a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. A total of 0.10 acre (1 x 0.10 = 0.10 acre = 4,356 square feet) will be required for the plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period (see Section 5).

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#3. Construction of a cell tower will require the removal of two isolated elderberry shrubs and the temporary loss of a minimal amount of grassland habitat. The project location is 3 miles east of the Feather River. The project site is not near a water course or any other shrubs within 800m. The shrubs were surveyed and do not exhibit exit holes.

Conclusion: The project area contains two non-riparian shrubs on or within 50m of the project area. Since both shrubs lack exit holes, other factors need to be considered to determine the likeliness of occupancy. A review of occurrence data reveals there are no known VELB occurrences within 800m of the project site and historical imagery shows the project site has never been a part of, or connected to, riparian habitat. Based on the specifics of this scenario, the two elderberry shrubs within the project area are not likely to be occupied..

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Appendix C. VELB Mitigation Bank Standards

The following was prepared by Sacramento Fish and Wildlife Office conservation banking staff as part of an effort to standardize and make transparent the process for establishing Valley Elderberry Longhorn Beetle (VELB) conservation banks. The credit release schedule and performance standards are intended to be practical, while promoting the success of the plantings. This document is not a comprehensive review of VELB literature, and is subject to revision.

Credit Release Schedule

The credit release schedule and performance standards are designed to ensure that the VELB conservation bank plantings will be self-sustaining after the irrigation is turned-off (before the start of year 5), so the credit release schedule is longer than it would be without irrigation, and credits will not be released prior to the year indicated. Credits will be released per the following schedule, slightly modified from the May 2008 Statewide Banking Template:

Table 1. Credit release schedule.

Credit Release	Action	Credits to be Released
1	Bank Establishment	15%
2	Service Acceptance of As-builts*	25%
3	Meet Year 2 Performance Standards, and endowment funded 15%	15%
4	Meet Year 3 Performance Standards, and endowment funded 40%	15%
5	Meet Year 5 Performance Standards, and endowment funded 70%	15%
6	Meet Year 7 Performance Standards, and endowment funded 100%	15%

*Review to be accomplished within 60 days of receipt of complete as-built drawings.
Note: endowment can be funded on an accelerated schedule, if the bank sponsor so desires.

Performance Standards

Performance standards apply to the credit releases upon the third release. If the elderberry population is too large for direct census, then sampling methods may be used, and they must be thoroughly described in the proposed bank's development and management plans, and will be subject to Service approval. Sample size must be adequate to assess the health of the population, as determined by a qualified plant ecologist[1]. Qualifications should be submitted with proposal.

Performance standards are based on survival without re-planting, and on baseline conditions of health and vigor of the elderberry plantings. If performance standards are not met, then the bank sponsor will meet with the Service to determine a course of action.

Table 2. Performance Standards.

Credit Release #	Monitoring Year	Performance Standards
3	Year 2	• 60% survival of original planted elderberries without re-planting[2], and all survivors categorized as "normal"[3] to "exceptionally vigorous"[3] • 60% survival of associates without re-planting[2] • Irrigation ok
4	Year 3	• Maintain 60% survival of original planted elderberries without re-planting[2], and all survivors categorized as "normal"[3] to "exceptionally vigorous"[3] • Maintain 60% survival of associates without re-planting[2] • Irrigation ok
5	Year 5	• Maintain 60% survival of original planted elderberries without re-planting[2] • Maintain 60% survival of associates without re-planting[2] • No more than 10% decline in overall health of *Sambucus* from baseline conditions[4] • No irrigation[5] • Fertilizer application prohibited
6	Year 7	• Maintain 60% survival of original planted elderberries without re-planting[2] • Maintain 60% survival of associates without re-planting[2] • No more than 10% decline in overall health of *Sambucus* from baseline conditions[4] • No irrigation[5] • Fertilizer application prohibited

[1]Qualified plant ecologist is defined as a person who:

a) holds a bachelor's degree or higher in botany, plant ecology or related plant science, or demonstrates experience equivalent to such education,
and

b) shows demonstrated expertise in ecological sampling/experimental design beyond obtaining an academic degree, and

c) has 2+ years experience in collecting and analyzing botanical field data beyond obtaining an academic degree

[2]If re-planting, then time-clock begins again, with no additional credit releases until performance standards for the monitoring year in which the re-planting occurred has been met. Re-planting must be approved by the Service in advance.

[3]See Vigor and Vitality, below.

[4]Years 2, 3 and 4 are used to establish the baseline condition. See Baseline Conditions, below.

[5]If irrigation continues beyond the end of monitoring year 4, credit release #'s 5 and 6 will be delayed beyond the years indicated in Table 2.

Vigor and Vitality

Observations made by a qualified plant ecologist during the late spring/early summer will be used to determine the vigor and vitality of surviving shrubs for the year 2 and 3 performance standards, and photographs should clearly document this. The following scale will be used (from Mueller-Dombois and Ellenberg, 1974):

- Very feeble, never flowering/fruiting
- Feeble
- Normal
- Exceptionally vigorous

Baseline Conditions

Observations made by a qualified plant ecologist during late spring/early summer will be used to determine the baseline conditions of the planted elderberries. Sampling is allowable where the population of planted elderberries is extensive, and must be thoroughly described in the bank's development and management plans. The following measurements will be used to determine baseline conditions (Elzinga, et. al., 1998):

- Height
- # of inflorescences per shrub
- # of stems per shrub
- # of stems over 1" diameter per shrub
- Volume of plant (height x cover)

These measurements will be averaged for surviving shrubs over years 2, 3 and 4. Condition of the planted elderberries in years 5 and 7 will be compared to the baseline. Photographs should clearly document the baseline condition.

Monitoring Reports

Monitoring reports will be required during the establishment period for years 2-7, and should clearly document the progress of the plantings. All surveys must be thoroughly described, and copies of any field notes or data sheets from the current year included. Photographic documentation of elderberry and associate condition during the field surveys is required, and should clearly show the condition of all shrubs sampled. If sampling, describe sampling design. Each report should be comprehensive, and include data summaries and other pertinent information from previous monitoring years.

Requirements for long-term monitoring and reporting, including due dates, should be discussed in the bank's development and management plans.

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SFWO_mail@fws.gov

In Reply Refer to:
08ESMF00-2020-F-2743-1

October 1, 2021

Laura Loeffler
Branch Chief, Division of Environmental Management, M-1 Branch
California Department of Transportation, District 3
703 B Street
Marysville, California 95901
laura.loeffler@dot.ca.gov

Subject: Formal Consultation on the Howsley Road Bridge Replacement Project in Sutter County, California (Federal Project Number BRLO-5918(101))

Dear Laura Loeffler:

This letter is in response to the California Department of Transportation's (Caltrans) April 19, 2021, request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Howsley Road Bridge Replacement Project (proposed project) in Sutter County, California. Your initiation request and the accompanying March 2021 *Howsley Road Bridge Replacement Project Biological Assessment* (biological assessment) prepared by NorthStar (consultant) was received by the Service on April 21, 2021. At issue are the proposed project's effects on the federally threatened giant garter snake (*Thamnophis gigas*) (snake). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action on which we are consulting is Caltrans issuing federal funding to Sutter County Development Services Department (County) to replace the Howsley Road Bridge over the Pleasant Grove Creek Canal. The proposed project is receiving federal funding through the Federal Highway Administration (Highway Administration). Caltrans has assumed the Highway Administration's responsibilities as the lead agency under the Act for this consultation in accordance with Section 1313, Surface Transportation Project Delivery Program, of the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012. The MAP-21 is described in the National Environmental Policy Act Memorandum of Understanding between the Highway Administration and Caltrans (effective March 30, 2017) and codified in 23 U.S.C. 327.

Pursuant to 50 CFR 402.12(j), you submitted a biological assessment for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is likely to adversely affect the snake. The proposed project is not within designated or proposed critical habitat for any federally listed species.

In considering your request, we based our evaluation on the following:

1) your April 19, 2021, letter requesting initiation of formal consultation with the attached biological assessment;

2) email communication between the Service, Caltrans, the consultant, T.Y. Lin International Group, and ECORP Consulting; and

3) other information available to the Service.

The remainder of this document provides our biological opinion on the effects of the proposed project on the snake.

Consultation History

July 15, 2020: The Service received Caltrans' July 9, 2020, request for initiation of formal consultation with an attached March 2020 biological assessment.

December 2, 2020: Caltrans withdrew the consultation request.

April 21, 2021: The Service received Caltrans' April 19, 2021, request for initiation of formal consultation with the March 2021 biological assessment.

June 25, 2021: The Service sent an email to Caltrans asking for clarification on when geotechnical boring will occur and how much work will occur during the snake's inactive season.

July 13, 2021: T.Y. Lin provided the Service with more information about the proposed geotechnical boring.

August 12, 2021: Caltrans informed the Service that the County's consultant or contractor will ensure the exclusion fencing will be installed two weeks prior to the start of the snake's inactive season.

BIOLOGICAL OPINION

Description of the Action

The Howsley Road Bridge is located between the Cities of Marysville and Sacramento approximately 1 mile east of State Route 99 and 70 along Howsley Road and west of the community of Pleasant Grove in Sutter County. The Howsley Road Bridge was originally constructed in 1935 and widened in 1965. The bridge was a sufficiency rating of 45.3 and has been designated as functionally obsolete per the Caltrans Structure Maintenance and Investigations, Local Agency Bridge List. In general, the proposed project will involve the removal and replacement of the existing two-lane structure with a new, safer two-lane structure. The proposed project will be implemented in two phases. Phase 1 will be geotechnical boring. Phase 2 is the construction of the new bridge and the demolition of the exiting bridge.

The existing bridge consists of two travel lanes and is approximately 25 feet wide where it crosses the Pleasant Grove Creek Canal (canal) and approximately 230 feet long with 11 spans. The bridge is comprised of precast inverted channel girders with an asphalt concrete deck

supported by reinforced 4-column rigid frame bents with battered exterior columns set on a common reinforced concrete footing. The abutments are reinforced concrete wall-type with strip bearings between the top of the wall and the superstructure end diaphragm. The foundation type is unknown but assumed to be pile supported. The bridge approach embankments extend into the levee by approximately 50 feet on the west and 170 feet on the east. Near the abutments, the embankments are protected by rock slope protection on both the upstream and downstream sides of the structure.

The new bridge structure will be constructed approximately 25 feet south of an immediately adjacent to the existing bridge. The new bridge will be constructed using a cast-in-place post-tensioned box girder using three spans over the canal. Interior supports are anticipated to be two column bents supported on large diameter cast-in-drilled-hole concrete piles. Abutments are anticipated to be reinforced concrete, pile supported set abutments. The width of the new structure will be approximately 36 feet, including two 12-foot lanes, two 4-foot shoulders, and two 2-foot wide concrete barriers. The length will be approximately 250-feet and will be comprised of spans of 75 feet, 100 feet, and 75 feet.

Exposed slopes below and adjacent to the new bridge will be protected by rock slope protection placed within the 200-year floodplain. Excavation near the new abutments will be required in order to install the required rock slope protection. Additional bank disturbance and vegetation removal will occur form general clearing and grubbing, the construction of the new bridge abutments and bents, buildup of embankments and roadway approaches, placement of scour projection measures and development of the construction access into the channel. The maximum depth of excavation is expected to be approximately 8 feet. The maximum depth of the pile shaft foundations is expected to be approximately 100 feet.

The existing Howsley Road Bridge east embankment after bridge removal will protrude into the channel further than the proposed embankment creating a contraction downstream of the proposed bridge. To remedy this situation the existing embankment will be shaved down to create more suitable flood flow conditions surrounding the proposed bridge. In addition to this grading, rock slope protection will be added to the embankment to protect the new alignment and bridge structure from scour.

The bridge approach profiles will be raised with fill and new embankment slopes will be graded to create stable embankments on the landside of the canal banks where adjacent agricultural land is effectively flat. Side slopes for the embankments will vary between 2:1 and 3:1 depending on whether or not metal beam guard rails are used.

The proposed project will require the improvement of the Howsley Road and Pacific Avenue intersection and the Pacific Avenue roadway to improve its safety and approach visibility, and the Howsley Road and Natomas Road intersection and Natomas Road approach to reconfigure the intersection geometrics. Private driveway access will either be redirected or restored.

The canal can be divided into two distinct channel areas depending on the season: the low-flow channel and the active floodplain. The top of the bank of the low-flow channel is the canal's ordinary high water mark. The proposed project will require work within both channels. Emergent vegetation can be found in the low-flow channel. Construction will require the relocation of the low-flow channel. Dewatering the low-flow channel will be required depending on stage of construction. Dewatering techniques may include sheet piling, the use of culverts, large sandbags, berms, bladder dams, or other commonly used dewatering practices. The design

width of the new low flow channel will be fixed at 40 feet and excavated to a depth and kind of the original channel as required to accommodate the largest anticipated flows observed during the low-flow portion of the year.

The staging and material storage areas may occur inside of the County's right-of-way but will likely occur outside of the right-of-way along Howsley Road. Potential sites identified are located south of Howsley Road on agricultural parcels and in the northwest residential parcel at the intersection of Howsley Road and Pacific Avenue. Only 0.79 acre of the action area will be utilized for staging area in total.

Phase 1, geotechnical boring, will take place prior to Phase 2 and either during the construction season or before the start of winter rains after the construction season. Phase 2, new bridge construction and old bridge demolition, is expected to take one and a half years (two construction seasons) beginning in the spring and ending in the fall of the following year. Construction of the new bridge structure will occur in the first construction season. The only construction planned to occur after October 1 includes finishing the concrete superstructure, removing equipment and materials from the canal, finishing paving, and installing barriers and rails on the new structure. The Central Valley Flood Protection Board will require all construction materials to be out of the canal channel by November 1, subject to two-week extensions based on site conditions at that time. Winter stoppage of work can occur after barriers and railings are installed and traffic shifted to the new structure an alignment in December. Demolition of the existing structure and final construction work will occur during the second construction season. At the end of construction, the channel banks will be re-graded and the appropriate environmental restoration will be implemented.

Additional project information can be found in the biological assessment.

Conservation Measures

In addition to implementing Caltrans' standard best management practices, Caltrans proposes the following conservation measures to avoid and minimize adverse effects to the snake. The conservation measures have been grouped by the phase of construction.

Phase 1 and Phase 2

1. County's Designated Representative and Biologist.

    a. Before any work in the action area begins, the County will designate a representative (Designated Representative) that will be responsible for communicating with the Service and the California Department of Fish and Wildlife (Department) and who will oversee compliance with applicable permits, conservation measures, and avoidance and minimization measures. The County shall notify the Service and the Department in writing before starting project activities of the Designated Representative's name, business address, and contact information, and shall notify in writing if a substitute Designated Representative is selected or identified at any time during the term of applicable regulatory permits.

    b. The County shall submit to the Service and the Department in writing the name, qualifications, business address, and contact information of the biological

monitors, including a Designated Biologist and other qualified biologists at least 30 days before starting project activities under the applicable regulatory permits. The County shall ensure that the biological monitors are knowledgeable and experienced in the biology and natural history of the snake. The Designated Biologist shall be responsible for overseeing qualified biologists to help minimize or avoid the incidental take of the snake and to minimize disturbance of the snake's habitat. The County shall obtain the Service's and the Department's approval of the Designated Biologist and qualified biologists in writing before starting project activities. The County shall obtain the Service's and Department's approval in writing if the Designated Biologist must be changed. The minimum requirements for the Designated Biologist include experience with the biology and ecology of the snake and experience handling the snake.

2. Worker Awareness Training.

    a. Before any ground-disturbing work (including vegetation removal and grading), a qualified biologist will conduct a mandatory Worker Awareness Training for all construction personnel about special-status species that could potentially occur on-site.

    b. Proof of personnel attendance will be provided to the Service and the Department within one week of the training. The Worker Awareness Training will be conducted for new personnel as they are brought on the job during the construction period. General restrictions and guidelines that will be followed by construction personnel include:

        i. The construction crew leader will be responsible for ensuring that crew members adhere to the guidelines and restrictions.

        ii. The training will discuss the legal status of each species, habitat requirements, representative photographs, and avoidance and minimization measures to be implemented. Information regarding the life history of the snake; importance of irrigation canals, marshes and wetlands, and seasonally flooded areas; and a description of activities that qualify as take of the species including harassment, destruction of habitat, and death of an individual.

        iii. Distribution of a fact sheet conveying this information to the personnel who may enter the action area.

3. General Pre-construction Survey.

    a. See the biological assessment for the full list of conservation measures related to general pre-construction surveys.

4. Project Site Management.

    a. Access routes and the number and size of staging, access, and work areas will be limited to those identified in the project plans. Movement of heavy equipment to and from the site will be restricted to established roadways and access routes. Project activities shall confine all project-related parking, storage areas,

equipment storage, vehicles, and supplies and any other construction activities to the project work limits using, to the extent possible, previously disturbed areas. Additionally, the permittee shall not use or cross suitable snake habitat outside of the marked project work limits. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas.

b. Project-related vehicles will observe the posted speed limit on hard-surfaced roads and a 15 mile-per-hour speed limit on unpaved roads during travel in the project area.

c. Project-related vehicles and construction equipment will restrict off-road travel to the designated construction areas.

d. No pets will be allowed in the project construction area.

e. Any worker who inadvertently injures or kills a federally listed species or finds one dead, injured, or entrapped will immediately report the incident to an on-site biological monitor or Designated Biologist. The Designated Biologist will immediately notify the County, who will immediately provide verbal notification to the Service's Sacramento Fish and Wildlife Office (SFWO)and the local Department warder or biologist. The County will follow up with a written report to the Service and the Department within two calendar days. The report will include the date and time of the finding or incident, location of the animal or carcass, photographs, and explanation as to the cause of take, and any other pertinent information.

f. The biological monitor(s) and Designated Biologist will have the authority to immediately stop any activity that is not in compliance with the conservation measures or to order any reasonable measures to avoid the unauthorized take of a federally listed species. If there is a threat to any sensitive species, the qualified biologist will stop construction in the immediate area and notify the Service and the Department. Consultation with the Service and Department is required before re-commencing work in that area.

g. The Designated Representative will notify the Service and the Department in writing if the County or its contractors are not in compliance with any conservation measures. Non-compliance will be reported within 24 hours.

h. The biological monitors and Designated Biologist will record all observations of federally listed species, California listed species, or species of special concern on California Natural Diversity Database (Database) and submit to the Department.

i. See the March 2021 biological assessment for additional conservation measures related to project site management.

5. Environmentally Sensitive Areas.

a. Prior to the initiation of construction, project work limits will be clearly delineated with high visibility fencing, stakes, cones, or flags to avoid ground disturbance to areas adjacent to and outside of work limits.

b. To prevent unwanted impact to suitable snake habitat that is not scheduled for permanent or temporary disturbance, orange construction barrier fencing (snow fence) will be installed around areas off limits to vehicle and equipment traffic within the limit of temporary disturbance. This fencing is referred to as environmentally sensitive area fencing. Additionally, the limits of the allowed extent of disturbance will be marked in the field (during construction staking) to prevent construction related impacts outside of the approved work area. To prevent snakes and other ground-dwelling animals from being caught in the orange construction fencing, it will be placed such that there is a 1-foot gap between the ground and the bottom of the orange construction fencing.

c. See the March 2021 biological assessment for additional conservation measures related to environmentally sensitive areas.

6. Erosion and Sediment Control.

a. Protection of graded areas from erosion will be implemented using a combination of silt fences, biodegradable fiber rolls along toes of slopes or along edges of designated staging areas, and biodegradable erosion control mat (such as jute or coir) as appropriate on sloped areas. The contractor bid solicitation package will specify that tightly woven fiber netting (less than 0.25 inch), coconut coir matting, or similar material will be used for erosion control. Plastic monofilament or wire mesh in straw wattles or other erosion control devises will not be used. Only erosion control materials with natural fibers or other netting approved by the Service and the Department will be used. The edge of the material will be buried in the ground to prevent snakes from crawling under the material.

b. See the March 2021 biological assessment for additional conservation measures related to erosion and sediment controls.

Phase 1 Only

1. Geotechnical Boring Measures.

a. The Service will be notified at least seven days in advance of initiation of site exclusion and inspection efforts.

b. Two weeks prior to initiation of boring work, the Designated Biologist will conduct pre-construction surveys. Exclusion fencing will be installed in areas scheduled for boring at this time. Exclusion fencing will contain one-way exits to allow trapped wildlife to exit the excluded area. If boring is to occur after October 1, exclusion fencing will be placed no later than September 15, to prevent brumation in boring areas.

c. If a snake believed to be a giant garter snake is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Giant garter snake encountered during construction activities will be allowed to move away from construction activities on their own.

d. Borings will not occur after October 30 or prior to May 1, secondary to the Central Valley Flood Protection Board's regulation.

e. Vegetation clearing within 200 feet of the banks of suitable snake aquatic habitat will be limited to the minimum necessary. Avoided snake habitat within or adjacent to the action area will be flagged and designated as an environmentally sensitive area and will be avoided by all construction personnel.

f. The Designated Biologist will be on-site for the duration of any ground-disturbing activities (e.g., vegetation clearing, grubbing, grading, boring, and other earth-moving activities) required for work or site access.

g. See the March 2021 biological assessment for additional conservation measures related to the Phase 1 Geotechnical Boring.

Phase 2 Only

1. Pre-construction Surveys and Monitoring.

   a. Prior to ground-disturbing activities within suitable aquatic or upland habitat, a Designated Biologist will conduct a pre-construction survey for the snake and will inspect exclusion and orange barrier fencing to ensure they are both in good working order. Preferably, the pre-construction survey will be conducted immediately prior to ground-disturbing activities but no more than 24 hours before the start of this work. The construction area will be re-inspected and surveyed whenever a lapse in construction activity of two weeks or more has occurred. Results of pre-construction surveys will be provided to the Service and the Department within 24 hours of commencement of construction activities. Surveys will confirm that no rodent holes occupied by the snake are present within the action area.

   b. If a snake believed to be the giant garter snake is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Giant garter snake encounters during construction activities will be allowed to move away from construction activities on their own.

   c. A compliance monitoring report including photo documentation of the project area conditions will be submitted to the Service and the Department each month.

2. Timing of Construction.

   a. To the maximum extent possible, construction activities (including the installation of exclusion fencing) in snake aquatic and upland habitat (within 200 feet of aquatic habitat) will be initiated during the snake's active period (May 1 through October 1). During this timeframe, the potential for injury and mortality are lessened because snakes are actively moving and avoiding danger.

   b. Twenty-four hours prior to the commencement of construction activities within the channel prism, the project area shall be surveyed by a Designated Biologist to document the presence or absence of the snake. The Designated Biologist will

provide the Service and the Department a written report that adequately documents the monitoring efforts within 24 hours of commencement of in-channel construction activities. The project will be re-inspected by the Designated Biologist whenever a lapse in construction in the area of two weeks or greater has occurred. If any snake habitat is identified within the project area during the pre-construction survey, exclusionary fencing shall be placed around the proposed habitat to identify areas to be avoided during construction.

3. Established Procedures for Snakes Encountered.

    a. If a snake is encountered, the County or its consultant shall halt construction until the uninjured snake has left the area under its own volition. Capture of trapped or injured individuals shall be attempted only by the Designated Biologist and proper species identification must be made prior to any capture or handling. For each snake encountered, the Designated Biologist shall submit a completed field survey form (or equivalent) to the Service and the Department no more than 90 days after completing the last field visit to the project area.

    b. Prior to capturing a snake, a positive identification must be made by the Designated Biologist. Construction workers shall receive a Worker Awareness Training to recognize and respond to the presence of all snakes in work areas. Because the giant garter snake can be easily confused with other snakes, crews should be directed to assume that any snake encountered is the giant garter snake until positively identified by the Designated Biologist.

    c. Captured snakes shall be released as soon as practicable. Snakes captured within the work area will not be released at the point of capture but will be released at a designated release site. The following conditions for release have been adapted from the U.S. Geological Survey's National Wildlife Health Center guidance on the use and care of wildlife during field research. Field-captured animals shall be released only:

        i. at sites that are approved by the Service and the Department and in habitat suitable for the species survival,

        ii. when the released animal can be reasonably expected to function normally within the population,

        iii. when local and seasonal conditions are conducive to survival,

        iv. when the ability to survive in nature has not been irreversibly impaired, and

        v. when release is not likely to spread pathogens or contribute to disease processes in other ways.

4. Dewatering Snake Habitat.

    a. The use of sheet piling (or other approved diversion device or methods) may be used to divert flow around work areas so that no work in standing water occurs (with the exception of installation or removal of diversion and dewatering

devices). Diversion devices and methods shall be built from clean materials such as sandbags, gravel bags, water dams, or clean or washed gravel, which will cause little or no siltation.

b. If dewatering becomes necessary between May 1 and October 1, the County shall ensure that dewatered habitat remains dry for at least fifteen (15) consecutive days prior to the initiation of excavation and filling of dewatered habitat within the canal. The dewatered habitat shall remain dry until work in the dewatered habitat is complete.

c. Dewatered habitat will be subject to daily biological monitoring.

5. Minimize Construction Impacts.

a. Vegetation clearing within 200 feet of the banks of suitable snake aquatic habitat will be limited to the minimum area necessary. Avoided snake habitat within or adjacent to the action area will be flagged and designed as an environmentally sensitive area and will be avoided by all construction personnel.

b. If the contractor chooses to place a temporary bridge crossing, it shall not exceed 30 feet in width or 60 feet in length. Additionally, the installation and removal activities of the temporary crossing will be limited to within 15 feet of the existing low-flow channel's edge. All impacted areas will be restored to preconstruction conditions after removal of the temporary crossing.

c. The movement of heavy equipment within 200 feet of the banks of suitable snake aquatic habitat will be confined to the designated haul routes to minimize habitat disturbance.

d. The contractor bid solicitation package will specify that best management practices utilized will comply with descriptions in section 5.5.1 of the March 2021 biological assessment and the regulatory permits.

e. If water will be obtained from any suitable snake aquatic habitat, intake hoses will be screened with mesh no larger than 0.25 inch.

f. All project personnel will look beneath parked vehicles and equipment for snakes prior to their movement.

6. Restoration of Disturbed Areas.

a. All slopes or unpaved areas temporarily affected by the proposed project will be stabilized with effective erosion control materials.

b. Slopes and bare ground will be reseeded with native plant seed mix to stabilize and prevent erosion as soon as possible.

c. Where temporary disturbance includes the removal of trees or plants, native species will be replanted.

7. Additional Protective Measures for Working in Suitable Habitat during the Snake's Inactive Period (between October 2 and April 30).

    a. Areas of suitable habitat that are scheduled for excavation or ground disturbance and fill will be excluded with silt fencing containing one-way exists at least two weeks prior to the inactive season to reduce the likelihood of brumation by individuals within the area. The silt fencing will be approximately three feet tall and buried six inches below the ground surface level. Barrier and exclusionary fencing will be inspected daily by the Designated Biologist during ground-disturbing activities. The Designated Biologist will report any inadequacies in the fencing to the resident engineer. The resident engineer will be responsible for ensuring the contractor maintains the exclusionary and construction barrier fencing around snake habitat throughout the construction period and makes necessary repairs.

    b. The Designated Biologist will be on-site for the duration of any ground-disturbing activities (e.g., vegetation clearing, grubbing, grading, and other earth-moving activities) after October 1.

    c. All vegetation within 200 feet of aquatic habitat will be cleared prior to the snake brumation period (i.e., vegetation clearing must be completed by October 1 to allow work to continue in the following winter).

    d. If exclusion fencing is installed in the active period but work does not begin until the inactive period, a Designated Biologist will thoroughly inspect all fencing and one-way exits and any necessary repairs will be made before ground-disturbing activities begin on-site.

    e. Temporary disturbed habitat will be revegetated, as appropriate, with native species when construction activities are complete.

8. Implement a Mitigation Monitoring Reporting Program.

    a. A report summarizing the activities that have occurred and the snakes protective measures that were implemented will be prepared and submitted to the Service and Department each month during construction. The report will contain a Mitigation Monitoring and Reporting Program table of conservation measures, when the measure will be implemented (i.e., before, during, or after construction), the status of the measure (i.e., complete, ongoing, incomplete), the name of the individual completing the table, and the date completed.

    b. No later than 45 days after completion of all conservation measures, the County will submit a final mitigation report to the Service and the Department. The final mitigation report will include:

        i. a summary of information provided in monthly status reports,

        ii. the Mitigation Monitoring and Reporting Program table with notes showing when each of the conservation measures was implemented,

iii. all available information about incidental take of the snake during construction of the proposed action,

iv. information about other effects on the snake from the proposed action,

v. beginning and ending dates of the proposed action,

vi. an assessment of the effectiveness of conservation measures in minimizing and compensating for effects on the snake,

vii. recommendations on how conservation measures might be changed to more effectively minimize take and compensate for effects of future projects on the snake, and

viii. any other pertinent information.

9. Performance Security.

a. Prior to proceeding with the proposed project, the County will provide the Service and the Department with written documentation that the County has ensured funding to complete all measures to minimize and fully mitigate the incidental take of the snake resulting from construction. The documentation provided by the County will identify specific minimization and mitigation components and the costs associated with each component.

10. Compensation.

a. Prior to the initiation of Phase 2 (i.e., bridge construction), the County will purchase compensatory mitigation. The County will compensate for the permanent loss of 2.52 acres of suitable habitat for the snake by purchasing snake credits at a 3:1 ratio (7.56 credits) and will compensate for the temporary effects to 6.86 acres of suitable habitat for the snake by purchasing snake credits at a 1:1 ratio (6.86 credits) for a total of 14.42 credits from a Service- and Department-approved snake conservation bank. The transaction will take place through a purchase and sale agreement and funds must be transferred within 30 days and prior to the initiation of any Phase 2 construction activities. The County will provide the Service and the Department with copies of the credit sale agreement and fund transfer.

Action Area

The action area is defined in 50 CFR 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the 68.75-acre action area encompasses the construction area, staging areas, access to and from paved roads, and a 200-foot buffer around the project limits.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected,

directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Status of the Species

For the most recent comprehensive assessment of the species' rangewide status, please refer to the *Giant Garter Snake (Thamnophis gigas) 5-year Review: Summary and Evaluation* (Service 2020). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since this 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of snake habitat throughout the various recovery units, including the American Basin Recovery Unit where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The proposed project occurs in the Natomas Basin Management Unit in the American Basin Recovery Unit (Service 2017). There are 32 known occurrences within 5 miles of the proposed project. The closest known occurrence occurs adjacent to the proposed project where an adult snake was observed on the levee of the canal.

The consultant surveyed the area for suitable snake habitat on May 17, 2017. There are 11.11 acres of suitable upland habitat consisting of the annual grassland community and rock slope protection; 25.89 acres of suitable aquatic habitat consisting of rice agriculture, riverine,

and fresh emergent wetland communities; and 6.59 acres in the canal that changes from suitable aquatic habitat to suitable non-overwintering upland habitat depending on the water level. Burrows suitable for brumation were found in the annual grassland community and within riprap protecting the existing bridge.

The canal contains water year-round and is composed of aquatic habitat with large amounts of emergent and aquatic vegetation including hardstem bulrush (*Schoenoplectus acutus*) and cattail (*Typha latifolia*) immediately adjacent to the low flow channel. During the summer months, aquatic habitat is confined to an incised low flow channel that is approximately 40 to 50 feet wide and approximately 3 feet deep. The low flow channel is bordered by hardstem bulrush and cattail with opening for the snake to bask. During the early spring, the canal can be filled from levee to levee providing additional aquatic habitat for the snake. When water recedes back into the low flow channel the exposed plateau becomes suitable upland habitat.

The Service is reasonably certain the snake occurs in the action area due to the proposed project being within the range of the species, positive nearby occurrences according to the Database, and the presence of suitable aquatic and upland habitat.

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The majority of construction activities, particularly ground-disturbing activities, will take place during the snake's active season, when the snake has the potential to move away. Construction activities will continue through the start of the snake's inactive season; however, exclusion fencing will be installed two weeks prior to the start of the inactive season if ground-disturbing activities will occur during the snake's inactive season. Construction activities that occur in suitable upland habitat increase the risk of injury or mortality to the snake. Noise and vibrations from construction activities will cause snakes to leave the proposed project and will make them more vulnerable to predation. Equipment traveling between construction areas can run over a snake if it is basking and does not move away.

Construction activities will result in the permanent loss of 1.05 acres of suitable aquatic habitat, 0.93 acre of suitable upland habitat, and an additional 0.54 acre of suitable habitat that changes between aquatic and upland habitat. The permanent loss of aquatic habitat will remove opportunities for the snake to forage. Additional suitable aquatic habitat is located immediately outside the action area. However, traveling to the nearby aquatic habitat will increase the amount of time in which a snake travels, thereby increasing its risk of exposure to predation. The permanent loss of upland habitat will remove burrows the snake may use for brumation, which will increase the amount of time in which a snake travels to find other suitable burrows, thereby increasing its risk of exposure to predation.

Construction will also result in the temporary loss of 1.88 acres of suitable aquatic habitat, and 2.85 acres of suitable upland habitat, and 1.33 acres of suitable habitat that changes between aquatic and upland habitat. If water is in the canal during in-channel work, the work site will be drained of water by diverting the water into a pipe. The dewatered area will be dry for at least

15 days before construction. Dewatering will take place during the snake's active season when the snake is actively foraging. Dewatering the area will help deter the snake from using the area as there will not be any prey for the snake. Additional suitable aquatic habitat is located immediately outside the action area. However, traveling to the nearby aquatic habitat will increase the amount of time in which a snake travels, thereby increasing its risk of exposure to predation. The 1.88 acres of suitable aquatic habitat that will be temporarily dewatered will be available to the snakes after the removal of diversion equipment and the water returns to its normal flow during the snake's next active season. The upland areas that will be temporarily affected during the proposed project will be restored by hydroseeding. Depending on the amount of rain, the vegetation may not be tall enough for the snake to use for cover during its next active season. Fossorial mammals will be able to start creating burrows for the snake to use for brumation after the completion of the project. The new burrows may be available for use by the snake the inactive season following construction. Rock slope protection (e.g., riprap) will be installed to protect the structure from erosional forces. The snake will be able to use the riprap for aestivation or brumation immediately following the end of construction.

These effects will be reduced but not eliminated by implementing the conservation measures proposed, including conducting pre-construction surveys, having biological monitors present, and relocating snakes from within the action area. The County will also lessen the likelihood of the snake from using the action area such as removing vegetation during the within 200 feet of aquatic habitat and the installation of exclusion fencing, prior to starting ground-disturbing activities. The exclusion fencing will help keep snakes from entering the construction area during the active season and will help keep stakes from using burrows and riprap in the action area during the snake's inactive season.

As noted previously in the *Description of the Action* section, Caltrans has proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect on the species of the proposed project's anticipated incidental take, resulting from the permanent loss of habitat described above. The compensatory habitat proposed will be in the form of snake conservation credits at a Service- and Department-approved conservation bank with a service area that includes the proposed project's location.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of snake, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the Howsley Road Bridge Replacement Project, as proposed, is not likely to jeopardize the continued existence of the snake. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following:

1) the amount of suitable habitat for the snake lost due to the implementation of the proposed project is small compared to the amount of habitat available for the snake;

2) suitable aquatic and upland habitat can be found adjacent to the proposed project;

3) the purchase of snake conservation credits will minimize the permanent loss of snake habitat; and

4) the implementation of the proposed conservation measures will minimize effects to the snake.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by Caltrans so that they become binding conditions of any grant or permit issued to the County, as appropriate, for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to assume and implement the terms and conditions or (2) fails to require the County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

Amount or Extent of Take

The Service anticipates that incidental take of the snake will be difficult to detect or quantify because the number of individuals in the action area is unknown and estimates of population density in the action area are unavailable. The snake is secretive and uses underground burrows for shelter while not in aquatic habitat during the active season and for brumation during the inactive season. In instances in which the number of individuals that may be taken cannot be determined, the Service may quantify take in the amount of lost or disturbed habitat as a result of the proposed project; since take is expected to result from these effects to habitat, the quantification of habitat becomes a direct surrogate for the species that will be taken. Therefore, the Service anticipates that all snakes inhabiting the 1.05 acres of aquatic habitat, the 0.93 acre of upland habitat, and the 0.54 acre of suitable habitat that changes between aquatic and upland depending on the amount of water in the canal that will be lost will be subject to incidental take in the form of harm. In addition, the Service anticipates that all snakes inhabiting the 2.93 acres of aquatic habitat, the 3.78 acres of upland habitat, and the 1.87 acres of suitable habitat that changes between aquatic and upland habitat that will be permanently and temporarily affected will be subject to incidental take in the form of capture. Although it is infeasible to quantify the exact number of snakes that may be incidentally taken, the Service anticipates that the number will be low based on the fact that snakes are expected to avoid active construction if possible, as well as the conservation measures proposed by Caltrans.

Since we cannot estimate the number of individual snakes that will be incidentally taken for the reasons listed above, we are providing a mechanism to quantify when incidental take will be considered to be exceeded as a result of implementing the proposed project. We will use the detection of one (1) dead or injured snake to determine when take is exceeded. By setting a threshold of one individual detected, we have set an incidental take limit that is measurable, irrefutable, and indicated that the snake is being affected at a level where conservation measures and project implementation need to be evaluated and possibly modified. We conclude that incidental take of the snake will be considered exceeded if one dead or injured snake is detected by biological monitors or other project personnel.

Upon implementation of the following reasonable and prudent measures, incidental take of snake associated with the proposed project will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the snake resulting from implementation of this project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the snake:

1) All conservation measures, as described in the biological assessment and restated in the *Description of the Action* section of this biological opinion, shall be fully implemented

and adhered to. Further, this reasonable and prudent measure shall be supplemented by the *Terms and Conditions* below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. Caltrans shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the proposed project.

2. Caltrans or the County will provide a copy of the completed bill of sale and payment to the Service upon the purchase of snake conservation credits.

3. In order to monitor whether the amount or extent of incidental take anticipated from implementation of the proposed project is approached or exceeded, Caltrans shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Caltrans must immediately reinitiate formal consultation, as per 50 CFR 402.16(a).

    a. For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, Caltrans shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction.

    b. Caltrans shall immediately contact the Service's SFWO at (916) 414-6600 to report direct encounters between listed species and project workers and their equipment whereby incidental take in the form of injury or death occurs. If the encounter occurs after normal working hours, Caltrans shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, Caltrans shall follow the steps outlined in the Salvage and Disposition of Individuals section below.

    c. For those components of the action that will require the capture and relocation of any listed species, the Caltrans shall immediately contact the SFWO at (916) 414-6600 to report the action. If capture and relocation need to occur after normal working hours, Caltrans shall contact the SFWO at the earliest possible opportunity the next working day.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Sacramento Valley Division Supervisor of the Endangered Species Program at the SFWO at (916) 414-6600.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) Caltrans should work with the Service to assist us in meeting the goals of the Recovery Plan for the snake.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the Howsley Road Bridge Replacement Project. As provided in 50 CFR 402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;

2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or

4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Sam Sosa, Fish and Wildlife Biologist (samuel_sosa@fws.gov), at (916) 414-6560 or Michelle Havens, Sacramento Valley Division Supervisor (michelle_havens@fws.gov), at (916) 414-6492 or at the letterhead address.

Sincerely,

MICHAEL FRIS Digitally signed by MICHAEL FRIS Date: 2021.10.01 11:52:14 -07'00'

Michael Fris
Field Supervisor

ec:
Brooks Taylor, California Department of Transportation, Marysville, California
Gabriele Quillman, California Department of Fish and Wildlife, Rancho Cordova, California

LITERATURE CITED

[Database] California Natural Diversity Database. 2021. Biogeographic Data Branch, Department of Fish and Wildlife. Sacramento, California. Accessed August 16, 2021.

[Service] U.S. Fish and Wildlife Service. 2017. Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. vii + 71 pp.

[Service] U.S. Fish and Wildlife Service. 2020. Giant Garter Snake (*Thamnophis gigas*) 5-year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, California. June 2020. 52 pp.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846
SFWO_mail@fws.gov

In Reply Refer to:
08ESMF00-2019-F-1312-R003-1

October 1, 2021

Memorandum

To: Paul Zedonis, Chief, Environmental and Natural Resource Division, U.S. Bureau of Reclamation, Northern California Area Office, Shasta Lake, California
pzedonis@usbr.gov

From: Michael Fris, Field Supervisor MICHAEL FRIS Digitally signed by MICHAEL FRIS Date: 2021.10.01 13:24:51 -07'00'

Subject: Reinitiation of Formal Consultation on the Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project, Phase 2, in Butte County, California (NC-312 2.2.1.06)

This memorandum (memo) is in response to the U.S. Bureau of Reclamation's (Bureau) September 20, 2021, request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project (proposed project) in Butte County, California. The Service issued the original biological opinion (Service File Number 08ESMF00-2019-F-1312-3) on July 25, 2019, the first amendment (Service File Number 08ESMF00-2019-F-1312-R001-1) on October 29, 2020 (called the first reinitiation throughout the rest of the document), and the second amendment (Service File Number 08ESMF00-2019-F-1312-R002-1) on August 2, 2021 (called the second reinitiation throughout the rest of the document). Your request for reinitiation was received by the Service on September 20, 2021. At issue are the proposed project's effects on the federally-listed as threatened giant garter snake (*Thamnophis gigas*) (snake). The Bureau requested reinitiation due to an increase in the effects to the snake that were not previously analyzed in the amended biological opinion associated with the improvement of an access road for proposed project-related construction on the Upper Belding Lateral. This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action on which we are consulting is the Bureau's authorization of the construction of structural modifications and canal lateral improvements within the water conveyance infrastructure. This water conveyance system is managed by the Biggs West Gridley Water District (applicant), and the proposed project is necessary in order to satisfy the Level 4 Central Valley Project Improvement Act water supply mandate for the Gray Lodge Wildlife Area (Wildlife Area). Pursuant to 50 CFR §402.12(j), you submitted the reinitiation memo for our review and requested concurrence with the findings presented therein. These findings conclude

that the proposed project may affect, and is likely to adversely affect the snake. The proposed project is not within designated or proposed critical habitat for any federally listed species.

The Bureau requested this third reinitiation due to additional construction needed west of the Union Pacific Railroad crossing to allow semi-trucks with trailers necessary to haul equipment and materials to the work area for the proposed project. The engineers for the proposed project identified two access roads, one on each side of the Ashley Lateral, as inadequate. This reinitiation is for the temporary fill of 140 feet of the Ashley Lateral to provide adequate access to the proposed project. The April 2019 biological assessment included the two access roads that are the focus of this reinitiation; however, did not include plans to fill the Ashley Later or improve the two roads.

The July 25, 2019, biological opinion was superseded by the October 29, 2020, amended biological opinion and was superseded a second time by the August 2, 2021, amended biological opinion. All changes to the August 2, 2021, amended biological opinion are shown below in **bold** to aid in their identification and all other text remains unchanged. Therefore, this biological opinion supersedes the previously issued August 2, 2021, amended biological opinion.

In considering your request we based our evaluation on the following: (1) the September 5, 2018, site visit with the Service and the California Department of Fish and Wildlife (Department); (2) the February 2019 biological assessment prepared by the Bureau; (3) your February 25, 2019, letter initiating formal consultation; (4) the April 30, 2019, letter addressing requested supplemental information, which included the April 2019 revised biological assessment prepared by the Bureau; (5) Eric C. Hansen's (species expert) March 27, 2013, Biggs-West Gridley Water District Gray Lodge Wildlife Area Water Supply Project, Giant Garter Snake (*Thamnophis gigas*) Habitat Impact Assessment and April 17, 2019, Revised Giant Garter Snake Impact Analysis Memorandum; (6) email and telephone correspondence between the Service, the Bureau, the Department, and Eric C. Hansen; (7) your October 7, 2020, letter requesting reinitiation of formal consultation, which provided updated biological information for the proposed project; (8) your June 21, 2021, letter requesting reinitiation of formal consultation; **(9) your September 20, 2021, letter requesting reinitiation of formal consultation, which provided an updated project description and effects analysis on the snake; (10) telephone communication between the Project Representative and the Service;** and **(11)** other information available to the Service.

Consultation History

The Service previously issued a biological opinion on January 4, 2010, appending the Construction of Conveyance Features to Deliver Water to Gray Lodge Wildlife Area (Service File Number 81420-2009-TA-1164-1) to the programmatic biological opinion on Conveyance of Refuge Water Supply Project, West and East Sacramento Valley (Issued December 7, 1998; Service File Number 1-1-99-F-0015) (programmatic). Originally, the project in its entirety was designed for the construction of 69 minor structural modifications and the reconstruction of over 19 miles of canal laterals to allow for the delivery of full Level 4 water supply to the boundary of the Wildlife Area, as required by the Central Valley Project Improvement Act. However, due to funding constraints, this project was divided into two main construction phases (Phase 1 and Phase 2). Phase 1 was designed to complete a portion of the original project, including the construction of 12 minor structural modifications and the reconstruction of 4.28 miles of canal laterals. The preliminary Phase 1 project analysis determined that the acreage permanently affected by Phase 1 construction would be 11 acres of aquatic and 11 acres of upland snake

habitat (22 acres total). However, based on the March 27, 2013, *Biggs-West Gridley Water District Gray Lodge Wildlife Area Water Supply Project, Giant Garter Snake (Thamnophis gigas) Habitat and Impact Assessment* prepared by Eric C. Hansen, it was determined that effects of the project were not fully analyzed as there would be gains to both aquatic and upland snake habitat that were not included in previous calculations. Reanalysis indicated that the permanent snake habitat loss for Phase 1 would be 1.15 acres of only aquatic snake habitat instead of the total 22 acres of upland and aquatic snake habitat previously determined.

As a result of the reanalysis of project effects, the Service issued a biological opinion on September 27, 2013, amending the Gray Lodge Wildlife Area Water Supply Project (Service File Number 81420-2009-TA-1164-2) with the updated loss of 1.15 acres of permanent aquatic snake habitat. Phase 1 was completed from spring of 2013 to summer of 2015, during which 12 minor structural modifications were constructed and 4.28 miles of canal laterals were reconstructed. For Phase 1, take was exempted for all snakes within the 1.15 acres of permanently affected aquatic snake habitat. The permanent loss of aquatic snake habitat was compensated with the purchase of 4.6 snake conservation credits from the Sutter Basin Conservation Bank. However, due to construction occurring in the snake's inactive season, a large number of snakes were encountered. During the 2014-2015 construction seasons, 232 snakes were encountered, of which 171 were relocated, 18 were injured, 35 were killed, and eight were euthanized due to extensive injuries. As a result of the number of snakes encountered during Phase 1 and the length of time since the issuance of the 2013 biological opinion, it was determined by the Service that Phase 2 will be independent from Phase 1 and will undergo a separate section 7 analysis.

Due to the effects to the snake that occurred during Phase 1, the Department issued an amendment to their Incidental Take Permit on April 15, 2015, requiring the applicant to purchase an additional 5.95 snake conservation credits from Sutter Basin Conservation Bank and to also provide 77 acres of snake habitat on the Wildlife Area. This 77-acre commitment serves as compensation for the loss of snake habitat associated with both Phase 1 and Phase 2, and is derived from the number of acres that can be supplied adequate water to support snake habitat needs even in critically dry years or in years when surface water is not available during the summer months. This habitat consists of permanent summer flooded wetlands, summer flooded emergent wetlands, and canals and ditches. The protected habitat is not set to a specific, bound location because of the rotational nature of summer water deliveries to the Wildlife Area. Additionally, there is no end date for the 77-acre commitment as it is to be implemented consistently as part of the management activities for the Wildlife Area so long as the Wildlife Area stands. Approximately 47.95 acres of the 77 acres have been used to offset effects associated with Phase 1. The remaining 29.05 acres will be incorporated into the compensation for effects to the snake from Phase 2.

In anticipation of the start of the proposed project (Phase 2), a giant garter snake working group was created to identify additional avoidance and minimization measures to be implemented during construction in order to further minimize effects to the snake. Participants included the Bureau, the Service, the Department, the applicant, Swaim Biological Inc., species experts (Eric C. Hansen), U.S. Geological Survey, Ducks Unlimited, and Defenders of Wildlife. The working group determined that the best way to minimize effects to the snake is to maximize construction in the snake's active season. A modified construction schedule was created based on feasibility and risk associated with the quantity and quality of suitable snake habitat within the construction area. The working group recommended avoidance and minimization measures related to

construction timing, techniques for riprap and concrete bank lining removal, and vegetation and rodent burrow removal.

July-August 2018	Giant garter snake working group meetings were attended to discuss additional avoidance and minimization measures for the proposed project.
September 5, 2018	The Service attended a site visit with the Wildlife Area manager to see the completed Phase 1 area and the proposed Phase 2 project site.
February 25, 2019	The Service received the February 25, 2019, memo from the Bureau requesting initiation of formal consultation and the accompanying biological assessment.
April 1, 2019	The Service sent the Bureau a letter requesting additional information regarding the conservation measure to provide 77 acres of snake habitat at the Wildlife Area as part of the compensation for the proposed project.
April 24, 2019	The Service participated in a conference call with the Bureau and the Department to discuss the 77 acres of proposed compensation located on the Wildlife Area.
April 30, 2019	The Service received the April 30, 2019, letter from the Bureau providing the requested additional information.
May 10, 2019	This date confirms the receipt of all of the complete information in order for consultation to begin.
June 28, 2019	The Service received additional information on the snake conservation measure regarding methods for excavation of rodent burrows.
July 25, 2019	The Service issued a biological opinion for the proposed project (Service File Number 08ESMF00-2019-F-1312-3).
Jul – Sep 2020	The applicant's Project Representative notified the Service that reinitiation on the proposed project will be needed in order to continue working along the Lower Traynor Lateral during the snake's inactive season. The representative sent documents to the Service for comments on the proposed project prior to submitting the documents to the Bureau. The reinitiation will remove the bypass from the Lower Traynor Lateral and will build up the levee on the Upper Belding Lateral.
Sep – Oct 2020	The Service and the Bureau discussed the upcoming reinitiation via meetings and email communication. The Bureau notified the Service that the upcoming reinitiation will be split into two reinitiations due to timing constraints. The first reinitiation, which is addressed here, will be the removal of the bypass from the Lower Traynor Lateral. The Bureau will submit the second reinitiation request at a later date and after the final designs for the Upper Belding Lateral have been completed.
October 7, 2020	The Service received the Bureau's request for reinitiation of consultation.

October 29, 2020	The Service issued an amended biological opinion for the proposed project (Service File Number 08ESMF00-2019-F-1312-R001-1).
May 26, 2021	The Service participated in the Spring 2021 Coordination Meeting to discuss the progression of Phase 2. After the meeting, Ducks Unlimited provided additional information and a tour of the Upper Belding Lateral.
June 21, 2021	The Service received the Bureau's second request for reinitiation of consultation.
August 2, 2021	**The Service issued an amended biological opinion for the proposed project (Service File Number 08ESMF00-2019-F-1312-R002-1).**
August 31, 2021	**The Project Representative notified the Service that reinitiation may be necessary due to unforeseen access issues at the Union Pacific Railroad crossing.**
Sept. 20, 2021	**The Service received the Bureau's third request for reinitiation of consultation.**

The remainder of this document provides our biological opinion on the effects of the proposed project on the snake.

BIOLOGICAL OPINION

Description of the Action

The proposed project analyzed in this consultation is the second and final phase (Phase 2) of the water conveyance infrastructure improvement project. For the remainder of this biological opinion, all references to the proposed project are for the construction of Phase 2. While Phase 1 made significant improvements to the canals supplying water to the Wildlife Area, bottlenecks in water conveyance facilities still persist, which require additional work. The proposed project is necessary to further increase the conveyance capacity in the applicant's water distribution system. These improvements will provide the remaining infrastructure necessary to allow the Wildlife Area to receive full Level 4 water supply at the appropriate time of year to achieve waterfowl habitat management objectives.

The proposed project is located approximately 60 miles north of Sacramento, to the north of the Wildlife Area, near the base of the Sutter Buttes in Butte County, California. The original project proposed in the January 4, 2010, biological opinion was designed for the construction of 69 minor structural modifications and reconstruction of over 19 miles of canal laterals. Phase 1 of this project completed construction of 12 minor structural modifications and 4.28 miles of canal laterals. However, based on engineering review, 26 of the originally proposed minor structural modifications and 9.32 miles of the originally proposed canal lateral improvements are not needed to achieve the water delivery goal. Therefore, the proposed project will include the final construction of 31 minor structural modifications and 5.64 miles of canal lateral improvements. These improvements will be achieved by retro-fitting or replacing structures throughout the canal system, including bridges, siphons, flumes, weirs, checks, and farm and railroad crossings, as well as modifying canal cross-sections to improve hydraulics, including grading to smooth the canal and widening to increase canal water capacity.

The proposed project will improve the Traynor Lateral from the Nugent Flume to the boundary of the Wildlife Area along Evans Reimer Road, the Schwind Lateral from the Schwind Flume south to the boundary of the Wildlife Area along West Liberty Road, and the Upper Belding Lateral from the Razorback Flume to the Union Pacific Railroad crossing. Bridges at North Farris Road, Afton Road, Gridley-Colusa Highway, West Liberty Road, and Evans Reimer Road will be replaced with the widening of these lateral segments. Additional structures to be replaced during the proposed project include the Union Pacific Railroad crossing at the end of the improved segment of the Upper Belding Lateral and the Razorback Flume farther east, and the Schwind Flume and culverts on the north end of the improved segment of the Schwind Lateral. A levee road east of the Union Pacific Railroad crossing**, two levee roads along the Ashley Lateral,** and a rice field road north of the Razorback Flume will be improved to allow project equipment to access the Upper Belding Lateral (**updated** Figure 1).

Minor Modifications

Minor structural modifications include activities that will disturb less than 0.5 acre of land each at each construction location. Typical minor structural modifications consist of structure excavation, demolition work, concrete placement, and structure backfill using equipment such as excavators, wheel loaders, earth movers, backhoes, end-dump trucks, concrete mixer trucks, concrete pump trucks, hydraulic cranes, drum compactors, water trucks, flatbed trucks, and pickup trucks.

Check Structures

The check structures are located within the trapezoidal canal section. The structures are cast-in-place concrete, approximately 80 feet by 80 feet, and require approximately 30 feet of excavation and side slope beyond the footprint of construction. A construction ramp approximately 25 feet wide will provide access into the work area. A dewatering system including pumps and pipes will be installed. The finished canal bank slopes will have riprap bank protection upstream and downstream of the structures.

Turnouts and Lateral Headgates

Landowner turnouts and lateral headgate structures will be removed and reconstructed at the same time as the canal bank and levee improvements. As feasible, some existing turnouts and headgates will be left in place where the improvement design is able to accommodate the existing feature. Turnout structures will consist of pre-cast concrete weirs, cast-in-place concrete bank protection, and culvert pipe. A trench through the rebuilt levee will be excavated to install the pipe and backfilled. Pipe trenches will be approximately 4 to 8 feet wide at the bottom with gradual slopes, depending on the pipe diameter.

Structural improvements to the Upper Belding Lateral headgate at the beginning of the applicant's canal system were also identified as requiring repair or improvement. The headgate area supports side-by-side concrete flow channels; the distal end of the central concrete support is cracked and needs minor structural repair. The concrete side walls of the flow channel need to be raised by several feet so that water splash associated with the full design flow will be contained within the channel. At the bottom of the concrete outflow sill, additional riprap is needed to dissipate the water flow energy at the full design flow.

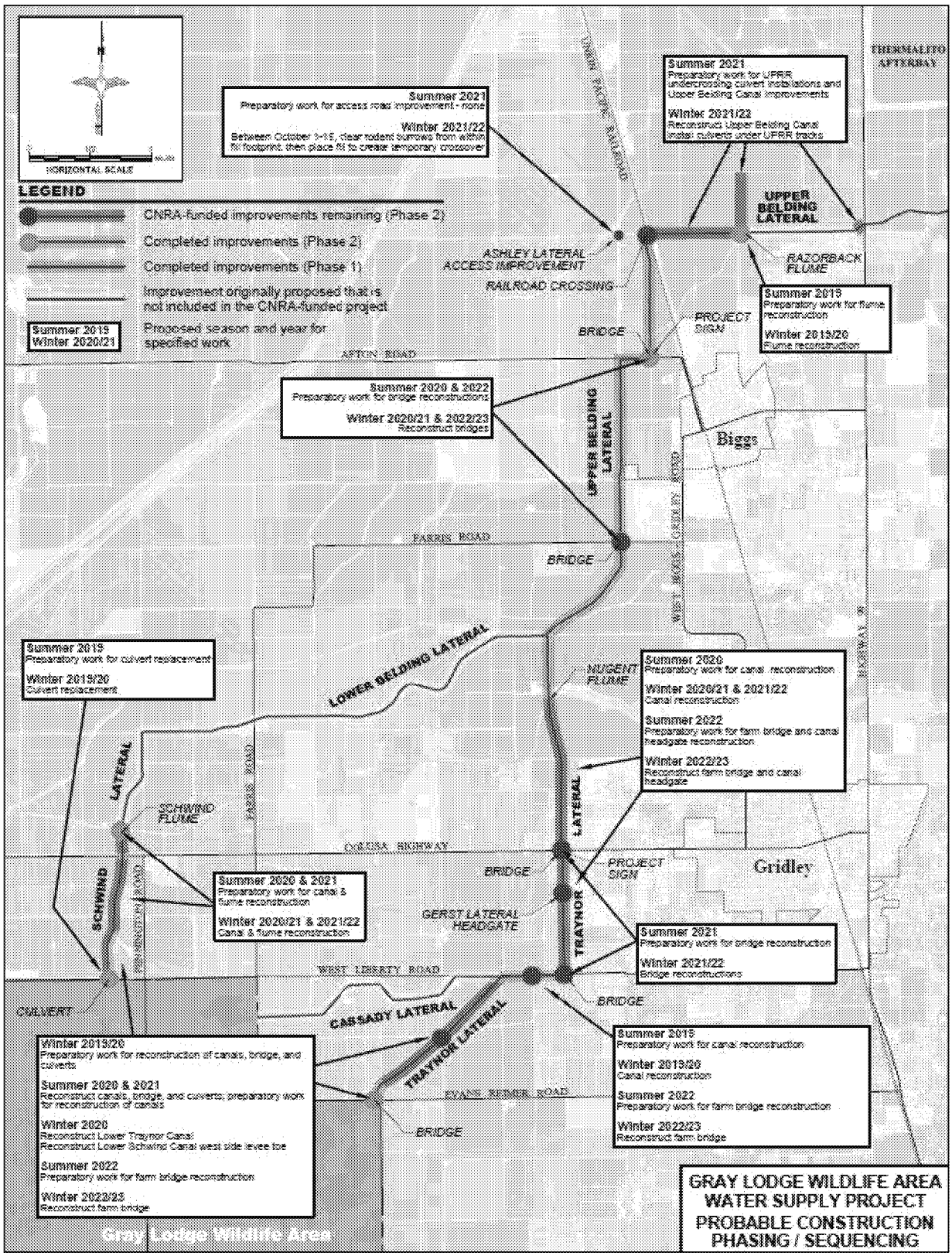


Figure 1. Site plan and construction sequencing for the proposed project.

During reconstruction of the Upper Traynor Lateral in the winter of 2020-2021, the headgate of the Gerst Lateral was damaged and must be reconstructed. The structure includes a concrete headwall, three concrete culverts, and associated downstream concrete bank linking and riprap. To reconstruct the structure, the existing concrete headwall and culverts will be demolished and replaced with three pre-cast concrete water control structures fitted with canal gates and three associated 36-inch culverts attached to the pre-cast concrete outlet structures similar to the water control structures installed for the proposed project.

County Road Bridges and Culvert Crossings

Five county road bridges and one road culvert crossing will require replacement to accommodate the project-related flow increase. County road bridges will be designed as a concrete culvert with headwalls. This will require the bridges to be built during the winter when the water district system is offline. Butte County requires that a temporary traffic bypass be established at each site, which will consist of a Class II aggregate base when outside of the paved roadway. County bridges and culverts are large structures that will require excavation and dewatering similar to check structures and turnouts. Structure excavation will be approximately 100 feet by 140 feet, with additional excavation for pipes.

Farm Crossings

Farm canal crossings require replacement due to the widening of the canal and will be located at historical access points. Farm crossings will consist of pre-cast bridges and culvert crossings. Pre-cast bridges will be supported on driven pre-cast concrete piles. Culvert crossings will be double-pipes with riprap inlets and outlets. Farm crossings will require an excavation footprint of approximately 40 feet by 60 feet.

Union Pacific Railroad Crossing

Due to its current under capacity to meet flow requirements, a new culvert pipe will be added to the existing Union Pacific Railroad culvert crossing near the head of the Belding Lateral. The new pipe will be bored under the railroad embankment to avoid disturbance to the rail line. Boring the new channel tie-in will require an excavation of approximately 120 feet by 120 feet on each side of the railroad. The Union Pacific Railroad crossing work will be performed during the snake's inactive season.

Drain Crossings

Several drain crossings require replacement or improvement to accommodate the change in canal cross-section. The existing flume crossings will be replaced by reconstructing the main canal to cross the drain as a trapezoidal canal, with the drain conveyed in pipes or concrete culverts, at grade, under the main canal cross-section. Other drain crossings will be replaced or extended as required depending on engineering requirements. Typical improvements at the drains will require an excavation footprint of approximately 70 feet by 50 feet.

Major Modifications

Major structural modifications include activities that will disturb more than 0.5 acre of land at each construction location and primarily refers to the reconstruction of canal laterals. The main canal will be widened and reshaped, and in some locations realigned and deepened. Typical canal excavation and embankment work will consist of removing existing earth material from the

levees and inside the canal slopes, and compacting the earth into new and improved levees. Earth material may be temporarily stockpiled outside of the existing levees or in the existing canal bottom. For the entire length of the proposed project, a levee top on one side of the canal will receive crushed rock or a similar type of all-weather surfacing material for maintenance access. Existing drainage toe ditches and farm roads will be replaced at the toe of the new canal bank to accommodate the wider canal section. In these locations, existing drainage and access functions will be maintained. Therefore, the limits of ground disturbance beyond the outer edge of the new drainage ditch will be no more than 20 to 30 feet. Multiple structures and improvement segments will be underway at any given time. Equipment will include excavators, side-dump trucks, end-dump trucks, wheel loaders, backhoes, drum compactors, motor graders, water trucks, mechanic's trucks, and pickup trucks.

Upper Belding Lateral

The Upper Belding Lateral was re-designed in January 2021. The re-design necessitates raising levee top elevations in some reaches to reach a 12-inch freeboard at full design flow. The channel will also be widened and slightly redirected to provide optimized flow. The cumulative length of levee reconstructed on both the south and north sides of the Upper Belding Later to correct the freeboard and channel capacity issues will be approximately 5,380 feet. The levee top will be widened to 14 feet to allow the drill bore head and crane to access the Union Pacific Railroad undercrossing.

Construction of a new approximately 5-foot-wide-by-2-foot-deep earthen seepage ditch at the outer edge of the improved levee top drive surface where it abuts rice fields is also proposed as part of the levee top reconstruction on the north side of the Upper Belding Lateral. The seepage ditch will begin adjacent to the Razorback Flume and run west for approximately 2,425 feet. This ditch will collect potential seepage water that may flow subsurface from the Upper Belding Lateral into the adjacent rice fields; it will also collect rice field drain water after construction ends.

A rice field road approximately 2,323 feet long located just north of the Razorback Flume will be improved to provide access to the Upper Belding Lateral. The rice field road currently is a 12-foot wide gravel road. In its current condition, it likely will not support the heavy equipment that will be traveling on this road to and from the Union Pacific Railroad work area during the winter months.

Staging and Site Preparation

Staging areas include suitable land outside of the construction footprint which provide secure sites for office trailers, equipment parking and servicing, sanitation facilities, stockpiling materials, and equipment and material preparation. The proposed project will be performed over an area spanning more than 10 miles and will be completed over four construction seasons (2019 to 2022). Each major modification will require a staging area in close proximity to the construction being performed. Of the nine staging area options, only six will be selected for the proposed project, culminating in an affected area of no more than 5.18 acres based on selection and use of the largest six staging options. Each staging area will be used for one or two construction seasons. Therefore, all six staging areas will not be used at the same time or for the entire period of construction.

Site preparations for both major and minor modifications include preconstruction vegetation removal, constructing setback check berms, and completing appropriate snake conservation measures. Each season of construction (i.e., summer or winter) will be preceded by site preparation activities in the prior season to minimize the effects to the snake. Vegetation removal will primarily consist of cutting back or removing weeds, blackberry vines, and a small number of trees that occur within the footprint of proposed improvements and associated work and staging areas. Below ground and root zone vegetation removal and grubbing will only occur during the snake's active season and will be accomplished with excavation, dozing, and mechanical and hand cutting. Above ground clearing will be accomplished through various means such as mechanical cutting and mowing, hand cutting, grazing, or burning. Cuttings from rooted vegetation trimmed during the snake's inactive season will be left in place until the snake's active season to avoid any below ground disturbance during vegetation removal. Additional site preparation will include the removal of riprap and rodent burrows. This work will be accomplished with excavators, backhoes and other typical construction equipment.

Construction access west of the Union Pacific Railroad culverted undercrossing work was previously assumed adequate for semi-trucks with trailers that would carry construction materials and equipment into the site via Riceton Highway. However, based on the contractor's assessment during a recent pre-construction site visit, safe turning radius for such vehicles from the Riceton Highway onto the Ashley Lateral north levee access road is obstructed by narrow shoulders and an existing concrete headwall and guard rail over the Ashley Lateral. A temporary fill of approximately 140 feet of the Ashley Lateral is proposed to avoid the obstructions and provide safe passage. Aggregate base rock will be placed on top of the fill to provide a temporary drive surface. The fill will be removed prior to the April start of the irrigation season. The work area will be restored, including recontouring the sides of the Ashley Lateral to the original dimensions.

Construction Timing

Figure 1 includes the timing of each segment of construction. While construction typically occurs during the snake's active period (May 1 to September 30), some work will need to occur during the winter when the applicant's water delivery system is offline due to the nature of many of the construction improvements and the need to deliver water to agricultural properties during the growing season. Winter construction activities will include the majority of canal reconstruction, placement of new water control structures, and reconstruction of bridges. The majority of the Lower Traynor Lateral was scheduled for construction during the summer of 2020, but is now scheduled to occur in the fall of 2020, which is considered part of the winter construction season. Preparation for construction at the Lower Traynor Lateral, including the implementation of the proposed conservation measures from the original biological opinion, occurred during the summer of 2020. The Upper Belding Later improvement and the Gerst Lateral Headgate replacement will occur during the winter construction season. **The fill of the Ashley Lateral will be completed as soon as possible in 2021 following the implementation of the relevant conservation measures and will be removed prior to the April start of the irrigation season.**

A portion of canal reconstruction activities will be conducted during the summer, concurrent with the snake's active season and while water will be conveyed to farmers. These activities will be focused in the lower portions of the Traynor and Schwind Laterals. Utilizing existing delivery and drainage ditches, a temporary bypass system will be developed to accommodate continued irrigation water deliveries while portions of the Lower Traynor Lateral is dewatered to facilitate

construction activities. In addition, other summer work will include removing riprap and concrete bank linings from around water control structures and bridges, clearing vegetation from along toe drain, and collapsing rodent burrows along canal banks and water control structures.

A total of **20.214** acres of upland snake habitat will be temporarily affected by the proposed project. Of the total **20.214** acres, **12.13** acres will be compensated at a 1:1 ratio because restoration of snake upland habitat is expected to occur within one year following completion of the proposed project. The remaining 8.084 acres of snake upland habitat will be compensated at a 3:1 ratio for a total of 24.252 acres due to a lag in restoration as a result of soil compaction. A total of **4.80** acres of temporarily affected aquatic snake habitat will be compensated at a 0.5:1 ratio equaling **2.40** acres based on anticipated habitat reestablishment occurring within two years of completion of the proposed project.

A total of 0.908 acre of upland snake habitat will be permanently affected and will be compensated at a 3:1 ratio, which equals 2.724 acres. There will be a net gain of 4.113 acres of aquatic snake habitat due to the increasing width and depth of canals. Based on the overall impacts of the proposed project and the proposed compensation ratios, the compensation for the proposed project will total 36.342 acres.

The 77 acres of wetlands to be preserved for the snake in perpetuity on the Wildlife Area and managed by the Department will be utilized for a portion of the total compensation. Of the total 77 acres, 47.95 acres were used to offset effects to the snake associated with Phase 1; therefore, the remaining 29.05 acres will be incorporated into the compensation for effects to the snake from Phase 2. The remaining 8.257 acres will be purchased from a snake conservation bank, which includes the proposed project within its service area, prior to construction. The **forecasted** compensation in the original biological opinion equaled 10.8 credits, which the applicant purchased on April 9, 2019 (Service File Number 08ESMF00-2019-F-1312-4).

The action area decreased in the first reinitiation of this consultation, which decreased the effects on the snake's habitat, and lowered the amount of compensation needed to offset effects to the snake. This resulted in a balance of 5.515 credits **in excess** that had already been purchased. The action area increased in **the** second reinitiation, which increased the effects on the snake's habitat, and increased the amount of compensation needed to offset effects to the snake. **The applicant purchased an additional 3.22 credits from a Service-approved bank on August 18, 2021 (Service File number 08ESMF00-2019-F-1312-R002-2) to offset effects to the snake associated with the second reinitiation.** However, this resulted in a balance of 2.543 credits **in excess** from the original consultation. **The action area increased by 0.14 acre in the third reinitiation, which increased the effects on the snake's habitat, and increased the amount of compensation necessary to offset effects to the snake. However, the increase in proposed project effects to the snake, which increased the number of credits purchased, results in a balance of 5.673 credits in excess available for the proposed project should future reinitiation be necessary where there are increased effects to the snake as described in the Compensation Reconciliation Process described below.**

The amount of compensation necessary to offset temporary and permanent impacts is summarized here and is provided in a tabularized format in Appendix A (attached). As of the third reinitiation, the proposed project is forecasted to need 37.397 credits to offset temporary and permanent effects to the snake. When the amount of excess credits from Phase 1 (29.05 acres, which is equal to 29.05 credits) is applied to the proposed project, the applicant needed to purchase an additional 8.247 credits. The applicant has purchased

14.02 credits for the proposed project. This equates to a balance of 5.673 credits in excess, which will be used in the Compensation Reconciliation Process. Appendix B (attached) lists a tabularized accounting of the forecasted compensation for the **August 2, 2021**, amended biological opinion.

Compensation Reconciliation Process

In the April 2019 biological assessment, the Bureau provided a process for reconciliation of forecasted habitat effects versus actual habitat effects as the potential for variance exists. The determination of the proposed project's appropriate compensation requirement will be monitored until construction ends. Foreseeable circumstances under which the current forecast of snake habitat effects may change include minor adjustments or finalization of design plans made in concert with forthcoming access agreements, including those made for the inclusion of the Traynor Lateral Bypass, and the contractor's selection and refinement of the staging areas. The continuing potential for variance between anticipated and actual effects and the need to compensate for anticipated affected snake habitat in advance necessitates an adaptive management approach.

A project representative will submit reoccurring effects analyses to the Service and the Department at the end of each stage of construction. If the actual effects to habitat are greater than the forecasted effects to habitat, **the excess credits previously purchased in conjunction with the purchase of** additional credits**, if needed,** will be **used** to ensure that no temporal loss of snake habitat occurs. All effects to habitat described in this biological opinion are forecasted habitat effects. An amended biological opinion is not necessary to purchase additional compensation; however, this consultation should be reinitiated at the end of construction if actual effects exceed forecasted effects.

Project Progress

The proposed project is 90% complete as of the June 21, 2021, request for reinitiation of consultation. Figure 1 also shows the areas where construction is complete.

Conservation Measures

The applicant has proposed the following measures to minimize effects on the snake. The measures proposed below are considered part of the proposed action evaluated by the Service in this biological opinion.

General Conservation Measures

1. A Project Representative, responsible for all communications with the resource agencies, will be assigned to Phase 2 work. Contact information for the Project Representative will be provided to the resource agencies prior to the start of Phase 2 work. The resource agencies will be notified if a substitute Project Representative is selected at any time during Phase 2 work or planning activities.

    a. The Project Representative will notify the resource agencies 14 days before the start of each work phase of the intended work start and compliance with any pre-project conditions of approval outlined in the permits.

b. The Project Representative will also be responsible for notifying the resource agencies of any violations of the terms of the permits. Initial verbal notification will occur immediately and will be supplemented with written notification within 24 hours of the non-compliance incident. Reportable incidents will include, but will not be limited to, both actual and anticipated failures to implement protection measures within the time periods indicated in the permits. If project-related incidental take occurs, or a listed species if otherwise found dead or injured in the project area, notification will include the species, number and location and the permit number. The written report will include the date and time of the incident or finding, location of the animal or carcass, a photograph and explanation as to the cause of take or injury and any other pertinent information.

c. The Project Representative will submit to the resource agencies Annual Status Reports (Annual Reports) and Quarterly Compliance Reports (Quarterly Reports) with due dates based on the calendar year starting January 1, 2021; Annual Reports will be due one month after the end of the calendar year, and Quarterly Reports will be due one month after the end of each quarter. Annual Reports will be submitted until the resource agencies' acceptance of the Final Mitigation Report (Final Report). Annual Reports will include a summary of the Quarterly Report; general description of the status of the project and permitted activities, including actual or projected completion dates; an assessment of the completion and effectiveness of protection measures in avoiding and minimizing or mitigating project impacts, and; all available information on project-related incidental take. Annual Reports will be considered the 4th quarter Quarterly Report.

d. The Project Representative will submit a Final Report, prepared by the Designated Biologist, no later than 90 days after all mitigation measures are completed.

2. Either the Project Representative or the Designated Biologist will compile key information from observation and inspection records into the Quarterly Report to be submitted to the resource agencies. The Quarterly Reports will contain a table of the permit protection measures with notes on their current implementation status and copies of the forms on which listed species observations were reported to the California Natural Diversity Database (Database).

3. A Designated Biologist, knowledgeable and experienced in the biology and life history of the listed species to be addressed in the forthcoming permits, will be assigned to the project to help minimize and fully mitigate or avoid the incidental take of these species during Phase 2 work. The qualifications of the recommended Designated Biologist will be provided to the resource agencies for approval, along with their name and contact information, at least 30 days prior to the start of Phase 2 work.

    a. The Designated Biologist will be on-site during project activities to conduct compliance inspections and monitor exclusion zones, by ensuring that all signs, stakes, and fencing are intact and that permitted activities only occur in the action area, and; check for compliances with all permit conditions to otherwise minimize the incidental take, and prevent unlawful take, of listed species.

b. The Designated Biologist will inspect each construction zone after clearing, grubbing and grading of the zone are completed. During periods of inactivity, the Designated Biologist will conduct compliance inspections at a frequency of once per month or greater.

c. The Designated Biologist, and their trained and qualified representative biologists, will have the authority to stop work activities that are not in compliance with permit conditions or if listed species are otherwise at risk of take. The Designated Biologist will also have the authority to order any supplementary reasonable measures necessary to avoid unauthorized take and shall be consulted on the timing and conditions of the restart of work following any stop work order they may issue. The Designated Biologist will implement a worker education program. Workers will be provided a fact sheet or other summary handout of the information. An interpreter shall be provided to relay the information to non-English speaking workers.

d. The Designated Biologist, and their trained and qualified representative biologists, will maintain a dedicated log of construction-monitoring activities. The Designated Biologist's log will contain the permits with attachments and signatures of all personnel who have successfully completed the education program. All monitoring logs will contain daily written observation and inspection records summarizing: oversight activities and compliance inspections; survey results including observations of listed species and indications of their presence, and; monitoring activities required by the permit. The monitoring logs will be housed on-site during work activities, and offered to the resources agencies for inspection upon request.

e. The Designated Biologist will submit all observations of listed species to the Database concurrent with the submission of the Quarterly Report or Annual Report, whichever report is submitted first relative to the observation.

f. The Final Report prepared by the Designated Biologist will include a summary of the key aspects of the Quarterly Report and Annual Reports, including the table of the protection measures and an assessment of their effectiveness, and the effectiveness of the permit conditions on whole, in minimizing and fully mitigating project impacts on listed species, and recommendations on adaptation of these measures to increase their effectiveness.

4. All workers in the action area will successfully complete an education program prior to work on-site and a refresher annually thereafter until completion of their work on-site. The education program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of listed species, their sensitivity to human activity, their regulatory listing status and related recovery efforts, legal protections and penalties for violations, and project-specific measures mandated by the permits. Workers will sign a form confirming their completion of the education program and understanding of its content, and species protection measures in particular.

5. Dust abatement measures will be implemented during work activities to provide visibility for effective biological monitoring. Water applied to dirt surfaces for this purpose will be

the minimal amount necessary to produce the desired effect and will not be allowed to pool or pond.

6. Erosion control measures which are potentially harmful to species (e.g., monofilament netting and erosion control netting and similar materials), will be prohibited from use in listed species habitat.

7. Listed species habitat within the action area will be clearly delineated with fencing, stakes, or flags.

8. No work activities will be performed outside the action area boundaries. No materials, equipment, or vehicles will be stored outside the limits of pre-approved staging areas.

9. Worker and equipment access to the action area will be limited to established routes that avoid listed species habitat Vehicular traffic within the action area will be restricted to established roads (including Operations and Maintenance access routes along laterals), staging and parking areas and speeds at or below 15 miles-per-hour to avoid road strikes of listed species and dust clouds which would obscure visibility for biological monitoring.

10. The resource agencies will be provided full access to the action area and reasonable access to the construction zones (as safety allows) for the purposes of biological and permit compliance monitoring.

11. A Spill Prevention Plan will be prepared to indicate the proper storage or any hazardous materials or petroleum products and fuels to be used in work activities and response measures, including appropriate response personnel and timing in the event of their accidental release.

12. A trash abatement program will be implemented prior to the start of work activities through the completion of Phase 2 work. Trash and food items will be properly stored in animal-proof containers and removed from the action area at least weekly to discourage the attraction of predatory wildlife to the action area.

13. Upon completion of Phase 2 work, the action area will be returned to pre-project conditions to the extent practical. Post-construction clean-up will include the removal of any and all temporary fill and construction refuse, including but not limited to equipment and parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers and boxes. To the extent practical, these materials will be properly consolidated and contained or removed from construction zones at the end of the work day or when no longer needed.

<u>Snake-Specific Conservation Measures</u>

1. Twenty four hours prior to commencement of construction activities for any work phase, the construction zone and adjacent portions of the action are shall be surveyed for the snake by the Designated Biologist.

    a. The Designated Biologist will provide the Service and the Department with a field report documenting the monitoring efforts within 24 hours of commencement of construction activities.

   b. The Designated Biologist will re-survey the action area for snakes whenever a lapse in project activities of two weeks or greater has occurred.

2. The Designated Biologist will be available during implementation of permitted activities and will have the authority to stop permitted activities until the appropriate corrective measures have been completed or it is determined that the snake will not be harmed.

   a. Any snake encountered during permitted activities will be allowed to move away from danger on its own or be moved by the Designated Biologist.

3. Clearing of vegetation in suitable snake habitat will be confined to the minimal area necessary to facilitate construction activities.

4. All snake habitat within or adjacent to the project will be flagged and designated as an Environmental Sensitive Area to be avoided by all construction personnel and activities, where feasible.

5. Any dredged or excavated material shall be placed outside designated snake habitat.

6. Any snake injured as a result of project-related activities shall be taken immediately by the Designated Biologist to a wildlife rehabilitation or veterinary care facility approved by the Service and the Department in advance of the start of project activities.

   a. The Permittee shall bear any costs associated with the veterinary treatment of injured snakes and shall notify the Service and the Department of the injury immediately, by telephone and email and subsequently through the incident report.

   b. Notification shall include the name of the facility to which the injured snake was taken.

7. To exclude snakes from work areas, prior to the inactive season of October 1 through April 30, barriers consisting of semi-permeable silt fencing shall be installed around all staging areas where staging area margins fall within 200 feet of aquatic snake habitat.

8. The applicant proposes to provide 39.85 acres of compensation for the temporary and permanent effects to snake habitat by purchasing 10.8 snake conservation credits at a Service-approved conservation bank servicing the proposed project area prior to any construction activities. The remaining balance of 29.05 acres from the 77 acres of wetlands to be preserved for the snake in perpetuity on the Wildlife Area and managed by the Department will also be applied as compensation.

Snake Working Group Additional Conservation Measures

The snake working group developed additional conservation measures for the proposed project based on the experiences in Phase 1, where most construction activities occurred during the snake's inactive season, a high density of snakes were encountered in hibernacula within the construction zone, and numerous snake injuries occurred due to the snake's delayed response to disturbances in their lowered metabolic state. These additional measures focus on the preferential sequencing and timing of high-risk activities during the snake's active periods; both the active season and active time of day for the snake were considered.

1. A portion of ground-disturbing activities along canals will occur during the snake's active season (May 1 through September 30) to avoid and minimize take of snake individuals, including removing as much rock riprap, concrete bank lining, water control structures, vegetation, and rodent burrows as feasible in advance of the snake-inactive season construction work.

2. The Designated Biologist will monitor all project-related construction actions involving initial ground disturbance and removal of vegetation, water control structure, riprap, and burrows conducted in the snake's active and inactive seasons. Each Designated Biologist will have the authority to immediately cease any activity that does not comply with the Biological Opinion or Incidental Take Permit. Designated Biologists will be sufficient in number to:

    a. Inspect the immediate work area for presence of snakes;

    b. Monitor the movement of each piece of heavy equipment, and;

    c. Order any other reasonable and appropriate measure to avert the unauthorized take of snakes.

3. Wildlife exclusion fencing will be installed at the junction of the outer edge of the construction work zones for the Traynor and Schwind Laterals and the adjoining rice fields. The fencing will demarcate the limits of the work zones to protect the rice fields from encroachment of personnel and equipment, and will act as a barrier to minimize the likelihood of snake entry into the work zone. The lower six inches of the fence will be buried in a trench and backfilled. One-way exit funnels will be installed in the fence at no more than 150-foot intervals. The exclusionary fencing will be inspected by the contractor before the start of each work day and maintained by the contractor until completion of the project.

4. A snake Handling and Relocation Plan (relocation plan) and an over-arching Environmental Compliance Plan will be prepared for each stage of construction and provided to the Service and the Department for review and approval prior to commencement of construction.

5. Designated Biologists will survey construction zones for the presence of snakes 24 hours prior to the commencement of construction activities. If a snake(s) is observed, all work in the immediate area where the snake(s) is encountered will cease and the animal(s) will be allowed adequate opportunity to leave the area of its own volition. If the snake does not abandon the construction zone:

    a. In the snake inactive season, Designated Biologists will capture and relocate snakes according to the protocols in the relocation plan.

    b. In the snake's active season, the Designated Biologist will advise work crews on areas to be temporarily avoided. If the snake is directly in harms way or if it is determined to be likely to move into the active construction area, the Designated Biologist will capture and relocate the snake according to the protocols in the relocation plan.

c. Designated Biologists will provide the Service and the Department written reports adequately documenting relocation efforts within 24 hours of the completion or relocation activities.

d. The construction area will be re-surveyed by the Designated Biologists whenever a lapse in construction activity of two weeks or greater has occurred.

6. During the snake's active season, canals and toe drains will be dewatered and remain dewatered and absent of aquatic prey for 48 hours prior to the initiation of construction activities. If complete de-watering is not possible, the canal or drain will be thoroughly inspected by a Designated Biologist prior to the commencement of construction. If snakes are found, the Designated Biologist will proceed as indicated in the previous measure. Engineering controls will be instituted as appropriate to prevent snakes from being entrained by the suction of large pumps used in dewatering. Such controls may include installation of a wire cage to create an area of separation between the canal and the intake.

7. The movement of heavy equipment will be confined to construction areas, staging areas, and existing roadways to minimize snake habitat disturbance. Project-related vehicles will observe a 15-miles-per-hour speed limit within construction areas.

8. To the maximum extent feasible, riprap and concrete bank linings will be removed during the snake's active season to support construction work in both the snake's active and inactive seasons. Where feasible, water levels will be raised in conveyance canal work areas to displace snakes and riprap and concrete bank lining removal will be initiated after these areas are inundated. Where it is not feasible to raise water in canals to inundate rock, its removal will be completed in the following sequence:

    a. Remove exposed rock that is above the canal water line, beginning no earlier than 9:00 a.m., to allow snakes to become active. After removal of rock that is above the canal water line, where feasible, immediately lower water level in canal and concurrently remove remaining rock, OR,

    b. Where canal water levels cannot be lowered, remove rock in the following sequence over two consecutive days:

        i. Day 1: Beginning no earlier than 9:00 a.m., remove rock that is above water line and suspend work for the day.

        ii. Day 2: Continue with removal of rock below water line until complete with no restrictions on construction start time.

9. Water control structures will be removed and replaced during the snake's active season where feasible. Where water control structures cannot be removed or replaced during the snake's active season, the area will be prepared for work during the snake's active season by removing vegetation, visible burrows, and riprap from around the water control structure to the extent feasible. These methodologies for removal of water control structures will be incorporated into construction specifications and Bid Documents.

10. Vegetation in construction areas will be removed during the snake's active season preceding construction to the extent practical to facilitate snake active season

construction. Most above-ground vegetation will be removed mechanically (e.g., mowing); however, some areas are too steep to access with larger equipment. The above-ground vegetation will be removed from those areas using a combination of hand labor and power tools (e.g., gas-powered weed eater).

a. Where construction will occur during the snake's inactive season, above-ground vegetation will be removed in late spring through summer of the preceding snake's active season. Vegetation removal work will occur between 11:00 a.m. and 6:00 p.m., when snakes are most likely to be above-ground and active.

b. To the maximum extent practicable, no grubbing or below-ground disturbance will occur as part of vegetation removal during the snake's inactive season.

c. A 15-day lag time will elapse between the completion of above-ground vegetation removal and commencement of root-zone grubbing activities to allow snakes that may be present in the immediate area to move to other more suitable habitat.

11. Excavation of rodent burrows will involve an excavator with an equipment operator, a laborer or spotter, and a Designated Biologist. The Designated Biologist will determine the procedure for removal based on site conditions and expected likelihood of encountering snakes and will monitor the burrow removal. The Designated Biologist may also require additional or different types of equipment to adapt to site conditions. The burrow excavation will primarily occur in the form of either micro-excavation or macro-excavation

a. Micro-excavation will be implemented in areas where the likelihood of encountering snakes is expected to be the highest (e.g., in areas where snakes have been observed during preconstruction surveys). The excavator used in micro-excavation will have a bucket that is 8-12 inches wide. Initially, the Designated Biologist will use a scope with a light to inspect the upper portion of the burrow to determine if a snake is present. If a snake is observed, the burrow will be carefully hand-excavated until the Designated Biologist is able to capture the snake and relocate it from the work area in accordance with the relocation plan. If a snake is not observed, the Designated Biologist will insert a section of pipe or hose into the burrow to mark the portion that was inspected. The burrow then will be mechanically excavated back to the end of the insert. This process will be repeated until the burrow has been excavated to the point where the Designated Biologist can determine that a snake is not present or has removed and relocated any snake that was present. The burrow will then be filled in with soil.

b. Macro-excavation will be implemented in all other portions of the project area where burrows are present. The excavator used in macro-excavation will have a bucket that is 24 inches wide. The excavator will pick up a bucket of soil from the burrow area. The Designated Biologist will examine the soil for any snakes that may be present in the bucket before the soil is deposited on the ground. If a snake is observed in the bucket, the Designated Biologist will capture the snake and relocate it from the work area in accordance with the relocation plan. If no snakes are observed in the bucket, the excavator will deposit the soil on the ground and the soil will be further examined by the Designated Biologist to determine if any snakes are present. If a snake is observed in the deposited soil, the Designated

Biologist will capture the snake and relocate it from the work area in accordance with the relocation plan. If the Designated Biologist determines that a snake is not present in the deposited soil, the excavator will pick up the next bucket of soil from the burrow area and the process will be repeated until the burrows have been excavated to the point that the Designated Biologist can determine that a snake is not present or has removed and relocated any snake that was present. The burrows will then be filled in with soil.

c. Some portions of the project area include very small holes or cracks in the soil that could provide potential burrows for snakes. Due to the smaller size, these burrows will be hand-excavated either by the Designated Biologist or by the Designated Biologist and a laborer provided by the contractor.

d. To the extent practical, rodent burrows will be removed in the latter part of the snake active season prior to snake inactive season construction. Burrow removal work will occur between 11:00 a.m. and 6:00 p.m., when snakes are most likely to be above-ground. After burrows are removed, levee construction activities can proceed with no daily time constraints.

e. Where above-ground vegetative growth is removed after May 1 to facilitate rodent burrow removal, a 15-day lag will occur between the time of completion of vegetation removal and the start of rodent burrow removal activities. In the event of a late spring or early summer precipitation event that may force snakes underground for an extended period, burrow removal activities will cease until dry, warm weather returns. Resumption of burrow removal work will be coordinated with the Designated Biologist.

f. The following procedure will apply to burrows encountered during the snake inactive season work (e.g., those with openings that were hidden behind water control structures and not identified during pre-construction inspection):

    i. The Designated Biologist will direct for a temporary stop in construction work for burrow inspection. If a snake is present, the Designated Biologist will capture and relocate the snake according to the protocols in the relocation plan. During this process, an excavator may be used to assist the Designated Biologist with burrow excavation to allow inspection and snake capture.

    ii. After burrows are inspected and snakes (if any) removed and relocated, the burrows(s) will be collapsed and buried and construction work will resume.

12. Stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to designated construction staging areas and all operations will be confined to the minimal area necessary.

13. Once construction is completed, all construction debris will be removed and, wherever feasible, disturbed areas will be restored. A photo documentation report showing pre- and post- project area conditions will be submitted to the Service and the Department no later than one month after the completion or restoration efforts.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the action area is the 5.64 miles of the linear corridor covering the length of all affected canal segments along with a 200-foot buffer on each side of the center line for the lateral, and areas comprising the locations of additional infrastructure improvements and potential staging areas. The action area also includes all areas up to 330 feet from the construction footprint in which noise from construction activities is expected to exceed ambient levels (derived from Service 2006). For the first reinitiation, 0.75 acre of bypass infrastructure and 10.28 acres of rice fields, which were part of the additional infrastructure improvements in the original consultation, have been removed from the action area since the bypass proposed in the original February 25, 2019, request for consultation will no longer be installed. For **the** second reinitiation, the action area expanded by 1.919 acres to include approximately 3,000 feet of canal with a 200-foot buffer on each side of the center line, approximately 2,323 feet of rice field road, the Upper Belding Lateral headgate, and the Gerst Lateral headgate. **For this third reinitiation, the action area expanded by 0.14 acre to include the temporary fill of the Ashley Lateral.**

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Status of the Species

For the most recent comprehensive assessment of the species' range-wide status, please refer to the *Recovery Plan for the Giant Garter Snake* (Recovery Plan) (Service 2017) and the *Giant Garter Snake (Thamnophis gigas) 5-year Review: Summary and Evaluation* (Service 2020). No change in the snake's listing status was recommended in this 5-year review. The abundance and distribution of the snake has not changed significantly since the previous review, although some populations remain in danger of extirpation due to small population sizes and low habitat quality.

Threats discussed in the review have continued to act on the snake since the 2020 5-year review was finalized, with loss and fragmentation of habitat being the most significant effect.

The historical range of the snake extends from Butte County southward to Buena Vista Lake in Kern County and from the foothills of the Coast Range in the west to the Sierra Nevada in the east. In California, the snake occurs within nine recovery units identified in the Recovery Plan. Each recovery unit corresponds directly to a geographically and genetically distinct snake population. Within these recovery units, the Service has identified a total of 28 management units to assist in managing the implementation of recovery actions. The proposed project is located within the Gray Lodge/Butte Sink Management Unit of the Butte Basin Recovery Unit. While there continue to be losses of snake habitat throughout its range, including the Butte Basin Recovery Unit where the proposed project is located, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the snake.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The proposed project is located within the Gray Lodge/Butte Sink Management Unit of the Butte Basin Recovery Unit, which covers approximately 193,892 hectares within portions of Tehama, Butte, Sutter, and Colusa Counties and includes the Wildlife Area. The proposed project is located directly north of the Wildlife Area and connects to the Wildlife Area boundary at two locations (Evans Reimer Road and West Liberty Road). Vegetation types within the proposed project area consist of valley and foothill grassland, marshes, and swamps along with agricultural land. Rice is the most prevalent crop in the action area, followed by tree orchards, row crops, and alfalfa. Unfarmed land within the action area is often grazed. Suitable snake habitat that occurs within the action area includes rice fields adjacent to canals that provide foraging opportunities and upland habitats with riprap, burrows, and crevices where snakes can find shelter for thermoregulation and open areas for basking. The canals within the action area also provide suitable aquatic habitat for the snake due to the persistent summer water and lack of predatory fish. Some unsuitable snake habitat also occurs within the action area in the form of orchards and pastures.

During Phase 1 activities, 232 snakes were encountered at various stages of construction. The majority of snakes were encountered during work to remove riprap from around existing water control structures and along canal banks, work to remove concrete bank lining, work to demolish existing cast-in-place concrete water control structures, and work to remove vegetation from toe drains to facilitate canal widening. Phase 1 construction provided valuable evidence that, in addition to mammal burrows along banks, snakes are attracted to the cracks in concrete infrastructure components of canals and openings within riprap for thermoregulation.

According to the Database, there are approximately 13 documented known occurrences of snakes within 5 miles of the action area, with the closest occurrence being approximately 0.34 mile from the proposed project (Database 2019). Additionally, during an initial site assessment conducted in April 2011, Eric Hansen captured or positively identified four individual snakes at three separate locations along a portion of the Phase 1 alignment (Hansen 2013). Surveys conducted by the Department in 2012 also verified the presence of snakes at the Wildlife Area, which is located adjacent to the proposed project. This study yielded 12 occurrences of snakes in a relatively small portion of the Wildlife Area (Hansen 2013). Due to the history of documented occurrences, the proximity to other known occurrences, and the suitable habitat within and adjacent to the action area, it is likely that the snake occurs in high numbers within the action area.

The expanded action area **from the second reinitiation** is composed of the main canal for the applicant, irrigation canals, two headgates, rice agriculture, and an orchard. Suitable snake habitat within the action area includes rice fields adjacent to canals that provide foraging opportunities and upland habitats with riprap, burrows, and crevices where snakes can find shelter for thermoregulation and open areas for basking. The canals within the action area also provide suitable aquatic habitat for the snake due to the persistent summer water and lack of predatory fish.

The expanded area in this third reinitiation is composed of approximately 140 feet of the Ashley Lateral that will be filled to provide necessary access for construction. Suitable snake habitat within the expanded action area includes canals that support emergent vegetation and upland habitat with burrows where snakes can find shelter for thermoregulation and open areas for basking. During the active season, the canal provides suitable aquatic habitat for the snake due to the persistent summer water and lack of predatory fish and is a movement corridor for the snake. However, the applicant began draining the Ashley Lateral at the end of the irrigation season in early September 2021 in anticipation of routine Operations and Maintenance work (not covered by this biological opinion), which includes vegetation clearing in this part of the Ashley Lateral. The expanded action area provides suitable upland habitat for the snake.

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Construction activities associated with the proposed project will occur during both the active and inactive season for the snake and will result in temporary and permanent effects to both upland and aquatic snake habitat. Construction during the snake's inactive season is generally discouraged. During this period, snakes are especially vulnerable to ground disturbing activities because they are unable to move quickly away from disturbance and may be inadvertently crushed, trapped, or buried, which may result in death or injury to snakes. While some construction will occur during the snake's inactive season, no winter impacts to uplands are projected for the proposed project due to the adjusted construction schedule and proposed conservation measures. Additionally, effects to aquatic habitat in winter are not considered

relevant because these aquatic habitats do not provide habitat to snakes during the winter while snakes are brumating (Hansen 2019).

Changes to the project description in the first reinitiation will both increase and decrease adverse effects from the proposed project. Activity changes that will increase or introduce new adverse effects include construction activities associated with the Lower Traynor Lateral that will now occur during the snake's inactive season. Snakes at the Lower Traynor Lateral will now be subject to ground-disturbing activities in suitable upland habitat during the winter, which the Service had considered to be available to the snake for brumating starting during the winter in late 2020 and early 2021 should fossorial mammals create burrows soon after completion or the contractors install riprap along the completed canal. The snakes will now have to travel away from the Lower Traynor Lateral to find suitable brumating habitat, which will increase the risk of predation and mortality due to being run over by vehicles.

Activity changes that will decrease adverse effects include not installing the proposed temporary bypass in suitable aquatic habitat. This allows the snake to continue to forage and escape predators in the area proposed for bypass infrastructure installation and the subsequent rice fields that were to be fallowed for the summer of 2020. Additionally, the removal of the bypass eliminated the effect of mortality due to being run over by construction vehicles in the area proposed for the bypass and access roads leading to the bypass.

Changes to the proposed project in **the** second reinitiation will increase the area in which the snake may be adversely affected. Snakes at the Upper Belding Lateral in suitable upland habitat will now be subject to ground-disturbing activities during the winter, which the Service had considered to be available to the snake for brumating. The snakes will now have to travel away from the Upper Belding Lateral to find suitable brumating habitat, which will increase the risk of predation and mortality due to being run over by vehicles.

The snake was anticipated to use the area around the Gerst Lateral Headgate following construction of the levee this past winter. Due to the headgate replacement, snakes will be excluded from using this area for brumation until the following active season. However, snakes at the Gerst Lateral Headgate may not be impacted if fossorial mammals have not created burrows in the levees suitable for the snake to brumate since construction on the canal was finished last winter. While the levee adjacent to the headgate will grow vegetation as anticipated, the area around the headgate will remain barren for another year. The snake will have to use another area for foraging or to escape from predators while the vegetation regrows.

Changes to the proposed project in the third reinitiation will increase the area in which the snake may be adversely affected. Snakes along the Ashley Lateral in suitable upland habitat will now be subject to ground-disturbing activities during the winter, which the Service considers to be available to the snake for brumating, prior to the fill of the Ashley Lateral. The snake will now have to travel away from the Ashley Lateral to find suitable brumating habitat, which will increase the risk of predation and mortality due to being run over by vehicles.

Temporary Effects

Temporary effects to habitat are described as activities that will disturb habitat and potentially result in the injury or mortality of a snake, but habitat will be restored and available to the snake within one to two years of disturbance. Temporary effects will occur in **4.80** acres of aquatic and

20.214 acres of upland snake habitat total. However, a portion of temporary effects to upland habitat associated with canal bank reconstruction (8.084 acres of the total **20.214** acres of upland habitat) may take longer than two years to be restored due to soil compaction from construction. Soil compaction may result in slow revegetation of grasses that provide essential cover for the snake and will limit the ability of ground squirrels to create burrows that the snake needs for brumation during the winter months or refugia from predators and thermoregulation in the summer months.

Other temporary effects to habitat may result from activities involving ground disturbance and cover removal conducted in and near canal banks and toe-drains that serve as habitat for the snake. These activities include clearing and grubbing of vegetation and removal of rodent burrows and riprap as well as excavation of banks and water control structures. Equipment used during these activities can injure or crush a snake if it is basking in upland refugia and does not move away from the construction. Additionally, since snakes utilize small mammal burrows and crevices in canal infrastructure as retreat sites, snakes may be crushed, buried, or otherwise injured from construction activities. The process of scoping burrows and capturing and relocating snakes found within those burrows may cause stress to the snakes resulting in impaired behavior in foraging and reproductive efforts. Mortality during relocation may also occur due to increased exposure to predators while exploring new habitat.

Canals, which serve as aquatic habitat for the snake, will be temporarily affected through the removal of aquatic vegetation and degradation of adjacent rice fields and drainage ditches. Once construction is completed and pre-construction topography and hydrology are reestablished, it is anticipated that aquatic habitat along canals will readily reestablish following construction. Temporary effects to the **4.80** acres of aquatic habitat will result in loss of foraging habitat and possibly cause snakes to move to other areas to find food. Snakes moving to other areas in order to access aquatic habitat for foraging could expose snakes to increased risk of predation and mortality due to being run over by vehicles.

Permanent Effects

Permanent effects to habitat are described as the loss of habitat for the snake and result in injury or mortality of individuals. Permanent effects for the proposed project will be the loss of a portion of upland habitat as a result of canal widening (0.902 acre permanent upland habitat loss). The permanent loss of upland habitat will remove opportunities for the snake to use upland habitat for basking or use as winter refugia. Consequently, individual snakes will no longer be able to thermoregulate above-or below-ground, seek protection from predators, or find hibernacula in these upland areas during its inactive season, which may increase snake mortality. Being displaced to alternative upland and aquatic locations that are located further afield or downstream may also result in displacement to less suitable areas, increased exposure to predators, disruption of foraging, and reduction in reproductive success, all of which may result in higher rates of mortality.

There will also be a net gain of 4.113 acres of aquatic habitat through the widening and deepening of canals. The increase in aquatic habitat will provide increased foraging habitat for the snake along with better aquatic connectivity to the Wildlife Area.

The noise and general activity associated with construction can also cause snakes to move away from the action area. These snakes may disperse from the action area by their own volition or may be captured and relocated by a Service-approved Designated Biologist. Dispersal or capture

and relocation will occur as a result of activities causing both temporary and permanent effects to the snake. These actions may result in stress and additional energy expenditures in snakes that would otherwise be used for foraging to accumulate energy for growth or reproduction. Gravid females in particular may be more sensitive to effects of relocation and dispersal because they require suitable gestation habitat throughout the active season to maintain optimal body temperature. Increased time searching for suitable habitat may also subject snakes to increased exposure to predators.

As noted previously in the *Description of the Action* section, the applicant has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect on the species of the proposed project's anticipated incidental take, resulting from the temporary modification and permanent loss of habitat as described above. The proposed project will result in temporary effects to **4.80** acres of aquatic snake habitat and **20.214** acres of upland snake habitat and permanent effects to 0.908 acre of upland snake habitat. There will also be a net gain of 4.113 acres of aquatic snake habitat.

In total, **37.397** acres of compensatory habitat are proposed to offset the temporary and permanent effects to the snake from the proposed project. The compensatory habitat will partially be in the form of purchasing **14.02** snake conservation credits at a Service-approved snake conservation bank with a service area that covers the proposed project. In addition to the purchase of snake conservation credits, a balance of 29.05 acres of snake habitat exists from the initial 77 acres that was previously set aside on the Wildlife Area in 2015 by the Department. This 29.05 acre balance will be applied to fulfill the remaining portion of compensation for the proposed project. This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of snake, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the *Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project*, as proposed, is not likely to jeopardize the continued existence of the snake. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the conservation measures proposed by the applicant to minimize effects to the snake as well as the permanent loss of snake habitat. The acreage of habitat that will be temporarily and

permanently affected by the proposed project represents a small portion of snake habitat available in the Butte Basin Recovery Unit and a much smaller percentage of habitat available to the snake range-wide. In addition, the compensatory habitat proposed, including the establishment of 77 acres on the Wildlife Area to be managed for the snake in perpetuity, will ensure that habitat for the species will be permanently protected and managed within the Gray Lodge/Butte Sink Management Unit and within the Butte Basin Recovery Unit.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Bureau so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Bureau must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

Due to the proximity to numerous known occurrences of giant garter snakes and the presence of suitable snake habitat, it is anticipated that a significant number of giant garter snakes will be present within the action area. Since the exact number of giant garter snakes within the action area is unknown, the Service has determined that the quantification of incidental take of the giant garter snake for the proposed project may be estimated based on the population density of giant garter snakes that were detected during construction of Phase 1. In Phase 1, 232 giant garter snakes were detected, of which 171 were relocated and salvaged (74%), 43 were killed (18%), and 18 were harmed and injured (8%). Due to the increased size of the action area for Phase 2 compared to Phase 1 (5.64 miles of canal laterals and 4.28 miles respectively), the Service anticipates more giant garter snakes may be encountered during the proposed project. However, due to the additional conservation measures proposed by the Bureau, the Service also anticipates that the number of giant garter snakes injured or killed will be less than Phase 1. These additional

snake conservation measures were derived from the collaborative efforts of the giant garter snake working group.

The giant garter snake is secretive and uses underground burrows for shelter while not in aquatic habitat during the active season and for brumation during the inactive season. The giant garter snake conservation measures ensure that any initial disturbance along the banks will occur as much as feasible during the active season when the snake has better ability to move away. The Service estimates that within the action area, there will be approximately 250 giant garter snakes inhabiting the 5.64 miles of canal lateral improvements. Therefore, the Service anticipates that 213 giant garter snakes (85%) will be captured, 25 giant garter snakes (10%) will be killed and 12 giant garter snakes (5%) will be subject to non-lethal harm. These numbers were based on additional information available to the Service such as discussions with species experts and their experiences with similar projects involving high quality snake habitat. The Service didn't anticipate the amount or extent of take exempted to change due to the proposed changes in the first reinitiation because construction occurring along the Lower Traynor Lateral will be conducting pre-construction activities during the snake's active season and will be following the same conservation measures originally proposed, both of which has minimized take to the snake according to the relocation reports, Quarterly Reports, and Annual Reports that have been submitted to the Service. Therefore, no additional take was exempted in the first reinitiation.

As of the June 21, 2021, request for reinitiation of consultation, the project is 90% complete. According to the reports submitted by the Project Representative, the Designated Biologist has safely relocated 42 snakes while construction activities have killed 4 snakes and injured 2 snakes. The number of snakes encountered has been significantly less than anticipated in the original consultations. Therefore, the Service **didn't** anticipate the amount or extent of take exempted to change **in the second reinitiation** as a result of expanding the action area to include construction along the Upper Belding Lateral and the Gerst Lateral Headgate due to the implementation of the conservation measures originally proposed, which has minimized take of the snake.

As of the September 20, 2021, request for reinitiation of consultation, the project is 90% complete. The only project activities conducted since the August 2, 2021, amended biological opinion was issued are the implementation of snake conservation measures. According to the reports submitted by the Project Representative, the Designated Biologist has safely relocated 51 snakes while construction activities have killed 5 snakes and injured 2 snakes. The number of snakes encountered has been significantly less than anticipated in the original consultations. Therefore, the Service doesn't anticipate the amount or extent of take exempted to change in this third reinitiation as a result of expanding the action area to include temporarily filling the Ashley Lateral for access road improvement for construction activities at the Union Pacific Railroad crossing due to the implementation of the conservation measures originally proposed, which has minimized take of the snake.

By setting these thresholds, we have set an incidental take limit that is measurable, irrefutable, and indicates that the giant garter snake is being affected at a level where avoidance and minimization measures and project implementation need to be evaluated and possibly modified. We conclude that incidental take of the giant garter snake will be considered exceeded if any of the limits defined above are observed by Service-approved biological monitors or other project personnel.

Upon implementation of the following *Reasonable and Prudent Measure*, incidental take of the giant garter snake associated with the *Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project* will be exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the snake.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the snake resulting from implementation of this project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the snake:

1. All conservation measures, as described in the April 2019 biological assessment and the October 7, 2020, letter requesting reinitiation of consultation and restated here in the *Description of the Action* section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the *Terms and Conditions* below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Bureau must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. The Bureau shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the proposed project.

2. In order to monitor whether the amount or extent of incidental take anticipated from implementation of the proposed project is approached or exceeded, the Bureau shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, the Bureau must immediately reinitiate formal consultation, as per 50 CFR §402.16(a).

    a. For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Bureau shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction. This report shall also include any information about changes in project implementation that result in habitat disturbance not described in the *Description of the Action* and not analyzed in this biological opinion.

Salvage and Disposition of Individuals

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved Designated Biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the

location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Sacramento Valley Division Supervisor of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6492.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. The Bureau should work with the Service to assist us in meeting the goals of the Recovery Plan for the snake.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION – CLOSING STATEMENT

This concludes formal consultation on the *Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project.* As provided in 50 CFR §402.16(a), reinitiation of formal consultation is required and shall be requested by the federal agency or by the Service where discretionary federal agency involvement or control over the action has been retained or is authorized by law and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;

2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding the *Gray Lodge Wildlife Area Water Supply Infrastructure Improvement Project*, please contact Sam Sosa, Fish and Wildlife Biologist (samuel_sosa@fws.gov), at (916) 414-6560 or Michelle Havens, Sacramento Valley Division Supervisor (michelle_havens@fws.gov), at (916) 414-6492 or at the letterhead address.

Enclousre:

ec:
Megan Simon, U.S. Bureau of Reclamation, Shasta Lake, California
Juan Torres, California Department of Fish and Wildlife, Rancho Cordova, California
Melissa Murphy, California Department of Fish and Wildlife, Chico, California
Dale Garrison, US Fish and Wildlife Service, Sacramento, California
Pamela Taber, U.S. Bureau of Reclamation, Sacramento, California
Eugene Massa, Biggs-West Gridley Water District, Gridley, California
Virginia Getz, Ducks Unlimited, Rancho Cordova, California

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APPENDIX A

Table 1. Forecasted Compensatory Habitat Acreage Analysis

	Upland Habitat Temporarily Impacted	Ratio	Compensation for Upland Habitat Temporarily Impacted	Aquatic Habitat Temporarily Impacted	Ratio	Compensation for Aquatic Habitat Temporarily Impacted	Upland Habitat Permanently Impacted	Ratio	Compensation for Upland Habitat Permanently Impacted	Aquatic Habitat Permanently Impacted	Ratio	Compensation for Aquatic Habitat Permanently Impacted
Construction Footprint: Canals & Structures	8.084 acres	3:1	24.252 credits	4.24 acres	0.5:1	2.12 credits	0.902 acre	3:1	2.706 credits	(4.115 acres)	N/A	(4.115 credits)
Adjacent Work Areas & Staging Areas	**12.13** acres	1:1	**12.13** credits	**0.56** acre	0.5:1	**0.28** credit	0.006 acre	3:1	0.018 credit	0.002 acre	3:1	0.006 credit
Total			**36.382** credits			**2.40** credits			2.724 credits			(4.109 credits)

Table 2. Final Compensation for Phase 2 Snake Habitat Impacts

Step	Amount
Net Total Compensation for Upland and Aquatic Habitat Impacts	**37.397** credits
Phase 1 Compensation Balance	29.05 acres (equal to 29.05 credits)
Phase 2 Compensation Required	**8.347** credits
Previously Purchased Compensation for Phase 2	**14.02** credits
Phase 2 Compensation Balance	**5.673** credits

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APPENDIX B

Table 1. Forecasted Compensatory Habitat Acreage Analysis **from the August 2, 2021, amended biological opinion.**

	Upland Habitat Temporarily Impacted	Ratio	Compensation for Upland Habitat Temporarily Impacted	Aquatic Habitat Temporarily Impacted	Ratio	Compensation for Aquatic Habitat Temporarily Impacted	Upland Habitat Permanently Impacted	Ratio	Compensation for Upland Habitat Permanently Impacted	Aquatic Habitat Permanently Impacted	Ratio	Compensation for Aquatic Habitat Permanently Impacted
Construction Footprint: Canals & Structures	8.084 acres	3:1	24.252 credits	4.24 acres	0.5:1	2.12 credits	0.902 acre	3:1	2.706 credits	(4.115 acres)	N/A	(4.115 credits)
Adjacent Work Areas & Staging Areas	12.09 acres	1:1	12.09 credits	0.46 acre	0.5:1	0.23 credit	0.006 acre	3:1	0.018 credit	0.002 acre	3:1	0.006 credit
Total			36.342 credits			2.35 credits			2.724 credits			(4.109 credits)

Table 2. Final Compensation for Phase 2 Snake Habitat Impacts **from the August 2, 2021, amended biological opinion.**

Step	Amount
Net Total Compensation for Upland and Aquatic Habitat Impacts	37.307 credits
Phase 1 Compensation Balance	29.05 acres (equal to 29.05 credits)
Phase 2 Compensation Required	8.257 credits
Previously Purchased Compensation for Phase 2	10.8 credits
Phase 2 Compensation Balance	2.543 credits

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer to:
08ESMF00-2022-F-0091-1

December 21, 2021

Laura Loeffler
M-1 Branch Chief, Division of Environmental Management
California Department of Transportation, District 3
703 B Street
Marysville, California 95901
Laura.Loeffler@dot.ca.gov

Subject: Formal Consultation on the County Road 66B Bridge Replacement Project, Glenn County, California (Caltrans Fed. ID# BRLO 5911 (063))

Dear Laura Loeffler:

This letter is in response to the California Department of Transportation's (Caltrans) October 6, 2021, request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed County Road 66B Bridge Replacement Project (proposed project) in Glenn County, California. Your request was received by the Service on October 6, 2021. At issue are the proposed project's effects on the federally threatened giant garter snake (*Thamnophis gigas*) (snake). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action on which we are consulting is the replacement of the County Road 66B bridge over the Colusa Drain in Glenn County. Caltrans has assumed the Federal Highway Administration's (FHWA) responsibilities as the lead agency under the Act for this consultation in accordance with Section 1313, Surface Transportation Project Delivery Program, of the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012. The MAP-21 is described in the National Environmental Policy Act assignment Memorandum of Understanding between FHWA and Caltrans (effective March 30, 2017) and codified in 23 U.S.C. 327. Pursuant to 50 CFR 402.12(j), you submitted a biological assessment for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is likely to adversely affect the snake.

In considering your request, we based our evaluation on the following:

1) Your October 6, 2021, letter requesting initiation of formal consultation;

2) The September 2021 *County of Glenn CR 66B Bridge Replacement Project: Biological Assessment* (biological assessment) prepared by Gallaway Enterprises (consultant);

3) Telephone and email communication between the Service and Caltrans; and,

4) Other information available to the Service.

Consultation History

October 6, 2021: The Service received the October 6, 2021, letter from Caltrans requesting initiation of formal consultation, and the accompanying biological assessment.

October 28, 2021: The Service sent an email to Caltrans asking for additional information about the project description and conservation measures.

November 3, 2021: The Service received an email with the additional information from Caltrans with answers to our questions forwarded from the consultant.

November 8, 2021: The Service sent an email to Caltrans to discuss the feasibility of additional potential conservation measures related to burrow excavation.

November 9, 2021: The Service received a telephone call from Caltrans to discuss burrow excavation measures.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed project is located in rural Glenn County along County Road 66B where it crosses the Colusa Drain irrigation canal between Road Vv and Road W, approximately 2.5 miles northwest of the town of Princeton. Adjacent land use consists of irrigated rice fields, and there are unpaved farm access roads at three of the four corners of the bridge. The primary objective of the proposed project is to replace the existing structurally deficient bridge with a new wider structure, widen the approach roadways, and improving access road alignments. The existing bridge was originally built in 1940 and is approximately 54 feet long and 20 feet wide. It is currently signed as a single-lane bridge and no longer meets the safety and functional needs of the public who use County Road 66B.

The proposed project will construct a new bridge that is a single span, precast prestressed concrete voided slab bridge. This bridge type does not require falsework within the channel. The new bridge will replace the existing bridge on the current existing alignment. Access to the canal will be required to remove the existing bridge supports. Heavy equipment will be required for removal of the existing bridge and construction of the new bridge. Depending on the flows during construction, temporary stream diversion may be required. Other construction activities will include vegetation removal, grading, paving, and fill and rock slope protection (RSP) placement within snake aquatic and upland habitat. The edges of the rice fields along the roadway will be temporarily filled, and small portions of the rice fields will be permanently filled by the new roadway profile. The bridge will be closed during construction, and therefore staging areas, materials storage, and construction operations will primarily occur along the existing roadway.

The proposed project will not involve permanent modification or alteration of Colusa Drain besides the placement of permanent RSP near both bridge abutment supports and abutment

slopes to prevent erosion and scour. RSP is anticipated along the bank for the width of the bridge and approximately 25 feet on either side of the bridge. The only other permanent modifications within the bounds of the Colusa Drain below the ordinary high water mark will be the removal of the old bridge supports. The irrigation ditch on the northwest side of County Road 66B will be filled and realigned to the north.

The proposed project will result in the permanent loss of 0.06 acre of aquatic snake habitat and 0.35 acre of upland snake habitat, for a total of 0.41 acre. The proposed project will also result in the temporary loss of 0.09 acre of aquatic snake habitat and 0.03 acre of upland snake habitat, for a total of 0.12 acre, until construction is complete and the area is restored to pre-project conditions. The proposed project footprint spans an approximately 300-foot section of the Colusa Drain. Burrows along the canal bank and the adjacent unpaved access roads, which the snake may use as refugia, will be excavated after vegetation removal and initial ground-disturbing activities. Excavation will be conducted by the construction contractor with heavy equipment, but will be monitored by a qualified biologist. Once exclusion fencing is installed, if a snake is found within the construction area it will be captured and relocated to suitable habitat by a qualified biologist.

Construction will occur from October 1 – April 30 to minimize disturbance to local agricultural operations. During this time period, Colusa Drain is not utilized for irrigation purposes and water levels will be at their lowest, allowing for bridge accessibility. Disturbance of the channel and banks of Colusa Drain and removal of vegetation will be kept to the minimum necessary to complete the proposed project. Clearing and grubbing will be performed prior to construction outside of the avian nesting season (February 1 – August 31). Following the completion of construction, temporarily disturbed upland and aquatic snake habitat will be restored to pre-project conditions. There are no foreseeable maintenance activities that will affect the snake following completion of the proposed project.

Conservation Measures

The following is a summary of the proposed conservation measures, as outlined in the biological assessment, to minimize effects to the beetle. The conservation measures proposed below are considered part of the proposed action evaluated by the Service in this biological opinion.

1) An erosion control plan that incorporates erosion control best management practices (BMPs) shall be created and implemented prior to the wet season (November 1 – April 1) in order to avoid sediment from entering into aquatic habitat. BMPs shall be implemented that are necessary to minimize the risk of sedimentation, turbidity, and hazardous material spills. Applicable BMPs will include permanent and temporary erosion control measures, including use of straw bales, mulch or wattles, silt fences, filter fabric, and spill remediation material such as absorbent booms.

2) One day prior to the commencement of construction activities, the project area shall be surveyed for the snake by a qualified biologist. The biologist will provide a written report that adequately documents the monitoring efforts. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of 2 weeks or greater has occurred.

3) A Worker Environmental Awareness Training Program for construction personnel shall be conducted by a qualified biologist for all construction workers, including contractors,

prior to the commencement of construction activities. During construction operations, stockpiling of construction materials portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and all operations will be confined to the minimal area necessary.

4) A qualified biologist shall be onsite to monitor for the snake during all vegetation removal and initial ground-disturbing activities. After the initial ground-disturbing activities have been completed, the qualified biologist will monitor the installation of exclusion fencing around the project boundary. The qualified biologist will monitor excavation of suitable snake habitat and bridge removal.

5) Project-related vehicles will observe a 20 mile per hour speed limit within construction areas, except on existing paved roads where they will adhere to the posted speed limits.

6) High visibility fencing will be erected around the habitat of the snake to identify and protect these areas from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing shall be inspected by the contractor before the start of each work day and maintained by the contractor until completion of the project. Fencing will be established in the uplands immediately adjacent to aquatic snake habitat and extending up to 200 feet from construction activities, where feasible. Snake exclusionary fencing will be buried at least 6 inches below the ground to prevent snakes from attempting to burrow or move under the fence.

7) After completion of construction activities, the applicant will remove and temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions Restoration work includes such activities as re-vegetating the banks and active channels with a seed mix similar to pre-project conditions.

8) A photo documentation report showing pre- and post-project area conditions will be submitted one month after the implementation of the restoration.

9) The permanent loss of suitable aquatic and upland habitat for the snake will be compensated for at a 3:1 acre ratio (3 acres of credits to 1 acre of habitat lost) by purchasing conservation credits for the snake at a Service-approved conservation bank with a service area that covers the proposed project. The temporary loss of suitable aquatic and upland habitat for the snake will be compensated for at a 1:1 acre ratio (1 acre of credits to 1 acre of habitat lost) by purchasing conservation credits for the snake at a Service-approved conservation bank with a service area that covers the proposed project. Therefore, Caltrans has proposed to offset the permanent loss of 0.41 acre of snake habitat and the temporary loss of 0.12 acre of snake habitat through the purchase of 1.35 acres of conservation credits for the snake. Credits will be purchased before the commencement of ground disturbing activities.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the 19.7-acre action area encompasses the project footprint, including the bridge and approach roads, and a 200-foot buffer surrounding the project footprint to account for potential noise, vibration, dust, and human disturbance.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Status of the Species

For the most recent comprehensive assessment of the species' rangewide status, please refer to the *Giant Garter Snake (*Thamnophis gigas*) 5-year Review: Summary and Evaluation* (Service 2020). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the June 2020 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of snake habitat throughout the various recovery units, including the Colusa Basin Recovery Unit (Service 2017) where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The action area is located in the Willows Management Unit of the Colusa Basin Recovery Unit (Service 2017). It is surrounded by irrigated rice fields and unpaved farm access roads, and the Colusa Drain irrigation canal flows through the action area. Water flow within Colusa Drain is

influenced by local agricultural practices, and low flows are anticipated from mid-September to April. Colusa Drain features a mud substrate with fairly steep banks. Vegetation within Colusa Drain and the action area are managed, though blackberry and willow thickets are present on the canal banks. Colusa Drain is bordered by unpaved access roads featuring small mammal burrows, and irrigated rice fields are adjacent. Two unnamed, ephemeral drainages run along County Road 66B and into Colusa Drain. The land adjacent to the roads and rice fields consists of annual grassland habitat.

Suitable habitat for the snake consists of a freshwater aquatic component with protective emergent vegetative cover that allows for foraging, an upland component near the aquatic habitat that can be used for thermoregulation and for summer shelter in burrows, and an upland refugia component that will serve as winter hibernacula (Service 2017). A biological habitat assessment was conducted by the consultant on July 10, 2018, to identify potential habitat for the snake. The action area contains suitable aquatic habitat for the snake in Colusa Drain, the two ephemeral drainages, and the surrounding rice fields. Water is present in these features during the snake's active season and vegetation was observed along the edges and banks of the canal for foraging and sheltering. The action area also contains suitable upland habitat for the snake on the canal banks and the adjacent annual grasslands and unpaved roads. There is vegetative cover on the banks of Colusa Drain and there are many small mammal burrows within the unpaved access roads and annual grassland areas.

There are two records of the snake within 5 miles of the action area: one 4.6 miles northeast of the action area and one 4.8 miles west of the action area in the Sacramento National Wildlife Refuge (CNDDB 2021). These occurrences are hydrologically connected to the action area through the system of canals, rice fields, and wetlands in the area. The U.S. Geological Survey has conducted snake surveys in the Colusa Basin Recovery Unit every year from 2016 through 2020 (Halstead, in litt. 2016, 2017, 2018, 2019, 2020). Four general sites have been surveyed in the Willows Management Unit, with one site confirmed to be occupied. This site is approximately 5.9 miles northwest of the action area, just north of the Sacramento National Wildlife Refuge, and is in a canal surrounded by rice fields, similar to the action area. Snakes were trapped using minnow traps and were tagged so that recaptured snakes could be identified. Either 50 or 100 traps were placed in the canal 5 to 20 meters apart, for a trapline length of approximately 1 kilometer (3,280 feet). In total, 2 unique individuals were captured in 2016, 0 in 2017, 10 in 2018, 7 in 2019, and 5 in 2020. This data was not extensive enough to provide precise abundance or density information at the occupied survey site, but the site is clearly able to support at least 10 snakes. The trapline at this site was approximately 10 times longer than the span of the Colusa Drain within the proposed project's footprint, so given that they are both canals surrounded by rice fields and are both located in the Willows Management Unit, it is reasonable to assume that the action area may be able to support $1/10^{th}$ of the number of snakes as the survey site, i.e. 1 snake, assuming they are equally distributed. Because the proposed project is within the range of the snake, suitable habitat for the snake exists within the action area, and the snake is known to occur nearby, it is reasonably likely that the snake is present within the action area.

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the

proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Placement of RSP along the bridge abutments, filling and realigning of the northwest irrigation ditch, widening of roadway approaches, and improving access road alignments will result in the permanent loss of 0.06 acre of aquatic snake habitat and 0.35 acre of upland snake habitat, for a total of 0.41 acre. The permanent loss of this habitat will remove opportunities for the snake to forage in aquatic habitat or to use upland habitat to bask and/or use as winter refugia. Consequently, individual snakes will no longer be able to thermoregulate above- or below-ground, seek protection from predators, or find hibernacula in these upland areas during the snake's inactive season. However, alternative upland and aquatic locations are available in and surrounding the action area.

Vegetation removal and temporary fill of adjacent rice fields for construction access will result in the temporary disturbance of 0.09 acre of aquatic snake habitat and 0.03 acre of upland snake habitat, for a total of 0.12 acre. The temporary disturbance to habitat from construction activities will prevent the snake from using these areas only in the short-term, since the upland and aquatic habitat will be restored to its pre-project condition. While construction activities are occurring, the temporary loss of these habitats will remove opportunities for the snake to forage in aquatic habitat or to use upland habitat to bask and/or use as winter refugia. Consequently, individual snakes will no longer be able to thermoregulate above- or below-ground, seek protection from predators, or find hibernacula in these upland areas during the snake's inactive season until construction is complete and the area is restored to pre-project conditions. However, alternative upland and aquatic locations are available in and surrounding the action area.

Construction activities will be initiated during the snake's active season when snakes are more active and able to move away from construction equipment. Construction activities may result in injury or mortality to the snake. Equipment can injure or crush a snake if it is basking in upland refugia and does not move away from the construction. The noise and general activity can also cause snakes to move away from the construction and make them more vulnerable to injury or mortality from predation as they seek food or shelter in other areas along the creek. However, snakes are generally expected to avoid injury or mortality by avoiding or leaving the construction site, and there is plenty of aquatic and upland habitat in the immediate vicinity for snakes to move to. Snakes are not expected to be present in the construction site during the snake's inactive season due to the exclusion fencing and the continuation of construction activities throughout the snake's inactive season. Burrows will be excavated prior to construction to relocate any snakes that have already entered winter refugia. It is expected that most snakes will move out of the action area of their own accord during the initial vegetation removal and ground disturbing activities before exclusion fencing is installed. However, it is possible that a snake may take refuge from these activities by hiding in a burrow, or that a snake may already be in a burrow preparing for brumation given that the proposed project will start so close to the onset of the snake's inactive season. During burrow excavation, if these snakes do not leave their burrows of their own accord then they will be captured and relocated to suitable habitat outside of the action area by a qualified biologist. In addition, if a snake is found within the construction area after exclusion fencing has been installed, it will be captured and relocated to suitable habitat outside of the action area by a qualified biologist.

As noted previously in the Description of the Proposed Action section, Caltrans has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect

on the species of the proposed project's anticipated incidental take, resulting from the permanent and temporary loss of habitat described above. The compensatory habitat proposed will be in the form of snake conservation credits at a Service-approved conservation bank.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of the snake, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the County Road 66B Bridge Replacement Project, as proposed, is not likely to jeopardize the continued existence of the snake. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following:

1) The amount of snake habitat permanently lost represents a very small portion of the habitat available throughout the Colusa Basin Recovery Unit and the full range of the snake; and,

2) The compensatory habitat proposed will ensure that habitat for the species will be protected and managed in perpetuity.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to

and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by Caltrans so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If Caltrans (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Caltrans must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service anticipates that incidental take of the snake will be difficult to detect or quantify because the snake is secretive and uses underground burrows for shelter while not in aquatic habitat during the active season and for brumation during the inactive season. Not all injured or dead snakes may be detected, as they may be injured or killed while in a burrow, or an injured snake may leave the action area without being seen. In instances in which the total number of individuals that may be taken cannot be determined, the Service may quantify take in the amount of lost or disturbed habitat as a result of the project action; since take is expected to result from these effects to habitat, the quantification of habitat becomes a direct surrogate for the species that will be taken. Therefore, the Service anticipates that within the action area, all snakes inhabiting the 0.06 acre of aquatic habitat and 0.35 acre of upland habitat that will be permanently lost, as well as the 0.09 acre of aquatic habitat and 0.03 acre of upland habitat that will be temporarily disturbed, may be subject to incidental take in the form of injury or death. The Service also anticipates take in the form of capture for all snakes that need to be relocated when excavating burrows prior to construction or if a snake is found within the construction area after exclusion fencing is installed.

Since we cannot estimate the number of individual snakes that will be incidentally taken for the reasons listed above we are providing a mechanism to quantify when take would be considered to be exceeded as a result of implementing the proposed project. Based on the data from another similar site within the Willows Management Unit, it is reasonable to assume that the action area will support at least one snake. Therefore, we expect incidental take of one snake in the form of injury or death, and we will use detection of more than one (1) dead or injured snakes to determine when take is exceeded. By setting a threshold of more than one injured or dead individuals detected, we have set an incidental take limit that is measureable, irrefutable, and indicates that the snake is being affected at a level where avoidance and minimization measures and project implementation need to be evaluated and possibly modified. We conclude that incidental take of the snake will be considered exceeded if more than one dead or injured snakes are detected by biological monitors or other project personnel.

Upon implementation of the following reasonable and prudent measures, incidental take of the snake associated with the County Road 66B Bridge Replacement Project will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the snake resulting from implementation of this project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the snake:

1) All conservation measures, as described in the biological assessment and restated here in the Project Description section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Caltrans must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

a. Caltrans shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the project.

b. Caltrans will provide a copy of the completed bill of sale and payment receipt upon the purchase of snake conservation credits at a Service-approved conservation bank.

c. In order to monitor whether the amount or extent of incidental take anticipated from implementation of the proposed project is approached or exceeded, Caltrans will adhere to the following reporting requirement. Should the anticipated amount or extent of take be exceeded, Caltrans must immediately reinitiate formal consultation, as per 50 CFR §402.16.

d. For those components of the action that will result in habitat loss, degradation, or modification whereby incidental take in the form of harm is anticipated, Caltrans shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction.

e. Caltrans shall immediately contact the Service's Sacramento Fish and Wildlife Office (SFWO) at (916) 414-6492 to report direct encounters between listed species and project workers and their equipment whereby incidental take in the form of, harm, injury, or death occurs. If the encounter occurs after normal working hours, Caltrans shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, Caltrans shall follow the steps outlined in the Salvage and Disposition of Individuals section below.

f. For those components of the action that will require the capture and relocation of any listed species, Caltrans shall immediately contact the SFWO at (916) 414-6600 to report the action. If capture and relocation need to occur after normal working hours,

Caltrans shall contact the SFWO at the earliest possible opportunity the next working day.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instruction s are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Sacramento Valley Division Supervisor of the Ecological Services Program at the SFWO at (916) 414-6600.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) Caltrans should work with the Service to assist us in meeting the goals of the recovery plan for the snake.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the County Road 66B Bridge Replacement Project. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;

2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or

4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Ian Perkins-Taylor, Senior Fish and Wildlife Biologist (ian_perkins-taylor@fws.gov), at (916) 414-6585 or by email, or Michelle Havens, Sacramento Valley Division Supervisor (michelle_havens@fws.gov), at the letterhead address, at (916) 414-6492, or by email.

Sincerely,

MICHAEL FRIS

Digitally signed by MICHAEL FRIS
Date: 2021.12.21 08:41:51 -08'00'

Michael Fris
Field Supervisor

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PROGRAMMATIC BIOLOGICAL OPINION

FOR THE

EAST ALAMEDA COUNTY CONSERVATION STRATEGY

EAST ALAMEDA COUNTY CONSERVATION STRATEGY
PROGRAMMATIC BIOLOGICAL OPINION

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
08ESMF00-2012-F-0092-1

MAY 31 2012

Ms. Jane M. Hicks
Chief, Regulatory Division
San Francisco District
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Subject: Programmatic Biological Opinion for U.S. Army Corps of Engineers (Corps) Permitted Projects Utilizing the East Alameda County Conservation Strategy that May Affect Federally Listed Species in East Alameda County, California (Corps File Number 2011-00230S)

Dear Ms. Hicks:

This document transmits the biological opinion of the U.S. Fish and Wildlife Service (Service) on issuance of permits for projects under the Corps jurisdiction that are utilizing the East Alameda County Conservation Strategy (Conservation Strategy) under section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act), for projects that may affect one or more of the following species: the federally endangered longhorn fairy shrimp (*Branchinecta longiantenna*) and its critical habitat, the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and its critical habitat, the endangered callippe silverspot butterfly (*Speyeria callippe callippe*), the threatened California red-legged frog (*Rana draytonii*) and its critical habitat, the threatened Central California Distinct Population Segment (DPS) of the California tiger salamander (*Ambystoma californiense*) (Central California tiger salamander) and its critical habitat, the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) and its critical habitat, the endangered San Joaquin kit fox (*Vulpes macrotis mutica*), and the endangered palmate-bracted bird's-beak (*Cordylanthus palmatus*). Your office requested consultation on October 25, 2011 and the request was received in our field office on October 28, 2011. This document is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Conservation Strategy addresses 19 focal species: nine state and/or federally listed species and ten non-listed special status species. The Conservation Strategy provides a framework for long-term conservation and management of these species and the habitats that support them. The Conservation Strategy includes measures to protect all 19 focal species as if they are currently

listed as endangered or threatened under the Act and/or the California Endangered Species Act. From a regulatory perspective, this Conservation Strategy is intended to streamline and simplify the issuance of permits for future project proponents, establish priorities for mitigation and conservation, and help maintain native biological and ecological diversity in eastern Alameda County. The Conservation Strategy aims to standardize avoidance, minimization, mitigation, and compensation requirements to comply with Federal (Act, National Environmental Policy Act), state (California Endangered Species Act, California Environmental Quality Act), and local laws and regulations relating to biological and natural resources of the study area.

The Conservation Strategy also provides a framework for future conservation efforts unrelated to mitigation/compensation from project impacts/effects. The Conservation Strategy establishes a baseline condition for acres of protected land in the study area and establishes which land cover types and focal species should be the focus of project planning and conservation efforts. The Conservation Strategy will be used to guide conservation projects, assist in obtaining grants for conservation efforts, contribute to the implementation of the San Francisco Bay Area Upland Goals projects, and promote the protection of wildlife corridors. It is intended to be utilized by various entities including but not limited to landowners, land trusts, non-profit organizations, and municipalities developing their regional planning documents.

Consultation History/Background

In late 2006 and early 2007 Zone 7 Water Agency (Zone 7) and the City of Livermore held discussions with the Service and the California Department of Fish and Game to determine the best approach to streamline consultations and provide meaningful conservation. It was determined at the time that development would not be sufficient to fund a regional habitat conservation plan and a conservation strategy similar to the Santa Rosa Plain Conservation Strategy would be more appropriate. Additional State, Federal, and local entities joined the discussion to form the Steering Committee: Alameda County, Alameda County Congestion Management Agency, Alameda County Resource Conservation District, Alameda County Waste Management Authority, California Department of Fish and Game (CDFG), City of Dublin, City of Livermore, City of Pleasanton, East Bay Regional Park District, Natural Resources Conservation Service, San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the Service, and Zone 7 Water Agency. The Steering Committee met monthly from early 2007 to late 2010 with additional meetings as needed. In order to have public and stakeholder participation, the User Advisory Group was formed and met bimonthly or as needed. The User Advisory Group was comprised of individual rural landowners, home builders, conservation bankers, various local, state, and federal entities, and non-profit environmental groups. Working drafts of chapters were provided to the User Advisory Group for review throughout the process. Several public meetings and smaller outreach meetings were held during the development of the Conservation Strategy. A website (http://eastalco-conservation.org/index.html) was created to allow for further outreach and review. The administrative draft was released to the public in late summer 2010 for review and solicitation of comments. A public meeting followed the release of the administrative draft. The Conservation Strategy was finalized in October 2010 after an extended comment period. The Conservation Strategy is intended to be a "living document" and will be adapted, as needed, during implementation. Please refer to the website for updates. The

Corps requested section 7 consultation for projects that implement the Conservation Strategy with the Service on October 25, 2011.

The Steering Committee intended this Conservation Strategy to be used during the entire project-level analysis, starting at project inception and ending at regulatory permits. Project applicants and resource agencies reviewing project effects/impacts and making decisions about compensation/mitigation should apply the mitigation standards of the Conservation Strategy and determine if the mitigation supports its conservation goals and objectives. Further, it should be determined whether the mitigation contributes to closing one or more conservation gaps for the focal species or natural communities in question within a given Conservation Zone, and ultimately within the Conservation Strategy Study Area. Additionally, the mitigation standards and analysis should not apply to projects that do not incorporate the conservation goals, objectives, and priorities of the strategy. Those projects will require additional analysis and most likely increased mitigation.

The Conservation Strategy is designed to serve as a coordinated approach to conservation in the eastern portion of Alameda County. The Conservation Strategy not only addresses project-level mitigation for potential impacts to species and habitats throughout the eastern part of the county, but also provides a broader, coordinated approach for local conservation efforts beyond those required by regulatory requirements. The conservation goals, objectives, and conservation actions provide a long-term vision of how conservation of resources should be implemented within the Conservation Strategy Study Area (Figure 1).

Conservation Strategy Summary

The Conservation Strategy Study Area encompasses 271,485 acres in eastern Alameda County, California. The western boundary runs along the Alameda Creek watershed boundary which encompasses small portions of the cities of Fremont, Union City, and Hayward, though those jurisdictions were not formally part of the planning process. The northern, southern, and eastern boundaries follow the Alameda County line with Contra Costa County, Santa Clara County, and San Joaquin County, respectively. The Conservation Strategy generalized land cover types to seven natural communities (grassland, chaparral and coastal scrub, oak woodland, conifer woodland, riparian forest and scrub, wetlands, and open water) and two non-natural land cover types (cultivated agriculture and developed). Focal species include the federally listed longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak. Non-federally listed focal species include foothill yellow-legged frog, golden eagle, tricolored blackbird, western burrowing owl, American badger, Central California coast steelhead, San Joaquin spearscale, big tarplant, congdon's tarplant, Livermore Valley tarplant and recurved larkspur.

The Conservation Strategy was designed using a multi-scale approach in accordance with principles of conservation biology. At the largest scale, conservation goals and objectives were developed to encompass ecological processes, environmental gradients, biological diversity, and regional wildlife linkages. Conservation actions were developed to implement these goals and

objectives. These conservation actions occur at the landscape scale or landscape level—generally at the scale of miles or tens of miles. At the middle scale, conservation actions were developed to address natural communities primarily through the enhancement, restoration, and management of vegetation types (i.e., land cover types). This medium scale is called the natural community level. The final scale addresses the specific needs of focal species for protection and enhancement of individuals, populations, and groups of populations. Species-level conservation actions were developed to supplement and focus actions developed at the broader scales and to ensure that all the needs of particular species are addressed.

A conservation gap analysis was conducted to determine the levels of existing protection of species and natural communities in the Conservation Strategy Study Area. The conservation gap analysis provided information on where natural communities occur in the study area, how many acres are currently protected, and how many should be protected for the natural community to persist. This was modeled using similar methods from the San Francisco Bay Area Upland Goals Project. The analysis then focused on finer scale resources such as species occurrences, species habitat, or unique physical features to conserve biological diversity not protected by the broader scale approaches. That additional focus is incorporated through species-level conservation goals and objectives.

The Conservation Strategy Study Area was subdivided into 18 Conservation Zones (Figure 2) based on California Department of Water Resources sub-watersheds to identify locations for conservation actions in areas with the same relative ecological function as those areas where impacts occur. The primary purpose of these Conservation Zones was to describe the specific areas in which conservation actions such as land acquisition will occur, without identifying individual parcels. This focuses the conservation actions in a spatially explicit manner while maintaining the flexibility to conduct these actions on different parcels and using different mechanisms (e.g., acquisition vs. incentives) to meet the conservation objectives. Chapter 4 of the Conservation Strategy discusses the conservation value and conservation acreage goals and recommendations for each Conservation Zone. Recommendations by Conservation Zones were calculated by applying the percentage of a land cover type that needs to be protected throughout the Conservation Strategy Study Area to the fraction of each land cover type in each zone. This approach allows for a more relevant assessment of the importance of resources in each zone during project review and determine where the conservation focus should be for each part of the study area.

Conservation Priorities

Conservation priorities were assessed for focal species on the basis of suitable habitat and designated critical habitat (where applicable) to focus where mitigation/conservation should occur. The conservation priorities in each Conservation Zone were determined by: (1) the rarity of the resource in the zone and in the study area; (2) the current and future threats on the persistence of the resource in the zone and in the study area; and (3) the acreage of the land cover type under protection in each zone relative to its distribution in the study area. These conservation priorities for federally listed species and their habitats in each conservation zone are described in Chapter 4 of the Conservation Strategy and are incorporated by reference.

Goals and Objectives

The conservation goals and objectives provide a long-term vision of how conservation of resources should be implemented in the study area. They were designed to maintain current populations of focal and other native species in the Conservation Strategy Study Area. In some cases, populations of focal species are expected to increase as a result of land preservation, management, habitat enhancement, habitat restoration, and habitat creation. Each conservation goal is supported by several conservation objectives. Conservation goals and objectives will be achieved through the implementation of conservation actions at the project level. These goals and objectives are described in Chapter 3 of the Conservation Strategy and are incorporated by reference.

Standardized Mitigation Ratios for Species

The core of the Conservation Strategy for the focal species is the application of standardized mitigation ratios for each species (Tables 3-4 through 3-12 of the Conservation Strategy; Appendix C of Programmatic BO). Appendices A and B are Tables 3-2 and 3-3 (minimization measures) of the Conservation Strategy. These ratios would be utilized by local jurisdictions and the Service to determine the level of mitigation necessary to offset project impacts. The ratios were developed in collaboration with the Service and based on consideration of sites with habitat quality and species occurrence typical of the study area. Figures 3-6 through 3-16 of the Conservation Strategy show spatially explicit information about how the ratios are applied. When determining the mitigation ratio for a focal species both the species' standardized mitigation ratio table and figure need to be consulted. The intent of the standardized ratios and figures is to keep the mitigation location as close to the impact area with habitat similar or better to where the impacts occur and to keep mitigation within the Conservation Strategy Study Area.

Mitigation ratios are applied to the project site based on actual site conditions and habitat quality. If the project area is more sensitive or if proposed mitigation sites have a higher habitat value, then ratios should be adjusted accordingly. Project applicants evaluate habitat quality based on a scoring system that qualitatively assigns habitat units for each focal species that occurs or may occur on the project site. A scoring system was created for all focal species except steelhead based on each species' life history (see Appendix D in this Programmatic BO and Appendix E in the Conservation Strategy for the scoresheets). Each applicable scoresheet will be completed to reflect project site conditions that are directly related to the habitat quality for each focal species. As discussed above, the assessment of habitat potential on a site will disregard the current land use and management activities that might be compromising the maximum potential habitat quality of the site. Sites with higher quality habitat will score higher for that particular focal species.

The habitat unit scores for project impacts reflect the habitat quality on the site where impacts will occur. While final determinations are subject to site-specific conditions, it is recommended that mitigation generally not be allowed at sites supporting lower quality habitat than the site being affected. However, exceptions can be made where potential mitigation sites with lower quality habitat have the potential to be enhanced or restored to a level of equal or higher habitat

value. If such a determination is made, the enhancements or restoration actions will be completed prior to initiation of project impacts to ensure that the mitigation adequately offsets the impacts.

Calculating Mitigation Ratios

The mitigation needed for each species is determined by multiplying the total acres of focal species habitat that are affected by the mitigation ratios, according to the location of the mitigation site and the mix of mitigation provided. Mitigation ratios are determined by using the mitigation reference map (Figures 3-6 through 3-16 in Chapter 3 of the Conservation Strategy and Appendix C in this Programmatic BO) for the appropriate species and applying the mitigation ratio from the mitigation ratio table (Tables 3-4 through 3-12 in Chapter 3 of the Conservation Strategy and Appendix C in this Programmatic BO) depending on the location of project impact and the location of proposed mitigation.

Less mitigation may also be required if mitigation habitat is of higher quality than affected habitat. For a given species, the species score sheets provided in Appendix E of the Conservation Strategy and Appendix D in this Programmatic BO allow a project applicant and the Service and CDFG to calculate a habitat score for the area that will be impacted by the proposed project. Similarly, these species score sheets would also be used to calculate a habitat score for that species on the proposed mitigation site. For the species in question the mitigation site must score equally or higher than the impact site in order for it to be considered for mitigation purposes. If the score of the mitigation site is higher than the score of the impact site the total mitigation required (as calculated using the Standardized Mitigation Table for that species and Mitigation Reference Map) would be reduced using a Mitigation Correction Factor. The Mitigation Correction Factor for the species in question is the species habitat score for the impact site divided by the species habitat score for the mitigation site. The Mitigation Correction Factor is then multiplied by the total mitigation acreage required when the Standardized Mitigation Ratios for that species are applied. This approach provides incentives for applicants to mitigate close to the impact sites.

For some projects, habitat restoration may be used in lieu of some habitat preservation. If habitat restoration can be provided, less habitat preservation may be required. In all cases, more species habitat will be preserved than affected.

For example, a project is proposed that will affect the Alameda whipsnake in Conservation Zone 13 and is located within a draft recovery unit but outside a critical habitat unit and the compensation site is located within the same draft recovery unit and inside a critical habitat unit. The standard mitigation ratio is 2.5:1 for Alameda whipsnake. Using the scoring sheets based on locations and habitat quality for both the impact site and compensation site, the project impact site score is 18 and the proposed compensation site score is 25. Therefore, the impact site score is divided by the compensation site score and then multiplied by the standard mitigation ratio to determine the adjusted ratio [(18 ÷ 25) x 2.5 = 1.8].

Another example, a project is proposed within grassland habitat within Conservation Zone 7. Using the scoring sheets, the proposed project will affect San Joaquin kit fox habitat (score is 25) and uplands for the Central California tiger salamander (score is 21) and California red-legged frog (score is 34). The project proponent proposes to compensate at a conservation bank near the impact site. The scores for the bank using the score sheets are: 29 for San Joaquin kit fox; 36 for Central California tiger salamander; and 50 for the California red-legged frog. The standard mitigation ratio for the species based on the locations of the impact site and the mitigation bank are: 3:1 for the San Joaquin kit fox; 3:1 for the Central California tiger salamander; and 3:1 for the California red-legged frog. The impact site scores are divided by the compensation site scores and multiplied by the standard mitigation ratios to determine the corrected ratios. The adjusted ratios are: (25 ÷ 29) x 3:1= 2.5:1 for the San Joaquin kit fox; (21 ÷ 36) x 3:1= 1.75:1 for the Central California tiger salamander; and (34 ÷ 50) x 3:1= 2:1 for the California red-legged frog.

As a third example, a project is proposed in Conservation Zone 3 that will affect Central California tiger salamanders, California red-legged frogs and critical habitat, and San Joaquin kit foxes. The habitat scores for the impact site per species are: 40 for the Central California tiger salamander, 45 for the California red-legged frog, and 18 for the San Joaquin kit fox. The project proponent proposes to mitigate in Conservation Zone 10. Using the standard mitigation ratio reference map and tables the standard ratios without the correction factor are: 4:1 for the Central California tiger salamander and 3:1 for the San Joaquin kit fox. The California red-legged frog ratio will be determined by the agencies per the standard mitigation ratio reference map and tables in Chapter 3 of the Conservation Strategy. The habitat scores for the mitigation site using the score sheets are: 21 for the Central California tiger salamander, 33 for the California red-legged frog, and 15 for the San Joaquin kit fox. After reviewing the project effects and compensation, the agencies approve a standard mitigation ratio of 4:1 for the California red-legged frog. The impact site scores are divided by the compensation site scores and multiplied by the standard mitigation ratios to determine the corrected ratios. Therefore, the corrected ratios are: (40 ÷ 21) x 4:1= 7.6:1 for the Central California tiger salamander; (45 ÷ 33) x 4:1= 5.45:1 for the California red-legged frog; and (18 ÷ 15) x 3:1= 3.6:1 for the San Joaquin kit fox.

Implementation and Adaptive Management

In order to track how the strategy is working and update the strategy over time, an Implementation Committee will be formed. The Implementation Committee will form a Public Advisory Committee to discuss technical issues, any lessons learned, and recommendations to the Implementation Committee. The intent is to update the Conservation Strategy in an adaptive manner based on input from all of the stakeholders and new scientific information. Similarly, this programmatic biological opinion may be revised based on changes to the Conservation Strategy. Chapter 5 of the Conservation Strategy outlines the processes for implementation of the multiple aspects of the Conservation Strategy.

Introduction to the Biological Opinion

This programmatic consultation evaluates the effects on the eight federally listed species named above from certain activities authorized by the Corps under Clean Water Act and Rivers and Harbors Act permits in the Conservation Strategy Study Area in eastern Alameda County, California. The purpose of this programmatic document is to streamline section 7 consultations on projects that implement the Conservation Strategy for those eight federally listed species. This programmatic consultation does not evaluate the effects for the non-federally listed focal species or the federally threatened Central California coastal steelhead (*Oncorhynchus mykiss*) focal species.

This programmatic biological opinion (Programmatic BO) with the Corps was developed as a tool to implement the Conservation Strategy and streamline consultations within the action area. The Conservation Strategy is the biological framework upon which this Programmatic BO is based. Since the Conservation Strategy is intended to be a living document via the adaptive management process, this Programmatic BO may be amended or a new one may be written if the Conservation Strategy is changed substantially.

This Programmatic BO is issued to the Corps for permits, enforcement actions or mitigation banks (project(s)) that are under their jurisdiction. Projects that are appended to this Programmatic BO will be provided individual incidental take authorization. Incidental take authorization is not provided in this document. This Programmatic BO will expedite the process for project approval provided all information listed in the next section is provided by the project applicants. The Conservation Strategy and this Programmatic BO provide the framework for compensation, mitigation, conservation, and appropriate minimization measures. The Service will track project effects, compensation and other pertinent information.

This Programmatic BO is based on information provided by the following information and documents: (1) the October 2010 East Alameda County Conservation Strategy Final Draft and corrections; (2) meetings and conversations with the Corps and CDFG; and (3) other information available to the Service.

Procedures for Appending Projects to the Programmatic Biological Opinion

The following information is required from the applicant and will be used by the Corps to evaluate whether a project can be appended to this Programmatic BO:

1. Corps Permit Application including Assessor's Parcel Number(s), Universal Transverse Mercator (UTM) or Latitude and Longitude coordinates, GIS shape files with metadata, and street address of the project;

2. Corps-verified jurisdictional determination;

3. Biological Assessment pursuant to 50 Code of Federal Regulations (CFR) 402.12. The Biological Assessment will include at a minimum:

a. Detailed project and compensation maps with listed species occurrences and critical habitat;
b. Baseline conditions for listed species;
c. Construction and compensation details;
d. Conservation measures; and
e. Effects of the project, conservation measures, and compensation on the listed species.

The Corps will make one of the following determinations of effect for a project by reviewing the Biological Assessment and other information provided by the applicant and will take the identified action:

- *No effect.* The proposed project will not affect listed species or critical habitat. The Corps will not consult with the Service.

- *May affect but is not likely to adversely affect listed species or critical habitat.* The proposed project effects are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and do not reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, for these effects a person would not: (1) be able to meaningful measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. The Corps will consult with the Service for concurrence and forward all biological and other pertinent information.

- *May affect and is likely to adversely affect listed species or critical habitat.* The proposed project has any adverse effect, either as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effects are not: discountable, insignificant, or beneficial. The proposed project may be overall beneficial to listed species, but is also likely to cause some adverse effects. The proposed project anticipates incidental take. The Corps will consult with the Service, requesting that the proposed project to be appended to this Programmatic BO and forward all biological and other pertinent information.

The Service will review the proposed project to evaluate whether it is appropriate to append the project to this Programmatic BO based on the level of effects, avoidance, minimization, and compensation measures. The Service may determine some projects require separate section 7 consultation and will not be appended to this Programmatic BO. If the Service does not concur the project is appropriate to be appended to this Programmatic BO, the Service will notify the Corps in writing. Applicants who have had consultation initiated by the Corps prior to the date of this Programmatic BO may continue with that consultation or may request their project be appended to this Programmatic BO.

Suitability Criteria for Projects to be Appended to the Programmatic Biological Opinion

Actions that fall under this consultation are projects that may adversely affect the above mentioned listed species either by take of individuals, temporary disturbance or permanent loss of habitat, and/or temporary disturbance or permanent loss of critical habitat, but which nonetheless are not likely to jeopardize the continued existence of the listed species and are not likely to destroy or adversely modify critical habitat. In order for individual projects to be appended to this Programmatic BO, they must be consistent with the Conservation Strategy and have been reviewed by the Corps and Service via the procedure described above. Individual projects will be located within the Conservation Strategy Study Area and fall under the list of covered activities in this Programmatic BO. Projects that are not covered activities will not be appended to this Programmatic BO and will require individual formal consultation.

Projects will adhere to the maximum extent practicable the Project-Level Use of the Strategy and Conservation Goals and Objectives as outlined in Chapter 3 of the Conservation Strategy including the Generalized Avoidance and Minimization Measures to Reduce Effects on Focal Species, Species-Specific Avoidance and Minimization Measures, Standardized Mitigation Ratios for focal species, and Impact/Mitigation Scoring of Focal Species Habitat. Projects shall follow Conservation Priorities and Summary actions for their specific Conservation Zone as described in Chapter 4 of the Conservation Strategy. All of these sections have been summarized above.

Compensation for project effects should occur within the Conservation Strategy Study Area for the project to be appended to the Programmatic BO. Consistent with the Conservation Strategy, the Service will consider compensation outside of the Conservation Strategy Study Area on a case by case basis. Any projects wishing to use areas outside of the Conservation Strategy Study Area shall provide a biological rational for not compensating within the Conservation Strategy Study Area. The Service reserves the right to determine if the project and compensation is appropriate to append to this Programmatic BO.

BIOLOGICAL OPINION

Description of the Action

Covered Activities

Development Projects:

- Residential
- Commercial
- Industrial
- Parks
- Public Institutions
- Associated Infrastructure (roads, utilities) for new development and redevelopment
- Park Facilities: Security residences, service yards, staging areas, small interpretive

facilities, campgrounds, and picnic areas (includes utilities, fencing for facilities, water and septic, maintenance)

Infrastructure Projects:

- Power Infrastructure and maintenance (includes transmission lines): New and existing infrastructure; minor construction
- Road Construction and Maintenance: New and existing roads
- Trail Construction and Maintenance: New and existing trails
- Rail Construction and Maintenance: New and existing
- Weather Towers and Maintenance: New and existing towers
- Telecommunication Towers and Maintenance: New and existing towers
- Bridge Construction and Maintenance: New and existing bridges and ramps
- Solar Projects: Installation, operation, and maintenance
- Wind Energy Projects: Installation, operation, and maintenance. Avian and bat effects are not included in this consultation.
- Electrical Co-Generation Plants
- Flood Wall Installation
- Bank Stabilization
- Low Flow Crossings and Maintenance
- Levee Installation and Maintenance
- Sedimentation Basins Construction and Maintenance
- Water Detention Basins Construction and Maintenance
- Drainage Pump Station
- New Flood Control Channel: Excavation and construction
- Flood Control Facilities and Appurtenances
- Culvert Installation and Maintenance
- Grade Control Structures: Construction, maintenance, removal
- Water Diversion Structure Construction and Maintenance. The actual diversion of water is not included in this consultation.
- Retaining Walls
- Water Treatment Plants and Appurtenances
- Water Pipelines and Appurtenances
- Sewer/Wastewater Pipelines
- Pump Stations
- Sludge Beds
- Aqueduct and Transmission System Turnouts: Construction and maintenance.
- Wells: Production, monitoring, cathodic protection and injection.
- Water Storage Tanks: Construction and maintenance
- Water Spreading Basins: For groundwater recharge
- Stream Gage: Installation and repairs
- Recycled Water Projects: Irrigation, recharge
- Solid Waste Discharges: Soil disposal, stockpiles (uncontaminated)
- Groundwater remediation systems

Maintenance Projects:

- Sediment Removal: Flood control channel, basin, stock pond
- Debris Removal: For large trash and woody debris
- Dams and Other Water Impoundments (Existing): Maintenance. New construction or increases in capacity or size are not covered.
- Vegetation Management: Riparian, native, and control of invasive vegetation (dependent on application)

Restoration Projects:

- Pond and/or Stream Restoration/Enhancement/Construction
- Fish Barrier Removal and Modification
- Wetland Construction and Maintenance (if needed)
- Channel Reconfiguration to Increase Complexity for Floodplain Creation and Recontouring
- Species/Habitat Conservation/Restoration Projects

Enforcement Actions:

- Actions Related to Regulatory Enforcement (Act, National Environmental Policy Act California Endangered Species Act, California Environmental Quality Act, Clean Water Act, etc…)

Certain activities will be covered as part of a long term management plan for conservation areas that are managed for listed species as compensation for project effects. These activities may include but are not limited to: integrated pest management, vegetation management, grazing, species surveys, conservation area enhancement actions, fence installation and maintenance, grazing water supply infrastructure installation and maintenance, and pond maintenance.

Minimization Measures

To the maximum extent practicable, projects authorized under this Programmatic BO will be designed and implemented in such a way as to minimize adverse effects to listed species and/or their habitat. To achieve that purpose, the projects will follow the Focal Species Goals and Objectives as described in Chapter 3 of the Conservation Strategy, Generalized Avoidance and Minimization Measures to Reduce Effects on Focal Species (Appendix A of this Programmatic BO and Table 3-2 in the Conservation Strategy), Species-Specific Avoidance and Minimization Measures (Appendix B of this Programmatic BO and Table 3-3 in the Conservation Strategy), Standardized Mitigation Ratios (Appendix C of this Programmatic BO and Table 3-4 in the Conservation Strategy), and Impact/Mitigation Scoring of Focal Species Habitat (Appendix D of this Programmatic BO and Appendix E in the Conservation Strategy).

In addition to the measures in the Conservation Strategy and discussed above, the Service has added the following general and species specific minimization measures. The Service recognizes that not all projects will require all of these measures. The applicant may request modification of these measures, if applicable. However, these measures below will be implemented unless

otherwise modified or waived by the Service in writing.

General Minimization Measures

1. At least 15 days prior to any ground disturbing activities, the applicant will submit to the Service for review and approval the qualifications of the proposed biological monitor(s). A qualified biological monitor means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the listed species.

2. A Service-approved biological monitor will remain on-site during all construction activities in or adjacent to habitat for listed species. The Service-approved biological monitor(s) will be given the authority to stop any work that may result in the take of listed species. If the Service-approved biological monitor(s) exercises this authority, the Service will be notified by telephone and electronic mail within one working day. The Service-approved biological monitor will be the contact for any employee or contractor who might inadvertently kill or injure a listed species or anyone who finds a dead, injured or entrapped individual. The Service-approved biological monitor will possess a working wireless/mobile phone whose number will be provided to the Service.

3. Prior to construction, a construction employee education program will be conducted in reference to potential listed species on site. At minimum, the program will consist of a brief presentation by persons knowledgeable in endangered species biology and legislative protection (Service-approved biologist) to explain concerns to contractors, their employees, and agency personnel involved in the project. The program will include: a description of the species and their habitat needs; any reports of occurrences in the project area; an explanation of the status of each listed species and their protection under the Act; and a list of measures being taken to reduce effects to the species during construction and implementation. Fact sheets conveying this information and an educational brochure containing color photographs of all listed species in the work area(s) will be prepared for distribution to the above-mentioned people and anyone else who may enter the project area. A list of employees who attend the training sessions will be maintained by the applicant to be made available for review by the Service upon request. Contractor training will be incorporated into construction contracts and will be a component of weekly project meetings.

4. Preconstruction surveys for listed species will be performed immediately prior to groundbreaking activities. Surveys will be conducted by Service-approved biologists. If at any point, construction activities cease for more than five consecutive days, additional preconstruction surveys will be conducted prior to the resumption of these actions.

5. To prevent the accidental entrapment of listed species during construction, all excavated holes or trenches deeper than 6 inches will be covered at the end of each work day with plywood or similar materials. Foundation trenches or larger excavations that cannot easily be covered will be ramped at the end of the work day to allow trapped animals an

escape method. Prior to the filling of such holes, these areas will be thoroughly inspected for listed species by Service-approved biologists. In the event of a trapped animal is observed, construction will cease until the individual has been relocated to an appropriate location.

6. Translocation will be approved on a project specific basis. The applicant will prepare a listed species translocation plan for the project to be reviewed and approved by the Service prior to project implementation. The plan will include trapping and translocation methods, translocation site, and post translocation monitoring.

7. Only Service-approved biologists will conduct surveys and move listed species.

8. All trash and debris within the work area will be placed in containers with secure lids before the end of each work day in order to reduce the likelihood of predators being attracted to the site by discarded food rappers and other rubbish that may be left on-site. Containers will be emptied as necessary to prevent trash overflow onto the site and all rubbish will be disposed of at an appropriate off-site location.

9. All vegetation which obscures the observation of wildlife movement within the affected areas containing or immediately adjacent aquatic habitats will be completely removed by hand just prior to the initiation of grading to remove cover that might be used by listed species. The Service-approved biologist will survey these areas immediately prior to vegetation removal to find, capture and relocate any observed listed species, as approved by the Service.

10. All construction activities must cease one half hour before sunset and should not begin prior to one half hour after sunrise. There will be no nighttime construction.

11. Grading and construction will be limited to the dry season, typically May-October.

12. Best Management Practices (BMPs) will be used to minimize erosion and impacts to water quality and effects to aquatic habitat. If necessary, a Storm Water Pollution Prevention Plan (SWPPP) will be prepared.

13. The applicant will ensure a readily available copy of this biological opinion is maintained by the construction foreman/manager on the project site whenever earthmoving and/or construction is taking place. The name and telephone number of the construction foreman/manager will be provided to the Service prior to groundbreaking.

14. The construction area shall be delineated with high visibility temporary fencing at least 4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment outside of the construction area. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site.

15. Silt fencing or wildlife exclusion fencing will be used to prevent listed species from entering the project area. Exclusion fencing will be at least 3 feet high and the lower 6 inches of the fence will be buried in the ground to prevent animals from crawling under. The remaining 2.5 feet will be left above ground to serve as a barrier for animals moving on the ground surface. The fence will be pulled taut at each support to prevent folds or snags. Fencing shall be installed and maintained in good condition during all construction activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site.

16. A Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas shall be removed.

17. Project sites shall be revegetated with an appropriate assemblage of native riparian wetland and upland vegetation suitable for the area. A species list and restoration and monitoring plan shall be included with the project proposal for review and approval by the Service and the Corps. Such a plan must include, but not be limited to, location of the restoration, species to be used, restoration techniques, time of year the work will be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved.

18. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

19. A Service-approved biologist shall permanently remove, from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible. The applicant shall have the responsibility to ensure that their activities are in compliance with the California Fish and Game Code.

Callippe Silverspot Butterfly

1. Preconstruction surveys for the larval food plants of callippe silverspot butterfly will be conducted during typical bloom season during a period from January through April. Any larval food plants found within 300 feet of the project footprint will be clearly marked with pin flagging. Flagged areas will be avoided to the maximum extent practicable and if possible, fenced for avoidance. In addition, orange fencing will be placed along the edge of the work area near any larval food plants to prevent workers and vehicles from entering this area.

2. The applicant and contractors will minimize generation and movement of construction-

related dust through BMPs and SWPPP provisions, such as those that would be conditioned by the SFBRWQCB and Bay Area Air Quality Management District. Specifically, contracts would enforce prudent site watering and application of nontoxic soil stabilizers. The amount of watering will be monitored to ensure polluted runoff from roads does not occur (roads will not be over-watered).

California Red-Legged Frog

1. A Service-approved biologist shall survey the work site immediately prior to construction activities. If California red-legged frogs, tadpoles, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists as provided in the relocation plan. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move California red-legged frogs from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.

2. Bare hands shall be used to capture California red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating individuals. To avoid transferring disease or pathogens of handling of the amphibians, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice."

Central California Tiger Salamander

1. A Service-approved biologist shall survey the work site immediately prior to construction activities. If Central California tiger salamanders, larvae, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists as provided in the relocation plan. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move Central California tiger salamanders from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of Central California tiger salamanders.

2. Bare hands shall be used to capture Central California tiger salamanders. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating individuals. To avoid transferring disease or pathogens of handling of the amphibians, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice."

San Joaquin Kit Fox

1. A qualified Service-approved biologist will conduct a preconstruction survey no more than 30 days before the beginning of ground disturbance or any activity likely to affect San Joaquin kit fox. This measure will be implemented in all off-road construction areas. The biologist will survey the proposed construction area and a 200-foot buffer area around the construction area to identify suitable dens. The biologist will conduct den searches by systematically walking transects spaced 30-100 feet apart through the survey area. Transect distance should be determined on the basis of the height of vegetation such that 100 percent visual coverage of the project area is achieved. If dens are found during the survey, the biologist will map the location of each den as well as record the size and shape of the den entrance; the presence of tracks, scat, and prey remains; and if the den was recently excavated. The biologist will also record information on prey availability (e.g., ground squirrel colonies). The status of the den as defined by the Service should also be determined and recorded. Dens will be classified in one of the following four den status categories:

    a. Potential den: Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is sufficient to conclude that it is being used or has been used by a San Joaquin kit fox. Potential dens comprise: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for San Joaquin kit fox use.

    b. Known den: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radio telemetry or spotlighting data; San Joaquin kit fox signs such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a San Joaquin kit fox.

    c. Natal or pupping den: Any den used by San Joaquin kit fox to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more San Joaquin kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which San Joaquin kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.

    d. Atypical den: Any artificial structure that has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

Written results of the surveys will be submitted to the Service within one week of the completion of surveys and prior to the beginning of ground disturbance and/or construction activities likely to affect San Joaquin kit fox.

2. After preconstruction den searches and before the commencement of construction activities, a qualified Service-approved biologist will establish and maintain the following exclusion zones measured in a radius outward from the entrance or cluster of entrances of each den.

    a. Potential and atypical dens: A total of 4-5 flagged stakes will be placed 50 feet from the den entrance to identify the den location.

    b. Known den: Orange construction barrier fencing will be installed between the construction work area and the known den site at a minimum distance of 100 feet from the den. The fencing will be maintained until all construction-related disturbances have been terminated. At that time, all fencing will be removed to avoid attracting subsequent attention to the den.

    c. Natal/pupping den: The Service will be contacted immediately if a natal or pupping den is discovered at or within 200 feet from the boundary of the construction area.

    d. Construction and other project activities will be prohibited or greatly restricted within these exclusion zones. Only essential vehicular operation on existing roads and foot traffic should be permitted and articulated to the Service. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones.

    e. In cases where avoidance is not a reasonable alternative, limited destruction of potential San Joaquin kit fox dens will be allowed. Potential dens can be removed by careful hand excavation by a Service-approved biologist or under the supervision of a Service-approved biologist, after the dens have been monitored for three days with tracking medium or a remote sensor camera and determined to be vacant of San Joaquin kit foxes. If, during excavation or monitoring, a potential den is determined to be currently or previously used (e.g., San Joaquin kit fox sign found inside) by San Joaquin kit fox, then destruction of the den or construction in that area will cease and the Service will be notified immediately.

3. Vehicle traffic will be restricted to established roads, construction areas, and other designated areas.

4. Grading activities shall be designed to minimize or eliminate effects to rodent burrows. Areas with high concentrations of burrows and large burrows suitable for San Joaquin kit fox dens shall be avoided by grading activities to the maximum extent possible. In

addition, when concentrations of burrows or large burrows are observed within the site these areas shall be staked and flagged to ensure construction personnel are aware of their location and to facilitate avoidance of these areas.

5. Compensate for the loss of San Joaquin kit foxes and suitable habitat by protecting occupied habitat and/or restoring suitable habitat to establish and maintain San Joaquin kit fox presence.

Palmate-Bracted Bird's-Beak

1. Prior to any ground disturbance in the project area, if feasible, all seasonal wetlands and areas containing palmate-bracted bird's-beak, and any suitable habitat will be staked or flagged and a temporary barrier (silt fencing, etc.) will be constructed.

Compensation/Mitigation

Compensation/mitigation in this Programmatic BO is only to minimize adverse effects to the above named federally listed species. This section does not cover mitigation for effects/impacts to state listed species or waters regulated by the Corps or SFBRWQCB.

As stated in the Suitability Criteria, compensation should occur within the Conservation Strategy Study Area. Compensation shall be identified and approved prior to project commencement. Ideally, compensation should be implemented prior to project commencement. If the land acquisition is not acquired and protected prior to project effects, financial assurances will be provided to the Service and a strict timeline for conservation easement recordation and management will be implemented.

Compensation for permanent effects to listed species and habitat can occur through buying credits at a Service-approved conservation/mitigation bank or land acquisition, management, and protection. Species presence must be established and documented on the compensation site. The conservation property will be free of all liens and incompatible leases and easements or they will be terminated or subordinated to the conservation easement. Geological Hazard Abatement Districts will not be allowed to be established on compensation areas, manage compensation sites, or fund endowments for the management of listed species habitat. Compensation sites will follow the Conservation Priorities and mitigation ratios in the Conservation Strategy for the listed species affected by the project and will be subject to success requirements.

Compensation for temporary effects is similar to compensation for permanent effects discussed above with the exception that the affected areas need to be restored to pre-project conditions within 12 months from the commencement of the activity. In addition to restoration, compensation will occur at a 1:1 ratio at a Service-approved conservation/mitigation bank or through land acquisition, management, and protection. Projects that require longer than 12 months from the commencement of the activity to restore their effects will be considered to have permanent effects and will be required to use the standardized mitigation ratios.

Land acquisition can either be in fee title with a permanent conservation easement placed on the property or through a permanent conservation easement without holding fee title. A Service-approved recorded conservation easement is required and a copy will be provided to the Service prior to project implementation or within the specific approved timeframe. A Service-approved resource management plan and long-term maintenance and monitoring endowment must be established. The applicant is required to obtain the approval of the conservation easement holder, land manager, and endowment holder of the compensation area.

Appendix F of the Conservation Strategy provides examples of what the Service requires for compensation (conservation easement template, management plan template, requirements for off-site compensation, performance securities). The Service periodically revises these documents. Contact the Sacramento Fish and Wildlife Office for the most recent templates and guidance (916-414-6600; http://www.fws.gov/sacramento/).

Reporting and Notification

In order to verify compliance with the Programmatic BO, the project applicant will be required to submit reports during various stages of project implementation. Applicants with projects that have relatively small effects or are limited in scope and duration can request the Service waive this requirement. The Service will be notified immediately in writing if the project is not in compliance with the Programmatic BO and/or the accompanying letter appending the project to the Programmatic BO. Documentation will be provided to the Service verifying compliance with pre-project minimization measures no later than 14 calendar days before project implementation.

The applicant will provide monthly compliance and status reports to the Service during construction documenting: (1) dates that construction occurred; (2) photo documentation of construction and applicable minimization measures; (3) pertinent information concerning the success of the project in meeting minimization measures including status of the compensation; (4) an explanation of failure to meet such measures, if any; (5) known project effects on listed species, if any; (6)occurrences of incidental take of listed species, if any; (7) documentation of employee environmental education; and (8) other pertinent information. Applicants with projects that have relatively small effects or are limited in scope and duration can request the Service waive this requirement.

The applicant will submit a post-construction compliance report prepared by the Service-approved biologist to the Sacramento Fish and Wildlife Office within 30 calendar days of the date of the completion of construction activity. This report will compile the monthly reports and detail: (1) dates that construction occurred; (2) photo documentation of construction and applicable minimization measures; (3) pertinent information concerning the success of the project in meeting minimization measures including status of the compensation; (4) an explanation of failure to meet such measures, if any; (5) known project effects on listed species, if any; (5) occurrences of incidental take of listed species, if any; (7) documentation of employee environmental education; (8) as built drawings for the project and any compensation/mitigation features; and (9) other pertinent information.

The Service must be notified within one (1) working day of the finding of any injured listed species or any unanticipated damage to its habitat associated with the proposed project. Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Notification must include the date, time, and precise location of the individual/incident clearly indicated on a United States Geological Survey 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. Dead individuals must be sealed in a sealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site. The Service contact persons are the Coast Bay/Forest Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600; and the Resident Agent-in-Charge of the Service's Division of Law Enforcement, 2800 Cottage Way, Room W-2928, Sacramento, California 95825, at (916) 414-6660.

Non-Compliance and Remedial Actions

Projects that are not in compliance with the Programmatic BO and the accompanying letter appending the project to the Programmatic BO will be required to correct the matter(s) immediately and provide additional compensation. The amount of additional compensation will be determined on case-by-case basis but will be subject to the same requirements as the original compensation. The amount of remedial compensation will increase commensurate with the degree of the violation and the amount of time the project is out of compliance.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area is the Conservation Strategy Study Area encompassing 271,485 acres in eastern Alameda County, California. The western boundary runs along the Alameda Creek watershed boundary which encompasses small portions of the cities of Fremont, Union City, and Hayward, though those jurisdictions were not formally part of the planning process. The northern, southern, and eastern boundaries follow the Alameda County line with Contra Costa County, Santa Clara County, and San Joaquin County, respectively (Figure 1-1).

Analytical Framework for the Jeopardy and Adverse Modification Analyses

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Programmatic BO relies on four components: (1) the Status of the Species, which evaluates the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak's range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the eight

species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the these listed animals; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the longhorn fairy shrimp, vernal pool fairy shrimp, callippee silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox and palmate-bracted bird's-beak; (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on them.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these eight species in the wild.

The jeopardy analysis in this Programmatic BO places an emphasis on consideration of the range-wide survival and recovery needs of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak and the role of the action area in their survival and recovery as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This Programmatic BO does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Programmatic BO relies on four components: (1) the Status of Critical Habitat, which evaluates the rangewide condition of proposed critical habitat for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake in terms of primary constituent elements (PCE)s, the factors responsible for that condition, and the intended recovery function of the critical habitat at the provincial and range-wide scale; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units and; (4) Cumulative Effects which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake critical habitat are evaluated in the context of the range-wide condition of the critical habitat at the provincial and range-wide scales, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional(or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake.

The analysis in this Programmatic BO places an emphasis on using the intended range-wide recovery function of longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Status of the Species

Longhorn Fairy Shrimp

Refer to the *Longhorn Fairy Shrimp (Branchinecta longiantenna) 5-Year Review: Summary and Evaluation* (Service 2007a) for the current Status of the Species.

Longhorn Fairy Shrimp Critical Habitat

A final rule designated approximately 858,846 acres of critical habitat collectively for 4 vernal pool crustaceans and 11 vernal pool plants in 34 counties in California and 1 county in southern Oregon on August 11, 2005 (Service 2005a). On February 10, 2006, a final rule describing species-specific unit descriptions and maps identifying the critical habitat for each individual species was published (Service 2006a). The rule identifies approximately 13,557 acres within 3 critical habitat units in Alameda, Contra Costa, Merced, and San Luis Obispo counties, California.

The PCEs of critical habitat for longhorn fairy shrimp are the habitat components that provide: (1) topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools and providing for dispersal and promoting hydroperiods of adequate length in the pools; (2) depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 23 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands; (3) sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological

processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and (4) structure within the pools consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter. Refer to the final designation of critical habitat for additional information.

Vernal Pool Fairy Shrimp

Refer to the *Vernal Pool Fairy Shrimp (Branchinecta lynchi) 5-Year Review: Summary and Evaluation* (Service 2007b) for the current Status of the Species.

Vernal Pool Fairy Shrimp Critical Habitat

A final rule designated approximately 858,846 acres of critical habitat collectively for 4 vernal pool crustaceans and 11 vernal pool plants in 34 counties in California and 1 county in southern Oregon on August 11, 2005 (Service 2005a). On February 10, 2006, a final rule describing species-specific unit descriptions and maps identifying the critical habitat for each individual species was published (Service 2006a). The rule identifies approximately 597,821 acres within 32 critical habitat units in Jackson County, Oregon, and Alameda, Amador, Butte, Contra Costa, Fresno, Kings, Madera, Mariposa, Merced, Monterey, Napa, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Tehama, Tulare, Ventura, and Yuba counties, California.

The PCEs of critical habitat for vernal pool fairy shrimp are the habitat components that provide: (1) topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools and providing for dispersal and promoting hydroperiods of adequate length in the pools; (2) depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands; (3) sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and (4) structure within the pools consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter. Refer to the final designation of critical habitat for additional information.

Callippe Silverspot Butterfly

Refer to the *Callippe Silverspot Butterfly (Speyeria callippe callippe) 5-Year Review: Summary and Evaluation* (Service 2009a) for the current Status of the Species.

California Red-Legged Frog

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813) (Service 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service 2006b) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2011).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, they also inhabit ephemeral creeks, drainages and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or

near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer, including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5-mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that a 57 percent majority of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. Her study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and under man-made structures; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting

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higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of the larvae is not well studied, but is likely similar to that of other ranid frogs which feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frog, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and

reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the threatened amphibian. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Humans can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, which results in the listed species being more susceptible to the effects of disease.

Recovery Plan: The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long term viability within existing populations. The management strategy identified within the Recovery Plan will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

California Red-Legged Frog Critical Habitat

The Service designated critical habitat for the California red-legged frog on April 13, 2006 (Service 2006b) and a revised designation to the critical habitat was published on March 17, 2010 (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection and; (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known PCEs together with the critical habitat description. Such physical and biological features include, but are not limited to, the following: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, or dispersal and; (5) generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The PCEs defined for the California red-legged frog were derived from its biological needs. The area designated as revised critical habitat provides aquatic habitat for breeding and non-breeding activities and upland habitat for shelter, foraging, predator avoidance, and dispersal across its range. The PCEs and, therefore, the resulting physical and biological features essential for the conservation of the species were determined from studies of California red-legged frog ecology. Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, the Service determined that the PCEs essential to the conservation of the California red-legged frog are: (1) aquatic breeding habitat defined as standing bodies of fresh water (with salinities less than 7.0 parts per thousand), including: natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years; (2) non-breeding aquatic habitat defined as freshwater and wetted riparian habitats, as described above, that may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs. Other wetland habitats that would be considered to meet these elements include, but are not limited to: plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period; (3) upland habitat defined as upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile in most cases and comprised of various vegetational series such as grasslands, woodlands, wetland, or riparian plant species that provides the frog shelter, forage, and predator avoidance. Upland features are also essential in that they are needed to maintain the

hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter and; (4) dispersal habitat defined as accessible upland or riparian dispersal habitat within designated units and between occupied locations within a minimum of 1 mile of each other and that allows for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields, which do not contain barriers (e.g., heavily traveled road without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCEs 1, 2, or 3 as essential to the conservation of the subspecies.

With the revised designation of critical habitat, the Service intends to conserve the geographic areas containing the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the PCEs sufficient to support the life-history functions of the species. Not all life-history functions require all the PCEs and not all areas designated as critical habitat will contain all the PCEs. Refer to the final designation of critical habitat for California red-legged frog for additional information.

Central California Tiger Salamander

Listing Status: On May 23, 2003, we proposed to list the Central California DPS of the tiger salamander as threatened. At that time, we also proposed reclassification of the Santa Barbara County DPS and Sonoma County DPS from endangered to threatened (68 FR 28647). In the same notice, we also proposed a special rule under section 4(d) of the Act to exempt take for routine ranching operations for the Central California DPS and, if reclassified to threatened, for the Santa Barbara and Sonoma County DPSs (68 FR 28668). On August 4, 2004, after determining that the listed Central California population of the California DPS of the Central California tiger salamander was threatened (69 FR 47211), we determined that the Santa Barbara and Sonoma County populations were threatened as well, and reclassified the Central California tiger salamander as threatened throughout its range (69 FR 47212), removing the Santa Barbara and Sonoma County populations as separately listed DPSs (69 FR 47241). In this notice, we also finalized the special rule to exempt take for routine ranching operations for the Central California tiger salamander throughout its range (69 FR 47248).

On August 18, 2005, as a result of litigation of the August 4, 2004 final rule on the reclassification of the California tiger salamander DPSs (*Center for Biological Diversity et al.* v. *United States Fish and Wildlife Service et al.*, C 04-04324 WHA [N.D. Cal. 2005]), the District Court of Northern California sustained the portion of the 2004 rule pertaining to listing the

Central California tiger salamander as threatened with a special rule, vacated the 2004 rule with regard to the Santa Barbara and Sonoma DPSs, and reinstated their prior listing as endangered. The List of Endangered and Threatened Wildlife in part 17, subchapter B of Chapter I, title 50 of the CFR has not been amended to reflect the vacatures contained in this order, and continues to show the rangewide reclassification of the California tiger salamander (salamander[s]) as a threatened species with a special rule. We are currently in the process of correcting the CFR to reflect the current status of the species throughout its range.

Species Description: The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches long (Petranka 1998; Stebbins 2003). California tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. The coloration of the adults generally consists of random white or yellowish markings against a black body. The markings tend to be more concentrated on the lateral sides of the body; whereas other salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

Distribution: The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and Inner Coast Ranges (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet in the Coast Ranges and to approximately 1,600 feet in the Sierra Nevada foothills (Shaffer and Trenham 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.

The Central California tiger salamander occupies the Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties), Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeastern Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties), southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings Counties), and the Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties).

Life History: The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, the species is otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Because they spend most of their lives underground, the animals rarely are encountered even in areas where California tiger salamanders are abundant. Subadult and adult California tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat these amphibians, the relationship with their burrowing hosts is primarily commensal (an association

that benefits one member while the other is not affected) (Loredo *et al.* 1996; Semonsen 1998).

California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for the amphibians. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. California tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.* 1996).

Upland burrows inhabited by California tiger salamanders have often been referred to as aestivation-sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that the animals remain active in their underground dwellings. One study has found that salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because adults arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that they are feeding while underground. A number of direct observations have confirmed this (Trenham 2001; Van Hattem 2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by California tiger salamanders.

California tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993; Trenham *et al.* 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Male California tiger salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham *et al.* 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stock ponds. Ideal breeding ponds are typically fishless, free of non-native predators, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranka 1998).

While in the ponds, adult California tiger salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an average of 814 eggs (Trenham *et al.* 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.* 1996; Trenham 1998a). Adult California

tiger salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer *et al.* 1993).

California tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (Petranka 1998). They have yellowish gray bodies, broad fat heads, large, feathery external gills, and broad dorsal fins that extend well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific tree frogs, western spadefoot toads, and California red-legged frogs (J. Anderson 1968; P. Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water. Young California tiger salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The California tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60 to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

Following metamorphosis, juvenile California tiger salamanders leave their pools and move to upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Wet conditions are more favorable for upland travel but summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable

upland refugia. The peak emergence of these metamorphs in ponds is typically between mid-June and mid-July (Loredo and Van Vuren 1996; Trenham et al. 2000). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for 2 to 5 years (Loredo and Van Vuren 1996; Trenham *et al.* 2000).

Reproductive success for the California tiger salamander is low. Results from one study suggest that the average female bred 1.4 times over their lifespan and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham *et al.* 2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer *et al.* 1993). Some individuals may not breed until they are 4 to 6 years old. While California tiger salamanders may survive for more than 10 years, many breed only once, and in one study, less than 5 percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by California tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). After breeding, adult California tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham *et al.* 2000).

California tiger salamanders are known to travel long distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles from their breeding ponds (Sweet 1998). As a result of a 5-year capture and relocation study in Contra Costa County, Orloff (2011) estimated that captured California tiger salamanders were traveling a minimum of 0.5 miles to the nearest breeding pond and that some individuals were likely traveling more than 1.3 miles to and from breeding ponds. California tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet away (Trenham *et al.* 2001). In addition to traveling long distances during juvenile dispersal and adult migration, salamanders may reside in burrows far from their associated breeding ponds.

Although previously cited information indicates that California tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study

conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile California tiger salamanders were captured in traps placed at 328, 656, and 1,312 feet from a breeding pond instead of 164 feet. Approximately 20 percent of the captured juveniles were found at least 1,312 feet from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile California tiger salamanders were within 2,099 feet of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile California tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet from the breeding pond (Trenham 1998a). Surprisingly, most juveniles captured, even those at 2,100 feet, were still moving away from ponds. In Santa Barbara County, juvenile Santa Barbara County DPS California tiger salamanders have been trapped approximately 1,200 feet away while dispersing from their natal pond (Science Applications International Corporation, unpublished data). This data shows that many California tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult California tiger salamanders were tracked to burrows between 62 to 813 feet from their breeding ponds (Trenham 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously cited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks, than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Threats: The Central California tiger salamander is imperiled throughout its range due to a variety of human activities (Service 2004). Current factors associated with declining Central California tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003); and predation by introduced species. Central California tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and threatened the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extirpated habitat patches). Other threats include disease, predation, interspecific competition, urbanization and population growth, exposure to contaminants, rodent and mosquito control, road-crossing

mortality, and hybridization with non-native salamanders. Currently, these various primary and secondary threats are largely not being offset by existing Federal, State, or local regulatory mechanisms. The Central California tiger salamander is also prone to chance environmental or demographic events, to which small populations are particularly vulnerable.

The Bay Area is located within the Central Coast and Livermore vernal pool regions (Keeler-Wolf *et al.* 1998). Most of the vernal pools in the Livermore Region in Alameda County have been destroyed or degraded by urban development, agriculture, water diversions, poor water quality, and long-term overgrazing (Keeler-Wolf *et al.* 1998). During the 1980s and 1990s, vernal pools were lost at a 1.1 percent annual rate in Alameda County (Holland 1998).

Due to the extensive losses of vernal pool complexes and their limited distribution in the Bay Area region, many Central California tiger salamander breeding sites consist of artificial water bodies. Overall, 82 percent (94) of the identified water bodies from the California Natural Diversity Database (CNDDB) Central California tiger salamander occurrences in Alameda County are stock, farm, or berm ponds used by cattle grazing and/or as a temporary water source for small farm irrigation (CDFG 2011). Without long-term maintenance (sediment removal, berm maintenance, etc.), the longevity of artificial breeding habitats is uncertain relative to naturally occurring vernal pools that are dependent on the continuation of seasonal weather patterns (Shaffer in litt. 2003).

Shaffer *et al.* (1993) found that the East Bay counties of Alameda and Contra Costa supported the greatest concentrations of Central California tiger salamander. Central California tiger salamander populations in the Livermore Valley are severely threatened by the ongoing conversion of grazing land to subdivisions and vineyards (Stebbins 2003). Central California tiger salamanders are under increasing pressure from habitat conversion and urbanization, development (i.e. Dublin Ranch, Fallon Village, Fallon Sports Park, Staples Ranch, and Shea Center Livermore, vineyards), and infrastructure, utility and safety improvement projects (i.e. I-580 Eastbound HOV, I-580/Isabel Avenue Interchange, and I-580/Charro Avenue Interchange). The species' low recruitment and high juvenile mortality makes it particularly susceptible to habitat loss, fragmentation, urbanization, and construction related harm and mortality.

California Tiger Salamander Critical Habitat

The Service designated critical habitat for the Central California tiger salamander on August 23, 2005 (Service 2005c). The rule identifies approximately 199,109 acres in 19 counties in California.

Based on our current knowledge of the life history, biology, and ecology of the species and the relationship of its essential life history functions to its habitat, the Service determined that the Central population of the California tiger salamander requires the following PCEs: (1) standing bodies of fresh water (including natural and manmade (e.g., stock)) ponds, vernal pools, and other ephemeral or permanent water bodies which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall; (2) upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other

underground habitat that California tiger salamanders depend upon for food, shelter, and protection from the elements and predation; and (3) accessible upland dispersal habitat between occupied locations that allow for movement between such sites. Refer to the final designation of critical habitat for additional information.

Alameda Whipsnake

Refer to the *Alameda Whipsnake (Masticophis lateralis euryxanthus) 5-Year Review: Summary and Evaluation* (Service 2011) for the current Status of the Species.

Alameda Whipsnake Critical Habitat

On October 2, 2006, the final rule determining critical habitat for the Alameda whipsnake was published in the **Federal Register** (Service 2006c). The rule identifies approximately 154,834 acres within six critical habitat units in Alameda, Contra Costa, Santa Clara, and San Joaquin counties, California.

Based on our current knowledge of the life history, biology, and ecology of the Alameda whipsnake and the requirements of the habitat necessary to sustain the essential life history functions of the subspecies, we have determined that the PCEs for the Alameda whipsnake are: (1) scrub/shrub communities with a mosaic of open and closed canopy: Scrub/shrub vegetation dominated by low-to medium-stature woody shrubs with a mosaic of open and closed canopy as characterized by the chamise, chamise-eastwood manzanita, chaparral whitethorn, and interior live oak shrub vegetation series (as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California ((Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (CDFG 1998)), occurring at elevations from sea level to approximately 3,850 feet. Such scrub/shrub vegetation within these series forms a pattern of open and closed canopy used by the Alameda whipsnake for shelter from predators; temperature regulation, because it provides sunny and shady locations; prey-viewing opportunities; and nesting habitat and substrate. These features contribute to support a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds; (2) woodland or annual grassland plant communities contiguous to lands containing PCE 1: Woodland or annual grassland vegetation series comprised of one or more of the following: blue oak, coast live oak, California bay, California buckeye, and California annual grassland vegetation series (as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (CDFG 1998)) are PCE 2. This mosaic of vegetation is essential to the conservation of the Alameda whipsnake because it supports a prey base, consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds. This provides opportunities for foraging by allowing snakes to come in contact with and visualize, track, and capture prey (especially western fence lizards along with other prey such as skinks, frogs, birds); short and long distance dispersal within, between, or to adjacent areas containing essential features (i.e., PCE 1 or PCE 3); and contact with other Alameda whipsnakes for mating and reproduction; and (3) lands containing rock outcrops, talus, and small mammal burrows within or adjacent to PCE 1 and or PCE 2. These areas are essential to the conservation

of the Alameda whipsnake because they are used for retreats (shelter), hibernacula, foraging, and dispersal, and provide additional prey population support functions. Refer to the final designation of critical habitat for additional information.

San Joaquin Kit Fox

Refer to the San *Joaquin Kit Fox (Vulpes macrotis mutica) 5-Year Review: Summary and Evaluation* (Service 2010b) for the current Status of the Species.

Palmate-Bracted Bird's-Beak

Refer to the *Palmate-bracted bird's-beak (Cordylanthus palmatus = Chloropyron palmatum) 5-Year Review: Summary and Evaluation* (Service 2009b) for the current Status of the Species.

Environmental Baseline

Urban

The Conservation Strategy Study Area encompasses 271,485 acres in eastern Alameda County, California. The cities of Dublin, Livermore, and Pleasanton are completely included in the Conservation Strategy Study Area and a portion of the cities of Fremont, Union City, and Hayward are included in the Alameda Creek watershed boundary. Located between the urban areas surrounding the San Francisco Bay and the Central Valley, east Alameda County has had considerable growth pressure in the recent past. In 1990, the population was approximately 133,000 and will most likely exceed 250,000 by 2010, representing an 88 percent growth (Alameda County Community Development Agency 2002 as cited in the Conservation Strategy (ICF International 2010)). The Association of Bay Area Governments has projected that the populations of Livermore, Pleasanton, and Dublin will grow to 89,600; 75,300; and 56,800 by the year 2015, and 95,500; 79,100; and 62,700 by the year 2020, respectively (Association of Bay Area Governments 2006 as cited in the Conservation Strategy (ICF International 2010)).

Alameda County has an urban growth boundary via voter approved Measure D and the general plans of the cities of Livermore, Pleasanton, and Dublin have designated urban growth boundaries. Development, however, is not precluded from occurring outside of the urban growth boundaries. In general, development outside of an urban growth boundary requires an amendment to a general plan.

Open Space

In east Alameda County, California Department of Parks and Recreation owns Bethany Reservoir State Recreation Area (802 acres), Carnegie State Vehicular Recreation Area (3,850 acres), and Lake Del Valle State Recreation Area (5,005 acres) (State of California 2008 as cited in the Conservation Strategy and Figure 2-3 of the Conservation Strategy (ICF International 2010)). Bethany Reservoir is the northern terminus of the California Aqueduct. The associated Bethany Reservoir State Recreation Area provides opportunities for water recreation, including fishing

and windsurfing as well as biking along the California Aqueduct Bikeway. Carnegie State Vehicular Recreation Area is located on the eastern edge of the study area and straddles the Alameda/San Joaquin County line. The park provides active motorized riding areas on a diversity of terrain ranging from rolling hills to steep canyons. Lake Del Valle State Recreation Area surrounds Lake Del Valle and provides hiking, horseback riding, and water recreation. It is also the eastern gateway to the 28-mile Ohlone Trail and is operated by East Bay Regional Park District (EBRPD).

EBRPD manages regional parks, regional preserves, and trails in the Conservation Strategy Study Area. Regional parks in the Conservation Strategy Study Area are Del Valle Regional Park (5,005 acres), Pleasanton Ridge Regional Park (3,387 acres), and Vargas Plateau Regional Park (1,043 acres) (Figure 2-3 of the Conservation Strategy (ICF International 2010)). A regional park must be at least 500 acres, including land and water, and must include scenic or natural resources in at least 70 percent of the park area and have the capacity to accommodate a range of recreational activities, as long as recreational areas are less than 30 percent of the overall park area (EBRPD 1997). Regional preserves in the Conservation Strategy Study Area are Sunol Regional Wilderness (6,881 acres), Ohlone Regional Wilderness (8,714 acres), Brushy Peak Regional Preserve (406 acres), and Mission Peak Regional Preserve (470 acres) (Figure 2-3 of the Conservation Strategy (ICF International 2010)). The primary objective of a regional preserve is to preserve and protect significant natural or cultural resources.

Lawrence Livermore National Laboratory owns and operates Site 300, located in eastern Alameda and western San Joaquin Counties north of Corral Hollow Road (Figure 2-3 of the Conservation Strategy (ICF International 2010)), for the purpose of conducting unique scientific experiments and explosive tests. The site is approximately 7,000 acres in size, 803 acres of which is in the Conservation Strategy Study Area. Site 300 is inhabited by a diverse assemblage of flora and fauna and less than 5 percent of the property-area is developed. Developed areas with buildings are generally separated from wildland settings with high-security fences.

Within the Conservation Strategy Study Area, Livermore Area Recreational and Park District (LARPD) currently owns and operates two open space parks: Sycamore Grove Park/Veterans Park (774 acres) and Holdener Park (55 acres); and one open space preserve, Garaventa Wetlands Preserve (24 acres). LARPD owns 507 acres of Brushy Peak Regional Preserve (the remainder is owned by EBRPD), but the entire preserve is managed by EBRPD. Overall, LARPD parks and preserves represent 1,360 acres of natural open space and also owns and manages several trail facilities (LARPD 2008 as cited in the Conservation Strategy (ICF International 2010)).

The San Francisco Public Utilities Commission (SFPUC) owns, leases, and manages 23,000 acres of watershed lands located in Conservation Strategy Study Area (Figure 2-3 of the Conservation Strategy (ICF International 2010)) in the Alameda Watershed. The remaining 13,000 acres occur in Santa Clara County. While the primary purpose of SFPUC watershed lands is for watershed protection, the agency also uses the watershed lands for several other purposes, including quarry operations, plant nurseries, utilities routing, and water conveyance.

The entire area provides habitat for a variety of wildlife and is managed under a grazing management plan to enhance native flora and fauna.

The Tri-Valley Conservancy oversees conservation easements and manages lands in eastern Alameda County, including north and south Livermore, south Pleasanton, west Altamont Hills area, and the future Chain of Lakes Recreation Area. The purpose of the Tri-Valley Conservancy is "to permanently protect the fertile soils, rangelands, open space, and biological resources and to support a viable agricultural economy in the Tri Valley Area" (Tri-Valley Conservancy 2005 as cited in the Conservation Strategy (ICF International 2010)). The Tri-Valley Conservancy protects lands through acquisitions, conservation easements, deed restrictions, conditional transfers, reverter clauses, management agreements, leases, mutual covenants, and donations. The Tri-Valley Conservancy also has ongoing stewardship programs for acquired lands.

The Conservation Strategy Study Area contains thousands acres of private agriculture and rangeland. Most of this land is either in vineyards, used for livestock production, or is in dry land farming. The Conservation Strategy Agriculture and Rangelands land use planning category comprises 167,449 acres (approximately 61.7 percent) of the Conservation Strategy Study Area. Rangeland in the northeastern portion of Alameda County also falls within the Wind Resource Area and many private ranches have existing wind energy facilities.

Please refer to Chapter 2-Evironmental Setting of the Conservation Strategy (ICF International 2010) for more information on the general physical, biological and habitat based resources, and land use within the Conservation Strategy Study Area.

Longhorn Fairy Shrimp

Threats to longhorn fairy shrimp in the action area include wind energy, habitat alteration and degradation as a result of development and changes to natural hydrology, recreational activities (e.g., off-highway vehicles and hiking), erosion, contamination, environmental disturbances, including severe drought, degradation of habitat from invasive weedy plant species, inappropriate grazing regimes, and other unforeseen events (Service 2005b, 2007a).

All of the known localities of this species in the Conservation Strategy Study Area are within the Brushy Peak Preserve and are currently protected (Service 2007a). The Brushy Peak Preserve contains one of the four known populations of longhorn fairy shrimp. The Brushy Peak Preserve is within one of the five Altamont Hills Core Recovery Areas in the Livermore Vernal Pool Region. General recovery criteria include: (1) habitat protection; (2) adaptive management and monitoring; (3) status surveys; (4) research; and (5) participation and outreach. The recovery plan established the following criteria for downlisting the longhorn fairy shrimp in the Altamont Hills Core Recovery Areas: (1) 100 percent protection of known occurrences range-wide and (2) 95 percent protection of suitable habitat in this core area.

Informal monitoring of known populations of fairy shrimp has occurred within the Brushy Peak Preserve. There are several vernal pools that have longhorn fairy shrimp within the 507-acre Brushy Peak Preserve, which is owned by the LARPD and managed by the EBRPD (Steve

Bobzien, personal communication, 2007 as cited in Service 2007a). The exact number of vernal pools within this preserve containing this species has not been quantified. The Brushy Peak Preserve contains rock outcrops with multiple indentations that seasonally pool water and support longhorn fairy shrimp. The number of pools supporting longhorn fairy shrimp varies from year to year (Steve Bobzien, personal communication, 2007 as cited in Service 2007a).

There is also potential for longhorn fairy shrimp to occur in unprotected areas that have not been surveyed for fairy shrimp species, particularly in areas south of the Brushy Peak Preserve (Service 2007a). The Conservation Strategy has modeled areas of suitable habitat within Conservation Zones 2, 4, 5, 6, 7, and 9. However, some habitat may have been too small to be mapped and not captured in the model.

The Service has determined it is reasonable to conclude the longhorn fairy shrimp inhabits the action area based on the recent observations of this animal the biology and ecology of the species, and the presence of suitable habitat.

Longhorn Fairy Shrimp Critical Habitat

Longhorn fairy shrimp critical habitat Unit 1B is located within Conservation Zones 5 and 6 in the Conservation Strategy Study Area. Unit 1A in Contra Costa and Unit 1B in Alameda County combine for a total of 791 acres. Approximately 133 acres occur in Conservation Zone 5 and 354 acres in Conservation Zone 6 for a total of 487 acres in Unit 1B. Of those, approximately 133 acres in Conservation Zone 5 and 134 acres in Conservation Zone 5 are unprotected. This unit was known to be occupied by longhorn fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). These features of the critical habitat, which are present in Unit 1B, are essential to the recovery of the species.

Vernal Pool Fairy Shrimp

Threats to vernal pool fairy shrimp in the action area include habitat loss in the form of habitat alteration and degradation as a result of development, agricultural conversion, and changes to natural hydrology, invasive species, incompatible grazing regimes, including insufficient grazing for prolonged periods; recreational activities (e.g., off-highway vehicles and hiking), erosion, and contamination (Service 2005b, 2007b).

The Conservation Strategy Study Area contains two of the five Altamont Hills Core Recovery Areas and is in the Livermore Vernal Pool Region. The two Core Areas are located in the Springtown Preserve area in Livermore and within the Brushy Peak Preserve in Conservation Zones 4, 5, and 6. The Brushy Peak Preserve contains known occurrences of vernal pool fairy shrimp in small rock pools on sandstone outcrops (Service 2007b). General recovery criteria include: (1) habitat protection; (2) adaptive management and monitoring; (3) status surveys; (4)

research; and (5) participation and outreach. The recovery plan established the following criteria for delisting the vernal pool fairy shrimp in the Altamont Hills Core Recovery Areas: (1) 80 percent protection of known occurrences range-wide and (2) 85 percent protection of suitable habitat in this core area.

The CNDDB lists four vernal pool fairy shrimp occurrences within the Conservation Strategy Study Area (three in Livermore and one east of Livermore) (CDFG 2011). However, through section 7 consultations the Service is aware of additional occurrences within the Conservation Strategy Study Area. Some of these occurrences are located in man-made ditches and roadside depressions, as well as in vernal pools and seasonal wetlands.

The Conservation Strategy has modeled areas of suitable habitat within Conservation Zones 2, 4, 5, 6, 7, and 9. However, some habitat may have been too small to be mapped and not captured in the model.

The Service has determined it is reasonable to conclude the vernal pool fairy shrimp inhabits the action area based on the recent observations of this animal the biology and ecology of the species, and the presence of suitable habitat.

Vernal Pool Fairy Shrimp Critical Habitat

The vernal pool fairy shrimp Altamont Hills critical habitat unit is comprised of three subunits (19A–19C), located in the general vicinity of Mount Diablo and Morgan Territory Regional Park, and comprises approximately 7,892 acres in Contra Costa and Alameda Counties. Vernal pool fairy shrimp critical habitat Unit 19C is located within Conservation Zones 4 and 5 in the Conservation Strategy Study Area. Approximately 1,378 acres occur in Conservation Zone 4 and 77 acres in Conservation Zone 5 for a total of 1455 acres in Unit 19C. Of those, approximately 892 acres in Conservation Zone 4 and 60 acres in Conservation Zone 5 are unprotected. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). These features of the critical habitat, which are present at the site, are essential to the recovery of the species.

Callippe Silverspot Butterfly

Threats to callippe silverspot butterflies in the action area include illegal collection, habitat loss and degradation from human activities, including off-road vehicle use, trampling by hikers and horses, inappropriate levels of grazing, fire suppression, pesticide use, air pollution, and invasive exotic vegetation (Service 2009a)

The callippe silverspot butterfly is found exclusively within grassy hills surrounding San

Francisco Bay that support its native host-plant, *Viola pedunculata* (California golden violet or Johnny jump-up) (Service 2009a). The Conservation Strategy has mapped potential habitat for the callippe silverspot butterfly in all Conservation Zones excluding Conservation Zones 6, 7, and 10.

Populations within the Conservation Strategy Study Area have been observed; however, their taxonomic status as *S. c. callippe* has not been verified, according the 5-Year Review (Service 2009a). These include a population in the hills in the City of Pleasanton (Mattoon in litt. 1992; LSA Associates 2002) and a population along the watershed to the east of Calaveras Reservoir (just east of the city of Milpitas) (Arnold 2004a, b). Dr. Arnold noted that the individuals from the Calaveras reservoir population displayed morphological characteristics intermediate between the callippe silverspot butterfly and Comstock's silverspot butterfly (*S. c. comstocki*); however, Dr. Arnold judged this population was closer in appearance to the callippe silverspot butterfly (Arnold 2004a, b). Another population was identified with similar intermediate morphological characteristics in the proposed second phase of the Ohlone Preserve Conservation Bank.

California Red-Legged Frog

Threats to California red-legged frogs in the action area include habitat loss and degradation from human activities, including development, off-road vehicle use and various forms of recreation, inappropriate levels of grazing, agriculture, flood control maintenance, herbicide and pesticide use, and by non-human activities such as predation by introduced species and/or feral animals (Service 2002, 2010).

There are 128 occurrences within or immediately adjacent to the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed throughout all of the Conservation Zones. The Conservation Strategy has mapped potential breeding and upland habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the California red-legged frog inhabits the action area.

The Conservation Strategy Study Area is located within the East San Francisco Bay Core Area of the South and East San Francisco Bay Recovery Unit. The recovery plan established the following conservation needs for the East San Francisco Bay Core Area: (1) protect existing populations; (2) control non-native predators; (3) study effects of grazing on riparian corridors, ponds, and uplands (e.g., on EBRPD lands); (4) reduce impacts associated with livestock grazing; (5) protect habitat connectivity; (6) minimize effects of recreation and off-road vehicle use (e.g., Corral Hollow watershed); (7) avoid and reduce impacts of urbanization; and (8) protect habitat buffers from nearby urbanization (Service 2002).

Numerous recent developments have reduced habitat and known California red-legged frog populations: Schaefer Ranch in west Dublin; Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore.

California Red-Legged Frog Critical Habitat

The Conservation Strategy Study Area is within California red-legged frog critical habitat units CCS-2B, ALA-1A, ALA-1B, and ALA-2 for a total of 148,105 acres. Approximately 21,981 acres are protected and 126,033 acres are unprotected.
California red-legged frog critical habitat unit CCS-2B, a subunit of the CCS-2, Mount Diablo Unit, occurs in Conservation Zones 2, 3, 4, 5, 6, and 7. Approximately 81 acres occur in Conservation Zone 2, 7,426 acres occur in Conservation Zone 3, 857 acres occur in Conservation Zone 4, 8,343 acres occur in Conservation Zone 5, 13,095 acres occur in Conservation Zone 6, and 842 acres occur in Zone 7. Of those, approximately all the critical habitat lands in Conservation Zones 2 and 3, 774 acres in Conservation Zone 4, 6,637 acres in Conservation Zone 5, 12,489 acres in Conservation Zone 6, and 701 acres in Conservation Zone 7 are unprotected. Unit CCS-2 totals approximately 48,697 acres of land, and is located in eastern Contra Costa County and northeastern Alameda County, north of Highway 580. Subunit CCS-2B contains (44,470 acres) the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). Subunit CCS-2B was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats suitable for breeding, and upland areas for dispersal, shelter, and food, and provides for connectivity between populations farther south in the interior Coast Range. Subunit CCS-2B contains some of the highest concentrations of California red-legged frogs and habitat and could serve as a source for potential reintroduction efforts. Subunit CCS-2B consists of 4,059 acres of State, 3,088 acres of local government, and 37,322 acres of private lands and was mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in Unit CCS-2 may require special management considerations or protection due to predation by nonnative species, urbanization, overgrazing of aquatic and riparian habitats, and erosion and siltation due to flooding, which may alter aquatic and upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Approximately 814 acres of California red-legged frog critical habitat subunit ALA-1A, Dublin Canyon, occurs within Conservation Zone 1. Of those, 543 acres are unprotected. This subunit is comprised of approximately 3,650 acres of land and is located in northwestern Alameda County and southern Contra Costa County, north of Highway 580 and west of Dublin, California. Subunit ALA-1A contains the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-1A was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats that provide for breeding that are comprised of manmade stock ponds and natural streams with emergent vegetation, willows, or are surrounded by riparian vegetation, grasslands and oak forest. These aquatic habitats also have adjacent upland areas for dispersal, shelter, and foraging opportunities. Subunits ALA-1A and ALA-1B provide for connectivity between populations farther south in the East San Francisco Bay foothills and represents the southernmost distribution of the California red-legged frogs and its habitat in the East San Francisco Bay region. The subunit consists of 603 acres of local

government land and 3,047 acres of private land and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA- 1A subunit may require special management considerations or protection due to removal and alteration of habitat due to urbanization, alteration of aquatic and riparian habitats, dumping, and erosion and siltation of ponded habitat, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Approximately 1,829 acres of California red-legged frog critical habitat subunit ALA-1B, Cook Canyon, occurs within Conservation Zone 8. Of those, 834 acres are unprotected. This subunit is comprised of approximately 10,159 acres of land and is located in northwestern Alameda County, south of Highway 580. Subunit ALA-1B contains the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-1B was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats comprised of manmade stock ponds and natural streams with emergent vegetation, willows surrounded by riparian vegetation, grasslands and oak forest that provide for breeding, and upland areas for dispersal, shelter, and foraging opportunities. Subunits ALA-1A and ALA-1B provide for connectivity between populations farther north in the East San Francisco Bay foothills and also represents the southernmost distribution of the California red-legged frog and its habitat in the East San Francisco Bay region. ALA-1B consists of 3,667 acres of local government land and 6,792 acres of private land and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA-1B subunit may require special management considerations or protection due to removal and alteration of habitat due to urbanization, alteration of aquatic and riparian habitats, and erosion and siltation of ponded habitat, which may result in direct or indirect loss of egg masses or adults.

California red-legged frog critical habitat unit ALA-2, Arroyo Valle, occurs in Conservation Zones 9, 10, 11, 12, 13, 15, 16, 17, and 18. Approximately 11,966 acres occur in Conservation Zone 9, 24,937 acres occur in Conservation Zone 10, 92 acres occur in Conservation Zone 11, 8,567 acres occur in Conservation Zone 12, 11,670 acres occur in Conservation Zone 13, 6,631 acres occur in Conservation Zone 15, 23,265 acres occur in Conservation Zone 16, 8,838 acres occur in Conservation Zone 17, and 18,763 acres occur in Conservation Zone 18. Of those, all of the critical habitat lands in Conservation Zones 9, 11, and 13, 24,659 acres in Conservation Zone 10, 8,427 acres in Conservation Zone 12, 1,535 acres in Conservation Zone 15, 14,958 acres in Conservation Zone 16, 4,878 acres in Conservation Zone 17, and 18,363 acres in Conservation Zone 18 are unprotected. This unit is comprised of approximately 153,624 acres of land and is located in southwestern Alameda County, south of Highway 580 at Altamont Pass southeast into San Joaquin County and southwest into Santa Clara County near Arroyo Hondo and Calaveras Reservoir. Unit ALA-2 contains the features that are essential for the conservation of the species. The unit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-2 was known to be occupied at the time of listing and is currently occupied. The unit contains

permanent and ephemeral aquatic habitats comprised of natural ponds and streams and manmade stock ponds with emergent vegetation, willows surrounded by riparian vegetation, grasslands and oak forest that provide for breeding, and upland areas for dispersal, shelter, and foraging opportunities. The unit provides for connectivity between populations farther north and south in the interior Coast Range. The unit consists of 6,892 acres of Federal, 3,932 acres of State, 39,525 acres of local government, and 103,276 acres of private lands and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA-2 unit may require special management considerations or protection due to urbanization, alteration of aquatic and riparian habitats, and erosion and siltation of ponded habitat, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Central California Tiger Salamander

Threats to Central California tiger salamanders in the action area include habitat destruction, degradation, and fragmentation due to urban development and conversion to intensive agriculture, off-road vehicle use and various forms of recreation inappropriate levels of grazing, exposure to various contaminants, rodent population control efforts, mosquito control, hybridization with nonnative tiger salamanders and predation by introduced species and/or feral animals (Service 2004b).

There are 150 occurrences within or immediately adjacent to the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed throughout most of the Conservation Zones. The Conservation Strategy has mapped potential breeding and upland habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the Central California tiger salamander inhabits the action area.

Numerous recent developments have reduced habitat and known Central California tiger salamander populations: Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore.

Central California Tiger Salamander Critical Habitat

The entire Central California tiger salamander critical habitat unit 18, Doolan Canyon Unit, is located within Conservation Zone 3. This unit contains approximately 1,178 unprotected acres and is essential to the conservation of the species because it is needed to maintain the current geographic and ecological distribution of the species in the Central Valley Geographic Region. At the time of designation, two extant occurrences of the species were found in this unit. Unit 18 is south of the Contra Costa County line near Collier Canyon Road on the east and the south, and the City of Dublin on the west. Land ownership is private. Threats that require special management considerations for this unit include urban developments, agricultural land conversions, and associated infrastructure, including road construction which could destroy or degrade aquatic habitat essential for breeding and rearing; destroy, degrade, or fragment upland

habitat essential for growth, feeding, resting, and aestivation; or destroy, degrade, or fragment habitat essential for dispersal and connectivity. Portions of Unit 18 are being proposed to be added to the City of Dublin's Sphere of Influence for development. At the same time, the City of Livermore is proposing to add the same lands to their Sphere of Influence for open space protection.

Alameda Whipsnake

Threats to Alameda whipsnakes in the action area include urban development and habitat loss and fragmentation, water development projects, predation, colonization of non-native plants species, inappropriate grazing, and off-road vehicle use and various forms of recreation (Service 2011).

There are 19 occurrences within the Conservation Strategy Study Area (CDFG 2011). These occurrences are listed as sensitive in the CNDDB and the specific locations will not be discussed in this Programmatic BO. The Conservation Strategy was not able to model parameters for Alameda whipsnake habitat. Instead, the Conservation Strategy used the draft recovery units and designated critical habitat for mapping potential habitat in Conservation Zones 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the Alameda whipsnake inhabits the action area.

The Conservation Strategy Study Area contains portions of draft Recovery Unit 2 (Oakland-Las Trampas) in Conservation Zone 1, portions of draft Recovery Unit 3 (Hayward-Pleasanton Ridge) in Conservation Zone 8, portions of draft Recovery Unit 4 (Mount Diablo-Black Hills) in Conservation Zones 4 and 5, all of draft Recovery Unit 7 (Niles Canyon-Sunol Corridor) in Conservation Zones 14 and 15, and 75 percent of draft Recovery Unit 5 (Sunol-Cedar Mountain) in Conservation Zones 2, 9, 10, 11, 12, 13, 15, 16, 17, and 18. A little over one-third of draft Recovery Unit 2 and almost the entirety of the western border of this unit are in public ownership. However, significant development pressure continues from the north, southwest, and east (Service 2011). Approximately one third of draft Recovery Unit 3 is owned by EBRPD. However, very few of these EBRPD-owned parcels are contiguous or located adjacent to urban development; therefore; they provide little protection from the development pressures associated with adjacent urban areas and transportation corridors (Service 2011). Draft Recovery Unit 7 was designated to provide habitat linkage between draft Recovery Units 3 and 5, across Interstate 680. More than three quarters of this unit is in public ownership; SFPUC is the largest landowner and EBRPD owns several parcels in the western portion of the unit (Service 2011). Draft Recovery Unit 4 contains one of the most isolated populations of Alameda whipsnakes and more than two-thirds is within the East Contra Costa Habitat Conservation Plan (Service 2011). Approximately one quarter of draft Recovery Unit 5 is within public ownership; SFPUC, EBRPD, City of Fremont, Santa Clara County, and California Department of Park and Recreation are the largest public land owners within the unit. Current development pressure within and adjacent to this unit is primarily associated with the Cities of Pleasanton and Livermore along the northwestern border and the Cities of Fremont and Milpitas along the western border.

Alameda Whipsnake Critical Habitat

The Conservation Strategy Study Area is within Alameda whipsnake critical habitat units AWS-3, AWS-5A, and AWS-5B for a total of 53,260 acres. Approximately 13,722 acres are protected and 39,538 acres are unprotected.

Approximately 14,916 acres of Alameda whipsnake critical habitat unit AWS-3, Hayward-Pleasanton Ridge, occur in Conservation Zone 8 and 12 occur in Conservation Zone 14. Of those, approximately all the critical habitat lands in Conservation Zone 14 and 10,134 acres are unprotected. Unit 3 is located immediately to the west of Interstate 680 and to the south of Interstate 580 and totals 25,966 acres. Land ownership includes 404 acres of EBRPD land and 25,562 acres of privately owned land. Unit 3 contains the mosaic of scrub and chaparral vegetation and rocky outcrops (PCE 1, PCE 3) considered essential to the conservation of the subspecies. The unit also includes variation in vegetation patch size, abundant edge between grassland and woodland, and a minimal amount of development or planned development. The area supports scrub and rock outcrop features essential for Alameda whipsnake. The Alameda whipsnake records within this unit are associated with Gaviota rocky sandy loams in particular, which likely provide talus (PCE 3), and appear to coincide in aerial imagery to scrub or chaparral vegetation preferred byAlameda whipsnake. Vegetation is largely of oak woodland community of variable densities (PCE 2) and statures (trees, shrubs) interspersed with grassland. Some peripheral portions of habitat around this unit were not included as critical habitat due to the high degree of development-related disturbance and fragmentation of the habitat. The unit is included in the designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake; is currently occupied by the subspecies; and represents the southwestern portion of the subspecies' range and one of the five population centers. The special management actions that may be required throughout this unit include management of controlled burns and grazing, trespass, unauthorized trail and road construction, dumping, and/or feral animals, and other activities or situations associated with the urban or recreational interface.

Alameda whipsnake critical habitat unit AWS-5A, Cedar Mountain, occurs in Conservation Zones 9, 10, 12, 13, and 18. Approximately 185 acres occur in Conservation Zone 9, 11,046 acres occur in Conservation Zone 10, 2,191 acres occur in Conservation Zone 12, 8,913 acres occur in Conservation Zone 13, and 366 acres occur in Zone 18. Of those, approximately all the critical habitat lands in Conservation Zones 10, 12, 13 and 18, and 184 acres in Conservation Zone 9 are unprotected. Unit 5A is located east of Lake Del Valle along Cedar Mountain Ridge and Crane Ridge to Corral Hollow west of Interstate 580 and totals 24,723 acres. Land ownership within this unit includes approximately 2,492 acres of Department of Energy land, 246 acres of EBRPD land, and 21,986 acres are privately owned. The vegetation pattern within this unit consists of various woodland, scrub, and/or chaparral communities on northeast-facing slopes (PCE 1, PCE 2). Rock bearing soils which are associated with multiple Alameda whipsnake records (e.g. Vallecitos rocky loam) as well as rock lands are abundant, indicating the presence of PCE 3. Open, grassland-dominated communities are prominent on southwest-facing slopes, but there is also a significant component of woodland habitat on these slopes. Significant areas of vegetation types known to support Alameda whipsnake are present, including coastal oak, chamise-chaparral, mixed chaparral, blue-oak-foothill pine woodland, blue oak woodland,

valley oak woodland, and montane hardwood. In most instances, the boundaries for critical habitat designation correspond to natural breaks in plant communities, habitat quality, and/or landform (ridgelines, water features). A moderate number of light duty roads (e.g., paved or unpaved lightly used) are present within the unit, although there are very few structures or other land modifications. Special management, such as prescribed burns, may be required for portions of the unit with dense vegetation. The special management actions that may be required throughout this unit include management of grazing, trespass, unauthorized trail and road construction, dumping, and/or feral animals, and other activities or situations associated with urban or recreational interface. The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake, is currently occupied by the subspecies, and represents the southernmost and easternmost distribution of Alameda whipsnake and one of five population centers for the subspecies.

Alameda whipsnake critical habitat unit AWS-5B, Alameda Creek, occurs in Conservation Zones 15, 16, and 17. Approximately 6,457 acres occur in Conservation Zone 15, 35 acres occur in Conservation Zone 16, and 9,141 acres occur in Conservation Zone 17. Of those, approximately 1,388 acres of the critical habitat lands in Conservation Zones 15, 18 in Conservation Zone 16, and 5,286 acres in Conservation Zone 17 are unprotected. This unit is located northeast of Calaveras Reservoir, south of the town of Sunol, including the area along Wauhab Ridge in Alameda County and Oak Ridge in Santa Clara County and totals 18,214 acres. Land ownership within this unit includes approximately 361 acres of EBRPD lands and 17,854 acres in private lands. Vegetation is a mix of blue oak--foothill pine and annual grassland with a significant amount of woodland patches. Coastal live oak is present in the vicinity of Lleyden Creek. Soil types in which Alameda whipsnakes are found dominate the unit. This unit contains six Alameda whipsnake records documented between 1972 and 2000 (Swaim 2005a). Significant areas of vegetation types known to support Alameda whipsnake are present, including coastal oak, chamise-chaparral, mixed chaparral, blue oak-foothill pine woodland, blue oak woodland, valley oak woodland, and montane hardwood interspersed with rock outcrops or talus (PCEs 1, 2, 3). The boundaries for critical habitat designation correspond to natural breaks in plant communities, soil type, and or landform. A moderate number of light roads are present within the unit, although there are very few structures or other land modifications. Development within or adjacent to the unit is minimal. As a result of this low development pressure, the survey efforts for the Alameda whipsnake in this unit have not been as extensive as in the other units. Special management, such as prescribed burns, may be required for portions of the unit with dense vegetation. Other special management actions which may be required throughout this unit includes management of grazing, unauthorized trail and road construction, dumping, and/or feral animals, control and other activities or situations associated with urban or recreational interface. The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake, is currently occupied, and represents the southernmost distribution of Alameda whipsnake and one of the five population centers for the subspecies.

San Joaquin Kit Fox

Threats to San Joaquin kit foxes in the action area include loss and modification of habitat due to agricultural conversion, infrastructure construction, and urban development, pesticides and

rodenticides, road mortality and off-road vehicle use, competition, and predation (Service 1998, 2010b).

There are 17 occurrences within the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed in the northeastern Conservation Zones with an outlier in Conservation Zone 14. Alameda and Contra Costa counties are the northern extent of the San Joaquin kit fox range. The Conservation Strategy has mapped suitable habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the San Joaquin kit fox inhabits the action area.

Portions of the Conservation Strategy Study Area are located within the San Joaquin kit fox recovery satellite population S1. In addition to protection of core areas, protection of at least three satellite populations is required for downlisting and protection of additional satellite populations with three or more showing stable or increasing populations during one precipitation cycle is required for delisting. According to the recent 5-year review (Service 2010b) the trend for the S1 population has declined with no known breeding. The recovery plan (Service 1998) lists protecting habitat in the northern, northeastern, and northwestern segments of the range and existing connections between habitat in those areas and habitat south as a recovery action.

Numerous developments and activities have reduced and/or fragmented habitat for the San Joaquin kit fox in the Conservation Strategy Study Area: Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore, commercial and private racetracks and off-road vehicle parks, energy and water infrastructure projects, and agricultural conversion.

Palmate-Bracted Bird's-Beak

Threats to palmate-bracted bird's-beak include habitat loss in the form of habitat alteration and degradation as a result of changes to natural hydrology and salinity, invasive species, incompatible grazing regimes, off-road vehicle use, and development (Service 1998, 2009b).

There is one occurrence within the Conservation Strategy Study Area in Springtown Alkali Sink Preserve in the City of Livermore (CDFG 2011). The population varies in size from year to year. Portions of the Springtown Alkali Sink Preserve are protected; however local residents use the area for off-road bicycling, dog walking, and various other activities in both the protected and unprotected areas. The Conservation Strategy did not model habitat due to the limited occurrence and habitat and the vast amount documentation of that one occurrence. Based on the documentation of the occurrence over the years, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the palmate-bracted bird's-beak inhabits the action area.

Effects of the Proposed Action

The following effects analysis is based on the effects of Covered Activities on federally listed species. Project(s) appended to this Programmatic BO must adhere to the minimization measures described in the Description of the Action. Implementation of the minimization measures may have some adverse effects but will likely have greater beneficial effects as a result of creation, restoration and enhancement of habitat for these species. Because many of the effects resulting from the Covered Activities may apply to more than one species and the specific projects under the Covered Activities have not been described, the effects are described below are discussed generally. Project specific effects to listed species and their critical habitats will be described individually when appended to this Programmatic BO.

Habitat Loss, Fragmentation, and Degradation

Habitat alteration consists of changes made to the environment that adversely affect ecosystem function, although not perhaps completely or permanently (Dodd and Smith 2003). Habitat alteration includes the physical conversion of natural habitat to unnatural habitat (loss), the breaking of large, contiguous blocks of habitat into smaller patches (fragmentation), the increasing separation of blocks of habitat from one another (isolation), and the changes in a habitat that effects its composition, structure, or function (degradation) (Noss *et al.* 1997). Habitat alteration includes physical, chemical, and biotic changes. Projects listed in the Description of the Action of this Programmatic BO will result in habitat alteration; however, implementation of the measures described in the Conservation Strategy and this Programmatic BO will minimize the adverse effects of habitat alteration. These conservation measures include mitigation/compensation, BMPs, and species specific minimization measures.

Habitat loss is one of the main threats to listed species. Habitat loss is defined as the complete elimination of a localized or regional ecosystem leading to the total loss of its former biological function (Dodd and Smith 2003). A direct effect of habitat destruction/reduction is the decline and/or loss of individuals or populations from the portion of the landscape that has been destroyed. Species that previously used the site become displaced. Population numbers of native and listed species that are limited in range and suitable habitat are reduced even further.

Habitat fragmentation is an effect of habitat loss and occurs when remaining populations are isolated because the links between habitat patches have been destroyed. Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge to interior ratio (Primack 1998). Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981; Lande 1988; Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding

depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors. When a sub-population becomes extirpated, habitat fragmentation reduces the chance of recolonization from any remaining populations.

Deleterious effects of habitat fragmentation and conversion of natural habitats to other uses often extend beyond project footprints resulting in "edge effects." The biological integrity of habitats adjoining development can be diminished by adverse effects of noise, lighting, irrigation, exotic plant and animal introduction, predators, parasitism, disturbance from human activities, changes in fire regimes, and other factors. The severity of these effects depends on distance to land alteration boundaries, source of disturbance, and the affected species. Species that are particularly vulnerable to edge effects require large patches of habitat that are relatively free from edge effects.

Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Hilty and Merenlender 2004; Petit *et al.* 1995; Buza *et al.* 2000).

Effects of habitat fragmentation can be minimized by maintaining linkages (Soule 1986; Saunders *et al.* 1991; Beirer and Noss 1999). Linkages are connections between larger blocks of habitat that allow for wildlife movement, recruitment, and colonization between different core biological areas. Linkages are important for allowing species to move or disperse from their natal areas to sites where they may reproduce. Linkages that provide for successful movement between core population areas reduce genetic isolation and allow for recruitment into areas where populations have been extirpated due to natural or anthropogenic disturbances or stochastic events (Soule and Simberloff 1986; Lande 1988). Several factors influence the effectiveness of habitat linkages including length, width, and species targeted for use (Meffe and Carrol 1998). When large blocks of habitat remain intact, the rate of successful dispersal between core population areas is higher. At a minimum, dispersal habitat within linkages should provide some level of foraging and limited protection from predators. When the distance between core populations of a species is greater than the dispersal distance for individuals, effective linkages must provide live-in habitat. It is important to recognize that the effectiveness of any habitat linkage varies considerably by species. Linkages are critical to the design and function of any conservation area.

The Conservation Strategy was designed to incorporate the large scale goal and objectives of natural communities down to the species specific goals and objectives. The multi-scale approach was developed to incorporate diversity, linkages, natural communities, and species specific conservation goals and objectives. This approach stepped down to conservation priorities that protect key features identified for each Conservation Zone and will minimize the effects from

project related habitat loss and fragmentation.

Additionally, the preservation and restoration of habitat will minimize the effects of habitat lost as a result of projects appended to this Programmatic BO. Compensation for effects to occupied and suitable habitat will be in the form of preserving occupied sites or established sites with the same affected species. The location of the compensation may be anywhere appropriate within the Conservation Strategy Study Area as depicted in Appendix C and as described in the Conservation Strategy. Conservation easements, adaptive management plans and endowment funding will increase the probability of populations to be viable in the long term and will be protected in perpetuity.

The Conservation Strategy addresses project-level mitigation for potential impacts to species and habitats throughout the eastern part of the county and provides a coordinated approach for local conservation efforts beyond those required by regulatory requirements. The combination of project-level mitigation and voluntary conservation will help to ensure that the effects from habitat loss and fragmentation are minimized in the Conservation Strategy Study Area.

Construction

Construction work within the specific project footprint, access areas, and staging areas can result in direct mortality or injury to individuals, harassment of the animals, and entrapment. Mortality or injury to species can occur from being crushed by earth moving equipment and worker foot traffic. Individuals in burrows may be killed or injured by filling or grading activities. Work activities, including vibration, dust, noise, contaminants, and lighting may cause individuals to leave the work site and surrounding areas. This disturbance and displacement may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Implementation of the minimization measures like preconstruction surveys, exclusion fencing, etc., as described in the Conservation Strategy and this Programmatic BO will minimize these effects to listed species.

Preconstruction surveys and the relocation of individuals may reduce injury or mortality. However, the capturing and handling of these species to remove them from a work area if they become trapped may result in the mortality or injury of individuals. These effects would be reduced or prevented by the use of a Service-approved biologist.

Minimization Measures and Conservation Activities

The Conservation Strategy's standardized avoidance, minimization, mitigation, and compensation requirements will result in consistent and effective protection of listed species in the Conservation Strategy Study Area.

The standardized mitigation ratios as described in Appendix C ensure the protection of occupied habitat at a greater rate than what is lost. The ratios with the correction factor are intended to protect high quality, occupied habitat within close proximity to the project site and if applicable, within the same critical habitat unit. Standard mitigation/compensation using the guidance

provided in Chapter 5 of the Conservation Strategy combined with the required conservation easement, management plan, and endowment to implement the management plan will minimize the effects of habitat loss and fragmentation to listed species. Mitigation/compensation also includes purchase of appropriate credits from approved mitigation banks.

Enhancement and restoration projects may adversely affect individuals or temporarily affect habitat as described in the Construction section above. However, the long term benefits of restoration and conservation will provide listed species protected and managed habitat in perpetuity. Conservation will improve protection for listed species and their habitats, improve habitat quality, increase species population size, increase extent of protected habitat, and increase connectivity for species between occupied areas.

General Effects to Longhorn Fairy Shrimp, Vernal Pool Fairy Shrimp, and their Critical Habitats

Ground-disturbing Covered Activities have the potential to result in direct mortality, life cycle disturbance, and reduce habitat quality for the longhorn fairy shrimp and vernal pool fairy shrimp. Shrimp cysts could be buried by soil moved into vernal pools, swales, or other habitat during ground-disturbing activities. In addition, upland habitat and swales around a vernal pool and within a vernal pool complex are essential to the hydrological biological integrity of the vernal pool and complex. Vernal pool habitat indirectly affected would include all habitat supported by upland areas and all habitat otherwise damaged by effects to the watershed, introduced species, human intrusion, or pollution caused by a project. Where the reach of these indirect effects cannot be determined definitively, the Service considers all areas within 250 feet of a vernal pool to be indirectly affected. If any habitat within a vernal pool complex is impacted, then all remaining habitat within the complex is considered indirectly affected. Examples of potential indirect effects from Covered Activities include possible disruption of hydrological integrity within a vernal pool, sandstone outcropping, or other suitable habitat within the associated upland habitat, or within the vernal pool complex. Other potential indirect effects to vernal pool habitat could result from dust generated during covered activities and subsequently deposited within vernal pools adjacent to work sites. Water and habitat quality could be reduced by a variety of indirect effects associated with Covered Activities. Covered Activities have the potential to spread invasive weeds that could reduce habitat quality within vernal pools or their associated uplands. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce the potential for these effects and contribute to recovery goals for the species.

Approximately 267 acres of longhorn fairy shrimp critical habitat Unit 1B in the Conservation Strategy Study Area are unprotected. Approximately 952 acres of vernal pool fairy shrimp critical habitat Unit 19C are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated longhorn fairy shrimp and vernal pool fairy shrimp critical habitat. Projects appended to this Programmatic BO will discuss effects, species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained. Compensation will be a combination of preservation and

restoration/creation of habitat. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat for both species will ensure preservation of habitat that provides overall improved management and enhancement of the sites.

General Effects to Callippe Silverspot Butterfly

Ground disturbing activities could affect grasslands that support the larval host plant for callippe silverspot butterfly, cause the loss of individuals, and remove nectar plants (e.g. California buckeye, thistle species) used by adults. Dust generated from construction activities could degrade the quality of habitat by smothering larval host plants. Due to the short life span of adults, which emerge and breed within a period of only a few weeks, there is no predictable period during the year when the host plants would not support either larvae at some stage of development, or newly deposited eggs. Therefore, direct mortality of callippe silverspot butterfly eggs or larvae could occur if the plants were affected.

Ground disturbance also could reduce the number of stable holes and cracks that larvae use during diapause, which would result in increased risk of predation. Larvae could be crushed by foot or vehicle traffic, or grazing livestock. Soil could inadvertently fill cracks in the soil where larvae occur. Spills of hazardous materials such as paint or engine fuel could contaminate habitat and make it unsuitable or could poison butterflies in the area. Prescribed burns could result in injury or mortality of larvae, and damage to host plants (Mollenbeck *et al.* 2009), although long-term effects of prescribed burns are expected to result in a net benefit through elimination of invasive plants that outcompete the larval food plant. Grazing could potentially affect the species through trampling of larvae and herbivory of food plants. However, most of the grasslands mapped as suitable habitat are currently grazed. Beneficial or adverse effects of grazing will be determined on a project by project basis.

Measures to avoid and minimize effects to the species would involve preconstruction surveys for host plants and avoiding disturbance in areas that support host plants when feasible. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects. Conservation measures to minimize vegetation removal and direct injury, destruction, or removal of larvae, eggs, and host plants would include preconstruction surveys; installing exclusion fencing; providing worker awareness training; monitoring; limiting work areas; and confining activities to designated work areas. The risk of effects from spills of hazardous materials will be avoided through limiting maintenance activities to designated areas and implementation of toxic-spill prevention measures. The minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat and critical habitat consistent with the goals and objectives of the Conservation Strategy and the criteria to recover the species.

General Effects to California to Red-Legged Frog and its Critical Habitat

California red-legged frogs require both terrestrial and aquatic environments and migrate between the two habitat types, therefore, they can be particularly sensitive to the effects of

urbanization or other growth-related changes that permanently alter or expose either of these environments. New roads and urbanization can create barriers between aquatic and terrestrial habitat. Indirect effects that affect streams or ponds, including increased runoff of urban pollutants, spread of nonnative plants, and spread of nonnative predators, can adversely affect California red-legged frogs. Amphibians can be affected by sedimentation, changes in water quantity and temperature, and road runoff. Sedimentation increases turbidity thereby reducing the amount of light in the water column and primary nutrient production. Significant sedimentation may also change streambed characteristics. Changes in hydrology can favor nonnative predatory species. Human activities or impacts that increase as the human population grows can also indirectly affect California red-legged frogs. These effects include light pollution, human disturbance, increase of urban-adapted predators (skunks and raccoon), increased numbers of domestic predators (dogs and cats), introduction of other nonnative predators (e.g., bullfrogs), increased vehicle-related disturbance, and increased risk of wildfire. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects.

Approximately 543 acres of California red-legged frog critical habitat subunit ALA-1A, 834 acres of subunit ALA-1B and 96,548 acres of unit ALA-2, and 28,108 in unit CCS-2 in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will protect and manage occupied habitat in perpetuity and contribute to recovery goals for the species. California red-legged frog compensation areas will contain both suitable aquatic and terrestrial habitat. Compensation areas or restored habitat will have measures in place to minimize or eliminate populations of exotic aquatic predators such as bullfrogs. Compensation areas will be located within habitat currently occupied by California red-legged frogs. The minimum ratio for compensation/mitigation for effects the species and loss of habitat is 2.5:1 and may increase to 3.5:1 or higher depending on the location of the project and compensation sites, project effects, and quality of habitat at both sites. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to Central California Tiger Salamander and its Critical Habitat

Central California tiger salamanders require both terrestrial and aquatic environments and migrate between the two habitat types, therefore, they can be particularly sensitive to the effects of urbanization or other growth-related changes that permanently alter or expose either of these environments. New roads and urbanization can create barriers between aquatic and terrestrial

habitat. Indirect effects that affect streams or ponds, including increased runoff of urban pollutants, and spread of nonnative predators, can adversely affect Central California tiger salamanders. Amphibians can be affected by sedimentation, changes in water quantity and temperature, and road runoff. Changes in hydrology to longer inundation periods can favor nonnative predatory species. Human activities or impacts that increase as the human population grows can also indirectly affect Central California tiger salamanders. These effects include light pollution, human disturbance, increase of urban-adapted predators (skunks and raccoon), increased numbers of domestic predators (dogs and cats), introduction of other nonnative predators (e.g., bullfrogs), increased vehicle-related disturbance, and increased risk of wildfire. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects.

All 1,178 acres of Central California tiger salamander critical habitat unit 18 in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will protect and manage occupied habitat in perpetuity. Central California tiger salamander compensation areas will contain both suitable aquatic and terrestrial habitat. Compensation areas and/or restored habitat will have measures in place to minimize or eliminate populations of exotic aquatic predators such as bullfrog. Compensation areas will be located within currently occupied habitat. The minimum ratio for compensation/mitigation for effects the species and loss of habitat is 2.5:1 and may increase to 4:1 or higher depending on the location of the project and compensation sites, project effects, and quality of habitat at both sites. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to Alameda Whipsnake and its Critical Habitat

Activities associated with projects appended to this Programmatic BO will result in the loss of suitable Alameda whipsnake habitat and the harm, harassment, injury, and death of individuals. There is increased potential for predation by non-native predators, fragmentation and isolation of suitable Alameda whipsnake habitat and migration corridors by development, lack of sufficient buffers between suitable habitat and adjacent development, and disturbance by increased human activity in the area. Alameda whipsnakes could be injured or killed by new roadways adjacent to suitable habitat, and by increased recreation (horseback riding, hiking, bicycling, and off-road vehicle use).

Approximately 10,146 acres of Alameda whipsnake critical habitat unit AWS-3, 22,700 acres of unit AWS-5A and 6,692 acres of unit AWS-5B in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will minimize adverse effects to individuals and protect and manage occupied habitat in perpetuity and contribute to recovery goals for the species. Compensation areas will be located within currently occupied habitat. Management plans for conservation areas will address grazing practices and vegetation management for the benefit of the Alameda whipsnake. The minimum ratio for compensation/mitigation for effects to species and loss of habitat is 2.5:1 and may increase to 4:1 or higher depending on the location of the project and the compensation, effects, and quality of habitat (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to San Joaquin Kit Fox

The Conservation Strategy Study Area represents an area of connectivity to the northernmost extension of the species' range in Contra Costa County. Maintaining this connectivity is critical for maintaining San Joaquin kit foxes in Alameda County. Development of movement corridors and expansion of development and energy projects in the Altamont Hills will substantially reduce the San Joaquin kit fox's ability to persist in the northern part of their range. The Conservation Strategy provides goals and objectives to maintain, enhance and protect suitable habitat and corridors.

Ground disturbing activities have the potential to adversely affect individual San Joaquin kit foxes. San Joaquin kit foxes in their dens could be crushed or harmed by equipment and vehicles driving over the occupied dens. Vehicles or equipment could strike San Joaquin kit foxes when they are out of their burrows. San Joaquin Kit foxes could be attracted to prey that is displaced from the ground disturbing activities sites, and thus be exposed to an elevated potential for injury, mortality, or predation. Individuals in dens adjacent to work-sites could be directly affected by noise and vibration from construction disturbance activities.

Compensation areas for San Joaquin kit fox will be located within the species' present range within the Conservation Strategy Study Area in areas that are generally considered occupied habitat. Compensation areas will be selected to contribute to maintenance of large habitat blocks and maintain connectivity of remaining San Joaquin kit fox habitat in the San Joaquin Valley,

consistent with the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998). Compensation areas will provide permanent habitat protection and management to compensate for disturbances to suitable habitat. The minimum ratio for compensation/mitigation for effects to the species and loss of habitat is 3:1 and may increase to 3.51 or higher depending on the location of the project and the compensation, project effects, and quality of habitat of both sites (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species and contribute to recovery goals for the species.

General Effects to Palmate-Bracted Bird's-Beak

Soil excavations or other ground disturbances in or near occupied palmate-bracted bird's-beak habitat could affect this listed plant due to a permanent loss of soil structure, soil water-holding capacity, soil fertility, or loss of cryptogamic biological soil crusts and other microhabitat-features essential to this species. Soil excavations or other ground disturbances in occupied habitat are likely to fragment the occurrence, which could isolate individuals and affect genetic variability within that plant population. Occupied habitat might be permanently degraded if the disturbance site is invaded by non-native weedy plant species following the ground-disturbing activities. Weedy invasive species could compete with palmate-bracted bird's-beak for space, soil moisture, and nutrients, and could extirpate the species from the site over time. Any construction dust generated from ground-disturbing covered-activities in or adjacent to occupied habitat may adversely affect plant-photosynthesis, respiration, transpiration, pollination, and seed-set during that growing season, which would adversely affect the number of plants germinating in the next and subsequent growing seasons.

Compensation lands for effects to palmate-bracted bird's-beak will be located in areas that include occupied habitat. The specific conservation goals are to protect the only known extant population and conduct annual surveys to better document contraction and expansion of the population. The minimum ratio for compensation/mitigation for effects to the species and loss of habitat is 5:1 and may increase depending on the location of the project and the compensation, effects, and quality of habitat (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat for the species and contribute to recovery goals for the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section

because they require separate consultation pursuant to section 7 of the Act.

The global average temperature has risen by approximately 0.6 degrees Celsius during the 20th Century (Intergovernmental Panel on Climate Change 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (Intergovernmental Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases (Adger *et al.* 2007). Ongoing climate change (Inkley *et al.* 2004; Kerr 2007; Adger *et al.* 2007; Kanter 2007) likely imperils these listed species and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitat and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this Programmatic BO are not likely to jeopardize the continued existence of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, or San Joaquin kit fox. Although critical habitat for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake will be affected, none will be destroyed or adversely modified by the the projects that meeting the qualifications of the Programmatic BO. This determination is based on the Description of the Action that provides numerous measures by reference and additional minimization measures that would be implemented to minimize adverse effects of the future proposed projects on listed species and their critical habitats. Implementing the Conservation Strategy, including the standard mitigation/compensation ratios, ensures more occupied habitat will be conserved than affected.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act directs Federal agencies to utilize their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information or data bases. The Service recommends the following actions:

1. The Corps through the applicant should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (Service 2002).

2. The Corps through the applicant should assist the Service in developing and

implementing recovery actions for the San Joaquin kit fox identified in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998).

3. The Corps through the applicant should assist the Service in developing and implementing recovery actions identified in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Service 2005b).

4. Sightings of any listed or sensitive animal species should be reported to the CNDDB of the CDFG. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes of formal consultation on the implementation of the East Alameda County Conservation Strategy. As provided in 50 CFR 402.16, reinitiating of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must immediately cease, pending reinitiation.

If you have any questions regarding this biological opinion, please contact Kim Squires, Senior Endangered Species Biologist, or Ryan Olah, Coast Bay/Forest Foothills Division Chief, at the letterhead address, telephone (916) 414-6600, or electronic mail at Kim_Squires@fws.gov or Ryan_Olah@fws.gov.

Sincerely,

for Susan K. Moore
Field Supervisor

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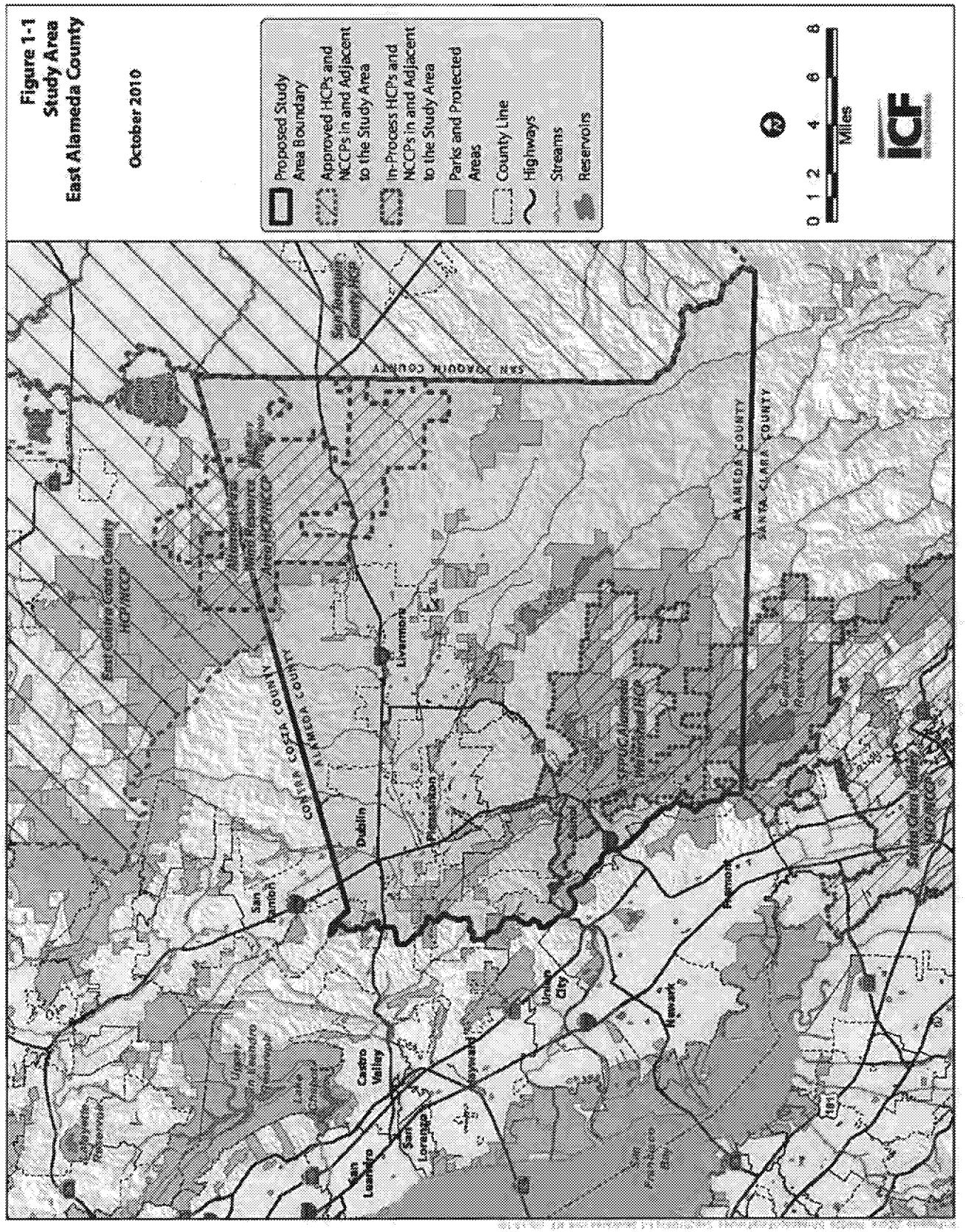
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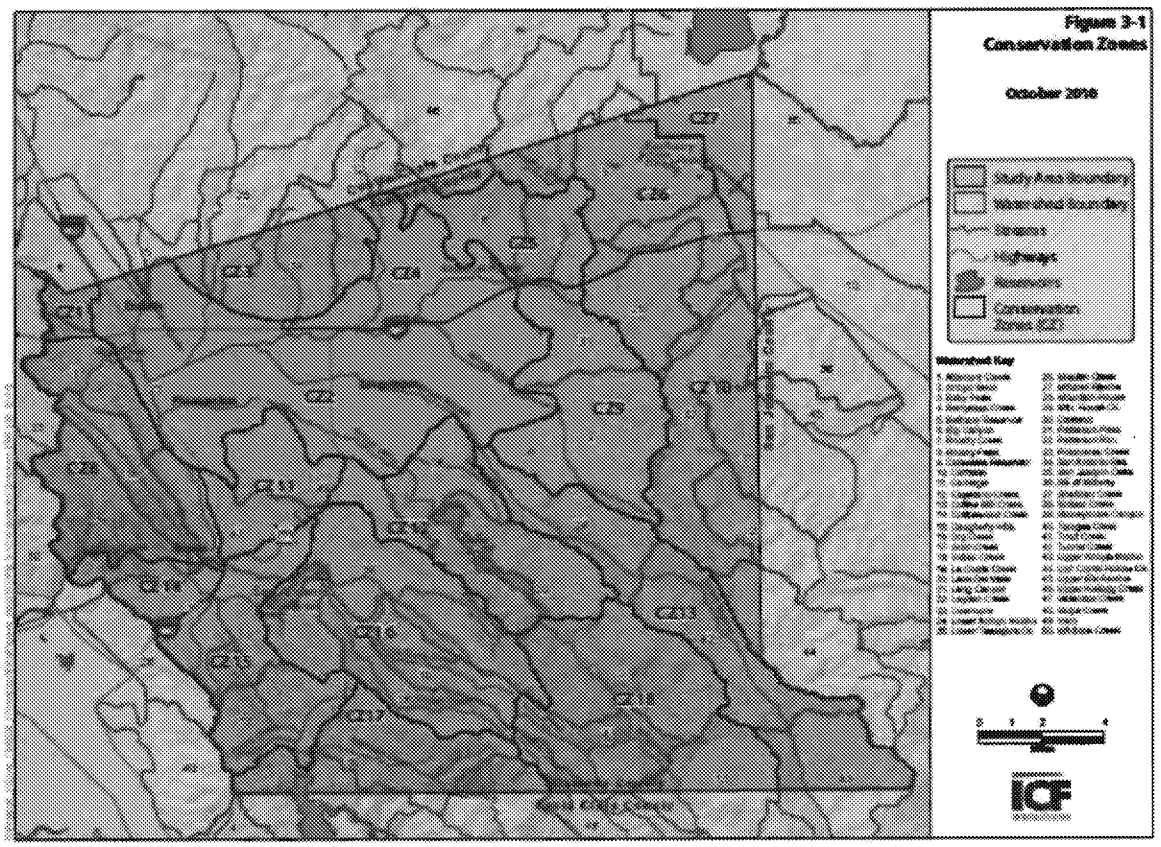
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Figure 1



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Figure 2


Figure 3-1
Conservation Zones
October 2016
Study Area Boundary
Watershed Boundary
Streams
Highways
Reservoirs
Conservation Zones (CZ)
Watershed Key
0 1 2 4
Miles
ICF

Appendix A

Table 3-2. General Avoidance and Minimization Measures to Reduce Effects on Focal Species

AMM Code	Avoidance and Minimization Measure
GEN-01	Employees and contractors performing construction activities will receive environmental sensitivity training. Training will include review of environmental laws and Avoidance and Minimization Measures (AMMs) that must be followed by all personnel to reduce or avoid effects on covered species during construction activities.
GEN-02	Environmental tailboard trainings will take place on an as-needed basis in the field. The environmental tailboard trainings will include a brief review of the biology of the covered species and guidelines that must be followed by all personnel to reduce or avoid negative effects to these species during construction activities. Directors, Managers, Superintendents, and the crew foremen and forewomen will be responsible for ensuring that crewmembers comply with the guidelines.
GEN-03	Contracts with contractors, construction management firms, and subcontractors will obligate all contractors to comply with these requirements, AMMs.
GEN-04	The following will not be allowed at or near work sites for covered activities: trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets (except for safety in remote locations).
GEN-05	Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
GEN-06	Off-road vehicle travel will be minimized.
GEN-07	Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land-cover types, or during off-road travel.
GEN-08	Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area is constructed.
GEN-09	Vehicles shall be washed only at approved areas. No washing of vehicles shall occur at job sites.
GEN-10	To discourage the introduction and establishment of invasive plant species, seed mixtures/straw used within natural vegetation will be either rice straw or weed-free straw.
GEN-11	Pipes, culverts and similar materials greater than four inches in diameter, will be stored so as to prevent covered wildlife species from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved.
GEN-12	Erosion control measures will be implemented to reduce sedimentation in wetland habitat occupied by covered animal and plant species when activities are the source of potential erosion problems. Plastic mono-filament netting (erosion control matting) or similar material containing netting shall not be used at the project. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
GEN-13	Stockpiling of material will occur such that direct effects to covered species are avoided. Stockpiling of material in riparian areas will occur outside of the top of bank, and preferably outside of the outer riparian dripline and will not exceed 30 days.
GEN-14	Grading will be restricted to the minimum area necessary.
GEN-15	Prior to ground disturbing activities in sensitive habitats, project construction boundaries and access areas will be flagged and temporarily fenced during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.
GEN-16	Significant earth moving-activities will not be conducted in riparian areas within 24 hours of predicted storms or after major storms (defined as 1-inch of rain or more).
GEN-17	Trenches will be backfilled as soon as possible. Open trenches will be searched each day prior to construction to ensure no covered species are trapped. Earthen escape ramps will be installed at intervals prescribed by a qualified biologist.

Appendix B

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
INV-1	Vernal pool fairy shrimp, longhorn fairy shrimp	Vernal pools/clay flats, alkaline pools/rock outcrops/sandstone pools	• A qualified biological monitor will be present if work is conducted outside of designated work corridors or off of existing access roads. • If vernal pools, clay flats, alkaline pools, ephemeral stock tanks, or sandstone pools, or roadside ditches are present, a qualified biologist will stake and flag an exclusion zone prior to construction activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the worksite and at least 250 feet from the aquatic feature wet or dry. • Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours. • No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be applied. • Avoid modifying or changing the hydrology of the habitat.
INV-2	Callippe silverspot butterfly	Grassland with host/nectar plants present	• No herbicide will be applied within 100 feet of host plant populations. Spot application to cut stumps, frilled stems, or injected into stems are acceptable. No broadcast applications will be applied. • Cut trees that are removed in the vicinity of host plants will be hand carried rather than dragged to disposal areas. • Avoid or minimize the removal of host plant, Johnny jump-up (*Viola pedunculata*) • Avoid work in suitable habitat during the flight and mating season (mid-May to mid-July); establish a minimum 50-foot buffer around host plants.
AMPH-1	Amphibians California tiger salamander California red-legged frog Foothill yellow-legged frog	Streams, wetlands, ponds, vernal pools	• If aquatic habitat is present, a qualified biologist will stake and flag an exclusion zone prior to activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the work site and at least 500 feet from the aquatic feature wet or dry.
AMPH-2	Amphibians California tiger salamander California red-legged frog Foothill yellow-legged frog	Riparian habitat and grasslands within 2-miles of aquatic habitat.	• A qualified biologist will conduct preconstruction surveys prior to activities define a time for the surveys (before ground breaking). If individuals are found, work will not begin until they are moved out of the construction zone to a USFWS/CDFG approved relocation site. • A Service-approved biologist should be present for initial ground disturbing activities. • If the work site is within the typical dispersal distance (contact USFWS/CDFG for

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			latest research on this distance for species of interest) of potential breeding habitat, barrier fencing will be constructed around the worksite to prevent amphibians from entering the work area. Barrier fencing will be removed within 72 hours of completion of work. • No monofilament plastic will be used for erosion control. • Construction personnel will inspect open trenches in the morning and evening for trapped amphibians. • A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, will be contracted to trap and to move amphibians to nearby suitable habitat if amphibians are found inside fenced area. • Work will be avoided within suitable habitat from October 15 (or the first measurable fall rain of 1" or greater, to May 1.
REPT-1	Alameda whipsnake	Chaparral, scrub, grassland, riparian, oak woodland	• No monofilament plastic will be used for erosion control • Barrier fencing may be used to exclude focal reptiles. Barrier fencing will be removed within 72 hours of completion of work. • Construction crews or on-site biological monitor will inspect open trenches in the morning and evening for trapped reptiles. • Ground disturbance in suitable habitat will be minimized. • A USFWS and CDFG-approved biological monitor will be present for all ground disturbing activities in suitable habitat. • A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, and approved by CDFG will be contracted to trap and to move reptiles to nearby suitable habitat if listed reptiles are found inside fenced area.
BIRD-1	Golden eagle	Cliffs and large trees surrounded by open grassland.	• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (February 1 to September 1). • If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-feet radius from the nest. • If an effective no-activity zone cannot be established in either case, an experienced golden eagle biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the eagles, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the eagles.

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
BIRD-2	Burrowing owl	Grasslands or ruderal areas with burrows	• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1). • If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-feet radius from the nest. • If burrowing owls are present at the site during the non-breeding period, a qualified biologist will establish a no-activity zone of at least 150 feet. • If an effective no-activity zone cannot be established in either case, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.
BIRD-3	Tricolored blackbird	Wetlands, ponds with emergent vegetation	• If an active nest colony is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1).
MAMM-1	San Joaquin kit fox, (American badger)	Grassland, generally with ground squirrel burrows	• If potential dens are present, their disturbance and destruction will be avoided. • If potential dens are located within the proposed work area and cannot be avoided during construction, qualified biologist will determine if the dens are occupied or were recently occupied using methodology coordinated with the USFWS and CDFG. If unoccupied, the qualified biologist will collapse these dens by hand in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999). • Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures available at the time. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and CDFG. • Pipes will be capped and trenches will contain exit ramps to avoid direct mortality while construction areas is active.
FISH-1	Central California coast steelhead	Stream habitats	• If any life stage of any listed species may be present during in-water activities or substantial disturbance, capture, handling, exclusion, salvage, and relocation will be considered for the listed species. A take permit from NMFS would be required for this unless it is for emergency, then DFG. • With the exception of streams identified by NMFS, and CDFG as not supporting spawning habitat, conduct all in-water activities outside the spawning and incubation season for listed fish species or to periods identified in cooperation with NMFS, and CDFG to accommodate site-specific conditions.

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			• Preserve stream width, depth, velocity, and slope that provide upstream and downstream passage of adult and juvenile salmonid fish according to NMFS and CDFG guidelines and criteria or as developed in cooperation with NMFS and CDFG to accommodate site-specific conditions. • Remove the minimum amount of wood, sediment and gravel, and other natural debris necessary to maintain and protect culvert and bridge function, ensure suitable fish passage conditions, and minimize disturbance of the streambed, using hand tools where feasible. • Instream woody material (IWM) subject to damage or removal shall be retained and replaced on site after project completion or used for other mitigation/restoration projects near the project site where feasible. • Minimize disturbed areas by locating temporary work areas to avoid patches of native aquatic vegetation, substantial large woody debris, and spawning gravel. • Where spawning gravel removal is temporary to support construction activities, replace spawning gravel to approximate the pre-construction conditions and using gravel removed from the site. • Gravel and LWD excavated from the channel that is temporarily stockpiled for reuse in the channel will be stored in a manner that prevents mixing with stream flows. • For diversion from streams, rivers, and other water bodies, any water intake structure shall be installed, operated, and maintained in accordance with NMFS, and DFG criteria for the species and life stages of concern or as developed in cooperation with NMFS, USFWS, and DFG to accommodate site-specific conditions. • Avoid extending existing areas of stream bank rock slope protection (RSP) or other bank protection (e.g., sheet piles) and limit the extent of bank and channel armoring to the minimum necessary to protect essential infrastructure. • Where rock slope protection (RSP) is necessary, incorporate native riparian vegetation and/or LWD in RSP. • Stream flow through new and replacement culverts, bridges, and over stream gradient control structures must meet the velocity depth, and other passage criteria for salmonid streams as described by NMFS and DFG guidelines or as developed in cooperation with NMFS and DFG to accommodate site-specific conditions. • Pile driving shall be conducted outside of the stream channel whenever feasible or practical. • Drive piles with a vibratory hammer when feasible. • For drop or hydraulic hammers, use the smallest pile driver and the minimum force necessary to complete the work – set the hammer drop height to the minimum necessary to drive the pile. • Where listed species cannot be captured, handled, excluded, or relocated (e.g.,

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			salmonid redd), avoid or delay actions that could injure or kill individual organism until the species leaves the affected area or the organism reaches a stage that can be captured, handled, excluded, or relocated . This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit. • Within occupied habitat, capture, handling, exclusion, and relocation activities shall be completed no earlier than 48 hours before construction begins to minimize the probability that listed species will recolonize the affected areas. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit. • Within temporarily drained stream channel areas, salvage activities shall be initiated before or at the same time as stream area draining and completed within a time frame necessary to avoid injury and mortality of listed species. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit.

Appendix C

Table 3-5. Standardized Mitigation Ratios for Longhorn Fairy Shrimp in the EACCS Study Area

	Location of Mitigation[1, 2]				
Location of Impact[1]	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of longhorn fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

[1] Reference Figure 3-7 for the location of key mitigation features for longhorn fairy shrimp.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

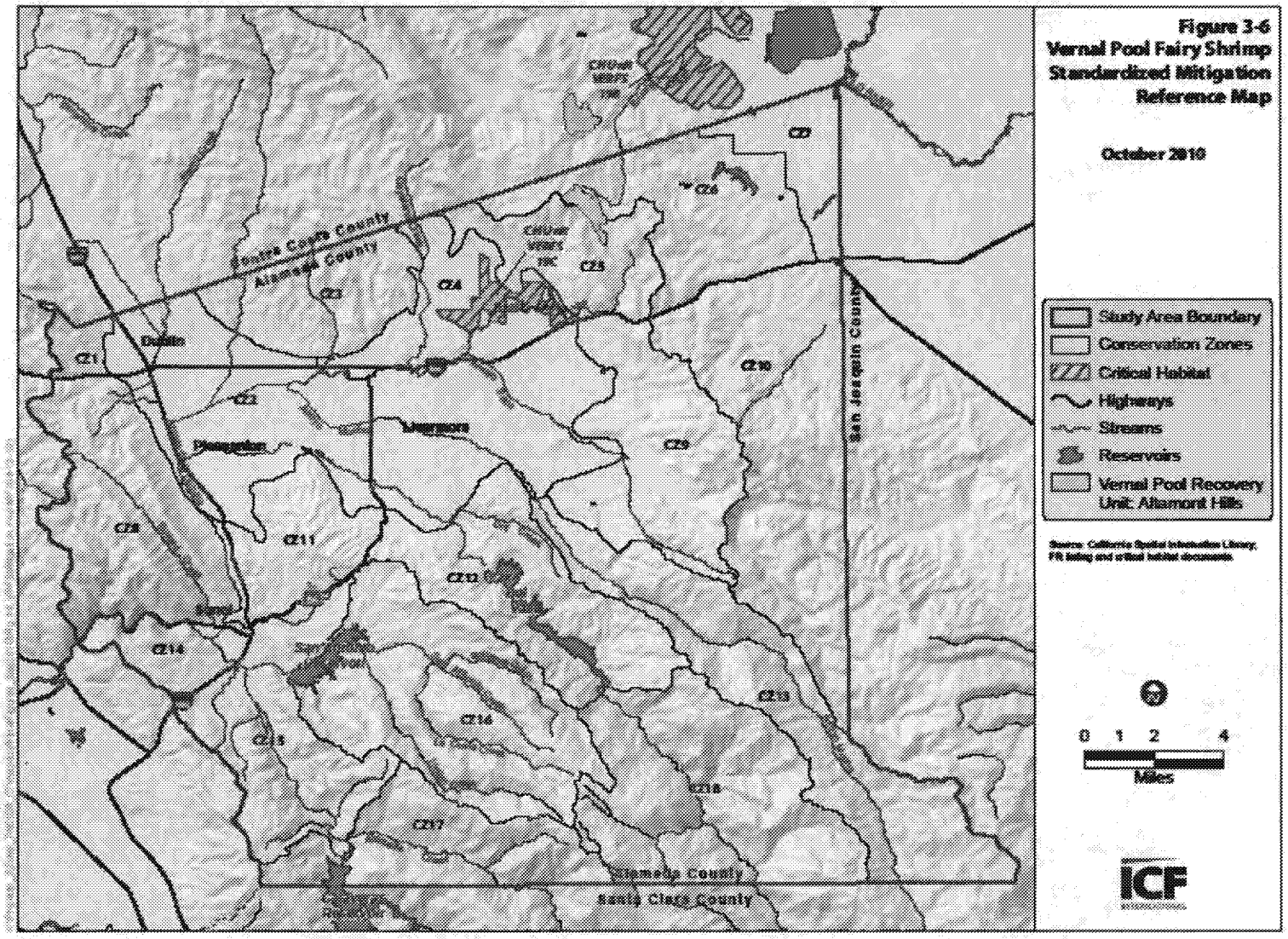
Figure 3-7
Longhorn Fairy Shrimp
Standardized Mitigation
Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Vernal Pool Recovery
Unit Abbreviations
Source: California Natural Diversity Database,
Fish and Wildlife Service Recovery Plan
Contra Costa County
Alameda County
San Joaquin County
Santa Clara County
Solano County
Tracy
Livermore
Brentwood
Byron
Discovery Bay
Antioch
Pittsburg
Concord
Walnut Creek
Danville
San Ramon
Dublin
Pleasanton
Fremont
Newark
Union City
Hayward
San Leandro
Oakland
Alameda
Berkeley
Richmond
El Cerrito
Hercules
Pinole
San Pablo
Martinez
Pacheco
Clayton
Orinda
Lafayette
Moraga
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
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CZ29
CZ30
CZ31
CZ32
CZ33
CZ34
CZ35
CZ36
CZ37
CZ38
CZ39
CZ40

Table 3-4. Standardized Mitigation Ratios for Vernal Pool Fairy Shrimp in the EACCS Study Area

	Location of Mitigation[1,2]				
Location of Impact[1]	Inside Critical Habitat in EACCS study area	Outside Critical Habitat and Inside Vernal Pool Recovery Unit	Outside Critical Habitat and Outside Vernal Pool Recovery Unit	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	9:1—(6 acres preservation; 3 acres restoration) *requires site-specific USFWS approval	10:1—(6.5 acres preservation; 3.5 acres restoration) *requires site-specific USFWS approval	11:1—(7 acres preservation; 4 acres restoration) *requires site-specific USFWS approval	Requires site-specific agency approval	In order to preserve 90% of vernal pool fairy shrimp habitat, consistent with the goals and objectives of the EACCS, a high ratio is required due to the rarity of this habitat type.
Outside Critical Habitat and Inside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	Requires site-specific agency approval	
Outside Critical Habitat and Outside Vernal Pool Recovery Unit	9:1—(6 acres preservation; 3 acres restoration)	10:1—(6.5 acres preservation; 3.5 acres restoration)	11:1—(7 acres preservation; 4 acres restoration)	Requires site-specific agency approval	

[1] Reference Figure 3-6 for the location of key mitigation features for vernal pool fairy shrimp.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.



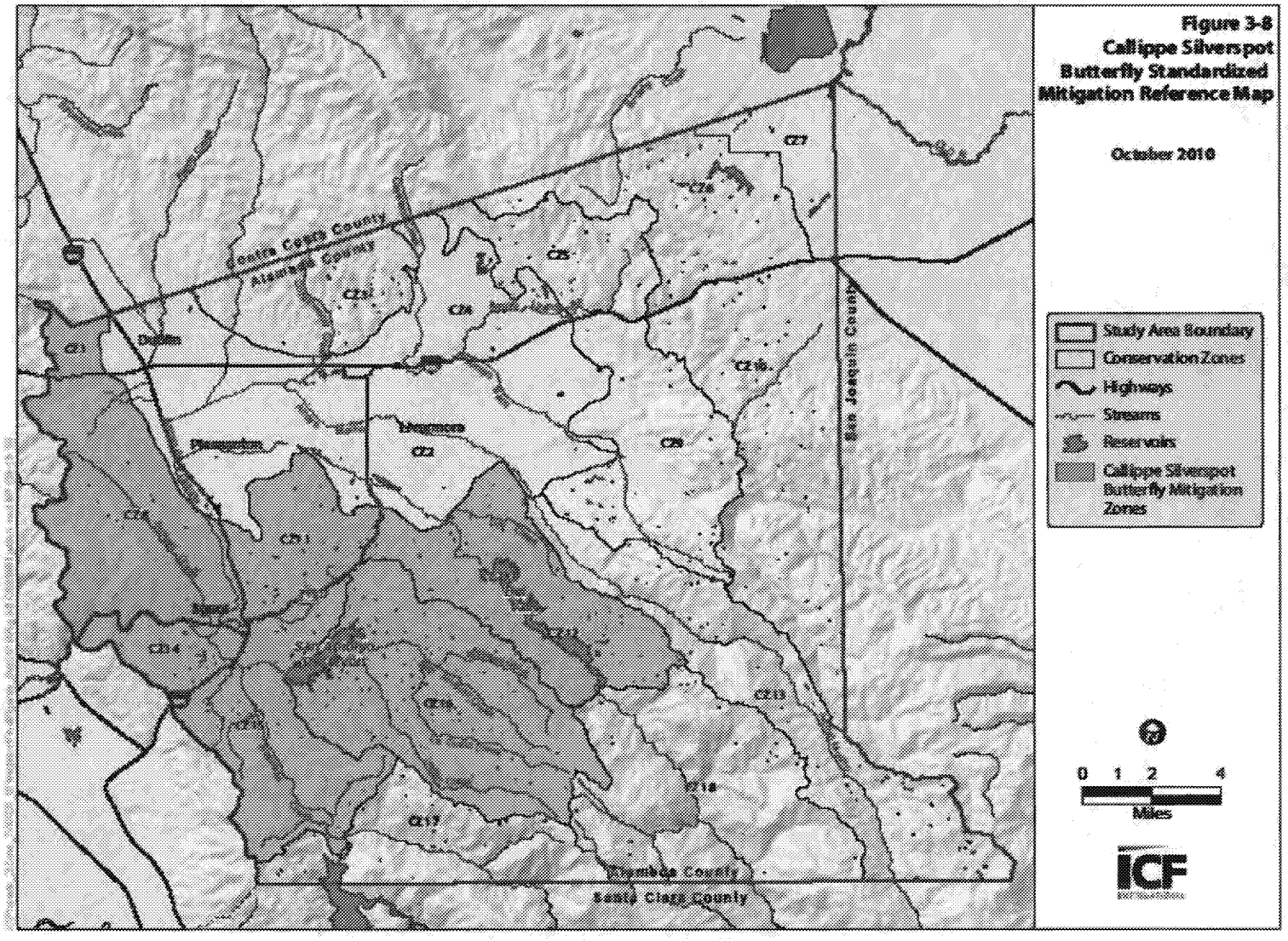
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Table 3-6. Standardized Mitigation Ratios for Callippe Silverspot Butterfly in the EACCS Study Area

	Location of Mitigation[1, 2]				
Location of Impact	Within CZ where impact occurred	Adjacent to CZ where impact occurred and inside mitigation area shown in Figure 3-8	In CZ Not Adjacent to CZ where impact occurred but inside mitigation area shown in Figure 3-8	Outside mitigation area shown in Figure 3-8 including an area outside EACCS Study Area	Notes
Inside Conservation Zones CZ1, CZ8, CZ11, CZ12, CZ14, CZ15, CZ16	3:1	3.5:1	4:1	Requires site-specific agency approval	

[1] Reference Figure 3-8 for the location of key mitigation features for callippe silverspot butterfly.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.



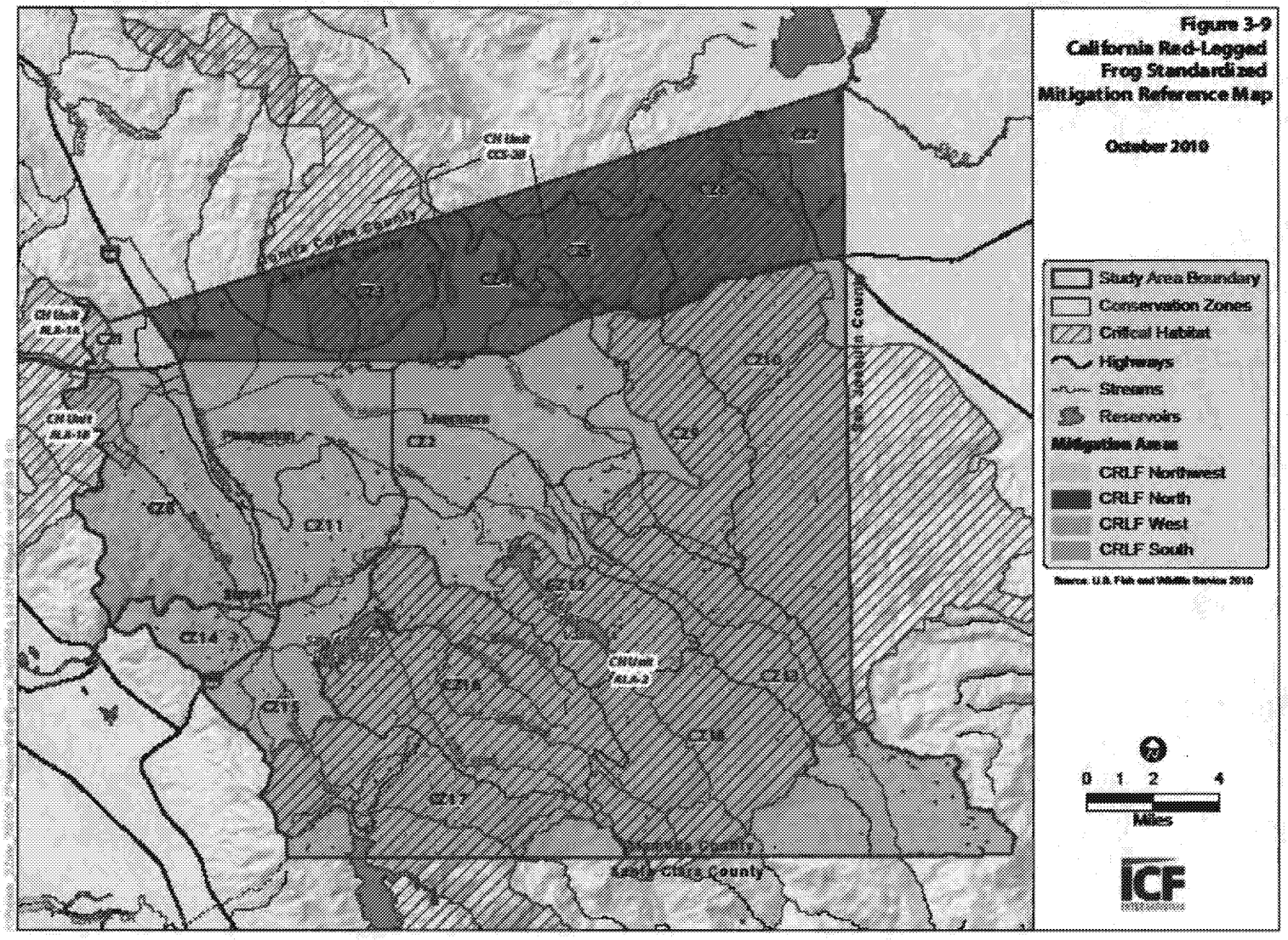
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Table 3-7. Standardized Mitigation Ratios for California Red-Legged Frog in the EACCS Study Area

	Location of Mitigation[1, 2]					
Location of Impact[1]	Inside Critical Habitat in EACCS study area in same CRLF Mitigation Area based on Figure 3-9	Inside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat but inside same CRLF Mitigation Area based on Figure 3-9	Outside Critical Habitat in EACCS study area in different CRLF Mitigation Area based on Figure 3-9	Outside EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	3:1	Requires site specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat in EACCS study area	2.5:1	3:1	3:1	3.5:1	Requires site-specific agency approval	

[1] Reference Figure 3-9 for the location of key mitigation features for California red-legged frog.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.



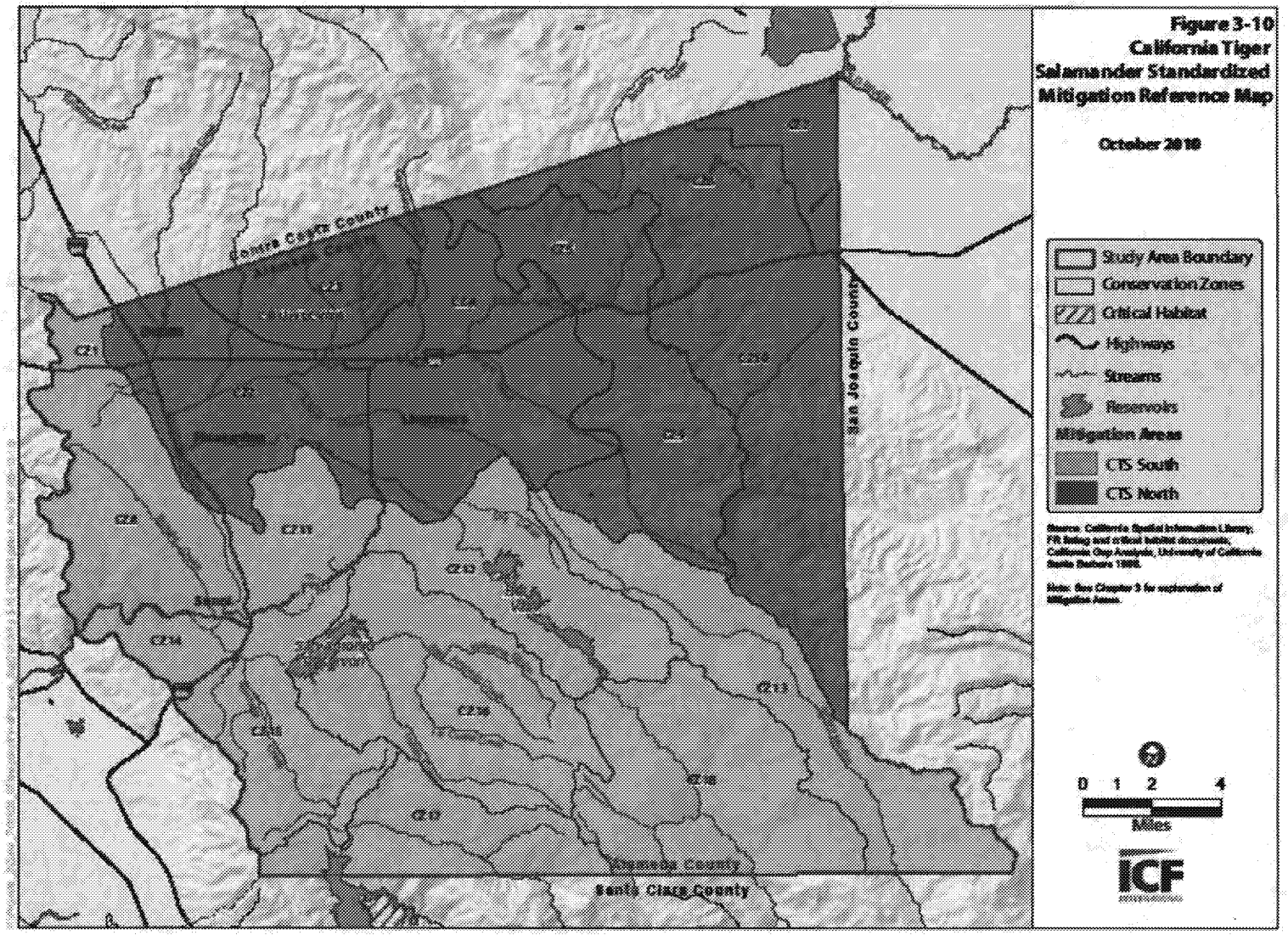
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Table 3-8. Standardized Mitigation Ratios for California Tiger Salamander in the EACCS Study Area

	Location of Mitigation[1,2]						
Location of Impact[1]	Inside Critical Habitat in EACCS study area	Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	Outside Critical Habitat but inside CTS South Mitigation Area, east of I-680	Outside of EACCS Study Area	Notes
Inside Critical Habitat in EACCS study area	3:1	Requires site specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS North Mitigation Area, north of I-580	2.5:1	3:1	3.5:1	4:1	4:1	Requires site-specific agency approval	Shaffer et al. 2004 found that there is some genetic distinction between CTS in the Central Valley Ecological Zone and the Western California Ecological Zone. Those zones were used to create CTS North and South Mitigation Areas.
Outside Critical Habitat but inside CTS North Mitigation Area, south of I-580	3:1	3.5:1	3:1	4:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Area, west of I-680	3:1	4:1	4:1	3:1	3.5:1	Requires site-specific agency approval	
Outside Critical Habitat but inside CTS South Mitigation Zone, east of I-680	3:1	4:1	4:1	3.5:1	3:1	Requires site-specific agency approval	

[1] Reference Figure 3-10 for the location of key mitigation features for California tiger salamander.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.



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Table 3-9. Standardized Mitigation Ratios for Alameda Whipsnake in the EACCS Study Area

	Location of Mitigation[1]						
Location of Impact[1]	Inside Critical Habitat Unit in same recovery unit[2]	Inside Critical Habitat Unit in different recovery unit	Outside Critical Habitat but Inside Same Recovery Unit	Outside Critical Habitat and Inside Different Recovery Unit	Outside Critical Habitat and Outside Recovery Unit	Outside EACCS Study Area	No
Inside Critical Habitat	3:1	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but Inside Recovery Unit	2.5:1	3:1	3:1	3.5:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat and Outside Recovery Unit	2.5:1	2.5:1	3:1	3:1	3:1	Requires site-specific agency approval	

[1] Reference Figure 3-12 for the location of key mitigation features for Alameda whipsnake.

[2] Agency approval will be required to mitigate impacts that occur inside Critical Habitat Unit 5a in Critical Habitat Unit 5b and vice versa, even though they are inside the same recovery unit.

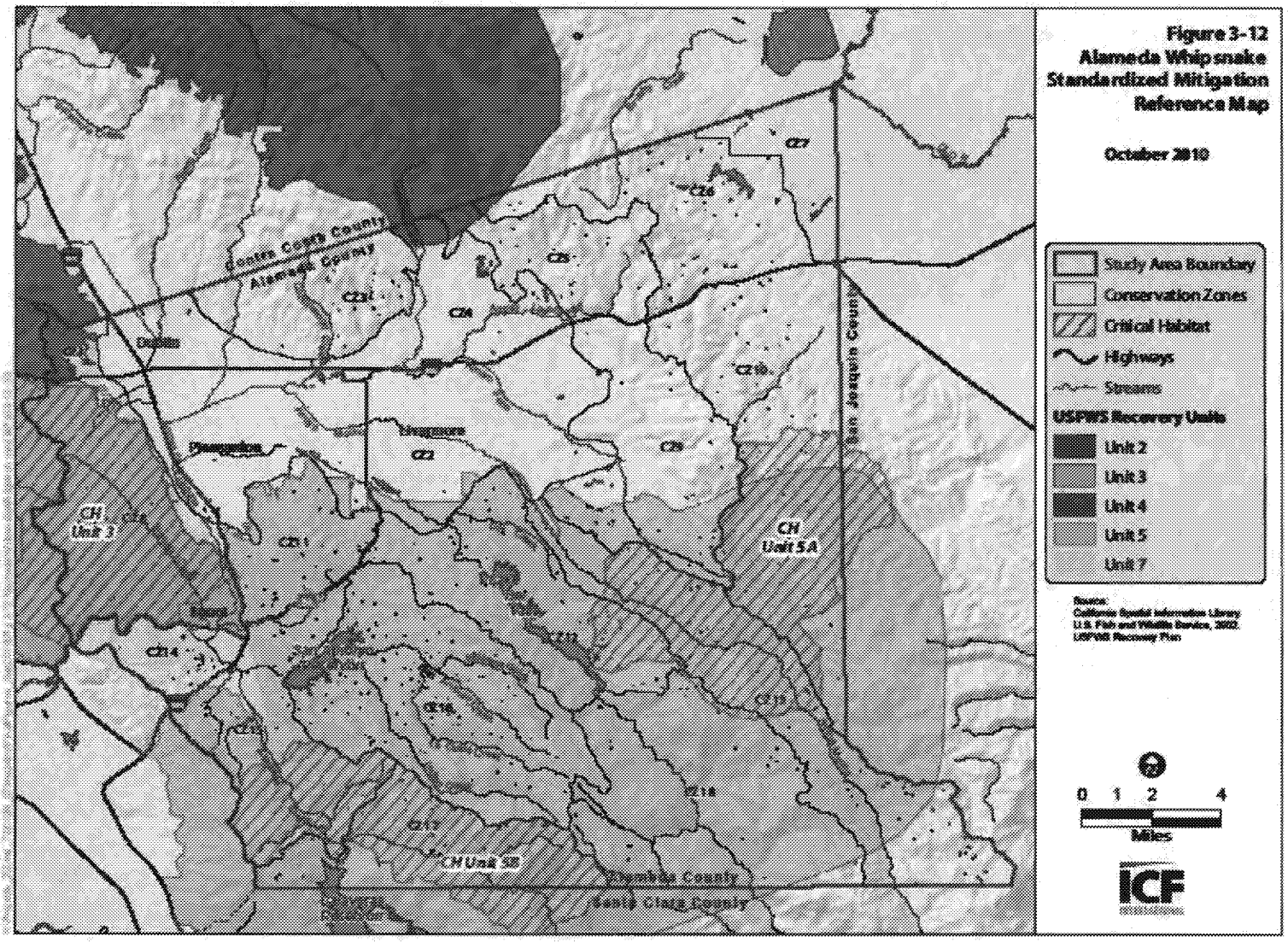

Figure 3-12
Alameda Whipsnake
Standardized Mitigation
Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
USFWS Recovery Units
Unit 2
Unit 3
Unit 4
Unit 5
Unit 7
Source:
California Spatial Information Library
U.S. Fish and Wildlife Service, 2002.
USFWS Recovery Plan
0 1 2 4
Miles
ICF
Contra Costa County
Alameda County
Santa Clara County
San Joaquin County
Stanislaus County
Tuolumne County
Calaveras County
Amador County
El Dorado County
Sacramento County
Yolo County
Solano County
Napa County
Sonoma County
Marin County
Mendocino County
Lake County
Glenn County
Colusa County
Yuba County
Sutter County
Placer County
Nevada County
Sierra County
Plumas County
Lassen County
Modoc County
Shasta County
Trinity County
Humboldt County
Del Norte County
Siskiyou County
Klamath County
Oregon
Nevada
Pleasanton
Livermore
Dublin
Tracy
Stockton
Manteca
Ripon
Escalon
Oakdale
Modesto
Turlock
Merced
Los Banos
Gilroy
Morgan Hill
San Jose
Milpitas
Fremont
Hayward
Oakland
Berkeley
Richmond
San Pablo
Concord
Martinez
Pittsburg
Antioch
Brentwood
Byron
Vacaville
Fairfield
Suisun City
Benicia
Vallejo
Napa
Petaluma
Santa Rosa
Sebastopol
Healdsburg
Windsor
Cloverdale
Ukiah
Willits
Fort Bragg
Eureka
Arcata
Crescent City
Weaverville
Redding
Shasta Lake
Red Bluff
Corning
Chico
Oroville
Paradise
Gridley
Marysville
Yuba City
Colusa
Williams
Orland
Willows
Grass Valley
Nevada City
Auburn
Roseville
Rocklin
Lincoln
Folsom
Placerville
South Lake Tahoe
Sonora
Jamestown
Angels Camp
Murphys
Ione
Jackson
Sutter Creek
Amador City
Plymouth
Shingle Springs
Cameron Park
Diamond Springs
Camino
Pollock Pines
Meyers
Truckee
Loyalton
Downieville
Quincy
Portola
Susanville
Alturas
Tulelake
Yreka
Weed
Mount Shasta
Dunsmuir
Hayfork
Willow Creek
Orleans
Somes Bar
Gasquet
Klamath
Smith River
Crescent City
Lakeport
Clearlake
Middletown
Calistoga
St. Helena
Yountville
Rutherford
Oakville
Sonoma
Glen Ellen
Kenwood
Boyes Hot Springs
Agua Caliente
Cotati
Rohnert Park
Penngrove
Petaluma
Novato
San Rafael
Mill Valley
Sausalito
Tiburon
Corte Madera
Larkspur
Fairfax
San Anselmo
Ross
Kentfield
Greenbrae
Point Reyes Station
Inverness
Bolinas
Stinson Beach
Muir Beach
Mill Valley
Tamalpais Valley
Alameda
Oakland
Berkeley
Emeryville
Albany
El Cerrito
Kensington
Richmond
San Pablo
Pinole
Hercules
Crockett
Rodeo
Martinez
Concord
Pleasant Hill
Walnut Creek
Lafayette
Orinda
Moraga
Danville
San Ramon
Dublin
Pleasanton
Livermore
Tracy
Lathrop

Table 3-11. Standardized Mitigation Ratios for San Joaquin Kit Fox in the EACCS Study Area

	Location of Mitigation[1, 2]					
Location of Impact[1]	Inside SJKF North Mitigation Area as shown in Figure 3-13	Inside SJKF East Mitigation Area as shown in Figure 3-13	Inside SJKF South Mitigation Area as shown in Figure 3-13	Inside SJKF Central-West Mitigation Area as shown in Figure 3-13	Outside of EACCS Study Area	Notes
Inside SJKF North Mitigation Area as shown in Figure 3-13	3:1	3:1	3:1	N/A	Requires site-specific agency approval	
Inside SJKF East Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3.5:1	N/A	Requires site-specific agency approval	Ratios may rise in areas of documented high occurrence or movement corridors.
Inside SJKF South Mitigation Area as shown in Figure 3-13	3.5:1	3:1	3:1	N/A	Requires site-specific agency approval	
Inside SJKF Central-West Mitigation Area as shown in Figure 3-13	N/A	N/A	N/A	N/A	Requires site-specific agency approval	

[1] Reference Figure 3-13 for the location of mitigation areas for San Joaquin kit fox.

[2] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.

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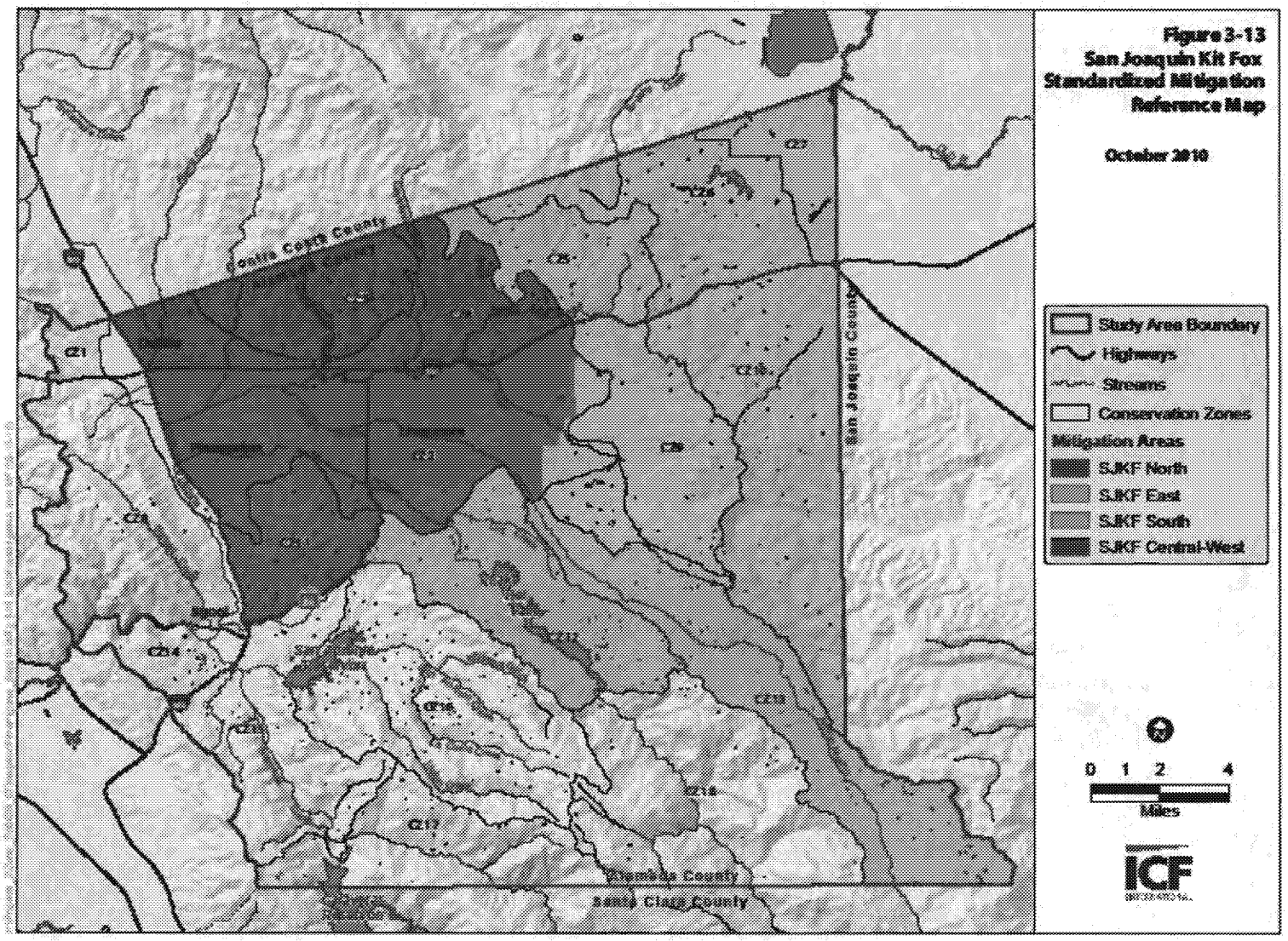


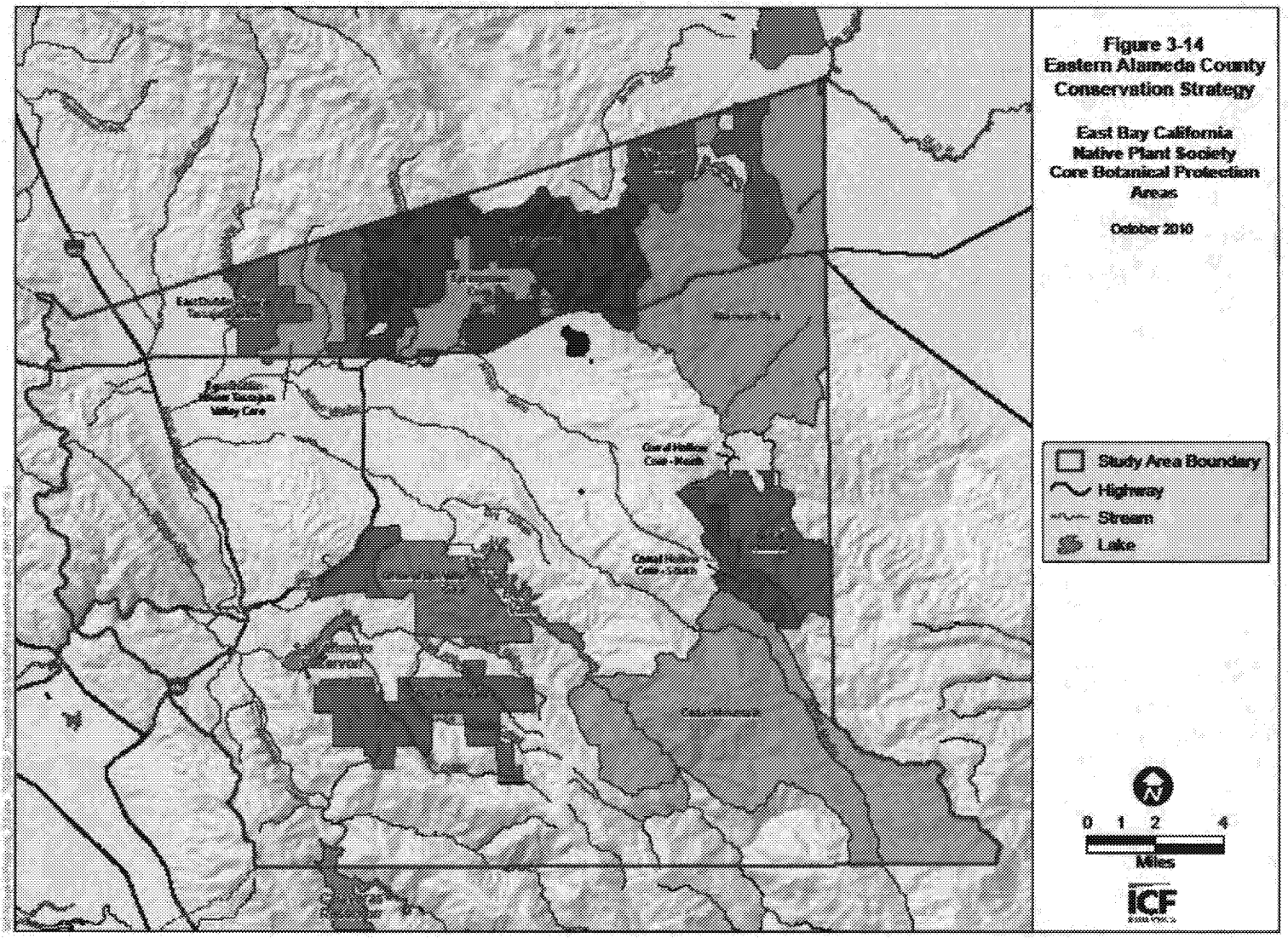
Table 3-12. Standardized Mitigation Ratios for Focal Plant Species in the EACCS Study Area[1]

	Location of Mitigation[2, 3]					
Location of Impact[2]	Within East Bay Hills Mitigation Area	Within Livermore Valley Mitigation Area	Within Altamont Hills Mitigation Area	Within Northern Diablo Range Mitigation Area	Outside EACCS Study Area	Notes
Within East Bay Hills Mitigation Area	5:1	With agency approval	With agency approval	With agency approval	With agency approval	
Within Livermore Valley Mitigation Area	With agency approval	5:1	With agency approval	With agency approval	With agency approval	
Within Altamont Hills Mitigation Area	With agency approval	With agency approval	5:1	With agency approval	With agency approval	
Within Northern Diablo Range Mitigation Area	With agency approval	With agency approval	With agency approval	5:1	With agency approval	

[1] Mitigation ratios for focal plant species refer to the size of the population that is effected or protected. Restoration ratio refers to reestablishing or increasing the size of an existing population. The quality/vigor of a population would need to be considered when making final determinations.

[2] Reference Figure 3-11 for the location of key mitigation features for plants and non-listed species in the EACCS study area.

[3] In order to meet CDFG's standard of full mitigation for state listed species under CESA, project applicants will have to demonstrate habitat enhancement, not just permanent protection, on properties used for mitigation. If credits are purchased at a CDFG approved mitigation bank, this enhancement is assumed, therefore the full mitigation standard would be met upon purchase of the credits.



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Appendix D

Table E-1. Impact/Mitigation Scoring for vernal pool fairy shrimp in the EACCS study area.

Vernal pool fairy shrimp	5	4	3	2	1	0	Score
Closest suitable vernal pool habitat to impact/mitigation area	On-site	Within 250 feet	Greater than 250 feet but hydrologically connected	--	--	Greater than 250-feet and not hydrologically connected	
Aquatic land covers impacted/ mitigated	Vernal pools	Other aquatic features that can support species	--	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderal	--	--		All others; none	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Inside Altamont Hills Core Area identified in Vernal Pool Recovery Plan	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-4. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.							

Table E-2. Impact/Mitigation Scoring for longhorn fairy shrimp in the EACCS study area.

Longhorn fairy shrimp	5	4	3	2	1	0	Score
Closest suitable vernal pool/sandstone pool habitat to impact/ mitigation area	On-site	Within 250 feet	-- Greater than 250 feet but hydrologically connected	--	--	Greater than 250-feet and not hydrologically connected	
Aquatic land covers impacted/ mitigated	Sandstone pools	Vernal pools	Other aquatic features that can support species	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderal	--	--		All others; none	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Inside Altamont Hills Core Area identified in Vernal Pool Recovery Plan	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-5. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.

Table E-3. Impact/Mitigation Scoring for Callippe silverspot butterfly in the EACCS study area.

Callippe silverspot butterfly	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in:	CZ1/CZ8/CZ11/ CZ12/CZ14/CZ 15/CZ16	--	--	--	--	All others	
Presence of host/nectar plants	On-site	Within 0.25-mile of site	>0.25-mile but <0.5-mile	--	--	> 0.5-mile	
Land covers impacted/ mitigated	--	--	Grassland	Oak woodland	--	All others	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-6. Habitat quality of the impact site and the mitigation site would be scored using this table.							

Table E-4. Impact/Mitigation Scoring for California tiger salamander in the EACCS study area.

California tiger salamander	5	4	3	2	1	0	Score
Closest suitable breeding habitat to site	On-site	Within 500 feet	Between 501 – 1,600 feet	Between 1,601 –2,050 feet	Between 2051–6,900 feet	Greater than 6,900 feet	
Is there occupied habitat within 6,900 feet of site?	Yes	--	--	No	--	--	
Aquatic land covers impacted/ mitigated	Wetland, Ponds	--	Stream/River	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Riparian	Conifer woodland	ruderal without refugia habitat	All others; none	
Elevation	Below 3,700 feet	--	--	--	--	Above 3,700 feet	
Presence of ground squirrels/pocket gophers	On site	Within 1,350 feet of site	Between >1,351 but <2,650 feet	Between >2,651 bu <5,300 feet	Between >5,301 but <7,900 feet	> 7,901 feet from site	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low number; not all aquatic habitats occupied	--	Yes, occurring in high numbers	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-8. Habitat quality of the impact site and the mitigation site would be scored using this table.							

Table E-5. Impact/Mitigation Scoring for California red-legged frog in the EACCS study area.

California red-legged frog	5	4	3	2	1	0	Score
Closest suitable breeding habitat to site	On-site	< 1-mile	>1-mile but < 2-miles	--	--	Greater than 2-miles	
Is there occupied habitat within 2-miles of site?	Yes	--	--	No	--	--	
Aquatic land covers impacted/ mitigated	Wetland, Ponds, Stream/River	--	--	--	--	All others; none	
Upland land covers impacted/ mitigated	Riparian, Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Conifer woodland	Cultivated ag, ruderal	--	All others; none	
Elevation	Below 3,500 feet	--	--	--	--	Above 3,500 feet	
Presence of ground squirrels or other burrowing mammals	On site	< 0.25-mile of site	> 0.25 but ≤ 0.5 miles	> 0. 5 but ≤ 1.0 miles	> 1.0 but ≤ 1.5 miles	> 1.5 miles	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low numbers and not all aquatic habitats are occupied	--	Yes, occurring in high numbers	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Inside East San Francisco Bay core recovery area	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-7. Habitat quality of the impact site and the mitigation site would be scored using this table.

Table E-7. Impact/Mitigation Scoring for Alameda whipsnake in the EACCS study area.

Alameda whipsnake	5	4	3	2	1	0	Score
Inside Core Recovery Unit reported in draft Recovery Plan	Yes	--	--	--	--	No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
High quality shrub habitat (scrub/chaparral especially; on northeast, east, south east, south and southwest Aspects) within one mile of subject site	Yes	--	--	--	No	--	
Land covers impacted/ mitigated	Chaparral/ Scrub	Grassland, Oak Woodland	Riparian	Conifer Woodland	--	All others	
Presence of rock outcrops	On-site	≤ 0.5-mile	≥ 0.5 but < 1-mile	--	--	> 1 mile	
Presence of important movement corridor reported in draft Recovery Plan	On-site	≤ 0.5-mile	≥ 0.5 but < 1-mile	--	--	> 1 mile	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-9. Habitat quality of the impact site and the mitigation site would be scored using this table.

Table E-11. Impact/Mitigation Scoring for San Joaquin kit fox and America badger in the EACCS study area.

San Joaquin kit fox/American badger	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in:	CZ5CZ6/CZ7/ CZ9/CZ10	--	—CZ4 or CZ13	--	—CZ2, CZ3, CZ11, CZ12	--	
Land covers impacted/ mitigated	Grassland, Rural residential	Chaparral/ Scrub	Oak woodland, Cultivated Ag	Seasonal wetlands, Orchard	, ruderal	All others	
Average Slope	0-5%	> 5 but < 10%	≥ 10 but < 25%	≥25%	--	All others	
Presence of ground squirrels	On site	Within 0.25-mile of site	Within 0.5-mile of site	--	--	Further away	
Linkages and movement	Creation or removal of potential linkage across barrier (e.g. culvert under freeway)	Land adjacent to potential linkage on both sides of barrier (e.g., culvert under freeway)	Land adjacent to potential linkage on one side of barrier (e.g., culvert under freeway)	Land not adjacent to key linkage for species.	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-11. Habitat quality of the impact site and the mitigation site would be scored using this table.							

Table E-16. Impact/Mitigation Scoring for Palmate-bracted bird's beak in the EACCS study area.

Palmate-bracted bird's beak	5	4	3	2	1	0	Score
Conservation Zones	Inside CZ4	--	--	--	--	Other CZ	
Elevation	Below 500 feet	--	--	--		Above 500 feet	
Land covers impacted/ mitigated	chenopod scrub	Annual grassland,	--	Rural residential, ruderal	--	All others	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Soils present in impact area	Alkali soils	--	--	--	--	others	
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.							

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December 22, 2021

Serge Stanich
Director of Environmental Services
California High-Speed Rail Authority
770 L Street, Suite 620
Sacramento, California 95814
Serge.Stanich@hsr.ca.gov

Subject: Formal Consultation on the California High-Speed Rail System: San Jose to Merced Project Section

Dear Serge Stanich:

This letter is in response to the California High-Speed Rail Authority's (Authority) request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the San Jose to Merced Project Section of the California High-Speed Rail (HSR) System (project) in Santa Clara, San Benito, and Merced counties, California. This letter is sent to the Authority in its role as the federal lead agency for the San Jose to Merced Project Section under the National Environmental Policy Act (NEPA) and other federal laws. Pursuant to 23 United States Code (U.S.C.) 327, under the NEPA Assignment Memorandum of Understanding (MOU) between the Federal Railroad Administration (FRA) and the State of California, effective July 23, 2019, the Authority is the federal lead agency for environmental reviews and approvals for all Authority Phase 1 and Phase 2 projects. Under the MOU, the Authority has been assigned FRA's Endangered Species Act (Act) Section 7 (16 U.S.C. 1536) responsibilities for consultations (formal and informal) with respect to HSR and other projects described in subpart 3.3 of the MOU.

At issue are the project's effects on the following federally listed species and critical habitats:

Species federally listed as endangered:

- San Joaquin kit fox (*Vulpes macrotis mutica*) (kit fox)
- California condor (*Gymnogyps californianus*) (condor)
- least Bell's vireo (*Vireo bellii pusillus*) (vireo)
- blunt-nosed leopard lizard (*Gambelia silus*) (lizard)
- Coyote ceanothus (*Ceanothus ferrisae*)
- Metcalf Canyon jewelflower (*Streptanthus albidus ssp. albidus*) (jewelflower)

- Santa Clara Valley dudleya (*Dudleya setchellii*) (dudleya)
- Tiburon paintbrush (*Castilleja affinis ssp. neglecta*)
- vernal pool tadpole shrimp (*Lepidurus packardi*) (tadpole shrimp)

Species federally listed as threatened:

- giant garter snake (*Thamnophis gigas*)
- California red-legged frog (*Rana draytonii*) (frog) and its designated critical habitat
- Central California Distinct Population Segment of California tiger salamander (*Ambystoma californiense*) (salamander) and its designated critical habitat
- Bay checkerspot butterfly (*Euphydryas editha bayensis*) (butterfly) and its designated critical habitat
- valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle)
- vernal pool fairy shrimp (*Branchinecta lynchi*) (fairy shrimp)

Critical habitat has been designated for the condor, vireo, beetle, tadpole shrimp, and fairy shrimp. Because no designated or proposed critical habitat for these species occurs in the action area, it is not considered in this biological opinion.

This response is provided under the authority of the Act of 1973, as amended (16 U.S.C. 1531 et seq.), and in accordance with the implementing regulation pertaining to interagency corporation (50 Code of Federal Regulations [CFR] 402).

The federal action on which we are consulting is the construction, operation, and maintenance of the Authority's San Jose to Merced Project Section of the HSR. Pursuant to 50 CFR 402.12(j), you submitted a biological assessment (BA) and a BA supplement for our review and requested concurrence with the findings presented therein. These findings conclude the project may affect and is likely to adversely affect the following federally listed species: the vireo, the frog, the salamander, the butterfly, the beetle, the tadpole shrimp, the fairy shrimp, the jewelflower, and the dudleya.

In considering your request, we based our evaluation on the following:

1) Extensive coordination between the Service and the Authority (and the FRA prior to the MOU, as described above) from April 2015 to October 2021 regarding the project, conservation measures, and framework for evaluating the effects on federally listed species

2) The June 24, 2020, letter from the Authority to the Service requesting initiation of formal consultation

3) The *San Jose to Merced Project Section Biological Assessment*, dated June 2020, and supplemental information provided November 2021

4) Correspondence between the Authority and the Service

5) Other information available to the Service

The Authority determined that the project, as proposed, may affect but is not likely to adversely affect the kit fox, the lizard, giant garter snake, Coyote ceanothus, and Tiburon paintbrush. The

Service concurs with this determination as the effects will be discountable for the following reasons:

1) The species have not been documented in the action area within the last 10 years and are not expected to occur in the action area,

2) Conservation measures as provided below under Description of the Project, including CM-GEN-07: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training and CM-PLT-01: Conduct Pre-Construction Surveys for Listed Plants and Implement Avoidance and Minimization Measures will be implemented and will avoid adverse effects should the species unexpectedly occur within the action area,

3) The conservation measure below specific to the kit fox,

4) The small amount of suitable habitat in the action area.

Conservation Measures Specific to San Joaquin Kit Fox

CM-SJKF-01: Conduct Pre-Construction Surveys for San Joaquin Kit Fox and Implement Exclusion Areas around Potential Dens

Within 30 days prior to the start of any ground-disturbing activity in each work area[1] from the Pajaro River in San Benito and Santa Clara Counties east along the entire alignment excluding areas directly above the tunneled alignment, the Designated Biologist will conduct pre-construction surveys in suitable habitat for kit fox in the work area plus a 500-foot buffer (where access permitted). If no potential dens or sign of kit fox are observed, no further measures will be required. The surveys will be phased with project buildout and the start of activities at each work area.

Potential dens will be monitored for a minimum of five consecutive nights with a trail camera and tracking medium to evaluate den status and determine the presence/absence of kit fox. A potential den includes all natural earthen dens/burrows with entrances/tunnels 3.5 inches in diameter or larger, but for which there are no historical records or current evidence of use. If there is a risk that cameras may be stolen or vandalized, then at that site, monitoring may be conducted using tracking medium only with prior concurrence from the Service. All potential kit fox dens will be mapped and photo documented and described in the survey report. The Project Biologist will submit a survey findings report prior to start of ground-disturbing activities to the Authority to document compliance with this measure. Once dens are monitored and shown to be unoccupied, they will be collapsed the next day following the fifth consecutive night of species absence. Should a survey result in positive identification of the kit fox or should kit fox be encountered during construction, the Designated Biologist will require all activities that could adversely affect individuals to stop and the Service will be notified within 24 hours to determine if reinitiation of Section 7 consultation is warranted. Any such cessation of activities will be limited to the area necessary to protect the species pending further direction from the Service.

[1] For the purposes of this biological opinion, the *work area* is defined as the portion of the project footprint that is currently under active construction.

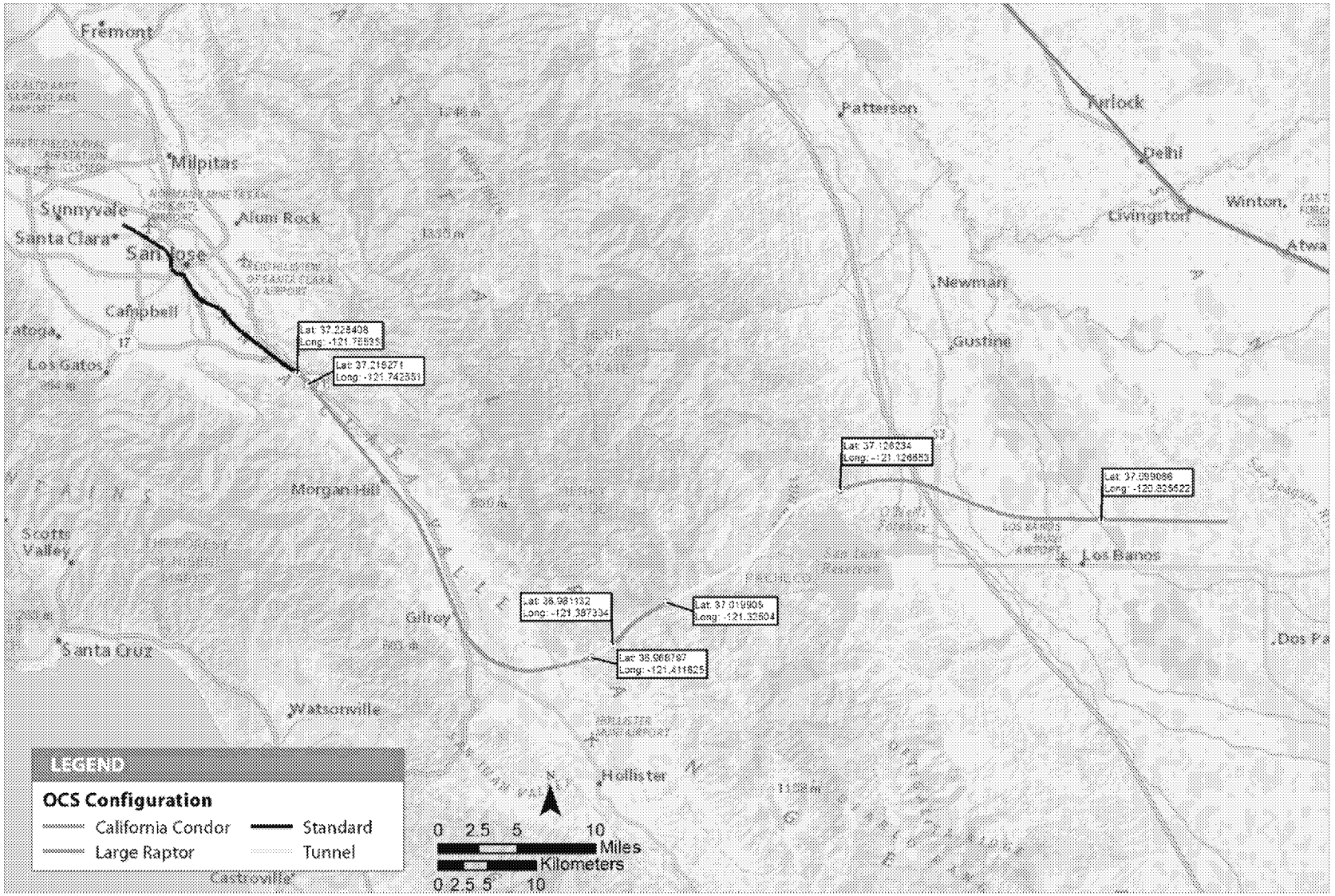
The Authority determined that the project, as proposed, may affect but is not likely to adversely affect the condor. The Service concurs with this determination as the effects will be discountable for the following reasons:

1) Implementation of species-specific conservation measures, as provided below (CM-CACO-01 through CM-CACO-07), will avoid adverse effects,
2) Implementation of general conservation measures, as described under the Description of the Project, including CM-GEN-20: Design the Project to Be Bird Safe, which states that the project, including the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities, will be designed to be bird and raptor-safe (i.e., avoid electrocution and strike) in accordance with applicable Avian Power Line Interaction Committee (APLIC) recommendations in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012),
3) The Authority's commitment to designing the project's overhead catenary system to provide a minimum safe distance between the conductors of 83 horizontal inches and 52 vertical inches to avoid condor electrocution between the latitude and longitude positions indicated on the map below (Figure 1),
4) No nesting habitat for the condor occurs within the action area.

CM-CACO-04: Implement Avoidance Measures for California Condor

During any ground-disturbing activities in the range of condor, the Project Biologist will implement the following avoidance measures:

- Construction materials in work areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored and secured when not in use.
- Litter, small artificial items (screws, washers, nuts, bolts, etc.), and all food waste will be stored in self-closing, sealable containers with lids that latch to prevent entry by wind, common ravens, and mammals. All trash receptacles will be inspected and collected regularly; the contents disposed of from work areas on a daily basis to prevent spillage and maintain sanitary conditions. The receptacles will be removed from the work area when construction or operations and maintenance (O&M) activities are complete.
- All fuels, fluids, and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured and/or secondary containment facilities as necessary. Any spills of liquid substances that could harm wildlife will be immediately addressed.



.Figure 1. Overhead Catenary System Bird-Safe Configuration Locations

- The project will avoid the exposure of wildlife to antifreeze containing ethylene glycol by keeping parked vehicles/equipment free of leaks, particularly antifreeze, and immediately cleaning up any spills or discharges that arise from leaks.
- Polychemical lines will not be used or stored on site to preclude wildlife, especially condor, from obtaining and ingesting pieces of polychemical lines.

CM-CACO-05: Implement Helicopter Avoidance Measures for California Condor

In the event helicopters are needed, the Project Biologist will coordinate with the Service, as appropriate, prior to helicopter use that could affect condor, to establish that no known individuals are in the work area. If condors are present, helicopter use will be avoided until the birds have left the area. If condors are observed in helicopter work areas, further helicopter use will be avoided until the Designated Biologist or Biological Monitor has determined that the condors have left the area. The Designated Biologist and Biological Monitors will have radio contact with the project foreman, who will be in radio contact with the helicopter pilot. The biologist will provide real-time information updates to the project foreman and helicopter pilot to avoid conflicts with condors.

CM-CACO-06: Stop Work and Implement Hazing Methods for California Condor

If a condor(s) lands or is observed in or near a work area, the Designated Biologist or Biological Monitor will assess the construction activities occurring and determine whether there is a potential hazard to the condor. Activities determined to be a potential hazard will be stopped until the condor has abandoned the area. After 15 minutes, if a condor has not left of its own volition, the Designated Biologist or Biological Monitor, or other Service-approved personnel, will implement Service-approved hazing methods in accordance with the Service Recovery Program's *Guidance on Hazing California Condors* (Service 2014a).

If the condor does not leave the area within 30 minutes of the initiation of hazing, the Designated Biologist or Biological Monitor will notify the Project Biologist. The Project Biologist will coordinate with the Authority and the Service to determine the appropriate actions.

CM-CACO-07: Implement Removal of Carrion That May Attract California Condor

Dead and injured wildlife found in the right-of-way and tracks will be removed during construction and O&M when the train is in operation. During O&M within condor range, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of carrion in the right-of-way.

Term and Condition #5 of the biological opinion will help ensure that the above measures and determinations remain accurate and supported prior to construction of the project.

The remainder of this document provides our biological opinion on the effects of the project on the vireo, the frog and its critical habitat, the salamander and its critical habitat, the butterfly and its critical habitat, the beetle, the tadpole shrimp, the fairy shrimp, the jewelflower, and the dudleya.

Consultation History

April to December 2015	The Authority initiated informal consultation with the Service; coordinated meetings with the Service; provided maps of the proposed alignments and species models to the Service; requested a list of species for consideration for the BA.
January to December 2016	The Authority coordinated with the Service regarding species information, modeling, and mitigation.
January 2017 to May 2020	The Authority coordinated with the Service regarding species information, modeling, mitigation, and effects analysis.
June 24, 2020	The Authority submitted documents initiating formal consultation with the Service, including providing the *San Jose to Merced Project Section Biological Assessment* (BA) for review.
June 24 to October 26, 2020	The Authority and the Service held meetings and conferences to discuss the need for additional information.
October 26, 2020	The Service requested additional information from the Authority.
October 26, 2020 to August 2021	The Authority and the Service held workshops and reviewed Service comments on the BA.
August 25, 2021	The Authority requested formal consultation with the Service for the project and submitted supplemental information to the BA.

BIOLOGICAL OPINION

Description of the Project

Project Overview

The State of California proposes to build a HSR system to connect the major population centers of the San Francisco Bay Area with the Los Angeles metropolitan region. The HSR system is envisioned as an electrically powered, high-speed, steel-wheel-on-steel-rail technology with state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

The project is the construction, operation, and maintenance of the approximately 90-mile portion of the San Jose to Merced Project Section between Scott Boulevard in Santa Clara County and Carlucci Road in Merced County (Figure 2). The project consists of the Authority's Preferred Alternative, Alternative 4, as identified in the *San Jose to Merced Project Section Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)* (Authority 2020) and includes electrical interconnection and network upgrades to existing infrastructure where required to meet the projected power demands of the HSR system.

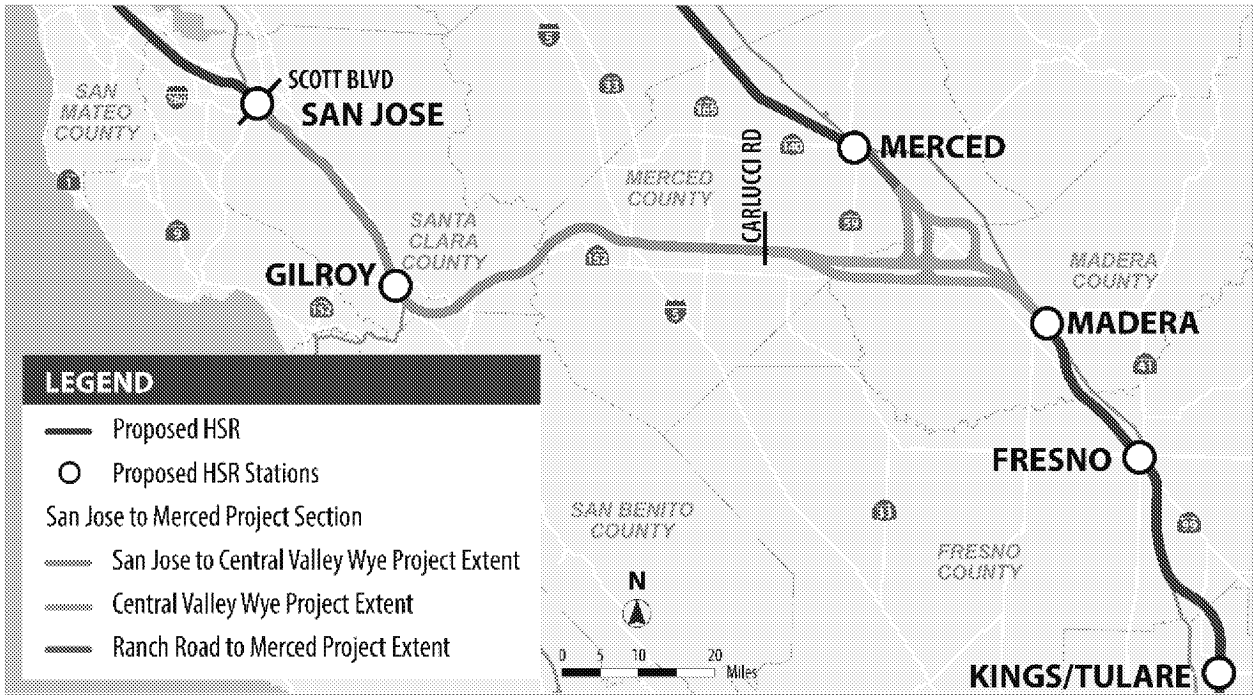


Figure 2. San Jose to Merced Project Section Geographic Context

Development of the project is intended to extend blended electric-powered passenger railroad infrastructure from the southern limit of the Caltrain Peninsula Corridor Electrification Project through Gilroy. South and east of Gilroy, HSR will operate on a dedicated guideway. The objectives of this approach are to minimize property displacements and natural resource impacts, retain local community development patterns, improve the operational efficiency and safety of the existing railroad corridor, and accelerate delivery of electrified passenger rail services in the increasingly congested southern Santa Clara Valley corridor.

The 90-mile project includes a blended, at-grade alignment that will operate on two electrified passenger tracks and (for a short portion of the alignment) one conventional freight track predominantly within the existing Caltrain and Union Pacific Railroad (UPRR) rights-of-way. The maximum train speed of 110 mph in the blended guideway will be enabled by continuous 8-foot chain-link, access-restriction fencing; four-quadrant gates, roadway lane channels, and railroad trespass deterrents at all public road grade crossings; and fully integrated communications and controls for train operations, grade crossings, and roadway traffic. Caltrain stations will be reconstructed to enable directional running as part of blended operations.

Overall, the project will be comprised of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles (Figure 3). The project comprises five subsections that are shown in Table 1 and illustrated on Figure 3.

Table 1. San Jose to Central Valley Wye Project Subsections

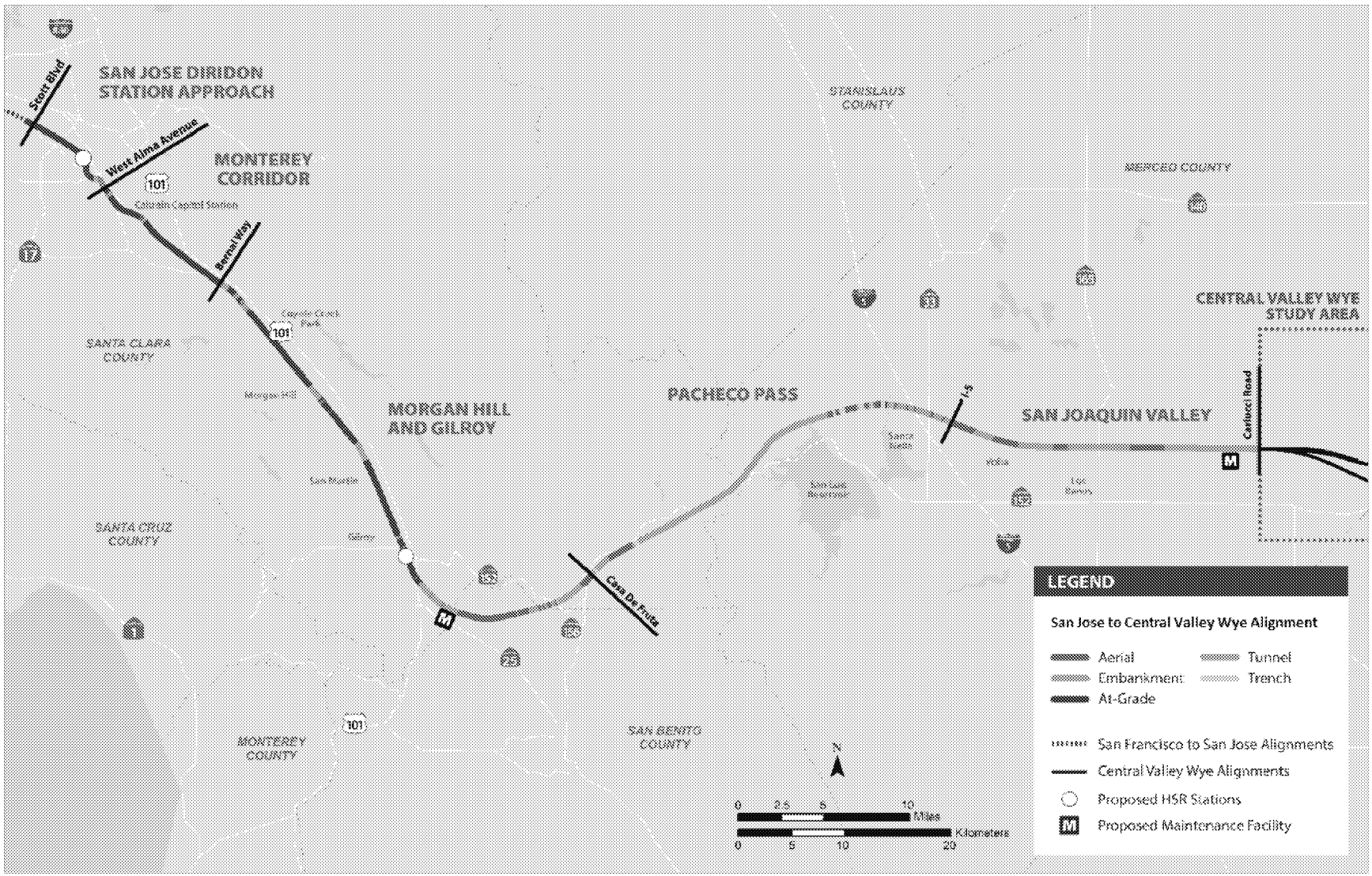
Subsection	Start	End
San Jose Diridon Station Approach (overlaps southern portion of San Francisco to San Jose Project Section)	Scott Boulevard (city of Santa Clara)	West Alma Avenue (city of San Jose)
Monterey Corridor	West Alma Avenue (city of San Jose)	Bernal Way/Kittery Court (community of South San Jose, city of San Jose)
Morgan Hill and Gilroy (includes Gilroy Station)	Bernal Way (community of South San Jose, City of San Jose)	Casa de Fruta Parkway (community of Casa de Fruta, Santa Clara County)
Pacheco Pass	Casa de Fruta Parkway (community of Casa de Fruta, Santa Clara County)	Interstate 5/Santa Nella Boulevard (community of Santa Nella, Merced County)
San Joaquin Valley	Interstate 5/Santa Nella Boulevard (community of Santa Nella, Merced County)	Carlucci Road (unincorporated Merced County)

Source: Authority 2019

Project Footprint

The project footprint extends to the physical limits of the construction activities associated with the action and includes all areas that will be permanently or temporarily affected by the action. The project footprint includes all components and rights of way (ROW) needed to construct, operate, and maintain all permanent HSR features between the Project Section's logical termini. The estimated project footprint (i.e., combined permanent and temporary disturbance areas) for the action is expected to be no greater than approximately 4,004 acres.

The project footprint primarily consists of rail ROW that would include both a northbound and a southbound track in a corridor ranging from 60 feet wide, where elevated on a viaduct, to several hundred feet wide, where on embankment or in cut. Additional ROW would be required to accommodate associated facilities and improvements, such as maintenance facilities and equipment storage areas, permanent access roads, traction power substations (TPSS), switching and paralleling stations, train signaling and communication facilities, grade separations (overheads and underpasses), intrusion protection barriers, and wildlife crossing structures. The project footprint also includes areas for utility relocations, roadway relocations, electrical power connections, and construction activities (e.g., laydown, storage, and similar areas). The project footprint consists of the limits of cut and fill, plus all access roads and areas required for operating, storing, and refueling construction equipment.



Source: Authority 2019

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Figure 3. San Jose to Central Valley Wye Alignment by Profile Type

Due to the Design/Build nature of the project, design refinements will occur as construction progresses, which may result in shifts in the project footprint into adjacent habitat. In addition, acquisition of ROW will provide access for surveys and updated habitat mapping. The HSR system, project footprint, and modeled habitat acreages included in the text below are based on the best available information at this time. Regardless of the final project footprint, project impacts will be similar geographically as well as in general nature and magnitude.

The following sections describe the project infrastructure.

San Jose Diridon Station Approach Subsection

The project will begin at Scott Boulevard in blended service with Caltrain on an at-grade profile following Caltrain Main Track (MT) 2 and MT3 south along the east side of the existing Caltrain corridor. The existing Lafayette Street pedestrian overpass will remain in place, as will the De La Cruz Boulevard and West Hedding Street roadway overpasses. New UPRR track will start just south of Emory Street to maintain freight movement capacity north of San Jose Diridon Station. The new UPRR track will be east of Caltrain MT1. The existing Santa Clara Station will remain. The existing College Park Caltrain Station will be reconstructed just north of Emory Street on the west side of the Caltrain Corridor on the existing siding track to eliminate the existing holdout rule at the station. A portion of both legs of the UPRR Warm Springs Subdivision Lenzen Wye will undergo minor track adjustments, and a new bridge will be built over Taylor Street for UPRR to tie into the Lenzen Wye.

The blended at-grade alignment will continue along MT2 and MT3 to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station. HSR platforms will be extended south to provide 1,385-foot and 1,465-foot platforms and will be raised to provide level boarding with the HSR trains. The existing Santa Clara Street underpass will remain, but the track in the throat and yard will require modification. There will be no need for modifications to the (Santa Clara) Valley Transportation Authority (VTA) light rail.

Continuing south, the blended at-grade three-track alignment will remain in the Caltrain right-of-way through the Gardner neighborhood. The existing underpass at Park Avenue and the existing overpass at San Carlos Street will remain in place. Four-quadrant gates with channelization will be built at Auzerais Avenue and West Virginia Street. A new bridge for the blended HSR/MT3 track over Interstate (I-) 280 will be constructed. The existing underpasses at Bird Avenue and Delmas Avenue will be reconstructed, as will the rail bridge overpasses. New standalone rail bridges over Prevost Street, State Route (SR) 87, the Guadalupe River, and Willow Street will be built for MT3. MT1 and MT2 will remain on the existing structures. The existing Tamien Caltrain Station will remain in place.

Monterey Corridor Subsection

The Monterey Corridor Subsection will be approximately 9 miles long and entirely within the San Jose city limits. From the San Jose Diridon Station Approach at West Alma Avenue, just south of the Caltrain Tamien Station, the alignment will extend primarily southeast to Bernal Way. This subsection will be in blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way. HSR and Caltrain will operate on the electrified MT2 and MT3 tracks, while UPRR will operate on

a nonelectrified MT1. The two existing tracks will be shifted to accommodate the third track. The existing Tamien Caltrain Station will remain in place with two new electrified turnback tracks constructed south of the station to facilitate turning trains outside the station platform areas. The Michael Yard will be reconfigured to a double-ended facility to accommodate storage of Altamont Corridor Express trains and relocated to the east side of the corridor. A new standalone bridge over West Alma Avenue will be constructed for MT3 and a maintenance track, with MT1 and 2 remaining on the existing structure. A new bridge over Almaden Road will be constructed for MT2 and MT3, while MT1 will remain on the existing structures. The bike path at Almaden Expressway will be realigned to the west in a culvert under the roadway. The existing pedestrian overpass at Communications Hill will remain in place. Capitol Caltrain Station will be reconstructed with a new center platform between MT2 and MT3. The platform will be reached by a new pedestrian overpass built at the north end of the platform. The existing Capitol Expressway overpass will remain in place. Four-quadrant barrier gates with channelization will be built at Skyway Drive, Branhan Lane, and Chynoweth Avenue. The existing Blossom Hill Road overpass and adjacent pedestrian overpass will remain in place. The Blossom Hill Caltrain Station will be reconstructed; the existing pedestrian overpass and platform will be removed and a new center platform constructed between MT2 and MT3. The platform will be reached by a new pedestrian overpass built at the south end of the platform. Great Oaks Parkway will be realigned for approximately 1,350 feet to accommodate the widened rail corridor. SR 85 and Bernal Road overpasses will remain in place.

Morgan Hill and Gilroy Subsection

The Morgan Hill and Gilroy Subsection will be approximately 32 miles long, continuing south from the Monterey Corridor Subsection. From Bernal Way in South San Jose, the alignment will extend through Morgan Hill and San Martin to the Downtown Gilroy Station, then curve generally east across the Pajaro River floodplain and through a portion of northern San Benito County before entering Tunnel 1 at the base of the Diablo Range. The alignment will exit the tunnel at Casa de Fruta Parkway/SR 152 in unincorporated eastern Santa Clara County, where it will transition to the Pacheco Pass Subsection. This subsection will be blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way with an at-grade Downtown Gilroy Station. Past the Downtown Gilroy Station and south of the U.S. Highway (US) 101 overpass, HSR will enter the fully grade-separated, dedicated track needed to operate HSR trains at speeds faster than 125 mph.

Beginning at the southern limit of the Monterey Corridor Subsection, the alignment will continue in blended service with Caltrain on an at-grade profile in the existing UPRR right-of-way. HSR and Caltrain will operate on the electrified MT2 and MT3 tracks, while UPRR will operate on MT1. A UPRR siding track will be provided between Blanchard Road and Bailey Avenue. Four-quadrant barrier gates will be installed at all existing public road crossings. Intrusion deterrents will be installed at all at-grade crossings. Three private roads crossing will be eliminated, and alternate access provided to those properties. The existing Bailey Avenue overpass will remain in place. The Monterey Road underpass will be reconstructed to accommodate the future widening of Monterey Road to four lanes. The Morgan Hill Caltrain Station will be reconstructed with two new side platforms built outside MT2 and MT3. The platform will be reached by a new pedestrian underpass constructed at the north end of the platform. The existing

Butterfield Boulevard overpass will remain in place. Upper Llagas Creek bridge will be reconstructed.

The San Martin Caltrain Station will be reconstructed—the existing platform will be removed and a new center platform will be built between MT2 and MT3. The platform will be reached by a new pedestrian overpass constructed at the south end of the platform. The existing bridge at Miller Slough will be replaced with a triple-cell box. Blended service will end just south of the Downtown Gilroy Station, where Caltrain will have access to turn back and stabling tracks relocated from the station area to south of 10th Street on the west side of the UPRR right-of-way. The Gilroy Caltrain Station will be reconstructed—the existing Caltrain platform will be shifted south and served by a southbound station track. A northbound Caltrain side platform will be provided to the east of a northbound station track. Two side platforms will be provided for HSR on the outside of the MT2 and MT3 tracks. The platforms will be reached by a new pedestrian overpass constructed over the center of the platforms. HSR will continue south under the US 101 overpass, which will remain in place. Past the Industry spur, HSR will ascend onto embankment and then a bridge over the UPRR. Two bridges will be constructed, one for MT2 and MT3 and a separate one for the maintenance of way facility (MOWF) lead track. The UPRR Hollister branch line will be realigned to the west to accommodate HSR bridging over the UPRR tracks at a single location. HSR MT2 and MT3 will descend from the embankment before crossing over Bloomfield Avenue on a new structure. Four-quadrant barrier gates and intrusion deterrents will be installed at Bloomfield Avenue for the MOWF lead track and UPRR service track. HSR will continue past the MOWF and transition to a new viaduct structure to cross over the Pajaro River.

The HSR alignment south and east of Gilroy will cross an agricultural area in Santa Clara and San Benito Counties that is part of the upper Pajaro River (UPR) floodplain, historically referred to as Soap Lake. The HSR guideway will be on viaduct over the major watercourses to provide a floodplain crossing that is neutral to the hydrology and hydraulics of the floodplain and to accommodate wildlife movement. Because of the Calaveras fault crossing at this location, Tequisquita Slough will be partially filled by approximately 800 feet of HSR embankment. The embankment area will include cross-culverts and 1.3 acres of adjacent floodwater detention basins; in addition, an extended viaduct over Pacheco Creek will serve to maintain floodplain capacity and function. HSR will be on embankment between Pacheco Creek and Lovers Lane, returning to viaduct at Lovers Lane. After Lovers Lane, the alignment will continue in a combination of embankment and viaduct until reaching the west portal for Tunnel 1 on the east side of SR 152. After exiting the 1.4-mile Tunnel 1 on the west side of SR 152, the alignment will cross over SR 152 and the southern portion of the Pacheco Creek Valley on an aerial structure south of Casa de Fruta. The alignment will transition onto embankment just beyond Southside Way at the western transition to the Pacheco Pass Subsection.

Pacheco Pass Subsection

The Pacheco Pass Subsection will be approximately 25 miles long. The alignment will generally follow the existing SR 152 corridor east from Casa de Fruta for approximately 17 miles, then diverge north around the Cottonwood Creek ravine of the San Luis Reservoir for approximately 8 miles before transitioning to the San Joaquin Valley Subsection near I-5 in Merced County. Tunnel is the only design option in this subsection.

From the eastern limit of the Morgan Hill and Gilroy Subsection, the guideway will transition from aerial structure to embankment along the southern boundary of Casa de Fruta. This stretch of embankment will be on fill or in excavated hillside cuts to accommodate a level HSR guideway profile over varied surface elevations and to control unstable slopes known for vulnerability to landslip (i.e., areas subject to the downward falling or sliding of a mass of soil, detritus, or rock on or from a steep slope). The alignment will ascend to viaduct over Pacheco Creek along the south side of SR 152 and remain on viaduct to the Tunnel 2 west portal. This portal will include a staging area for tunnel construction and a permanent area for traction and facility power with access provided by a service road from SR 152. Tunnel 2 will extend approximately 13.5 miles northeast. Access to the Tunnel 2 east portal for HSR construction, operations, and maintenance will be on McCabe Road north of Romero Ranch. Continuing east, the HSR guideway will be predominantly on a combination of embankment and aerial structures, with viaducts over Romero Creek and the California Aqueduct. Romero Road will be realigned at its intersection with I-5. East of I-5, the alignment will cross over SR 33/Santa Nella Road and the Central California Irrigation District (CCID) Outside Canal before transitioning to the San Joaquin Valley Subsection at Fahey Road.

San Joaquin Valley Subsection

The San Joaquin Valley Subsection will be approximately 18 miles long, from east of I-5 (at Fahey Road) to the intersection of Henry Miller Road and Carlucci Road in Merced County, where the alignment will connect to the Central Valley Wye. The single design option in this subsection is Henry Miller Road—a combination of viaduct and embankment.

South of Fahey Road, the guideway will continue east and cross over three irrigation ditches, Cherokee Road, the CCID Main Canal, two additional irrigation ditches, and adjacent farmland on viaduct. Continuing east, the alignment will be on embankment (including four proposed culvert crossings for irrigation ditches) before ascending on an approximately 1.4-mile-long viaduct over the San Luis Wasteway, the UPRR West Side branch line, and Ingomar Grade Road.

The alignment will descend to embankment west of Volta Road while turning southeast before crossing to the south side of Henry Miller Road. Henry Miller Road will be realigned to pass over the HSR alignment on a bridge. The HSR embankment between the Volta Road overcrossing and Los Banos Creek will cross over two proposed culverts to maintain irrigation canals. The alignment will then ascend to cross over Los Banos Creek and Badger Flat Road on a 1.35-mile-long viaduct before descending onto embankment.

The alignment will continue east for 3.6 miles on embankment over several combined wildlife crossing/drainage culverts and drainage culverts, including an irrigation ditch at Wilson Road, an irrigation ditch at Johnson Road, two irrigation ditches at Nantes Avenue, the Santa Fe Canal, the San Luis Canal, the San Luis Drain, and the Porter-Blake Bypass. A road will be constructed between Badger Flat Road and Nantes Avenue. SR 165/Mercey Springs Road will be raised to cross over the HSR alignment and Henry Miller Road on a bridge. East of SR 165 and the Santa Fe Grade, the alignment will ascend to an approximately 1.8-mile viaduct south of the Los Baños State Wildlife Area across Mud Slough to maintain wildlife movement within the Grasslands Ecological Area (GEA). Baker Road, Midway Road, and Hereford/Salt Slough will be closed south of

Henry Miller Road. Box Car Road will become a cul-de-sac with a new road to the east. Hutchins Road will be abandoned. The alignment will continue on embankment to the eastern limit of the subsection and the project. Culvert crossings will be provided for the San Pedro Canal, Boundary Drain, Longe Tree Canal, Devon Drain, West Delta Drain, West Delta Canal, Dambrosia Ditch, Delta Canal and seepage drain, East Delta Canal, Poso Drain, Belmont Drain, Delta Canal #1, West San Juan Drain, San Juan #1, and several other irrigation ditches and drains in the section of viaduct over the GEA. Several local roadways—Delta Road, Turner Island Road, and Carlucci Road—will be elevated over the HSR guideway, maintaining access to adjacent properties. The alignment will transition to the Central Valley Wye at Carlucci Road.

A typical train will be 9 to 11 feet wide and approximately 660 feet long and will seat up to 1,000 passengers. The power will be distributed to each train car via the overhead contact system (OCS) through a pair of pantographs that extend like antennae above the train. Each trainset will have a train control system that could be independently monitored with override control, while also communicating with the systemwide Operations Control Center. Phase 1 HSR service is expected to need up to 78 trainsets in 2040, depending on the HSR fares charged and ridership levels (Authority and FRA 2017). Vehicle lighting will comply with applicable rail safety, security, and operational requirements.

The fully grade-separated, dedicated track infrastructure needed to operate HSR trains at speeds greater than 125 mph has more stringent alignment requirements than infrastructure for conventional trains. The project will use multiple track support types, or profiles: low, near-the-ground tracks will be at grade; higher tracks will be elevated on structure (viaduct) or on embankment; and below-grade tracks will be in open cut, retained cut, trench, or tunnel. Types of bridges that might be built include full channel spans, large box culverts, and, for wider river crossings, limited piers below the ordinary high-water mark of the established channel. Two tunnels will be constructed: one in the Morgan Hill to Gilroy Subsection and one in the Pacheco Pass Subsection. Flood lighting or night lighting will not be installed along the HSR guideway for track operations or maintenance, except for specific sited facilities such as maintenance and systems sites. Lighting will be used with closed-circuit televisions (CCTVs). In spaces where lighting will be inappropriate due to environmental impacts, infrared receptors with infrared cameras or other appropriate technologies may be used. Temporary, portable lighting will be used at all locations when maintenance work is being undertaken to ensure sufficient light levels to undertake the works safely.

Traction power switching and paralleling stations work together to balance the electrical load between tracks and to switch power off or on to either track in the event of an emergency. Traction power switching stations will be required at approximately 15-mile intervals, midway between the TPSSs. Each traction power switching station will encompass approximately 14,400 square feet (160 by 90 feet). Traction power paralleling stations will be required at approximately 5-mile intervals between the traction power switching stations and the TPSSs. Each traction power paralleling station will encompass approximately 9,600 square feet (120 by 80 feet), and each will include an approximately 450-square-foot (18 by 25 feet) control room.

During normal system operations, the local utility will provide power service through the TPSSs. Should the flow of power be interrupted, the system will automatically switch to

a backup power source through use of an emergency standby generator, an uninterruptable power supply, or a direct current battery system. Permanent emergency standby generators for the project will be located at passenger stations and at terminal layup or storage and maintenance facilities.

A computer-based, enhanced automatic train control (ATC) system will control the trains. The enhanced ATC system will comply with the FRA-mandated positive train control (PTC) requirements, including safe separation of trains, over-speed prevention, and work zone protection. This system will use a wireless-based communications network that will include a fiber optical backbone and communications towers at intervals of approximately 1.5 to 3 miles, depending on the terrain and selected radio frequency. Signaling and train control elements within the right-of-way will include components and microprocessor components, cabling to the field hardware and track, signals, and switch machines on the track. Communications radio towers in these facilities will use a 6- to 8-foot-diameter 100-foot-tall pole. The communications facilities will be sited in the vicinity of track switches and will be grouped with other traction power, maintenance, station, and similar HSR facilities where possible. Where communications towers cannot be co-located with TPSSs or other HSR facilities, the communications facilities will be sited near the HSR corridor in a fenced area approximately 20 by 15 feet. ATC and standalone radio sites will not be staffed. Permanent safety lighting will incorporate motion sensors, height limits, shielding, and downward-facing orientation while still meeting safety, security, and operational criteria. Fencing around signaling and train control facilities may be screened. Lighting will be used with CCTVs. In spaces where lighting is inappropriate due to environmental impacts, infrared receptors with infrared cameras or other appropriate technologies may be used.

As previously described, each TPSS will have two 115/50-kV or 230/50-kV single-phase transformers. These transformers will interconnect the TPSS to two breaker-and-a-half bays5 constructed at a new utility switching station or within the fence line of an existing facility via a short section of 230-kV transmission or 115-kV power lines (tie-line). Per Authority requirements, the proposed interconnection points will need redundant transmission (i.e., double-circuit electrical lines) from the point of interconnection, with each interconnection connected only to two phases of the transmission source. A new utility switching station will encompass approximately 35,200 square feet (160 by 220 feet) and include an approximately 975-square-foot (15 by 65 feet) control building, 525-square-foot (15 by 35 feet) battery building and, if required, a retention basin. The utility switching station could be screened from view with perimeter walls or fences. Communication facilities (i.e., redundant [two underground or one underground and one overhead on existing power structures] fiber optic lines) will also be required to support the electrical interconnections connecting TPSSs to new utility switching stations or to existing facilities, typically within tie-line/utility corridors.

The project includes the following components:

- Alignment and ancillary features
    - Approximately 90 miles of railway consisting of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles
    - Approximately 15.2 miles of dual HSR track

  - Approximately 29 at-grade road crossings
  - Associated railway support structures (e.g., TPSSs, switching/paralleling stations, MOWFs)
- Electrical interconnections
  - Two 115/50 kV or 230/50 kV single-phase transformers for each TPSS
  - New 115 kV or 230 kV switching station or reconfiguration of existing facility within fence line
- Network upgrades
  - Reconductor two 115 kV power lines
  - Collocation of new power lines with existing 230 kV transmission lines

Heavy Maintenance Facilities

Three sites for the MOWF are under consideration. The East Gilroy MOWF will be located west of the HSR mainline, south of the community of Old Gilroy, extending from north of Pacheco Pass Highway (SR 152) to north of Bloomfield Avenue. The South Gilroy MOWF will be located in one of two locations—between Carnadero Avenue and Bloomfield Avenue on the east side of the HSR alignment or south of Bloomfield Avenue on the on the west side of the HSR alignment.

A maintenance of way siding (MOWS) is proposed near Turner Island Road near the eastern limit of the project. The MOWS will be about 0.5 mile long, encompassing about 4 acres. The facility will be constructed near Henry Miller Road to avoid the GEA and other sensitive habitat.

Stations

Two stations will be constructed for the project in San Jose and Gilroy. The San Jose Diridon Station will be constructed at the existing Caltrain station. A second station—in the Morgan Hill and Gilroy Subsection—will be constructed in either downtown Gilroy or east Gilroy, depending upon the alternative selected. Conceptual station plans at both stations provide space for a multitude of services, including local and regional transit connectivity, pick-up and drop-off facilities, parking, station buildings for ticketing and support services, and passenger waiting and access area for HSR. Station planning will incorporate pedestrian and bicyclist connectivity; improved station area roadways for facilitating connectivity; expanded sidewalks, pathways, and plazas; rider pick-up and drop-off areas; and automobile parking.

Project Roadway Modifications

State highway and local roadway modifications include:

- **State highway underpasses**—Where the HSR alignment is proposed to cross over state highway facilities in various locations on aerial structures, the possibility of encroachment into the California Department of Transportation (Caltrans) right-of-way will depend upon the placement of the HSR aerial structure columns. Temporary closure of the Caltrans right-of-way may be necessary for placement of precast aerial structure sections, during which time traffic will be detoured onto local streets.
- **Roadway overcrossings**—Where the HSR alignment is at grade and runs parallel to state facilities, access will be severed where an at-grade leg of an intersection crosses

the HSR alignment. Accordingly, road overcrossings will be necessary for maintaining function of the state highway and local road systems. Intersecting roads will be realigned horizontally and adjusted vertically to cross over the state highway. The possibility of encroachment into the Caltrans right-of-way will depend upon the placement of the overcrossing columns. The design intent of these crossings is to maintain the existing intersection and traffic patterns during construction. However, when conforming to the existing roads, some short-term closures may be required, and local traffic will utilize one of the other overcrossings or intersections in the vicinity.

- **Eliminating leg of intersections**—The elimination of one leg of an existing at-grade intersection with a state highway was deemed necessary where the road was in close proximity to other accessible, proposed overcrossings or where the existing average annual daily traffic was not high enough to warrant its own overcrossing. In these circumstances, the access will be severed along the leg of the intersection that the HSR track traverses. There will be no impacts on the Caltrans right-of-way as no structures are required. Local traffic will utilize one of the other overcrossings in the vicinity.
- **Ramp modifications**—Ramp modifications will be necessary where the HSR track is on an aerial structure, and the proposed columns directly interfere with the existing alignments of roadways or off-ramps. These ramps will be modified to avoid the proposed columns and accommodate any other roadway realignments that result from the aerial structure columns. Although the modifications will be slight, additional right-of-way may be required for the realigned off-ramps. Roadway traffic will likely use existing facilities while the realigned ramps are being constructed.

Project Construction Footprint

The project will require the acquisition of residential, commercial, industrial, and agricultural properties to obtain adequate right-of-way for construction and operations. In the San Joaquin Valley Subsection, the alignment will traverse a portion of the GEA, requiring acquisition of land under conservation easement.

Pre-Construction Activities

During final design, the Authority will conduct several pre-construction activities to optimize construction staging and management. These activities include the following:

- Conducting geotechnical investigations to define precise geologic, groundwater, and seismic conditions along the alignment. The results of this work will guide final design and construction methods for foundations, underground structures, tunnels, stations, grade crossings, aerial structures, systems, and substations.
- Identifying construction laydown and staging areas used for mobilizing personnel, stockpiling materials, and storing equipment for building HSR or related improvements. In some cases, these areas will also be used to assemble or prefabricate components of guideway or wayside facilities before transport to installation locations. Precasting yards will be identified for the casting, storage, and preparation of precast concrete segments; temporary spoil storage; workshops, and the temporary storage of delivered construction materials. Field offices and temporary jobsite trailers will also be located at the staging areas. Construction laydown areas are part of the project footprint that is evaluated for potential environmental impacts;

however, actual use of the designated laydown areas will be at the discretion of the design-build contractor. That is, some of the laydown areas included in the engineering drawings may not be fully disturbed or disturbed at all. After completing construction, the staging, laydown, and precasting areas will be restored to pre-construction condition.

- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials. Demolition will require strict controls to ensure that adjacent buildings, infrastructure, natural or community resources are not damaged or otherwise affected by the demolition efforts.
- Relocating utilities prior to construction. The Authority will work with the utility companies to relocate or protect in place high-risk utilities, such as overhead tension wires, pressurized transmission mains, oil lines, fiber optical conduits or cables, and communications lines or facilities prior to construction.
- Implementing temporary, long-term, and permanent road closures to reroute or detour traffic away from construction activities. Handrails, fences, and walkways will be provided for the safety of pedestrians and bicyclists.
- Locating temporary batch plants to produce Portland Cement Concrete or asphaltic concrete needed for roads, bridges, aerial structures, retaining walls, and other large structures. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. The Authority will implement procedures for reducing air emissions, mitigating noise impacts, and controlling the discharge of potential pollutants into storm drains or watercourses from the use of equipment, materials, and waste products.
- Conducting other studies and investigations, as needed, such as surveys of local business, farms or dairies, and wildlife refuges to identify usage, delivery, shipping patterns, and critical times of the day or year for business, planting, harvesting activities, or recreational activities. This information will help develop construction requirements and worksite traffic control plans, and identify potential alternative routes as well as necessary cultural resource investigations, historic property surveys, and wildlife surveys.

Major Construction Activities

Major types of construction activities for the project include earthwork; bridge, aerial structure, and roadway crossings; railroad systems; and station construction, as briefly described in the following subsections.

Earthwork

Earthwork is a general term applied to the movement or removal of soils by mechanical equipment (excavation) and the placement and compaction of soils by mechanical equipment (embankment). Earthwork will be conducted using conventional earthmoving methods and heavy construction equipment, such as dozers, wheel loaders, scrapers, articulated trucks, rear dump trucks, or wagons. The type of equipment used will depend on the hauling distance, with trucks or wagons used for longer distances.

The HSR system seeks to balance the volume of soils needed for excavation and embankment and minimize the input of materials from quarries and disposal of materials outside of the right-of-way. This earthwork balance assumes that excavated soils will be suitable for use as embankment fill (Draft Biological Assessment, Appendix 2-C [Authority 2021]). The Authority is conducting geotechnical investigations within the HSR alignment to assess the geotechnical properties of existing soils, evaluate opportunities for soil re-use and determine improvements to make existing soils suitable for HSR re-use.

The project will require greater quantities of embankment than excavation, requiring approximately an additional and 2.3 million 900,000 cubic yards of material, respectively. While fill material is likely to be acquired locally, ballast and subballast materials may be imported from off-site quarries. To minimize material transport, the preliminary engineering design has identified construction staging sites that will store excavated materials close to where they will be placed, minimizing repetitive handling of materials.

The project will require earthwork construction of 53 to 59 miles of embankment or trench construction. The high amount of earthwork is predominantly due to the embankment and at-grade profile through the Morgan Hill and Gilroy Subsection.

Bridge, Aerial Structure, and Roadway Crossing Construction

As is done for existing HSR systems around the world, the majority of the elevated guideways will be designed and built using single box segmental girder construction. Where needed, other structural types and construction methods will be considered. This section provides an overview of the construction methods required for foundations, sub-structures, and superstructures of bridges, aerial structures, and roadway crossings.

Foundations. A typical aerial structure foundation pile cap is supported by an average of four large-diameter (5 to 9 feet) bored piles. Depth of piles depends on the geotechnical conditions at each pile site. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings may be used to stabilize pile shaft excavation. The estimated pile production rate is 4 days per pile installation. Additional available pile installation methods include bored piles, rotary drilling cast-in-place (CIP) piles, driven piles, and a combination of pile jetting and driving.

Following completion of the piles, pile caps can be constructed using conventional methods supported by structural steel: either precast and pre-stressed piles or cast-in-drilled hole piles. For pile caps constructed near existing structures such as railways, bridges, and underground drainage culverts, temporary sheet piling (i.e., temporary walls) can be used to minimize disturbances to adjacent structures. Sheet piling installation and extraction will likely be achieved using hydraulic sheet piling machines.

Substructure. Typical aerial structures of up to 90 feet will be constructed using CIP bent caps and columns supported by structural steel and installed upon pile caps. A self-climbing formwork system may be used to construct piers and portal beams more than 90 feet high. The self-climbing formwork system is equipped with a winched lifting device, which is raised up along the column by hydraulic means with a structural frame mounted on top of the previous pour. In general, a 3-day cycle for each 12-foot pour height can be achieved. The final size and spacing of the piers depend on the type of superstructure and spans they are supporting.

Superstructure. The selection of superstructure type will consider the loadings, stresses, and deflections encountered during the various intermediate construction stages, including changes in static scheme, sequence of tendon installation, maturity of concrete at loading, and load effects from erection equipment. Accordingly, the final design will depend on the selected means and methods of construction, such as full-span precast, span-by-span, balanced cantilever segmental precast, and CIP construction on falsework. These superstructure construction methods are described in full detail in the *San Jose to Merced Project Section Constructability Assessment Report* (Draft Biological Assessment, Appendix 2-C [Authority 2021]) and are summarized as follows:

- **Full-span precast construction**—Box girders will be precast and pre-stressed in advance as a full span and stored in a precasting yard. The 110-foot precast segments, weighing around 900 tons, will be transported along the previously constructed aerial guideway using a special gantry system.
- **Span-by-span precast segmental construction**—Shorter box girder segments will be precast and pre-stressed and stored in a precasting yard. These segments, limited to 12-foot segments weighing less than 70 tons, will likely be individually transported to the construction site by ground transportation. Once the gantry system is in place, construction will involve hoisting the segments from the ground and installing and tensioning the prestressing tendons to create the box girder.
- **Balanced cantilever segmental construction**—In locations where construction will occur over existing facilities that prevent equipment and temporary supports on the ground, balanced cantilever segmental construction may be used. Under this construction method, box girder segments (12-foot segments weighing less than 70 tons) that are either precast or CIP will be placed in a symmetrical fashion around a bent column. The segments will be anchored at the ends by cantilever tendons located in the deck slab, with midspan tendons balancing the weight between two cantilevers. Precast segments will be precast off-site, transported to the construction site, and installed incrementally onto a portion of the existing cantilever using ground cranes, hoisting devices, or a self-launching gantry. Segments can also be CIP and installed two at a time, one at each end of the balanced cantilever. Segments generated by CIP are generally longer than those in precast construction since they do not need to be transported to the construction site.
- **CIP Construction on Falsework**—The method involves creating a suspended formwork with either a launching girder or gantry system. Once the formwork is in position and reinforcements and prestressing are placed, concrete is poured and the prestressing is stressed. The formwork is then removed and moved to the next segment.
- Construction of road crossings and bridges will be similar to the approach described above for aerial structures. The superstructure will likely be constructed using precast, prestressed, concrete girders and CIP deck. Approaches to bridges will be earthwork embankments, mechanically stabilized earth wall, or other retaining structures.
- Crossings of existing railroads, roads, and the HSR will be constructed on the line of the existing road or offline at some locations. When constructed online, the existing road will be closed or temporarily diverted. When constructed offline, the existing road will be maintained in use until the new crossing is completed. Single tracking of

VTA service will be necessary during construction of the SR 87 bridge. The following project features are necessary for VTA to modify operations during construction: a new crossover with two powered switches south of Tamien Station, provision of power to six existing switches, and installation of track signals at these new and existing powered switches. Where HSR will cross over existing railroads, the Authority will coordinate with the rail operators to avoid operational impacts during construction. Where new roadway undercrossings of existing railroads are required, a temporary shoofly track will be constructed to maintain railroad operations during undercrossing construction.

Tunnels

Tunnels will be used where the HSR system passes through a hill or mountain where the vertical profile is too deep to use an open cut to pass through the topography. The project will require the construction of two tunnels—Tunnel 1 in the Morgan Hill and Gilroy Subsection and Tunnel 2 in the Pacheco Pass Subsection. This is similar to what is anticipated for these project tunnels. These tunnels will be twin-bore, single-track tunnels, with lengths of approximately 1.6 and 13.5 miles, respectively, and a minimum internal diameter of 29.5 feet. Localized enlargements, or niches, may be required at intervals to accommodate equipment such as OCS tensioning devices, traction power paralleling stations, ventilation fans, communication equipment, signaling equipment, and drainage systems. Cross passages, placed no more than 800 feet apart, will be required between adjacent tunnels to provide emergency exits. The Authority will acquire exclusive underground property approximately 132 feet wide and 62 feet high to accommodate both tunnels and all support elements.

Preparation for and construction of these tunnels will occur over a 6-year period and will generally proceed as follows:

Construction of access roads to the future tunnel portal sites: a new access road will be constructed on the west side of SR 152 from Walnut Avenue to the east portal of Tunnel 1, and a new road and bridge across Pacheco Creek will be constructed to the west portal of Tunnel 2. McCabe Road will be improved to provide access to the east portal of Tunnel 2.

Construction of power system: overhead power lines will be installed to the construction staging areas, and portable diesel generators will be installed to provide backup power supply.

Preparation of tunnel portals: a large, level area will be constructed at each tunnel portal including installation of retaining walls to minimize grading and slope modification. At the portals for Tunnel 2, this construction will likely include hillside slope reduction or application of drainage techniques, as well as ongoing monitoring and maintenance, to reduce the potential for landslides. Tunnel portals will initially be used to store precast materials and equipment, assemble and maintain equipment, stockpile tunnel spoils, and conduct ongoing monitoring and measuring of safety and ventilation systems. Portals will also be designed to accommodate housing trailers, ventilation buildings, communications

equipment, power facilities, water and sewage, lighting and fencing, and clear areas for parking and storage.[2]

Manufacturing and transport of precast tunnel support materials: manufacturing of precast materials, such as the tunnel lining segments will occur off-site and be transported to the tunnel portals.

Tunnel excavation will likely be conducted using a combination of tunnel boring machines (TBMs) and conventional tunneling methods at either end of the tunnel portals. The type of machine used will be determined by the Authority's design-build contractor, based on the tunnel length, the particular geology of the project, the amount of groundwater present and its condition, and other factors. A detailed discussion of tunnel construction methods is available in the *San Jose to Merced Project Section: Conceptual Tunnel Design and Constructability Considerations – Pacheco Pass* (Authority 2017) and is summarized below:

- **Conventional tunneling methods**—The primary conventional tunneling method anticipated to be used is a roadheader, consisting of a boom-mounted cutting head, a loading device usually involving a conveyor, and a crawler traveling track to move the machine forward into the rock face. Drill-and-blast techniques and the use of hydraulic excavators could also be required. For conventional tunneling methods, the estimated power demand is 3,000 kVA to operate two roadheaders, two drill jumbos, and ancillary equipment, with 1,000 kVA emergency power supply.
- **TBMs**—TBMs are shielded or open-type machines consisting of a rotating cutting wheel, called a cutterhead, followed by a main bearing, a thrust system and trailing support mechanisms. Support mechanisms can include conveyors or other systems for muck removal, control rooms, electrical systems, dust removal, ventilation and mechanisms for transport of pre-cast segments. These machines excavate rock with disc cutters mounted in the cutterhead, and then transfer the excavated rock through openings in the cutterhead to a belt conveyor for removal from the tunnel. Following TBM excavation, a tunnel lining is built with steel ribs and lagging or precast concrete segments. The shield is then pushed forward with hydraulic jacks that thrust against the installed lining and the back of the tunnel shield. For TBM excavation, the estimated power demand for a single construction staging area of a twin-bore tunnel is 7,500 kVA to power two TBMs, trailing gear, and continuous conveyors, ventilation fans, lights, pumps, shop equipment, change house, yard lighting, and office trailers, as well as 4,000 kVA for an emergency power supply.
- **Transport of tunnel spoils**—Tunnel excavation will generate large volumes of soil and rock materials (an estimated 0.5 million cubic yards from Tunnel 1 and 4.3 million cubic yards from Tunnel 2). Tunnel spoils will be temporarily stockpiled at the tunnel portal and, depending on geotechnical properties, distributed along the alignment and reused for embankment fill or nonstructural fill. Depending on the rate of excavation completed, the transport of tunnel spoils could require approximately 160 three-axle dump truck trips per day at each tunnel portal (Draft Biological Assessment, Appendix 2-C [Authority 2021]).

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[2] Reinforced structures may be necessary for permanent support at tunnel portals. Permanent structures will be designed for the most unfavorable load combinations. Depending on the various conditions, including slope stability, static earth pressures, and seismic loading, slope stability mitigation measures may be required.

Railroad Systems Construction

The HSR system will include trackwork, traction power electrification, signaling, and communications. After completion of earthwork and structures, trackwork is the first rail system to be constructed, and it must be in place at least locally to start traction power electrification and railroad signalizing installation. Trackwork construction generally requires the welding of transportable lengths of steel running onto longer lengths (approximately 0.25 mile), which are placed in position on crossties or track slabs and field-welded into continuous lengths.

Tie and ballast, and slab track construction will be used. Tie and ballast construction, which will be used for at-grade and minor structures, typically uses crossties and ballast that are distributed along the track bed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands, and in areas of limited accessibility, this operation may be accomplished by using the constructed rail line for material delivery. For major civil structures, slab track construction will be used. Slab track construction is a nonballasted track form using precast supports to which the track is directly fixed.

Traction power electrification equipment to be installed includes TPSSs, traction power switching and paralleling stations, and the OCS. Traction power facility equipment and houses are typically fabricated and tested in a factory, then delivered by tractor-trailer to a prepared site adjacent to the alignment. Substations are assumed to be located every 30 miles along the alignment. Traction power switching stations are located every 15 miles and traction power paralleling stations every 5 miles along the alignment. The OCS is assembled in place over each track and includes poles, brackets, insulators, conductors, and other hardware.

Signaling equipment to be installed includes wayside cabinets and bungalows, communications radio towers, wayside signals (at track interlockings), switch machines, insulated joints, impedance bonds, and connecting cables. The equipment will support automatic train protection; enhanced automatic train protection; and PTC to maintain train separation, routing at interlocking, and speed.

Station Construction

Because the HSR stations in San Jose and downtown Gilroy will be co-located with existing Caltrain stations, existing train operations will be maintained during HSR station construction/modification. The San Jose Diridon Station and downtown Gilroy station will be reconstructed to accommodate the HSR system and the east Gilroy station will be a new station. HSR stations require significant coordination and planning to accommodate safe and convenient access to existing businesses and residences, to complement transit-oriented and station-supportive development, and to accommodate traffic control during construction periods. The typical construction sequence at station areas will be as follows:

- **Demolition and Site Preparation**—The Authority will be required to construct detour roadways, new station entrances, construction fences and barriers, and other elements to replace the removal from service of existing facilities on the worksite. The Authority will be required to perform street improvement work, site clearing and earthwork, drainage work, and utility relocations. Additionally, electrical substations and maintenance facilities are assumed to be newly constructed structures. For platform improvements or additional platform construction, the Authority may be required to realign existing track.

- **Structural Shell and Mechanical/Electrical Rough-Ins**—For these activities, the Authority will construct foundations and erect the structural frame for the new station, enclose the new building, construct new platforms, and connect the structure to site utilities. Additionally, the Authority will rough-in electrical and mechanical systems and install specialty items such as elevators, escalators, and ticketing equipment.
- **Finishes and Tenant Improvements**—The Authority will install electrical and mechanical equipment, communications and security equipment, finishes, and signage. Additionally, the Authority may install other tenant improvements if requested.

San Jose Diridon Station. The project will primarily involve installing new turnouts and modifying the configuration of San Jose Diridon Station to build two high-level, 1,400-foot platforms for HSR, retain two platforms for commuter and conventional intercity trains, provide passenger services and train operations support in new structures north and south of the existing station building, build new overhead concourses for passenger access to train platforms, and relocate the existing bus station in three stages to accommodate progressive growth in HSR services:

- San Francisco to Gilroy Early Service in 2027 will require all passenger platform improvements, HSR passenger and operations support in a building south of the existing station house, and an overhead concourse from the south HSR station building with ramps to the two HSR platforms. Access to existing subway ramps will be retained for HSR passenger egress.
- Valley-to-Valley Service in 2029 will require ramps from the south overhead concourse to the Caltrain platforms.
- Phase 1 Service in 2033 will require development of another HSR building north of the existing station house, relocation of the existing bus station at that location, a second overhead pedestrian concourse from the north HSR station building with ramps to all train platforms, and closure of all platform ramps down to the subway.

Downtown Gilroy Station. A Downtown Gilroy Station will be constructed. A pedestrian undercrossing will connect the new station entrances on either side of the track, and Caltrain service will not be interrupted for construction of the undercrossing. Track realignment work will, however, temporarily relocate the existing Caltrain platform. During work on the Caltrain and UPRR facilities, temporary tracks and platforms will be located at the future HSR platform locations as a shoofly.

The existing station platforms will be repurposed for longer HSR platforms with tracks on the inside and two shorter platforms on the outside for Caltrain, Amtrak, and Transportation Agency for Monterey County. A new overhead concourse will provide passenger access to all platforms.

Other Stations Affected by HSR Construction. Construction of the project will also affect the following existing Caltrain stations: Santa Clara Station, College Park Station, Capitol Station, Tamien Station, Blossom Hill Station, Morgan Hill Station, and San Martin Station. Construction work at these stations will be coordinated with the affected transit service providers to maintain access to and operation of existing facilities or provide temporary facilities to support continued operation during construction. Construction could entail shifting the position of the platforms or access, changing

platform types, providing grade-separated pedestrian access to platforms, maintaining parking capacity, and other methods to maintain operations.

Construction Utility Requirements and Waste Disposal

Contractors will need to use water for construction activities such as dust control during demolition of surface and subsurface features, excavation, soil compaction, landscape restoration, concrete work, general cleanup, hygiene, and drinking. If no available water sources exist near the site, then contractors will use tanker trucks, storage tanks, and/or water towers to provide water to the site. Contractors will temporarily store excavated materials produced by construction activities within the construction footprint. Wherever possible, they will return excavated soil to its original location to be used as backfill and dispose waste materials associated with construction, including soils unsuitable for backfill, in landfills permitted to take these types of materials.

Construction Materials and Equipment

Materials required for construction include steel rails, building materials for the maintenance facilities, control buildings, and power supply facilities, as well as concrete, reinforcing steel, ballast, cement, aggregates, specialized train system components, fuel, and water. Materials will be delivered and stored at the San Jose to Merced Project Section project site for use. Various construction types of equipment will be used and staged at the site, including but not limited to cranes, pile drivers, dump trucks, bulldozers, and bucket loaders.

Construction Timeline

Construction will likely proceed concurrently along the entire project alignment. When the project is funded, construction will occur over multiple phases over approximately 6 years. Construction will occur 5 days a week with 8-hour days (250 days per year), except for construction of the Pacheco Pass tunnels, which will occur 7 days a week, 24 hours per day. Trackwork within the existing railway will be predominantly performed at night and on weekends between San Jose and Gilroy, requiring short-term roadway closures and establishment of roadway detours while roadway approach grading and paving is performed and new crossing panels are set.

In addition to the standard construction period, 2 years of additional construction will be required after the initial Phase I start-up to reconductor the existing Spring to Llagas and Green Valley to Llagas existing power lines. This work will be completed within an approximately 24-month timeframe.

Operations and Maintenance

HSR Service

The conceptual HSR service plan for Phase 1 describes service from Anaheim/Los Angeles through the Central Valley from Bakersfield to Merced and northwest into the Bay Area, terminating in San Francisco. Subsequent stages of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento.

Train service will run in diverse patterns between various terminals. Three basic service types are envisioned:

- Express trains will serve major stations only, providing fast travel times between Los Angeles and San Francisco during the morning and afternoon peak.
- Limited-stop trains will skip selected stops along a route to provide faster service between stations.
- All-stop trains will focus on regional service.

The majority of trains will provide limited-stop services and offer a relatively fast run time along with connectivity among various intermediate stations. Numerous limited-stop patterns will be provided to achieve a balanced level of service at the intermediate stations. The service plan envisions at least four limited-stop trains per hour in each direction, all day long, on the main route between San Francisco and Los Angeles. Each intermediate station in the Bay Area, the Central Valley between Fresno and Bakersfield, Palmdale in the high desert, and Sylmar and Burbank in the San Fernando Valley will be served by at least two limited-stop trains every hour—offering at least two reasonably fast trains an hour to San Francisco and Los Angeles. Selected limited-stop trains will be extended south of Los Angeles as appropriate to serve projected demand.

The service plan provides direct train service between most station pairs at least once per hour. Certain routes may not always be served directly, and some passengers will need to transfer from one train to another at an intermediate station, such as Los Angeles Union Station, to reach their final destination. Generally, the Phase 1 conceptual operations and service plans offer a wide spectrum of direct-service options and minimize the need for passengers to transfer.

In 2029, the assumed first year of HSR operation, two trains per hour will operate during peak travel times and one train per hour off-peak travel times between San Francisco and Bakersfield. When Phase 1 operations occur, this biological opinion assumes the following service:

- Two peak trains per hour from San Francisco and Los Angeles (one in off-peak)
- Two peak trains per hour from San Francisco and Anaheim (one in off-peak)
- Two peak trains per hour from San Jose and Los Angeles
- One peak train per hour from Merced and Los Angeles
- One train per hour (peak and off-peak) from Merced and Anaheim

Total daily operations for the San Jose to Merced Project Section of the HSR system are shown in Table 2.

Table 2. Total Daily Operations—San Jose to Merced Project Section

Service Description	2029	2040
Nonrevenue Trains		
Between MOWF and Gilroy	0	0
Between MOWF and San Jose	0	0
Between MOWF and Merced	0	0
Revenue Trains		
Trains per peak hour (max, one-way)	2	7
Trains per off-peak hour (max, one-way)	1	4
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
Total Trains by Segment		
Trains per peak hour (max, one-way)	2	7
Trains per off-peak hour (max, one-way)	1	4
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
Total Trains All Segments		
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
Total Daily Operations	48	176

MOWF = maintenance-of-way facility

Maintenance Activities

The Authority will regularly perform maintenance along the track and railroad right-of-way as well as on the power systems, train control, signalizing, communications, and other vital systems required for the safe operation of the HSR system. Maintenance methods are expected to be similar to those of existing European and Asian HSR systems, adapted to the specifics of the California HSR. However, the FRA will specify standards of maintenance, inspection, and other items in a set of regulations (i.e., Rule of Particular Applicability) to be issued in the next several years, and the overseas practices may be amended in ways not currently foreseen. The brief descriptions of maintenance activities provided below are thus based on best professional judgment about future practices in California.

Track and Right of Way. The track at any point will be inspected several times each week using measurement and recording equipment aboard special measuring trains. These trains are of similar design to the regular trains but will operate at a lower speed.

They will run between midnight and 5 a.m. and will usually pass over any given section of track once in the night.

Most adjustments to the track and routine maintenance will be accomplished in a single night at any specific location with crews and material brought by work trains along the line. When rail resurfacing (i.e., rail grinding) is needed, perhaps several times a year, specialized equipment will pass over the track sections at 5–10 mph.

Approximately every 4–5 years, ballasted track will require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, using vibrating "arms" to move and position the ballast under the ties. The train will typically cover a 1-mile-long section of track in the course of one night's maintenance. Slab track, the track support type anticipated at elevated sections, will not require this activity. No major track components are expected to require replacement through 2040.

Other maintenance of the right-of-way, aerial structures, culverts, drains, and bridge sections of the alignment will include culvert and drain cleaning, vegetation control (e.g., mowing, disking, or herbicide application), litter removal, rodent control, and inspection that will typically occur monthly to several times a year.

Power. The OCS along the right-of-way will be inspected nightly, with repairs being made when needed; these will typically be accomplished during a single night maintenance period. Other inspections will be made monthly. Many of the functions and status of substations and smaller facilities outside the trackway will be remotely monitored. However, visits will be made to repair or replace minor items and will also be scheduled several times a month to check the general site. No major component replacement for the OCS or the substations is expected through 2040.

Structures. Visual inspections of the structures along the right-of-way and testing of fire/life safety systems and equipment in or on structures will occur monthly, while inspections of all structures for structural integrity will be conducted at least annually. Steel structures will require painting every several years. Repair and replacement of lighting and communication components of tunnels and buildings will be performed on a routine basis. No major component replacement or reconstruction of any structures is expected through 2040.

Signaling, Train Control, and Communications. Inspection and maintenance of signaling and train control components will be guided by FRA regulations and standards to be adopted by the Authority. Typically, physical in-field inspection and testing of the system will be conducted four times a year using hand-operated tools and equipment. Communication components will be routinely inspected and maintained, usually at night, although daytime work may be undertaken if the work area is clear of the trackway. No major component replacement of these systems is expected through 2040.

Stations. Each station will be inspected and cleaned daily. Inspections of the structures, including the platforms, will be conducted annually. Inspections of other major systems, such as escalators, the heating and ventilation system, ticket-vending machines, and CCTV, will be performed according to manufacturer recommendations. Major station components are not expected to require replacement through 2040.

Perimeter Fencing and Intrusion Protection. Fencing and intrusion protection systems will be remotely monitored, as well as periodically inspected. Maintenance will take place as needed; however, fencing and intrusion protection systems are not expected to require replacement before 2040.

Compensatory Habitat

The Authority will provide compensatory habitat mitigation that seeks to increase the amount of protected habitat for federally listed species; preserve and enhance important wildlife movement corridors; and consolidate and expand existing protected habitat.

The Authority will secure conservation easements and develop long-term management plans for compensatory mitigation sites. The list of potential compensatory mitigation sites has not been finalized and is subject to augmentation with Service approval. The final compensatory mitigation sites will be selected based on their relatively high conservation value (e.g., proximity to other protected habitats or conserved areas such as core habitat areas or linkages connecting core habitat patches); location within important wildlife movement corridors, recovery areas, or designated critical habitat; presence of listed species and/or suitable habitat (i.e., high species richness/high biodiversity sites); mitigation habitat overlap among species; and ability to satisfy the requirements of the Service and other permitting agencies. The permanent protection of the compensatory mitigation sites will also support goals identified for the jewelflower, the dudleya, the tadpole shrimp, the fairy shrimp, the beetle, the butterfly, the frog, the salamander, and the vireo in the recovery plans for these species by protecting habitat (Service 1998a, 1998b, 2002, 2005a, 2017a, 2019a).

For all proposed mitigation sites, long-term management plans, conservation easements, and funding analyses for the long-term endowments will be submitted to the Service for review and approval before the plans are finalized and implemented. The Authority may also purchase habitat compensation credits at a Service-approved mitigation site or conservation bank in addition to securing compensatory sites.

To avoid a temporal loss of habitat and reduce project effects on listed species, the Authority's proposed mitigation strategy includes securing compensatory mitigation prior to the start of construction. Compensatory mitigation will be secured in phases in accordance with the progress of construction of the San Jose to Merced Project Section. As such, the Authority's proposed mitigation strategy will ensure that the compensatory mitigation will be secured before or concurrent with the commencement of construction for each Construction Package (CP). In the event that it is not possible to secure all of the compensatory mitigation for each CP in advance, it will be completed no later than 18 months after the initiation of ground disturbance of each CP.

All areas of habitat loss for federally listed species will be documented in compliance reporting. This documentation will include geographic information system (GIS) data layers, associated metadata, and photo documentation of areas of habitat loss for each species. For each species, a cumulative acreage of habitat loss will be presented in a table.

Reporting

The Authority will submit monthly and annual reports to the Service documenting compliance with the conservation measures and this biological opinion. The reports will

include summaries of the habitat assessment and species-specific pre-activity surveys and findings, observations and incidental take of threatened or endangered species, compliance with conservation measures successfully implemented, noncompliance events and corrections or adjustments to meet compliance, an accounting of the cumulative total number of acres of species suitable habitat that has been disturbed (with associated GIS layers, associated metadata, and photo documentation), and the type and number of acres for which compensatory mitigation has been secured.

Conservation Measures

The Authority has proposed the following measures to minimize effects on federally listed species. The measures below are considered part of the project evaluated by the Service in this biological opinion.

The results of the habitat suitability modeling, described below, will be used as a guide during species' habitat assessment surveys. However, Designated Biologists (described below) will consider all areas in and adjacent to the project footprint when determining where surveys are warranted. Habitat assessment, protocol-level surveys when available, and pre-construction surveys will be phased with project buildout and the start of activities at each work area.

General Conservation Measures

CM-GEN-01: Establish Qualified Biologists and Biological Monitors

At least 15 days prior to the onset of activities, the Authority will submit, for review and approval by the Service, the name(s), contact information, and relevant qualifications and experience of Project Biologists and Designated Biologists who will conduct activities specified in the following measures. The roles of biologists will be as follows:

- **Project Biologists.** For each section or construction package, the Authority will identify a Project Biologist(s). For their section or construction package, the Project Biologist(s) will be responsible for implementation of the conservation measures, oversee the scheduling and work of Designated Biologists and Biological Monitors, and develop compliance reporting.
- **Designated Biologists.** Designated Biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. Designated Biologists may be Service-approved on a species-specific basis, in which case Designated Biologists will only be authorized to conduct surveys and implement other measures for the covered species for which they have been approved. The Designated Biologists will have support from Biological Monitors. Designated Biologists will submit memoranda and reports to the Authority to document compliance with conservation measures.
- **Biological Monitors.** Biological Monitors will report directly to a Designated Biologist for implementation of species measures or directly to the Project Biologist for implementation of general measures. Biological Monitors will be selected by the Authority based on their documented experience with and understanding of the ecology of the species included in this opinion. Biological Monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting compliance monitoring, and reporting their compliance monitoring activities. Biological Monitors

also may assist Designated Biologists in implementing species-specific conservation measures under the direct, on-site, supervision of the Designated Biologist.

CM-GEN-02: Conduct Monitoring of Construction Activities

The Designated Biologist or Biological Monitor will be present in the work area to verify compliance with avoidance and minimization measures, including during ground- or vegetation-disturbing activities in or adjacent to Environmentally Sensitive Areas (ESA), wildlife exclusion fencing (WEF), and construction exclusion fencing (exclusion fencing).

CM-GEN-03: Prepare and Implement a Biological Resources Management Plan

Prior to construction activities, the Project Biologist will prepare the Biological Resources Management Plan (BRMP). The goal of the BRMP will be to provide the Project Biologist, Designated Biologists, and Biological Monitors with an organized reference and reporting tool to verify that the mitigation measures and terms and conditions are implemented and reported in a timely manner. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility designations. These will include all conservation measures and repair, mitigation, and compensatory actions included in the biological opinion. These measures and conditions will be tracked through final design, implementation, and post-construction phases. For all measures, terms, and conditions, requirements and planned mechanisms for documenting and reporting compliance will be identified. The BRMP will also identify the individual responsible for post-construction compliance reporting. All project environmental plans, such as the Restoration and Revegetation Plan (RRP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. The BRMP will contain, but not be limited to, the following information:

- A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources
- Specific measures for the protection of special-status species
- Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored
- Identification of agency-approved Project Biologist(s), Designated Biologists, and Biological Monitor(s), including those responsible for notification and report of injury or mortality of federally- or state-listed species
- Measures to preserve topsoil and control erosion
- Design and locations of protective fencing around ESA and the construction staging areas
- Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance in sensitive habitat areas

- Specific measures for the protection of riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, work area limits, and biological monitoring requirements
- Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of Biological Monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts on special-status species habitat compared to pre-construction impact estimates
- Notification and reporting requirements in the event of an accidental death or injury to a federally listed species during project activities or failure to meet conservation measures included in the biological opinion

The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.

CM-GEN-04: Prepare and Implement a Restoration and Revegetation Plan

Prior to any ground-disturbing activity, the Project Biologist will prepare a RRP to address temporary impacts resulting from ground-disturbing activities in areas that potentially support special-status species, wetlands, and other aquatic resources. Restoration activities may include but are not limited to: grading landform contours to approximate pre-disturbance conditions, re-vegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands, and/or other aquatic resources.

Consistent with Section 1415 of the Fixing America's Surface Transportation Act, restoration activities will provide habitat for native pollinators by planting native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on nonnative invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10 percent compared to the pre-disturbance condition, or to a level determined through a comparison with an appropriate reference site consisting of similar natural communities and management regimes. The RRP will be submitted to the Authority for review and approval.

CM-GEN-05: Prepare and Implement a Weed Control Plan

Prior to any ground-disturbing activity during the construction phase, the Project Biologist will develop a WCP.

The purpose of the WCP is to establish approaches to minimize and avoid the spread of invasive weeds during ground-disturbing activities during construction and O&M. The WCP will include, at a minimum, the following:

- A requirement to delineate ESAs in the field prior to weed control activities
- A schedule for weed surveys to be conducted in coordination with the BRMP

- Success criteria for invasive weed control will be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria will establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council, to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground-disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10 percent or is 10 percent greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met.
- Provisions to ensure consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP
- Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods
- Restrictions on herbicide use to avoid primary or secondary poisoning of special-status plant species and butterfly host plants and to require application by certified applicators in accordance with the compound label and other restrictions mandated by the U.S. Environmental Protection Agency, and requirements of the California Department of Pesticide Regulation, and County agricultural Commissioner.
- Timeframes for weed control treatment for each plant species
- Identification of fire prevention measures
- All vehicles and equipment will arrive at project sites free of plant and soil material within or near serpentine habitat

CM-GEN-06: Facilitate Regulatory Agency Access

Throughout the construction period, the Authority or its designee will allow access by the Service or other resource agency staff to the project site. Because of safety concerns, all visitors will check in with the Authority's resident engineer prior to entering the project footprint. If agency personnel visit the project footprint, the Project Biologist will prepare a memorandum within three business days after the visit documenting the issues raised during the field meeting. The Project Biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.

CM-GEN-07: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training

Prior to any ground-disturbing activity, the Project Biologist will prepare a WEAP to train construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the Project Biologist and approved by the Authority may be used if the Designated Biologist or Biological Monitor is not available to present the training in person.

At a minimum, WEAP training materials will include the following information: key provisions of the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, California Fish and Game Code 1600, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person and procedures in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.

The Designated Biologist or Biological Monitor will present WEAP training to all construction personnel prior to working in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Designated Biologist or Biological Monitor, travel in the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. Training materials will include a fact-sheet handout or wallet-sized card conveying this information to be distributed to all participants in WEAP training sessions and will be provided in other languages as necessary to accommodate non-English speaking workers. All construction staff will attend WEAP training prior to beginning work on-site and will attend the WEAP training on an annual basis thereafter.

Upon completion of the WEAP training, each construction crew training attendee will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The Project Biologist will submit the signed WEAP training forms to the Authority monthly, and annually the Authority will certify that WEAP training had been provided to all construction personnel. Each month, the Project Biologist will provide updates relevant to the training to construction personnel during the daily safety (tailgate) meeting.

CM-GEN-08: Conduct Operation and Maintenance Period WEAP

Prior to initiating O&M activities, O&M personnel will attend a WEAP training session arranged by the Authority. At a minimum, O&M WEAP training materials will include the following information: key provisions of the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the BRMP, annual vegetation and management plan, WCP, and security fencing, ESAs, and WEF maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority's environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M

activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.

CM-GEN-09: Establish Monofilament Restrictions

Prior to any ground-disturbing activity, the Biological Monitor will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control materials. Non-monofilament substitutes including coconut coir matting, tackified hydroseeding compounds, rice straw wattles, and reusable erosion, sediment, and wildlife control systems that have been approved by the regulatory agencies (e.g., ERTEC Environmental Systems products) may be used.

CM-GEN-10: Avoid Animal Entrapment

At the beginning and end of each workday all excavated, steep-walled holes or trenches that are more than 8 inches deep with sidewalls steeper than a 1:1 (45 degree) slope will be inspected for trapped animals and, at the close of each day, will be covered with plywood or similar materials or provided a minimum of one escape ramp constructed of fill earth per 10 feet of trenching. Before such holes or trenches are filled, they will be thoroughly inspected for trapped wildlife by the Biological Monitor(s).

All construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight in the project footprint will be covered and elevated at least one foot above ground. Pipes or similar structures, regardless of diameter, will be covered such that avian entrapment is avoided. All pipes, culverts, and similar structures will be inspected for wildlife before such material is moved, buried, or capped.

CM-GEN-11: Delineate Equipment Staging Areas and Traffic Routes

Prior to any ground-disturbing activity, the Designated Biologist and Biological Monitor(s) will establish staging areas for construction equipment in areas that minimize effects on sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be in areas that will be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Designated Biologist and Biological Monitor(s) will flag and mark access routes to ensure that vehicle traffic in the project footprint is restricted to established roads, work areas, and other designated areas.

CM-GEN-12: Dispose of Construction Spoils and Waste

The contractor will dispose of waste materials associated with construction, including soil materials unsuitable for reuse, in local landfills are permitted to take these types of materials, and in conformance with state and federal laws.

CM-GEN-13: Establish Environmentally Sensitive Areas and Non-Disturbance Zones

Prior to any ground-disturbing activity in a work area, the Project Biologist will use flagging to mark ESAs that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. The Project Biologist will also direct the installation of WEF to prevent special-status wildlife species from entering work areas. The WEF will have exit doors to allow animals that

may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the work area, as appropriate, to avoid and minimize impacts on special-status species or aquatic resources outside of the work area during the construction period. The ESAs, WEF, and exclusionary fencing will be fine mesh material (e.g., Animex Fencing or similar) and delineated by the Designated Biologist based on the results of habitat mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.

Fencing installation will be monitored by a Designated Biologist or Biological Monitor to ensure that federally listed species are not injured or killed during installation. Temporary fencing will be installed in areas of construction that are beyond the perimeter of the right-of-way or in areas where construction staging will occur. After installation of the temporary fencing, the work area will be surveyed by a Designated Biologist(s) to confirm the absence of federally-listed wildlife. The ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Designated Biologist or Biological Monitors to ensure its integrity and that wildlife are not trapped.

CM-GEN-14: Install Aprons or Barriers within Security Fencing

Prior to final construction design the Project Biologist will review the fencing plans along any portion of the permanent right-of-way adjacent to natural habitats and confirm that the permanent security fencing will be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches above ground to prevent special-status reptiles, amphibians, and mammals from moving through or underneath the fencing and gaining access to areas in the right-of-way. At the 12-inch depth of the below grade portion of the apron, it will extend or be bent at an approximately 90-degree angle and oriented outward from the right-of-way a minimum of 12-inches, to prevent fossorial wildlife from digging or tunneling below the security fence. A climber barrier (e.g., rigid curved or bent overhang) will be installed at the top of the apron to prevent wildlife from climbing over the apron. The Project Biologist may coordinate with the Service prior to completion of the fencing design.

The Project Biologist will ensure that the selected apron material and climber barrier will not have the potential to cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for yearly inspection and repair of the fencing.

Prior to construction and operation, the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats and confirm that the fencing has been appropriately installed. Both the fencing plan review and field inspection will be documented in memorandums from the Project Biologist and provided to the Authority.

CM-GEN-15: Design and Maintain Wildlife Crossings to Facilitate Wildlife Movement

The Authority will design and maintain all wildlife crossings created specifically for terrestrial species consistent with the guidelines and recommendations in the Wildlife Corridor Assessment (WCA) unless different dimensions are specified in authorizations

issued under the Act. To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations:

- Native earthen bottom
- Ledges or tunnels will be incorporated into the design to facilitate safe passage of small mammals
- Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible
- Openness and a clear line of sight from end to end
- Cover materials within the crossing such as rock or brush piles where smaller animals can take cover
- Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water)
- Where water is likely to be present within a crossing as a result of a high groundwater table or proximity to an existing floodplain, wildlife crossing design will include features to minimize water entry into the crossing (e.g., impermeable groundwater barriers, berms) and to maximize drainage and drying time (e.g., slopes, sump pumps, permeable soils)
- Where hydrologic flow-balancing features (culverts) provide wildlife connectivity, "shelves" will be constructed to allow small and medium animals to pass through the structure when it is flooded
- Slight grade at approaches to prevent flooding
- Hydrologic designs (ledges, cross slopes, water detention features, infiltration features, water proofing, or other features) to maintain crossing functionality (a dry crossing path) up to and including 100-year storm events for 95 percent of the year (347 days)
- Limited open space between crossing and cover/habitat
- Separation from human use areas (e.g., trails, multiuse undercrossings)
- Avoidance of artificial light at approaches to wildlife crossings
- Wildlife undercrossings, hydrologic flow balancing features, culverts, and bridges, as well as the entry and exit areas to these features, will be inspected annually for obstructions such as debris, overgrown vegetation, garbage, or other material that was not included in the original design or will reduce the intended function
- All needed maintenance, repairs, and clearing of wildlife movement structures will be performed within 6 months of inspection.

The Authority will incorporate features to accommodate wildlife movement into the design of bridges and culverts that are replaced or modified as part of project construction, wherever feasible. Project Biologist review of final construction design for consistency with placement and dimensions of wildlife crossings will be verified in a memorandum provided to the Authority.

CM-GEN-16: Work Stoppage

During construction activities, the Designated Biologists and general Biological Monitors will have stop work authority to protect any federally listed wildlife species in the project footprint. This work stoppage will be coordinated with the Authority or its designee. The Contractor will suspend vegetation- or ground-disturbing activities in the work area(s) where the potential construction activity could result in injury or mortality of listed species; work may continue in other areas. The Contractor will continue the suspension until the individual leaves voluntarily or is moved to an approved release area using Service-approved handling techniques and methods, or as required by the Service.

CM-GEN-17: Enforce Construction Speed Limits

A speed limit of 15 mph will be enforced during project construction for all vehicles operating on unimproved access roads and in temporary and permanent work areas in the limit of direct effect.

CM-GEN-18: Implement Avoidance of Nighttime Light Disturbance

Prior to construction requiring nighttime lighting, the Contractor will prepare a Lighting Plan verifying how the Contractor will shield nighttime construction lighting and direct it downward in such a manner to minimize the light that falls outside the construction site boundaries. The Lighting Plan will be submitted to the Authority for review and approval prior to any work requiring nighttime lighting. The Lighting Plan will describe the type of lighting that will be used, maximum level of lumens to be emitted, and a schematic showing where lighting equipment will be stationed and which cardinal direction(s) the lighting equipment will face.

Permanent or temporary, fixed, exterior lighting, including motion triggered security lighting that casts light beyond the project footprint between sunset and sunrise, will not be used.

CM-GEN-19: Implement Water or Dust Palliative Measures

Water or dust palliatives will be applied to the construction right-of-way, dirt roads, trenches, spoil piles, and other areas where ground disturbance takes place to minimize dust emissions and topsoil erosion. Dust palliatives will be nontoxic to wildlife and plants. For construction in suitable habitat for listed species, the Biological Monitor will patrol areas of disturbance to ensure that water does not puddle for long periods and attract listed species or other wildlife to the project site. Operational ponding will be avoided through careful grading and hydrologic design. Water tanks will be covered with secure lids. Leaking hoses, tanks, or other sources of inadvertent pooling will be repaired immediately or moved offsite.

CM-GEN-20: Design the Project to Be Bird Safe

Prior to final construction design, the Authority, in consultation with the Project Biologist, will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012).

Applicable APLIC recommendations include, but are not limited to:

- Ensuring sufficient spacing of phase conductors to prevent bird electrocution
- Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible
- Marking lines and fences (e.g., Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement
- Installing perch guards to discourage avian presence on and near project facilities
- Minimizing the use of guy wires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers)
- Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning* (Service 2018)
- Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks
- Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas
- Ensuring poles do not have openings that could entrap birds; including sealing or capping all openings in poles or providing for escape routes (e.g., openings accommodating escape for various species)
- Designing aerial structures (e.g., viaducts and bridges) and tunnel portals to discourage birds and bats from roosting in expansion joints or other crevices
- Insulated wire or tree wire will be used for all electrical conduits to increase visibility of wires and minimize potential for collision

Additional bird operational actions will be required for dry lakes and playas, Audubon Important Bird Areas, and documented avian movement corridors. These measures include:

- Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions
- Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water

Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of on-coming trains.

CM-GEN-21: Prohibit Pets in Work Areas

No pets will be allowed on site during construction or O&M.

CM-GEN-22: Prepare Post-Construction Compliance Report

A post-construction compliance report will be submitted to the Service upon completion of each construction package, as defined by the design-build contracts. The post-construction compliance report will provide the following information:

- Dates of project groundbreaking and completion
- Pertinent information concerning the success of the project in meeting compensation and other conservation measures
- Known project effects on listed species
- Observed incidences of injury or mortality of any listed species
- Other pertinent information

CM-GEN-23: Notification of Dead, Injured, or Sick Wildlife

The Authority will notify the Service within 24 hours if dead, injured, or sick listed species are observed.

Conservation Measures Specific to Federally Listed Plants

CM-PLT-01: Conduct Pre-Construction Surveys for Listed Plants and Implement Avoidance and Minimization Measures

Prior to ground- or vegetation-disturbing activities, the Designated Biologist will conduct surveys for listed plants' suitable habitat. The Designated Biologist(s) will conduct protocol-level surveys for federally listed plant species prior to any ground- or vegetation-disturbing activities in suitable habitat for federally listed plant species during the appropriate bloom period for each species. Habitat assessment and protocol-level surveys will be phased with project build-out and the start of activities at each work area.

The surveys will be consistent with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018) and *Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (Service 2000). The Designated Biologist will flag and record in GIS the locations of any observed federally listed plant species. Prior to surveys and if a reference population exists, reference populations for target survey species will be visited to confirm bloom conditions and ensure target species have flowers or other discernible features necessary to identify plants.

If federally listed plants are observed during plant surveys, ESA fencing will be installed to protect the population or individuals, plus a 100-foot buffer (where access is permitted). In areas where construction occurs in modeled habitat that is occupied by serpentine-dependent federally listed plants, Section 3 (Construction Work) of the *Best Management Practices (BMP) for Preventing Phytophthora Introduction and Spread: Trail Work, Construction, Soil Import* (Swiecki and Bernhardt 2018) will be implemented.

If plants cannot be avoided, they will be documented prior to impacts. Documentation will include density and percent cover of the affected species; key habitat characteristics, including soil type, associated species, hydrology, and topography; and photo documentation of pre-construction conditions.

Prior to any vegetation- or ground-disturbing activity within temporary work areas, the Designated Biologist will stockpile and segregate the top 4 inches of topsoil from locations in the work area where federally listed plant species were observed during surveys. The topsoil will be stored on site and redistributed onto the temporary work area after construction completion.

Conservation Measures Specific to Bay Checkerspot Butterfly

CM-BCB-01: Minimize Direct Impacts on Bay Checkerspot Butterfly Host Plants

Prior to construction, the Designated Biologist will survey for Bay checkerspot larval host plants—dwarf plantain, purple owl's-clover, and paintbrush—within suitable habitat. If host plants are found within the project footprint, construction personnel will avoid them to the extent feasible. Where avoidance is not feasible, ground disturbance will take place during the adult flight season (March 1–April 30).

Conservation Measures Specific to Valley Elderberry Longhorn Beetle

CM-VELB-01: Conduct Pre-Construction Surveys for Valley Elderberry Longhorn Beetle

Prior to vegetation- or ground-disturbing activities within the species' range and in suitable habitat, an agency-approved Designated Biologist will search the work area for elderberry bushes with stems greater than 1 inch in diameter at ground level.

CM-VELB-02: Develop Construction Setback and Erect Signage

Within the species' range and in suitable habitat, a no-activity buffer zone will be established around elderberry shrubs whose retention is feasible. A 165-foot (or wider) buffer will be established and maintained around elderberry plants containing stems measuring 1 inch or greater in diameter at ground level (Service 2017b).

The agency-approved Designated Biologist will erect signage every 50 feet along the edge of the 165-foot buffer area with the following information: *"This area is habitat of the valley elderberry longhorn beetle, a federally threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment."* The signs will be installed prior to the start of construction, must be clearly readable from a distance of 20 feet, and must be maintained by the Authority throughout the duration of construction activities.

Conservation Measures Specific to Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

CM-VPS-01: Conduct Pre-Construction Surveys for Vernal Pool Species

Prior to vegetation- or ground-disturbing activities within the species' range, an agency-approved Designated Biologist will search for suitable seasonal wetland, vernal pool, and atypical wetland habitat (e.g., ditches, tire ruts) within the work area and a 250-foot buffer. Where suitable wetland habitat is identified, the Designated Biologist will visit these areas after the first rain event of the season to determine whether seasonal wetlands

and vernal pools have been inundated. A seasonal wetland, vernal pool, or other potentially suitable habitat (e.g., ditches, tire ruts) will be considered inundated when it holds more than 3 centimeters of standing water 24 hours after a rain event. Within 10 days after the pools have been inundated, the Designated Biologist will conduct surveys consistent with the *Survey Guidelines for the Listed Large Brachiopods* (Service 2017c). If surveys are not performed, the wetland habitat will be considered occupied. The Designated Biologist will submit a report to the Authority within 30 days of completing the work.

CM-VPS-02: Implement Seasonal Vernal Pool Work Restriction

Initial ground-disturbing activities that will not overlap with occupied or assumed occupied vernal pool crustacean habitat but that will occur within 250 feet of occupied or assumed occupied habitat will be restricted to the dry season (June 2 to October 14) or when the habitat is dry (i.e., lacks flowing or standing water). If construction activities must occur within 250 feet of suitable habitat during the October 15–June 1 period, erosion control materials will be installed to reduce sedimentation into vernal pools and other suitable habitat.

CM-VPS-03: Establish and Monitor Vernal Pool Exclusion Zones

Non-disturbance exclusion zones will be erected to minimize water quality and hydrologic impacts on the occupied or assumed occupied vernal pool crustacean habitat. The Designated Biologist will erect exclusion fencing 250 feet from the edge of occupied or assumed occupied seasonal wetland or vernal pool habitat, where accessible. The Biological Monitor(s) will monitor and maintain the vernal pool exclusion zones as directed by the Designated Biologist.

Conservation Measures Specific to California Red-Legged Frog

CM-CRLF-01: Conduct Pre-Construction Surveys for California Red-Legged Frog and Implement Avoidance Measures

Where suitable habitat has been identified within the project work area and prior to ground-disturbing activities, a Designated Biologist will conduct a pre-construction survey of potential breeding and suitable upland habitat to evaluate the presence or absence of the frog, or presence will be assumed.

Surveys for the frog will be conducted within suitable habitat as described below.

- Surveys will occur no earlier than 24 hours prior to ground-disturbing activities in the work area.
- The Designated Biologist will conduct a pre-construction survey of suitable breeding habitat following the *Revised Guidance on Site Assessments and Field Surveys for The California Red-legged Frog* (Service 2005b) or other more recent guidelines, if available.
- The Designated Biologist will investigate all potential areas that could be used by frogs for feeding, breeding, sheltering, movement, and other essential behaviors.
- Found individuals will be moved a short distance by the Designated Biologist to undisturbed suitable habitat beyond the work area no more

than 300 feet from the nearest suitable aquatic habitat to the greatest extent feasible while still in the action area. Preferred locations are those nearest and most similar to the habitat where the animal was found and could include mammal burrows, dense vegetation, mud cracks, and leaf litter.

- Any survey, construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the frog will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

CM-CRLF-02: Install, Monitor, and Maintain Exclusion Barriers

If occupied or assumed occupied habitat occurs adjacent to the work area, exclusion barriers (e.g., silt fences) will be installed, monitored, and maintained under direction of the Designated Biologist between the adjacent, suitable habitat and the work area, as described below.

- Exclusion barriers will be installed prior to initial ground-disturbing activities around the work area, or between the work area and occupied or assumed occupied habitat, as necessary to exclude individuals from entering.
- Exclusion fencing will be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent individuals from passing under the fence.
- Barriers will be installed with turnarounds at any access openings needed in the fencing to redirect frogs away from gaps in the fencing.
- Exclusion fencing will be monitored and maintained by the Authority until all construction activities are completed.
- Outside the breeding season (April 1 to October 31), barriers will be inspected by the Designated Biologist or Biological Monitor at least twice weekly on nonconsecutive days.
- During the breeding season (November 1 to March 31), barriers will be inspected daily.

If exclusion fencing between occupied or assumed occupied habitat and the work area is not possible (e.g., no property access) or warranted given the activity extent or duration (e.g., temporary activities that only take a couple of weeks to complete), the following measures will be implemented.

- The Designated Biologist or Biological Monitor will be on site during all activities that occur within suitable habitat of frogs.
- Prior to any ground-disturbing activity during the dry season (June 1–October 15), the Designated Biologist will conduct a pre-construction survey of suitable habitat within the work area and a 100-foot buffer, where access is available. After pre-construction surveys are complete, daily surveys are not needed during the dry season.

- During the wet season (October 16–May 31), to the maximum extent practicable, no construction activities will occur during rain events or within 24 hours following a rain event.
- During the wet season (October 16–May 31), the Designated Biologist or Biological Monitor will inspect the work area and all equipment/materials for the presence of frogs following or during a rain event.
- If a frog is found during any season, the animal will be allowed to move away from the project site of its own volition or, if the animal is in danger, moved by the Designated Biologist.

CM-CRLF-03: Dewatering Aquatic Breeding Habitat

If a suitable aquatic breeding feature that is occupied or assumed occupied needs to be dewatered by pumping, the following measures will be followed.

- The intakes will be completely screened with wire mesh not larger than 5 millimeters.
- Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.
- If the aquatic feature is not within the project work area, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate upon completion of construction activities.
- Any construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the frog will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases

Conservation Measures Specific to California Tiger Salamander

CM-CTS-01: Conduct Pre-Construction Surveys for California Tiger Salamander and Implement Avoidance Measures

Where suitable habitat has been identified within the project work area, prior to ground-disturbing activities, a Designated Biologist will conduct a pre-construction survey of potential breeding and suitable upland habitat to evaluate the presence or absence of salamanders, or presence will be assumed. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities in a work area. Within upland habitat, all mammal burrows will be hand excavated by a Designated Biologist. If possible, each burrow excavation will be conducted by slowly removing the burrow (including any side tunnels) or structures using hand tools (e.g., shovel, digging bar, garden trowel, masonry trowel, etc.). If hand tools cannot be used safely due to soil compaction, structural material present, and/or burrow depth extending greater than two feet from the surface, mechanical methods may be used. Mechanical methods will include either hand power tools or a backhoe and/or hand tools (e.g., shovel, garden trowel, masonry trowel, etc.). Cloth, cylinder, capped pipe, or similar material that would protect the integrity of the burrow will be pushed into the burrow approximately 12 to 16 inches to plug the burrow and prevent animals from exiting during excavation (i.e., to prevent injury or mortality). All burrows (including side burrows) will be excavated to their endpoints and the excavation will then be backfilled, brought back to grade, and compacted using the same equipment that was used for excavation. If any salamanders are found during excavation

or above ground within the work area, the Designated Biologist will relocate the individual(s). Found individuals will be moved a short distance by the Designated Biologist to undisturbed suitable habitat beyond the extent of the construction site no more than 300 feet from the capture location while still in the action area. Preferred locations are those nearest and most similar to the habitat where the animal was found and could include mammal burrows, dense vegetation, mud cracks, and leaf litter. Any survey, construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for salamander will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

CM-CTS-02: Install, Monitor, and Maintain Exclusion Barriers

If occupied or assumed occupied habitat occurs adjacent to a work area, exclusion barriers will be installed, monitored, and maintained along the perimeter of the work area to exclude individuals from entering the work area, as described below.

- The Authority, as directed by a Designated Biologist, will install exclusion barriers (e.g., silt fences) along the perimeter of the project footprint or between the project footprint and the adjacent, suitable habitat.
- Exclusion barriers will be installed prior to initial ground-disturbing activities around the work area, or between the work area and occupied or assumed occupied habitat, as necessary to exclude individuals from entering.
- Exclusion fencing must be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent salamanders from passing under the fence.
- Barriers will be installed with turnarounds at any access openings needed in the fencing to redirect salamanders away from openings.
- Exclusion fencing will be monitored and maintained by the Authority throughout the salamander's entire active period (November to June) or until all construction activities are completed, whichever occurs first.
- Barriers must be inspected by a Designated Biologist or Biological Monitor at least twice weekly on nonconsecutive days outside the breeding season.
- Barriers will be inspected daily following any rain event and during the active period (November to June).

If exclusion fencing between occupied or assumed occupied habitat and the work area is not possible work will restricted to the dry season between July and October.

CM-CTS-03: Dewatering Aquatic Breeding Habitat

If a suitable aquatic breeding feature that is occupied or assumed occupied needs to be dewatered by pumping, the following measures will be followed.

- The intakes will be completely screened with wire mesh not larger than 5 millimeters.
- Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.

- If the aquatic feature is not within the project work area, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate upon completion of construction activities.
- Any construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the salamander will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

Conservation Measures Specific to Least Bell's Vireo

CM-LBVI-01: Conduct Pre-Construction Surveys and Implement Avoidance Measures for Least Bell's Vireo

No more than 30 days prior to any ground- or vegetation-disturbing activity, the Designated Biologist will make an initial site visit to determine if suitable habitat for the vireo exists in the work area, plus a 500-foot buffer (where access is permitted).

Where suitable habitat is present, the Designated Biologist will conduct surveys prior to ground- or vegetation-disturbing activities, adhering to guidance in *Least Bell's Vireo Survey Guidelines* (Service 2001).

Habitat assessment and species surveys will be phased with project build-out and the start of activities at each work area. Following the surveys, the Designated Biologist(s) will conduct bimonthly surveys (every 2 weeks) during construction activities that occur within 500 feet of suitable habitat during the nesting season for the vireo as required by the survey guidelines. If construction activities are subsequently halted or delayed by more than 2 weeks (14 days) during the nesting season for the vireo, the Designated Biologist(s) will repeat surveys 5 days prior to the reinitiation of construction activities. Upon reinitiation of construction activities, the Designated Biologist will conduct the bimonthly surveys. A survey report will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey site.

If a vireo bird or nest is detected within 500 feet of construction or maintenance activities, the Designated Biologist will establish a 300-foot no-work buffer (where access is permitted) around the individual or nest to the extent practicable. The Designated Biologist may adjust the size of the no-work buffer in coordination with the Authority and Service. The Designated Biologist or Biological Monitor will have the authority to halt work if vireo individuals exhibit distress and/or abnormal nesting behavior.

The no-work buffer will remain in place until the Designated Biologist has determined that the individual(s) has left the area or the nest has failed or the young have fledged and are no longer reliant upon the nest site. The Designated Biologist will adjust the no-work buffer size and/or location to ensure that adults and young are not adversely affected by construction.

For construction activities involving the use of a helicopter, the nest buffer for federally listed nesting birds will be 500 feet horizontal and 300 feet vertical. Buffers will be measured from the location of the nest, regardless of where the nest is located.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." The action area includes the project footprint and the lands surrounding it. The project footprint includes the rail alignment as well as associated project structures such as roadway improvements, overcrossings, related ancillary facilities, and other permanent project elements, such as tunnel portals. The project footprint includes 4,004 acres, 138 acres of which are mapped as developed. The area affected by disturbance from noise, vibration, dust, and lighting during project construction and operation extends 1,000 feet from both sides of the project footprint. Therefore, the total action area that will be evaluated for potential effect from the San Jose to Merced Project Section of the HSR system under this biological opinion is 32,901 acres.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably will be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the project, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the project is likely to jeopardize the continued existence of the listed species.

Analytical Framework for the Adverse Modification Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification" (DAM) was published on August 27, 2019 (84 Fed. Reg. 44976). The final rule became effective on October 28, 2019. The revised definition states:

> "*Destruction or adverse modification* means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species."

The DAM analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the current rangewide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the *Environmental Baseline*, which analyzes the current condition of the critical habitat in the action area without the consequences to designated critical habitat caused by the project, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species; (3) the *Effects of the Action*, which determines all consequences to designated critical habitat that are caused by the proposed federal action on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) *Cumulative Effects*, which evaluate the effects of future non-federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of critical habitat, the Service formulates its opinion as to whether the action is likely to destroy or adversely modify designated critical habitat. The Service's opinion evaluates whether the action is likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.

Status of the Species

Metcalf Canyon Jewelflower

Please refer to the Streptanthus albidus ssp. albidus *(Metcalf Canyon Jewelflower) 5-Year Review: Summary and Evaluation* (Service 2013) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the 2013 5-year review was finalized. While there continues to be loss of habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the jewelflower.

Santa Clara Valley Dudleya

Please refer to the *5-Year Review Santa Clara Valley Dudleya* (Dudleya setchellii) (Service 2021) for the most recent comprehensive assessment of the species' range-wide status . No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the 2021 5-year review was finalized. While there continues to be loss of habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the dudleya.

Bay Checkerspot Butterfly

Please refer to the *Bay Checkerspot Butterfly* (Euphydryas editha bayensis) *5-Year Review: Summary and Evaluation* (Service 2009) for the most recent comprehensive assessment of the range-wide status of the butterfly, which found that because of continued population declines and habitat loss, the butterfly is at greater risk of extinction now that at the time of listing and may warrant reclassification to endangered status. Threats evaluated during that review have continued to act on the species since the 2009 5-year review was finalized. While there has been continued loss of habitat, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the butterfly.

Valley Elderberry Longhorn Beetle

Please refer to the *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (Service 2019a) for the current status of the species. For the most recent comprehensive assessment of the range-wide status of the beetle, please refer to the *Withdrawal of the Proposed Rule To Remove the Valley Elderberry Longhorn Beetle From the Federal List of Endangered and Threatened Wildlife* (Service 2014b). Threats evaluated during that review have continued to act on the species since the 2014 withdrawal was finalized. While there continues to be loss of beetle habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the beetle.

Vernal Pool Fairy Shrimp

Please refer to the *Vernal Pool Fairy Shrimp* (Branchinecta lynchi) *5-year Review: Summary and Evaluation* (Service 2007a) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 5-year review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Vernal Pool Tadpole Shrimp

Please refer to the *Vernal Pool Tadpole Shrimp* (Lepidurus packardi) *5-year Review: Summary and Evaluation* (Service 2007b) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 5-year review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

California Red-Legged Frog

Please refer to the *Recovery Plan for the California Red-Legged Frog* (Rana draytonii) (Service 2002) for the current status of the species. Threats evaluated during that review and discussed in the recovery plan have continued to act on the species since the review

was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

California Tiger Salamander

Please refer to the *California Tiger Salamander Central California Distinct Population Segment* (Ambystoma californiense) *5-year Review: Summary and Evaluation* (Service 2014c) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Least Bell's Vireo

Please refer to the *Least Bell's Vireo* (Vireo bellii pusillus) *5-Year Review: Summary and Evaluation* (Service 2006) for the current status of the species. The 5-year review recommended that the species be downlisted to threatened. Threats evaluated during that review have continued to act on the species since the review was published. To date, no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

Status of Critical Habitat

Bay Checkerspot Butterfly Critical Habitat

Fifteen units of critical habitat for the butterfly were designated by the Service in 2008 (73 Fed. Reg. 50406). The designated critical habitat includes four units in San Mateo County that comprise 1,692 acres and nine units in Santa Clara County that comprise 16,601 acres.

California Red-Legged Frog Critical Habitat

Critical habitat for the frog was designated in March 2001 (66 Fed. Reg. 14626) and revised in April 2006 (71 Fed. Reg. 19244) and in March 2010 (75 Fed. Reg. 12816). Approximately 1,636,609 acres in 27 California counties fall within the boundaries of the final revised critical habitat designation.

California Tiger Salamander Critical Habitat

Critical habitat for the salamander was designated in August 2005 (70 Fed. Reg. 49380). The designation includes nearly 200,000 acres across 31 critical habitat units designated in 19 counties.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the project. The environmental baseline includes the

past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The action area encompasses three U.S. Department of Agriculture Ecoregion sections, the Great Valley, Central Valley Coast Ranges, and Central California Coast. From the I-5 freeway east at or below an elevation of 200 feet above mean sea level (FAMSL) is the Great Valley ecoregion, which is characterized by a low-elevation fluvial plain formed on nonmarine sedimentary rocks with low hills. The cover type is primarily irrigated agriculture with small areas of natural cover types that include annual grasslands, western hardwoods, and wet grasslands or vernal pools. The Great Valley includes the Delta-Mendota Canal and California Aqueduct. The Central Valley Coast Ranges ecoregion approximately begins west of the I-5 freeway at elevations higher than 200 FAMSL, reaching elevations up to 2,200 FAMSL, and ends west at the descent into the Santa Clara Valley back to 200 FAMSL. The landscape of this ecoregion is low-elevation parallel ranges with steep slopes. Rock formations are marine and nonmarine sedimentary origins. Vegetation is western hardwoods, annual grasslands, and chaparral-mountain shrub cover types, and many species are drought-deciduous. The Central Valley Coast Ranges includes the O'Neill Forebay, San Luis Reservoir, Pacheco State Park, and Henry W. Coe State Park. The Santa Clara Valley and into San Jose is the Central California Coast ecoregion; terrain is low to moderate elevation with parallel ranges and valleys. The bedrock is sedimentary, granitic, and ultramafic formations. Vegetation is a mixture of western hardwoods, chaparral-mountain shrub, and annual grasslands cover types, with many of the species adapted to fire. The Central California Coast ecoregion includes San Felipe Lake, Coyote Lake County Park, and Santa Teresa County Park. The climate for all three ecoregions is Mediterranean-like, with mild, wet winters and hot, dry summers with brief periods of drought (USDA 2007).

Species

The Authority used species habitat suitability modeling initially to delineate potentially suitable habitat (hereinafter referred to as *modeled habitat*) and to estimate potential species distribution in the action area along the alignment. It can be reasonably assumed that not all modeled habitat will be occupied. The modeling effort used rule-based models for the the jewelflower, the dudleya, the butterfly, the beetle, the tadpole shrimp, the fairy shrimp, the frog, the salamander, and the vireo.

Rule-based models identified potentially suitable habitat based on scientific literature and species expert input related to the physical and biological habitat parameters associated with species occurrence. *Suitable habitat* is defined as any land cover type that is known to provide the resources and conditions necessary for survival and reproduction of a listed species (Hall et al. 1997). The precision of the species models is greatest in the project corridor, where detailed vegetation mapping was conducted for the permanent and temporary project impact footprints and within 500 feet of the permanent and temporary project impact footprints, using high resolution aerial photography and field reconnaissance surveys where access was available.

The results of the species habitat suitability modeling were applied to the following:

Impact estimates: The species habitat suitability models were overlain with the project footprint to determine the total area of potential impact to each species' modeled habitat.

Developing avoidance and minimization measures and determining habitat offsets: Species habitat suitability models provided information for the development and application of species-specific conservation measures and for the determination of the amount of compensatory mitigation that may be required for impacts to each species' habitat.

Metcalf Canyon Jewelflower

The action area contains 938 acres of modeled habitat for the jewelflower in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 15 acres of modeled habitat for the jewelflower are in the project's temporary disturbance footprint, and approximately 12 acres are in the permanent disturbance footprint.

In the action area, suitable habitat and known occurrences of the jewelflower are in Coyote Valley. There are three California Natural Diversity Database (CNDDB) jewelflower occurrences located within the action area (CDFW 2019). These occurrences are in Metcalf Canyon, near Dana Rock Park, and Communication Hill, in the City of San Jose.

Santa Clara Valley Dudleya

The action area contains 788 acres of modeled habitat for the dudleya in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 13 acres of modeled habitat for the dudleya are in the project's temporary disturbance footprint, and approximately 11 acres are in the permanent disturbance footprint. There are seven dudleya occurrences within the action area (CDFW 2019). Some of these occurrences are in Metcalf Canyon, Tulare Hill, and Coyote Ridge.

Bay Checkerspot Butterfly

The action area contains 792 acres of modeled habitat for the butterfly in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 15 acres of modeled habitat for the butterfly are in the project's temporary disturbance footprint, and approximately 11 acres are in the permanent disturbance footprint and include locations at Communication Hill, Tulare Hill, and Coyote Ridge.

Suitable habitat is mapped where serpentine soils are present outside of the developed portions of the south San Francisco Bay Area in the action area. Communication Hill is not known to be occupied. The butterfly occurs most densely along the east and west sides of Coyote Valley in areas designated as critical habitat and the surrounding vicinity. The action area intersects four CNDDB occurrences of the butterfly. The largest occurrence (occurrence #17), located on Coyote Ridge in the project footprint, spans more than 5,000 acres and has been documented as containing hundreds of thousands to millions of butterfly larvae (CDFW 2019).

The butterfly population on Tulare Hill is a satellite population[3]; 10 or fewer individuals were observed in annual surveys between 2004 and 2007 (Service 2009) until

[3] Smaller habitat patches capable of developing robust Bay checkerspot populations in years of favorable weather when the habitat is in good condition.

reintroduction efforts in 2013 boosted population numbers to 124 adults in 2014, 270 adults in 2015, and 270 adults in 2016. However, in 2017 the number of adults observed on Tulare Hill dropped to just six adults (CDFW 2019).

Tulare Hill is a steppingstone between Coyote Ridge and Santa Teresa County Park (i.e., land that facilitates movement between blocks of core habitat) (Service 1998a, 2009). Coyote Ridge contains high-quality serpentine bunchgrass grassland for the butterfly and is known to be occupied.

Valley Elderberry Longhorn Beetle

The action area contains 26 acres of modeled habitat for the beetle in the San Joaquin Valley project subsection. Approximately 2 acres of modeled habitat are in the project's permanent disturbance footprint.

Suitable habitat for the beetle overlaps the action area between the Santa Clara–Merced County boundary and the eastern terminus of the action area. Suitable habitat is most densely mapped in the action area in the vicinity of San Luis Reservoir and O'Neill Forebay. Suitable habitat for the beetle indicates the presence of riparian vegetation; however, a comprehensive survey of beetle and elderberry shrubs has not been conducted in the action area. There is limited riparian habitat that could support elderberry shrubs within the action area. There are no CNDDB occurrences of the beetle in the action area.

Vernal Pool Fairy Shrimp

The action area contains 70 acres of modeled habitat for the fairy shrimp in the Pacheco Pass and San Joaquin Valley project subsections. Approximately 3.7 acres of modeled habitat for the fairy shrimp are in the project's permanent disturbance footprint.

Fairy shrimp are known to occur within the Central Coast, San Joaquin Valley, and Southern Sierra Valley vernal pool regions (Service 2005a, 2007a; CDFW 2019). A comprehensive survey of vernal pools or habitat for fairy shrimp has not been conducted in the action area.

The project overlaps with three mapped vernal pools: one on Romero Ranch, north of SR 152; one on the east side of US 165 south of Henry Miller Road; and one along the south side of Henry Miller Road between US 165 and Santa Fe Grade. Based on a review of aerial photography, the habitat adjacent to US 165 is on farmland that has been disked or graded, which may preclude the presence of vernal pool crustaceans. While suitable vernal pool habitat overlaps with the action area, and the action area is within the species' ranges, no CNDDB occurrences of the fairy shrimp overlap with the action area (CDFW 2019).

Vernal Pool Tadpole Shrimp

The action area contains 9 acres of modeled habitat for the tadpole shrimp in the San Joaquin Valley project subsection. Approximately 0.5 acre of modeled habitat for the tadpole shrimp are in the project's permanent disturbance footprint.

In the action area, tadpole shrimp are known to occur within the San Joaquin Valley and Southern Sierra Valley vernal pool regions (Service 2005a; CDFW 2019). Within the San Joaquin Valley vernal pool region, tadpole shrimp are known to occur within the GEA core area (Service 2005a; CDFW 2019), which overlaps with the action area. The project overlaps with two mapped vernal pools: one on the east side of US 165 south of Henry Miller Road and one along the south side of Henry Miller Road between US 165 and Santa Fe Grade. Based on a review of aerial photography, the habitat adjacent to US 165

is on farmland that has been disked or graded, which may preclude the presence of vernal pool crustaceans.

There are no CNDDB occurrences of tadpole shrimp that overlap with the action area; however, there is one occurrence of tadpole shrimp immediately adjacent to the action area at Santa Fe Grade in Los Banos (CDFW 2019). A comprehensive survey of vernal pools or habitat for tadpole shrimp has not been conducted in the action area.

California Red-Legged Frog

The action area contains 4,079 acres of modeled habitat for the frog in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley project subsections. Approximately 32 acres of modeled habitat for the frog are in the project's temporary disturbance footprint, and approximately 270 acres are in the permanent disturbance footprint.

Suitable aquatic habitat includes streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons with components of submergent or emergent vegetation (Thomson et al. 2016), and terrestrial aestivation or refuge habitat includes moist leaf litter, dense understory, or in small mammal burrows for refuge and foraging (Jennings and Hayes 1994).

The action area overlaps suitable habitat in rural areas (i.e., excludes the heavily developed cities that constitute the south San Francisco Bay area) from the northern end of the action area in San Jose to O'Neill Forebay in eastern Pacheco Pass. Most of the overlap is concentrated along Pacheco Pass. The habitat in this area is primarily mapped as coastal oak woodland interspersed with annual grassland and a network of interconnected streams. Artificial stock ponds also dot the area. Mapped suitable habitat between Pacheco Lake and the Santa Clara County–Merced County line is primarily located along the steep SR 152 transportation corridor and is likely to be made up of small patches of denuded or ruderal habitat and culverted, steeply graded streams. Habitat along the transportation corridor is unlikely to be occupied. Habitat east and west of Pacheco Lake and the county line is up to 0.5 and 1.5 miles away from SR 152, respectively, and is expected to contain higher quality habitat (i.e., intact habitat blocks subject to less disturbance).

There are 12 CNDDB occurrences of the frog in the action area located at Coyote Valley at Monterey Road, South of Gilroy just west of US 101 (western edge of the Soap Lake complex), and Eastern Pacheco Pass near SR 152 (western edge of San Luis Reservoir) (CDFW 2019).

California Tiger Salamander

The action area contains 10,870 acres of modeled habitat for the salamander in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley project subsections. Approximately 68 acres of modeled habitat for the salamander are in the project's temporary disturbance footprint, and approximately 1,460 acres are in the permanent disturbance footprint.

Suitable habitat (aquatic breeding sites consist of seasonal ponds, such as vernal pools or other semipermanent calm waters; terrestrial aestivation or refuge sites in lowland grasslands, oak savannah, and mixed woodland habitats with underground retreats in California ground squirrel [*Spermophilus beechyii*] or Botta's pocket gopher [*Thomomys*

bottae] burrows) has been mapped within the action area, and there are documented occurrences within the action area.

Suitable habitat is located throughout the natural, undeveloped portions of the action area. There are nine extant occurrences of salamander in the action area (CDFW 2019). There is one location along the alignment that is within the assumed dispersal distance (1.3 miles) of breeding habitat, and it is in this location where there may be movement across the project footprint. It is along Monterey Road in Coyote Valley just south of the Monterey Road and Bailey Avenue interchange. On the east side of the rail in this location, the salamander occurrence is approximately 0.3–0.4 mile from the rail alignment at the Coyote Creek Golf Course. Another cluster of salamander presumed extant occurrences is on the west side of the rail alignment, almost directly west of the Coyote Creek Golf Course, in the foothills of the Santa Cruz Mountains. This occurrence is more than a mile away from the rail alignment.

Least Bell's Vireo

The action area contains 478 acres of modeled habitat for the vireo in the Morgan Hill and Gilroy and Pacheco Pass project subsections. Approximately 6 acres of modeled habitat for the vireo are in the project's temporary disturbance footprint, and approximately 67 acres are in the permanent disturbance footprint.

Suitable habitat for breeding and foraging (riparian habitat with a developed canopy layer and dense shrubs (Franzreb 1989; Kus 2002; Service 2006) has been mapped within the action area, and there is one documented occurrence within the action area.

Modeled breeding habitat for the vireo overlaps the action area in Santa Clara County and includes riparian habitat in Coyote Creek, Llagas Creek, Uvas Creek, Pajaro River, and north of Hollister within Pacheco Creek.

There is a historical occurrence of the vireo that overlaps the action area; a portion of this occurrence is within the project footprint. The CNDDB maps this occurrence as an approximately 3-mile reach of Llagas Creek between SR 152 and the Pajaro River in Santa Clara County near Gilroy. Individuals were detected in June 1997 and May 2001; because specific occurrence location was not provided, the entire reach was mapped in the CNDDB (CDFW 2019).

Stressors

Common stressors in the action area to most or all the species include:

- Disturbance to habitat from urbanization, energy development (oil, gas, wind, and solar), grazing, and agriculture
- Impacts from introduction of non-native invasive species (plants and insects)
- Herbicide and pesticide use
- Off-highway vehicle use
- Small population size
- Predation (for wildlife species, including nest brood parasitism for avian species)
- Climate change (including impacts from regional drought and fire)
- Inadequacy of existing regulatory mechanisms

- The presence of roads, routes, trails, railroads, and utility corridors in suitable habitat.
- Vehicle-caused mortality

Critical Habitat

Bay Checkerspot Butterfly Critical Habitat
There are 16,600 acres of butterfly critical habitat total, 1,120 acres of which overlap with the action area. The action area intersects four critical habitat units (6, 10, 12, and 13) between the cities of San Jose and San Martin on either side of US 101. Critical habitat unit 6, Tulare Hill, overlaps with 92 acres of the action area and is located within the permanent impact area of the project footprint. The other three intersected critical habitat units, Hale, San Martin, and Kirby, overlap with 198, 191, and 639 acres of the action area, respectively, and are located within the temporary impact area of the project footprint.

California Red-Legged Frog Critical Habitat
The final revised critical habitat designation consists of approximately 1,636,609 acres of critical habitat in 27 California counties. The action area overlaps with 4,674 acres of critical habitat unit STC-2 in the Diablo Range section of the project between Gilroy and San Luis Reservoir, where the alignment travels east toward the Central Valley.

California Tiger Salamander Critical Habitat
Critical habitat for salamander consists of almost 200,000 acres across 31 critical habitat units designated in 19 counties within four regions. The action area overlaps 267 acres of East Bay Region Units 10A and 10B, and 2,066 acres of San Felipe Unit 12 in Santa Clara and San Benito Counties.

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the project, including the consequences of other activities that are caused by the project. A consequence is caused by the project if it will not occur but for the project and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The project will result in the temporary and permanent loss of suitable habitat for the jewelflower, dudleya, butterfly, beetle, tadpole shrimp, fairy shrimp, frog, salamander, and vireo. Temporary habitat loss is any ground disturbance that can be restored to pre-disturbance conditions within 1 year. Permanent habitat loss includes ground disturbance that will last more than 1 year or any habitat conversion from suitable to non-suitable.

Table 3 shows maximum habitat loss for the nine federally listed species addressed in this biological opinion and the total compensation for each species. Adverse effects or impacts on species habitat are expressed as the maximum estimated acreage of suitable habitat affected by construction and operations of the project. The calculation of maximum habitat loss for species associated with vernal pools includes the entirety of the feature (i.e., the acreage of indirect bisected effects). Because habitat models were developed to conservatively estimate habitat suitability and the presence of federally

Table 3. Maximum Temporary and Permanent Loss of Suitable Habitat in the Action Area and Compensatory Mitigation

Species	Modeled Habitat That Overlaps with the Footprint	Modeled Habitat Loss Where the Species Is Reasonably Certain to Occur (acres)	Compensatory Habitat (acres)
Plants			
Metcalf Canyon jewelflower	27	27	81
Santa Clara Valley dudleya	24	24	72
Bay checkerspot butterfly			
Suitable habitat	26	26	78
Valley elderberry longhorn beetle			
Potentially suitable habitat	160	2	6
Vernal pool fairy shrimp			
Potentially suitable habitat, San Joaquin Valley Recovery Unit	0.5	0.5	1.5
Potentially suitable habitat, Central Coast Recovery Unit	3.2	3.2	9.6
Vernal pool fairy shrimp, TOTAL	3.7	3.7	11.1
Vernal pool tadpole shrimp			
Potentially suitable habitat, San Joaquin Valley Recovery Unit	0.5	0.5	1.5
California red-legged frog			
Potentially suitable aquatic breeding habitat	127	32	96
Potentially suitable upland refugia and foraging habitat	2,385	1,871	3,742
California red-legged frog, TOTAL	2,512	1,903	3,838

Species	Modeled Habitat That Overlaps with the Footprint	Modeled Habitat Loss Where the Species Is Reasonably Certain to Occur (acres)	Compensatory Habitat (acres)
California tiger salamander			
Potentially suitable aquatic breeding habitat	93	57	171
Potentially suitable upland refugia and foraging habitat	2,876	1,471	2,942
California tiger salamander, TOTAL	2,969	1,528	3,113
Least Bell's vireo			
Potentially suitable habitat	77	73	146

listed species is assumed in the absence of surveys, this analysis likely overestimates the magnitude of effects on occupied habitat.

Metcalf Canyon Jewelflower and Santa Clara Valley Dudleya

The project is anticipated to affect the jewelflower and dudleya where suitable habitat is identified in the action area. The jewelflower and dudleya are reasonably certain to occur on all modeled habitat in the project footprint, which is 27 acres and 24 acres, respectively (Table 3).

Affected habitat corresponds to areas where populations are known to or could occur, and required soil substrates and textures, vegetation communities, and/or elevation exist and where adverse effects on the jewelflower and dudleya are likely to occur if individuals are present. Effects on these species from construction and O&M activities could occur outside the project footprint but are not likely to be adverse.

Permanent loss of suitable habitat will occur at the base of Communication Hill along the existing railway and at the base of Tulare Hill along Monterey Road. Temporary habitat loss will result from establishment of staging areas for electrical reconductoring and infrastructure work, entailing temporary ground disturbance and vegetation removal. Temporary impact areas are located along Coyote Ridge in San Jose, along Llagas Road in Morgan Hill, on private property surrounding the CordeValle Golf Club in San Martin, and in the Soap Lake Region.

There is potential for individuals or seeds to be negatively impacted as a result of project construction, salvage, and relocation. Impacts could occur from the following:

- Removal and mortality during grubbing and clearing and establishment of staging areas and temporary construction easements in or near serpentine rock outcrops and serpentine grassland habitat
- Crushing by vehicles or equipment or burial during excavation

- Digging, transporting, and planting associated with salvage and relocation
- Dust generated from construction activities limiting gas exchange and photosynthesis.

O&M activities (e.g., vehicle access, grading, clearing, excavation, herbicide application) could cause reduced survival of special-status plants inside and adjacent to the project footprint, as well as to individuals that recolonize any remaining suitable serpentine habitat in and adjacent to the project footprint. Chemical runoff from trucks or equipment during construction, operations, and maintenance activities could leach into soils and reduce the vigor of or kill the jewelflower and dudleya. Use of herbicides for weed abatement during operations or maintenance could affect either species outside the right-of-way if they are applied near occupied habitat (e.g., drift effect).

Construction could introduce nonnative plant species that could permanently degrade serpentine grassland habitat. Although serpentine grasslands are typically more resistant to invasion by nonnative species than many other land cover types, nonnative species have potential to eventually degrade serpentine grasslands. For example, barbed goatgrass (*Aegilops triuncialis*) is an invasive grass that has been documented on Coyote Ridge and is the subject of focused management and monitoring by the Santa Clara Valley Open Space Authority (SCVOSA) (McGraw 2015). The introduction or spread of nonnative plants will increase competition for resources (i.e., sun, water, and soil nutrients), negatively affecting flowering success, pollination, seeding, and germination of native plants. The introduction of nonnative plant species may also significantly alter habitat heterogeneity by outcompeting native plants, thereby further facilitating successful invasion of nonnatives. Successful invasion of nonnative plant species could result in permanent degradation of suitable habitat for the jewelflower and the dudleya and negatively affect the fitness of populations that occur within the action area.

Construction could introduce nonnative diseases that could kill jewelflower and dudleya individuals and degrade serpentine grassland habitat. Specifically, introduction of exotic *Phytophthora* species can result in root disease and plant mortality. The *Phytophthora* genus is a group of water molds that can lead to root rot, stem cankers, and blights of fruit and leaves in the host plant. When introduced into native ecosystems, various exotic *Phytophthora* species have proven to be serious to devastating pathogens (Swiecki and Bernhardt 2018). However, the effect of *Phythophthora* species on the jewelflower and the dudleya is currently unknown.

To avoid and minimize effects on these species from the project, the Authority has proposed general and species-specific conservation measures, including pre-construction surveys, establishment of ESAs and non-disturbance zones, and salvage and relocation plans. Suitable habitat for these species that is temporarily disturbed will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the jewelflower and dudleya will also be implemented to offset impacts on suitable habitat.

Bay Checkerspot Butterfly

The project is anticipated to affect the butterfly where suitable habitat is identified in the action area. Butterflies are reasonably certain to occur on all 26 acres of modeled habitat in the project footprint. This habitat corresponds to locations on Communication Hill, Tulare Hill along Monterey Road, and on Coyote Ridge, where serpentine soils may be present and could support the species' larval host plants (*Plantago*) and where adverse effects are likely to occur if butterflies are present. Changes in butterfly behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

Temporary impact areas are located along Coyote Ridge in San Jose, at Chesbro Reservoir County Park in Morgan Hill, and on private property surrounding the CordeValle Golf Club in

Table 4. Impacts to Butterfly Critical Habitat

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
Unit 6: Tulare Hill	348	3	99.14%
Unit 10: Hale	205	5	97.56%
Unit 12: San Martin	189	2	98.94%
Unit 13: Kirby	2,204	13	99.41%
All Butterfly Critical Habitat	18,293	23	99.87%

San Martin. Effects to habitat include staging and temporary construction easements, which could temporarily remove vegetation reducing potential food, perching or egg laying opportunities which could result in reduced individual fitness.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could result from the following:

- Crushing of host plants supporting egg masses and larvae
- Collisions with or crushing of adults feeding on nectar plants by vehicles or equipment operating during the adult flight season (March to April)
- Disturbance and displacement of individuals from noise, vibration, and air turbulence.

The butterfly is considered to be relatively sedentary, although the upper dispersal limit is unknown. This species has only been recorded migrating up to 3.5 miles, but a multiyear study by McKechnie et al. observed that only 1.7 percent of males and 4.8 percent of females moved a distance of approximately 1,600 feet (Service 2009). The project will be sited on the Coyote Valley floor where substantial risk of mortality from vehicle and train strike already exist (US 101, Monterey Road, and Caltrain) for individuals migrating east to west across the alignment, from Coyote Ridge (the core population) to suitable habitat west of US 101 on Tulare Hill or at Santa Teresa County Park. Train operation will increase the risk of vehicle-related mortality in the area, as some individuals could be struck by a passing train.

Train maintenance vehicles or staff could crush adults, larvae, or eggs during inspections, emergency repairs, or vegetation management activities. Use of herbicides for weed abatement during operations or maintenance activities could affect butterfly host plants outside the right-of-way if applied near populations (e.g., drift effect). Chemical runoff from trucks or equipment along the rights-of-way for access roads could leach into soils and reduce the vigor of or kill host plants.

Construction could introduce nonnative invasive plant species that could permanently degrade serpentine grassland habitat. Although serpentine grasslands are typically more resistant to invasion by nonnative species than many other land cover types, nonnative species eventually degrade serpentine grasslands. For example, barbed goatgrass (*Aegilops triuncialis*) is an invasive grass that has been documented on Coyote Ridge and is the subject of focused management and monitoring by the SCVOSA (McGraw 2015: page 68).

To avoid and minimize adverse effects on the butterfly from the project, the Authority has proposed general and species-specific conservation measures including but not limited to pre-

construction surveys, Biological Monitors, establishment of ESAs, and water and dust palliative measures. Suitable habitat for the butterfly that is temporarily disturbed will be restored to pre-disturbance conditions following construction, to the extent feasible. Compensatory mitigation for the butterfly will be implemented for permanent impacts on suitable habitat containing host plants (*Plantago*) on serpentine grassland where butterflies are assumed to be present. Injury and mortality to eggs, larvae, pupae, and adults that occur in suitable habitat impacted by the project where the butterfly is assumed to be present are likely unavoidable due to the cryptic nature of this species during the egg, larvae, and pupae stages and the inability to block the insect from flying into the work area.

Bay Checkerspot Butterfly Critical Habitat

The project overlaps with 23 acres of butterfly critical habitat and 4 Units; Tulare Hill (Unit 6) with 3 acres of impacts, Hale (Unit 10) with 5 acres of impacts, San Martin (Unit 12) with 2 acres of impacts, and Kirby (Unit 13) with 13 acres of impacts (Table 4). The permanent project footprint overlaps with 3 acres of critical habitat, which are all in the Tulare Hill Unit. The temporary project footprint overlaps with 20 acres in the Hale, San Martin, and Kirby Units. The following describes each of the butterfly primary constituent elements (PCE) as defined in the critical habitat final rule (73 Fed. Reg. 50406–50452).

- **PCE #1**—Annual or perennial grasslands with little to no overstory that provide north-south and east-west slopes with a tilt of more than 7 degrees for larval host plant survival during periods of atypical weather (for example, drought). The project will temporarily diminish 20 acres and permanently remove 3 acres of the amount of PCE #1 available to the butterfly.

- **PCE #2**—The presence of the primary larval host plant, dwarf plantain (*Plantago erecta*), and at least one of the secondary host plants, purple owl's-clover (*Castilleja densiflora*) or exserted paintbrush (*Castileja exserta*), are required for reproduction, feeding, and larval development.

- **PCE #3**—The presence of adult nectar sources for feeding such as desert parsley (*Lomatium* spp), California goldfields (*Lasthenia californica*), tidy-tips (*Layia platyglossa*), sea muilla (*Muilla maritia*), scytheleaf onion (*Allium falcifolium*), false babystars (*Linanthus androsaceus*), and intermediate fiddleneck (*Amsinckia intermedia*).

  The temporary disturbance of 20 acres of critical habitat will temporarily diminish the amount of PCE #2 and PCE #3 available to the butterfly.

- **PCE #4**—Soils derived from serpentinite ultramafic rock (Montara, Climara, Henneke, Hentine, and Obispo soil series) or similar soils (Inks, Candlestock, Los Gatos, Fagan, and Barnabe soil series) that provide areas with fewer aggressive, nonnative plant species for larval host plants and adult nectar plants survival and reproduction.

- **PCE #5**—The presence of stable holes and cracks in the soil, and surface rock outcrops that provide shelter for the larval stage of the butterfly during summer diapause.Implementation of the general conservation measures will reduce adverse effects on the butterfly during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

After project impacts, 99.9 percent of all butterfly critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of the Tulare Hill, Hale, San Martin, and Kirby critical habitat units or butterfly critical habitat throughout the species' range.

Valley Elderberry Longhorn Beetle

Of the 160 acres of modeled habitat in the project footprint, beetles are reasonably certain to occur in approximately 2 acres of modeled habitat that will be permanently lost due to construction of the project. Permanent habitat loss will occur due to the conversion and disturbance of valley foothill riparian habitat within the project footprint. This habitat corresponds to riparian areas located along Henry Miller Road in Merced County where adverse effects are likely to occur if beetles are present. The remaining 158 acres of modeled habitat are grassland patches on the sides of roads, farm edges, and on levees where the species is not reasonably certain to occur due to the infrequency of elderberry bushes in these habitat types and the lack of known occurrence in the region. Changes in beetle behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

Construction could indirectly injure or kill the beetle host plant, the elderberry bush, as a result of altered site hydrology (e.g., altered flow and inundation patterns, changes in groundwater availability and water quality) from the installation of impermeable surfaces (e.g., concrete).

Temporary disturbance to riparian areas is expected from staging and temporary construction easements, which could remove host plants.

All temporary impacts to riparian vegetation will be restored in each work area to avoid and minimize indirect habitat degradation (i.e., erosion resulting from ground disturbance, spread of invasive plant species) and the temporal loss of suitable habitat for the beetle.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could occur from the following:

- Construction vehicles or equipment crushing or striking beetles
- Removal or pruning of occupied elderberry shrubs
- Removal or disturbance of valley foothill riparian habitat containing elderberry shrubs
- Removal or disturbance of annual grassland, coastal oak woodland, perennial grassland, or valley oak woodland containing elderberry shrubs within 200 feet of riverine or river, lacustrine habitat
- Disturbance and displacement of individuals may result from noise, vibration, and air turbulence.

Injury or mortality to the beetle could occur during O&M activities, but this is expected to be infrequent given these activities will take place within the developed rail footprint. Because immature beetles are confined to their host plants and adult beetles are generally found close to host plants (Service 2019a), train strike on riparian-dwelling beetles is not expected. However, periodic bridge maintenance activities may require workers and equipment to enter riparian corridors to inspect or work on bridges, and elderberry shrubs occupied by the species may be removed or pruned during such activities.

Construction could introduce invasive plant species that could permanently degrade valley foothill riparian and other suitable habitat. Nonnative invasive plant species may have significant indirect impacts on the beetle by affecting elderberry shrub vigor and recruitment (Talley et al.

2006). Nonnative grasses may also impair elderberry germination or establishment or elevate fire risk (Talley et al. 2006).

To avoid and minimize adverse effects on the beetle from the project, the Authority has proposed general and beetle-specific conservation measures, including but not limited to pre-construction surveys, Biological Monitors, establishment of ESAs, and water and dust palliative measures. Compensatory mitigation for the beetle will be implemented for permanent impacts on suitable habitat containing the elderberry host plant in riparian areas where the beetle has potential to occur. Injury and mortality to eggs, larvae, and pupae by the project are likely unavoidable due to the cryptic nature of this species and its biology (e.g., eggs, larvae, and pupae stages occur inside the stem of the bush with no outward evidence of presence).

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

The fairy shrimp and the tadpole shrimp are reasonably certain to occur on all 3.7 and 0.5 acres, respectively, of modeled habitat in the project footprint. Fairy shrimp and tadpole shrimp habitat corresponds to vernal pool and seasonal wetland land cover types within the San Joaquin Valley, along Henry Miller Road. Additional habitat for the fairy shrimp is found on Romero Ranch in eastern Pacheco Pass.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could occur from the following:

- Construction vehicles and equipment crushing individuals or cysts in occupied pools
- Construction activities resulting in the degradation or destruction of aquatic features containing adults or cysts
- Construction activities resulting in altered hydrology of occupied pools so that individuals can no longer complete their life cycle (i.e., drying of pools leading to desiccation and mortality of dormant cysts).

Operation of the train will not affect the tadpole shrimp or fairy shrimp. Train maintenance activities have potential to injure or kill individuals and damage suitable habitat. O&M effects include further habitat degradation from ground disturbance, clearing, or grubbing. These activities could cause erosion and sedimentation that directly affect the hydrology of adjacent vernal pool habitat. Maintenance vehicles or staff could crush individuals during inspections, emergency repairs, or vegetation management activities.

Use of herbicides for weed abatement during operations or maintenance could alter vernal pool vegetation through alterations to water chemistry or shade cover resulting in mortality or increased predation. Chemical runoff from trucks or equipment along the rights-of-way for access roads could leach into pools adjacent to the project and harm or kill individuals. The introduction of nonnative plant species could potentially affect vernal pool hydrology and result in long-term degradation of both vernal pool and upland plant communities.

To avoid and minimize adverse effects on the tadpole shrimp and fairy shrimp from the project, the Authority has proposed general and species-specific conservation measures including but not limited to pre-construction surveys, Biological Monitors, establishment of exclusion zones, and water and dust palliative measures. Compensatory mitigation will be implemented for permanent impacts on suitable vernal pool habitat where individuals are assumed to be present. Injury and mortality to individuals are likely unavoidable due to the size and nature of the species.

California Red-Legged Frog

Of the 2,512 acres of modeled habitat in the project footprint, frogs are reasonably certain to occur in approximately 1,903 acres. This habitat corresponds to areas of aquatic and upland land cover types within 1 mile of suitable aquatic habitat (including Coyote Valley, Soap Lake, and Pacheco Pass) where the species is likely to occur and where adverse effects are anticipated to occur. Frogs are not expected to be present on the remaining 609 acres of modeled habitat due to distance from suitable aquatic habitat, fragmentation by roads and other infrastructure, and development density. Changes in frog behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

There is potential for individuals to be injured or killed as a result of project construction and relocation. Injury and mortality could occur from the following:

- Construction-related ground disturbance (e.g., grading, earth-moving, vibration, excavation, exclusion fencing) and vehicle and equipment operation that could crush, entomb, or physically disturb individual frogs
- Construction activities resulting in the degradation, destruction, or dewatering of an aquatic feature containing frog adults, juveniles, or eggs
- Dispersing frogs becoming entrapped in construction materials or in excavation(s)
- Disturbance and displacement of individuals from noise and vibration.
- Capturing, transporting, and releasing individuals found within the construction site.

Train O&M activities have the potential to injure or kill frogs. Trains can strike an individual that has entered the railway. Maintenance vehicles or staff could crush a frog during inspections, emergency repairs, or vegetation management activities.

The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause frog mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. The introduction of nonnative plant species to upland habitat could reduce frog dispersal because dense herbaceous vegetation could impede movement.

Amphibian pathogens and parasites can be carried between habitats on the hands, footwear, or equipment of fieldworkers, spreading such pathogens or parasites to novel localities containing species that have had little or no prior contact with them. Construction could introduce nonnative diseases that could kill frogs. One example is chytridiomycosis, an infectious disease that affects amphibians worldwide. It is caused by the chytrid fungus (*Batrachochytrium dendrobatidis*), a fungus capable of causing sporadic deaths in some amphibian populations and 100 percent mortality in others.

The WCA identified two locations along the alignment as having potential to affect frog movement: (1) Monterey Road in Coyote Valley just south of the Monterey Road and Bailey Avenue interchange and (2) SR 152. These are the only two locations along the alignment that are within the assumed dispersal distance (2.0 miles) of presumed extant frog populations where the alignment is at-grade and fenced, therefore posing a potential barrier to movement.

The likelihood that individuals currently move across Monterey Road is low. Coyote Creek and Monterey Road currently provide a considerable barrier to east-west movement in this location. In addition, the occurrence polygons on the west side of the alignment are farther apart than the known dispersal distance (2.0 miles). Nonetheless, project design includes four wildlife undercrossings. These undercrossings are expected to maintain the potential for individuals to

move east and west across the alignment, even though the probability of individuals doing so is considered very low.

To minimize and avoid the effects of the project on the frog, the Authority has proposed general and frog-specific conservation measures, including pre-construction surveys, daily surveys, exclusion fencing, and Biological Monitors. Security fencing will be designed to exclude the species from accessing the right-of-way to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the frog that is temporarily disturbed will be restored to pre-disturbance conditions following construction, and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the frog will also be implemented for permanent impacts on suitable habitat. Habitat fragmentation and substantial obstruction of movement will be minimized with implementation of wildlife crossing structures proposed throughout the alignment and will provide frogs with movement and dispersal corridors, though it may increase the potential for the species to encounter predators that may also be utilizing the wildlife crossings.

California Red-legged Frog Critical Habitat

The project overlaps with 924 acres of the Wilson Peak critical habitat unit (Unit STC-2), 919 acres of which are from permanent activities and 5 of which are from temporary activities (i.e., activities that last less than one year)(Table 5). The frog PCEs as defined in the critical habitat final rule are as follows (75 Fed. Reg. 12816–12959) and all 4 PCEs are within the Wilson Peak critical habitat unit:

- **PCE #1**—Standing bodies of fresh water (with salinities less than 4.5 ppt), including natural and human-made (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years
- **PCE #2**—Freshwater pond and stream habitats, as described under PCE #1, that may not hold water long enough for the species to complete its aquatic life cycle but that provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult frogs
- **PCE #3**—Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile (1.6 kilometers) in most cases (i.e., depending on surrounding landscape and dispersal barriers), including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the frog.
- **PCE #4**—Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile (1.6 kilometers) of each other and that support movement between such sites

Table 5. Impacts to Frog Critical Habitat

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
STC-2: Wilson Peak	204,718	924	99.55%
All Frog Critical Habitat	1,636,609	924	99.94%

Implementation of the general conservation measures will reduce adverse effects on the frog during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

After project impacts, 99.9 percent of all frog critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of Wilson Peak critical habitat unit and its PCEs.

California Tiger Salamander

Of the 2,969 acres of modeled habitat in the project footprint, salamanders are reasonably certain to occur in 1,528 acres. This habitat corresponds to areas of aquatic and upland land cover types within 1.3 miles of suitable aquatic habitat (including Coyote Valley, Soap Lake, and Pacheco Pass) where the species is likely to occur and where adverse effects are anticipated to occur. Salamanders are not expected to be present on the remaining 1,441 acres of modeled habitat due to distance from suitable aquatic habitat, fragmentation by roads and other infrastructure, and development. Changes in salamander behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

The project footprint overlaps suitable habitat along the entire alignment, except for the heavily developed cities that constitute the South Bay area. Suitable habitat near existing transportation corridors is likely to be made up of small patches of denuded or ruderal habitat that is separated from larger patches of higher quality habitat by roads, houses, and agricultural development. These areas are unlikely to be occupied.

The greatest potential for the loss of occupied habitat occurs where natural portions of the action area are closest to the project footprint or, in the case of Coyote Valley, where a population may be persisting on a golf course.

Temporary impact areas are distributed along the entire alignment, although most temporary impacts on aquatic breeding and foraging habitat are located east of San Luis Reservoir.

There is potential for individuals to be injured or killed as a result of project construction, burrow inspection/excavation, and relocation. Injury and mortality could occur from the following:

- Construction-related ground disturbance (e.g., grading, earth-moving, excavation, exclusion fencing) that could kill or injure salamanders.
- Construction vehicles crushing individuals or collapsing occupied aestivation refugia in upland habitat.
- Construction activities resulting in the degradation, destruction, or dewatering of an aquatic feature containing salamander adults, juveniles, or eggs.
- Dispersing salamanders becoming entrapped in construction materials or in excavation(s).
- Disturbance and displacement from noise and vibration.
- Capturing, transporting, and releasing individuals found within the construction site.

Train O&M activities have potential to injure or kill salamanders. Trains can strike an individual that has entered the railway. Maintenance vehicles or staff could crush a salamander during inspections, emergency repairs, or vegetation management activities. The use of chemicals and

hazardous substances (e.g., oils, gasoline) during construction may cause salamander mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. The introduction of nonnative plant species to upland habitat could reduce salamander dispersal to nonbreeding sites (i.e., burrows) because dense herbaceous vegetation could impede movement.

To minimize and avoid effects of the project on the salamander, the Authority has proposed general and species-specific conservation measures, including pre-construction surveys, daily surveys, exclusion fencing, and Biological Monitors. Security fencing will be designed to exclude the species from accessing the right-of-way to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the salamander that is temporarily disturbed will be restored to pre-disturbance conditions following construction, and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the salamander will also be implemented for permanent impacts on suitable habitat. Habitat fragmentation and substantial obstruction of movement will be minimized with the wildlife crossing structures that are proposed as part of the project.

California Tiger Salamander Critical Habitat

The project overlaps with 279 acres of the East Bay Geographic Region of critical habitat for salamander, 5 acres of which are in Lion's Peak Unit (East Bay Units 10A and 10B) and 274 acres of which are in San Felipe Unit (East Bay Unit 12)(Table 6). The permanent project footprint overlaps with 274 acres of critical habitat, all of which are in the San Felipe Unit. The temporary project footprint overlaps with 5 acres, 4 acres of which are in the Lion's Peak Unit and 1 acre of which are in the San Felipe Unit. The following describes each of the salamander PCEs as defined in the critical habitat final rule (70 Fed. Reg. 49380–49458).

- **PCE #1**—Standing bodies of fresh water (including natural and human-made (e.g., stock) ponds, vernal pools, and other ephemeral or permanent water bodies, which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
- **PCE #2**—Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat that salamanders depend upon for food, shelter, and protection from the elements and predation. The project will diminish the amount of PCE #2 available to the salamander. The extent to which small mammal burrows or other underground habitat are present is unknown, but this analysis assumes burrows are present in these areas.
- **PCE #3**—Accessible upland dispersal habitat between occupied locations that allows for movement between such sites. The project will adversely affect PCE #3 if the dispersal habitat were diminished to the extent that salamanders could not move between occupied locations or if the project creates movement barriers between occupied locations. The project is not known to disrupt movement between occupied habitat patches within critical habitat.

Implementation of the general conservation measures will reduce adverse effects on the salamander during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

Table 6. Impacts to Salamander Critical Habitat

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
East Bay Region Unit 10A and 10B: Lion's Peak Unit	892	5	99.44%
East Bay Region Unit 12: San Felipe Unit	6,642	274	95.87%
All Salamander Critical Habitat	199,109	279	99.86%

After project impacts, 99.8 percent of all salamander critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of the Lion's Peak and San Felipe critical habitat units or salamander critical habitat throughout the species' range.

Least Bell's Vireo

The project is anticipated to affect the vireo where suitable habitat is identified in the action area. The population density within the project area is unknown but is anticipated to be low as the species may have only just begun to recolonize areas formally used as breeding habitat within its historic range. Of the 77 acres of modeled habitat in the project footprint, vireos are reasonably certain to occur in approximately 73 acres in the project footprint. This habitat corresponds to areas of suitable riparian habitat in the species' historical range where expanding vireo populations are beginning to recolonize and where adverse effects are likely to occur if vireo are present. Vireos are not expected to be present on the remaining 4 acres of modeled habitat due to small patch size, location, fragmentation by roads and other infrastructure, and development. Changes in vireo behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

There is potential for vireo individuals to be injured or killed as a result of project construction.

Train operations could injure or kill individuals. Injury and mortality could result from the following:

- Injury or death could result from train strike or electrical strike if vireo individuals perch on the alignment and are struck by the train or collide with the electrical line when flying away.
- Vireo individuals could fall into tubular steel OCS poles and become injured or trapped.
- Mortality or injury may result from collisions with vehicles or equipment.
- Disturbance and displacement of individuals may result from noise, vibration, and air turbulence.

Direct effects on the vireo during maintenance activities will likely be minor and sporadic because the HSR will operate on bridges or viaducts that are elevated above riparian corridors. However, periodic bridge maintenance activities may require workers and equipment to enter riparian corridors to inspect or work on bridges, and riparian vegetation occupied by the species may be removed or pruned during such activities.

Chemicals and hazardous substances used during construction (e.g., oils, gasoline) may cause vireo mortality if individuals enter habitat or water collection areas that have been contaminated by accidental spills or other vehicle and equipment leaks, ingest prey that has been contaminated, or bring contaminated plant or other material to the nest.

Ground disturbance and vegetation removal in riparian habitat will create areas of bare soil susceptible to colonization by nonnative invasive plant species such as giant reed, tamarisk, and

perennial pepperweed. Dense stands of these species will degrade riparian habitat for vireos and other riparian birds by outcompeting willows and other native plants that provide nest sites.

There is evidence that migrating birds avoid noisy areas during migration (McClure et al. 2013). Small populations are generally more vulnerable to adverse effects, because the loss of even a few animals may reduce genetic diversity in the population and may impede the potential for individuals to find mates and successfully reproduce.

To minimize or avoid effects of the project on the vireo, the Authority has proposed general and vireo-specific conservation measures including pre-construction nesting bird surveys, Biological Monitors, establishment of ESAs and nondisturbance zones, and bird safe project design. Suitable habitat for the vireo will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the vireo will also be implemented for permanent impacts on suitable habitat.

Compensatory Habitat

The Authority is proposing to provide compensatory habitat as part of the project. This compensatory habitat mitigation is intended to offset the effect on the species of the project's anticipated incidental take, resulting from the permanent and temporary loss, modification, and/or degradation of habitat described above. The compensatory habitat proposed will be in the form of placing conservation easements with long-term management plans on compensatory mitigation sites and the purchase of habitat compensation credits at a Service-approved mitigation site or conservation bank.

The amount of suitable habitat for each species that will be provided as compensatory habitat is as follows:

- Metcalf Canyon jewelflower—81 acres
- Santa Clara Valley dudleya—72 acres
- Bay checkerspot butterfly—78 acres
- Valley elderberry longhorn beetle—6 acres
- Vernal pool fairy shrimp—11.1 acres
- Vernal pool tadpole shrimp—1.5 acres
- California red-legged frog—3,838 acres
- California tiger salamander—3,113 acres
- Least Bell's vireo—146 acres

The Authority will provide compensatory mitigation for impacts on suitable habitat for each species per the above acreages. However, upon design finalization of each CP and completion of the pre-construction habitat assessment surveys, the amount of compensatory mitigation may be adjusted based on revised estimated impacts on species' suitable habitat, if needed, for each work area.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the project. Providing this compensatory habitat mitigation will offset the loss of habitat and may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the project are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

The Service does not have specific information regarding future non-federal actions within the project action area. However, increased agriculture, urbanization, and human development is reasonably likely to result in increased loss of habitat and a reduction in available food and water resources to support these species.

Conclusion

After reviewing the current status of the dudleya, jewelflower, butterfly, beetle, tadpole shrimp, fairy shrimp, frog, salamander, and vireo; the environmental baseline for the action area; the effects of the project; and the cumulative effects, it is the Service's biological opinion that the construction of the San Jose to Merced Project Section, as proposed, is not likely to jeopardize the continued existence of these species. The Service reached this conclusion because the project-related effects on the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not result in precluding recovery or appreciably reducing the likelihood of survival of these species based on the following:

1) The Conservation Measures are designed to avoid or minimize and offset adverse impacts on these species and their suitable habitat.
2) Project activities that will result in temporary and permanent impacts on suitable habitat only occur on a small percentage of such habitat within the action area and throughout the full range of these species, and, as such, will be unlikely to reduce landscape-scale habitat functionality.
3) Protection of habitats within the compensatory mitigation sites will preserve and restore suitable habitat in the same recovery areas (as applicable) affected by constructing and operating the project.

After reviewing the current status of designated critical habitat for the butterfly, frog, and salamander; the environmental baseline for the action area; the effects of the San Jose to Merced Project Section; and the cumulative effects, it is the Service's biological opinion that the San Jose to Merced Project Section, as proposed, is not likely to destroy or adversely modify designated critical habitat. The Service reached this conclusion because the project-related effects to the designated critical habitat, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding the function of the butterfly, frog, and salamander's critical habitat to serve its intended conservation role for the species based on the following:

1) The Conservation Measures are designed to avoid or minimize and offset adverse impacts on these species and their suitable habitat.
2) Project activities that will result in temporary and permanent impacts on suitable habitat only occur on a small percentage of such critical habitat within the action area and throughout the full range of these species, and, as such, will be unlikely to reduce landscape-scale habitat functionality.

3) Protection of habitats within the compensatory mitigation sites will preserve and restore suitable habitat in the same recovery areas (as applicable) affected by constructing and operating the project.

The effects to the butterfly, frog, and salamander are small and discrete, relative to the entire area designation, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the butterfly, frog, and salamander.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Authority for the exemption in section 7(o)(2) to apply. The Authority has a continuing duty to regulate the activity covered by this incidental take statement. If the Authority (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Authority must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

Amount or Extent of Take

Bay Checkerspot Butterfly and Valley Elderberry Longhorn Beetle

The Service anticipates that incidental take of the butterfly and beetle will be difficult to detect due to their life history and ecology. The butterfly inhabits host plants (dwarf plantain or owl's clover) and spends most of its lifespan in the egg or pupa stage, making them difficult to detect. The beetle has short lifespans, with adult males typically living 4 to 5 days, and adult females

living up to 3 weeks. This short adult lifespan coupled with larval development occurring exclusively within the stems of the host elderberry plant make this species difficult to detect. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all butterflies within 26 acres of suitable habitat and all beetles within the 2 acres of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

The Service anticipates that incidental take of fairy shrimp and tadpole shrimp will be difficult to detect due to their life history and ecology and because the number of individuals within the project action area is unknown. Fairy shrimp are less than 2.5 centimeters in length and cysts become embedded in the dried bottom mud of vernal pools at the end of their lifecycle making them difficult to detect. Tadpole shrimp are less than 3.3 inches in length and also produce cysts that lie buried in the soil until the next winter rains trigger the eggs to hatch. It is difficult to know how many cysts are in the soil of any wetland feature, or how many individuals or eggs will occupy any wetland feature later in time. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all fairy shrimp within the 3.7 acres of suitable habitat and all tadpole shrimp within the 0.5 acre of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

California Red-legged Frog and California Tiger Salamander

The Service anticipates that incidental take of the frog and the salamander will be difficult to detect due to its life history and ecology. Specifically, the frog and the salamander can be difficult to locate due to their cryptic appearance and finding a dead or injured individual is unlikely due to their relatively small size. Losses of the frog and the salamander may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in their habitat, or additional environmental disturbances. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all frogs within 1,903 acres of suitable habitat and all salamanders within the 1,528 acres of suitable habitat that will be disturbed by the project could be subjected to incidental take in the form of injury, mortality, capture, harm, or harassment.

Least Bell's Vireo

The Service anticipates that incidental take of vireo will be difficult to detect due to its life history and ecology which includes seasonal fluctuations in populations and an unknown anticipated recolonization rate. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all vireo individuals within the 73 acres of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

Upon implementation of the Reasonable and Prudent Measures, these levels of incidental take associated with the San Jose to Merced Project Section in the form of harm, harassment, capture, injury, and death of the frog and the salamander and harm, harassment, injury, and death of the

butterfly, the beetle, fairy shrimp, tadpole shrimp, and the vireo caused by habitat loss, construction activities, and O&M activities will become exempt from the prohibitions described in section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the butterfly, the beetle, fairy shrimp, tadpole shrimp, the frog, the salamander, and the vireo.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the vireo, the frog, the salamander, the butterfly, the beetle, fairy shrimp, and tadpole shrimp resulting from implementation of the San Jose to Merced Project Section have been incorporated into the project's conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the vireo, the frog, the salamander, the butterfly, the beetle, fairy shrimp, and tadpole shrimp:

1) All conservation measures, as described here in the Project Description section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Authority must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1) The Authority will include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the project.
2) The Authority will require that all personnel associated with this project are made aware of the conservation measures and the responsibility to implement them fully.
3) For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Authority will provide a precise accounting of the total acreage of habitat impacted to the Service on a monthly and annual basis as described in the reporting section of the project description.
4) In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Authority will adhere to the reporting requirements described in the project description. The Authority and Service will coordinate annually at a minimum to discuss the project and determine if any adjustments need to be made to the annual limit, the description of covered actions, or any other portion of the project.
5) Because it is likely that the Authority will not begin construction on the project for a number of years, the Authority will confer with the Service no less than 1 year before the start of project construction to assess any changes to the project, the species baseline in the action area, and potential changes to the effects from the project on listed species. This process will ensure that the assessment of impacts and proposed avoidance and

minimization measures within this opinion are still accurate and reflect existing conditions on the ground.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the San Joaquin Valley Division Supervisor at the Sacramento Fish and Wildlife Office at (916) 414-6544.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a project on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) The Authority should continue to work with the Service to assist us in meeting the goals of the *Draft Recovery Plan for the Least Bell's Vireo* (Service 1998b), *Recovery Plan for the California Red-legged Frog (Rana aurora draytonii)* (Service 2002), *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (Ambystoma californiense)* (Service 2017a), *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (Service 1998a), *Revised Recovery Plan for Valley Elderberry Longhorn Beetle (Desmocerus californicus dimporphus)* (Service 2019a), and *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Service 2005a).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the California High-Speed Rail System: San Jose to Merced Project Section. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;

2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or

4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Maggie Sepulveda, Senior Fish and Wildlife Biologist, at margaret_sepulveda@fws.gov or (916) 414-6512 or Patricia Cole, Supervisor, San Joaquin Valley Division, at patricia_cole@fws.gov or (916) 414-6544, or the letterhead address.

Sincerely,

MICHAEL FRIS

Digitally signed by MICHAEL FRIS
Date: 2021.12.23 10:22:12 -08'00'

Michael Fris
Field Supervisor

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Laurie Warner Herson

Subject: RE: [EXTERNAL] ICF Request for Reclamation Input - "Tribal trust resources"

From: Dekar, Melissa D <mdekar@usbr.gov>
Sent: Friday, April 22, 2022 8:28 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; King, Vanessa M <vking@usbr.gov>
Cc: Linda Fisher (linda.fisher@hdrinc.com) <linda.fisher@hdrinc.com>; Carper, Mark A <mcarper@usbr.gov>; Clancy, Kevin M <KClancy@usbr.gov>
Subject: RE: [EXTERNAL] ICF Request for Reclamation Input - "Tribal trust resources"

Good morning, Laurie,

I checked in with Mark Carper and Kevin Clancy (Native American Affairs Program Manager) on this request. In reading their responses, it seem to me that they both think the Coalition probably meant ITAs, but we cannot know for sure without asking for clarification. Neither Reclamation nor NEPA have a specific definition for the term *Tribal Trust Resources,* however, there is a specific definition of *Trust Resources* (see below). Let me know if you have additional questions.

Melissa
--
Mark's thoughts:
I can see the confusion in the terminology. Without asking the Coalition specifically what they mean I fear we're just guessing. My take is that the Coalition is aware that Indian Trust Assets has a very specific definition but got a little fast and loose in discussing resources associated with ITAs. This is also the risk when dealing with a CEQA/NEPA doc that has Tribal Cultural Resources (addressable through CEQA), Traditional Cultural Properties (addressable through NHPA/NEPA), and the ITA language here.

Ultimately since this is in the ITA section, barring clarification from the Coalition, I would suggest they meant ITAs. In conversation the terms are often interchangeable.

Kevin's thoughts:
To me they are interchangeable, but we if are going to split hairs...

Indian trust assets means lands, natural resources, money, or other assets held by the Federal Government in trust or restricted against alienation for Indian tribes and individual Indians (Secretarial Order No. 3215, April 28, 2000). Trust is a formal, legally defined, property-based relationship that depends on the existence of three elements: (1) a trust asset(lands, resources, money, etc.); (2) a beneficial owner (the Indian tribe or individual Indian allottee); and (3) a trustee (the Secretary of the Interior).

25 CFR § 1000.352 - What are "trust resources" for the purposes of the trust evaluation process?
§ 1000.352 What are "trust resources" for the purposes of the trust evaluation process?
(a) Trust resources include property and interests in property:
  (1) That are held in trust by the United States for the benefit of a Tribe or individual Indians; or
  (2) That are subject to restrictions upon alienation.
(b) Trust assets include:
  (1) Other assets, trust revenue, royalties, or rental, including natural resources, land, water, minerals, funds, property, assets, or claims, and any intangible right or interest in any of the foregoing;

(2) Any other property, asset, or interest therein, or treaty right for which the United States is charged with a trust responsibility. For example, water rights and off-reservation treaty rights.

(c) This definition defines trust resources for purposes of the trust evaluation process only.

Many things and ideas that are commonly represented in terms of "trust" obligations are not actually part of the Government's trust responsibility toward Indians.

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/25/2022 8:53:00 AM
To: steve.micko@jacobs.com; Whittington, Chad/SAC [Chad.Whittington@jacobs.com]; Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: FW: Question regarding the Sites Reservoir Daily Diversion Tool

Importance: High

Hi all – See below. Doug would like to have a call. Let me know if you have availability sometime Thursday, 4/28 from 10 AM to 2 PM.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Friday, April 22, 2022 1:53 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Cooper, Ashley <ACooper@nrdc.org>
Cc: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

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Subject: Re: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

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Date: Thursday, April 14, 2022 at 3:27 PM
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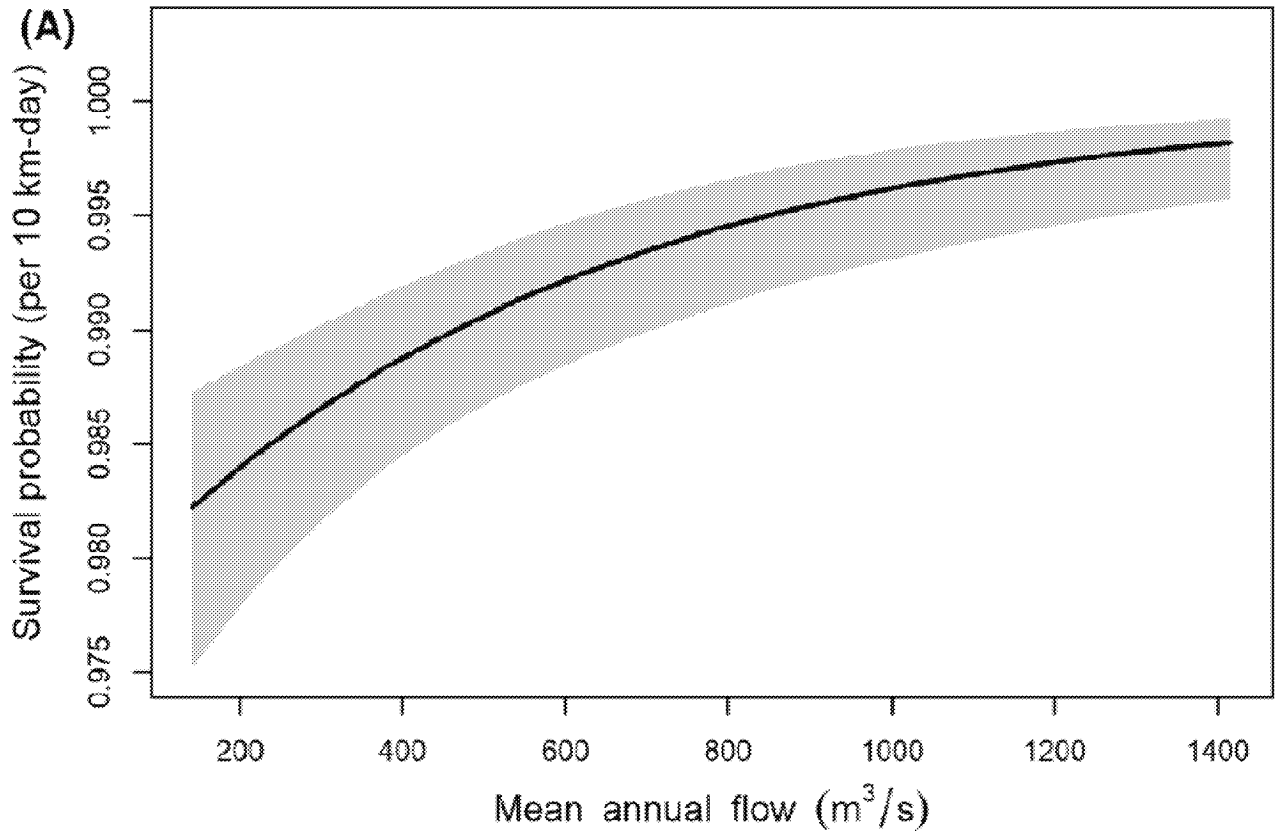
Thanks,
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From: Obegi, Doug
Sent: Friday, March 25, 2022 10:52 AM
To: Kristal Davis-Fadtke <Kristal.Davis-Fadtke@wildlife.ca.gov>
Cc: jon@baykeeper.org
Subject: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

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This paper indicates that at least for hatchery winter-run Chinook salmon, higher bypass flow thresholds for Sites Reservoir than 10,700 cfs are necessary to fully mitigate impacts and avoid further reductions in juvenile survival of this endangered species.

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Sent: Friday, March 25, 2022 9:23 AM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

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Jason

From: Obegi, Doug <dobegi@nrdc.org>
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To: Hassrick, Jason <Jason.Hassrick@icf.com>; arnold.ammann <arnold.ammann@noaa.gov>
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Cc: miles.daniels@noaa.gov
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> Take care,
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Sent: Tuesday, February 1, 2022 10:57 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hello Doug,

Please find attached the early online version of the paper. Let me know if you have any questions about it.

Cheers,

Arnold

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> Congratulations to you both on this new paper published in CJFAM! Very cool. Any chance that one of you has a pre-publication version that you could share with me?

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To: jason.hassrick@icf.com
Subject: Request for pre-publication copy of your recent manuscript

Hi Jason,

I hope you're doing well these days. Congratulations on your new paper published in CJFAM! (https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1002/nafm.10748)

Do you have a pre-publication version of the manuscript that you would be willing to share with me, since the paper is currently not open access?

Thanks,

Doug

DOUG OBEGI

*Senior Attorney**

Water Program

NATURAL RESOURCES

DEFENSE COUNCIL

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T 415.875.6100

DOBEGI@NRDC.ORG

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Please save paper.
Think before printing.

** Admitted to practice in California*

--

Arnold J. Ammann
National Marine Fisheries Service
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110 McAllister Way
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Tel: 831-331-9947
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From: Micko, Steve/SAC [Steve.Micko@jacobs.com]
Sent: 4/25/2022 9:21:06 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Whittington, Chad/SAC [Chad.Whittington@jacobs.com]; Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Ali – I'm available anytime during that time window.

Best,
Steve

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 25, 2022 8:53 AM
To: Micko, Steve/SAC <Steve.Micko@jacobs.com>; Whittington, Chad/SAC <Chad.Whittington@jacobs.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: [EXTERNAL] FW: Question regarding the Sites Reservoir Daily Diversion Tool
Importance: High

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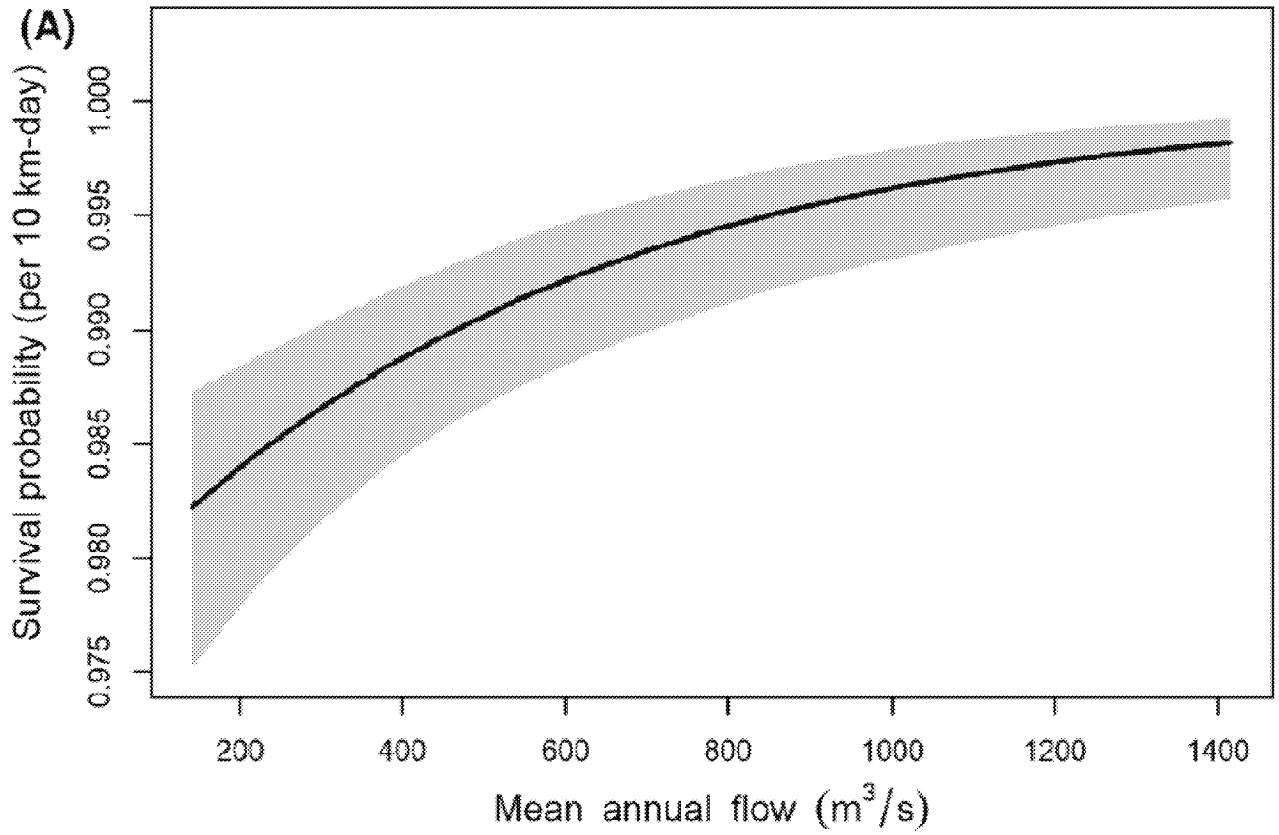
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*Senior Attorney**

Water Program

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SAN FRANCISCO, CA 94104

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DOBEGI@NRDC.ORG

NRDC.ORG

Please save paper.
Think before printing.

** Admitted to practice in California*

--

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National Marine Fisheries Service
Fisheries Ecology Division
110 McAllister Way
Santa Cruz, CA 95060
Tel: 831-331-9947
arnold.ammann@noaa.gov

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From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 4/25/2022 12:06:57 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; steve.micko@jacobs.com; Whittington, Chad/SAC [Chad.Whittington@jacobs.com]
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

I'm available starting at 11:30 or could possibly reschedule my 11 am if needed. Afternoon (like, 1 pm if possible) would be best but I can make it work either way.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 25, 2022 8:53 AM
To: steve.micko@jacobs.com; Whittington, Chad/SAC <Chad.Whittington@jacobs.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: FW: Question regarding the Sites Reservoir Daily Diversion Tool
Importance: High

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi all – See below. Doug would like to have a call. Let me know if you have availability sometime Thursday, 4/28 from 10 AM to 2 PM.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Friday, April 22, 2022 1:53 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Cooper, Ashley <ACooper@nrdc.org>
Cc: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Thanks Ali. Appreciate the quick response, and nice to know that it wasn't just user error on our end! Happy to talk with you more next week about this; as of now, it looks like Ashley and I are both available:

Wednesday, 4/27: before 12 pm or 1-3 pm
Thursday, 4/28: between 9 am and 3:30 pm

Let us know if there are any slots that work for your folks during those dates and times. Hope you have a good weekend.

Best,
Doug

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 21, 2022 6:08 PM
To: Obegi, Doug <dobegi@nrdc.org>; Cooper, Ashley <ACooper@nrdc.org>
Cc: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Doug – I talked with the Jacobs team and they indicated that the tool isn't quite set up for what you are trying to accomplish. However, the Jacobs team can provide some work arounds. I've asked them to put some initial thoughts in an email. But I do think that it would be best to have a call to discuss.

Would you and Ashley be good to get on the phone next week to discuss? From there, we can either walk you through the work arounds or we can revise the tool and get you a revised version.

I need to coordinate with the Jacobs team on their availability, but if you'd like to chat, let me know if there are days/times that work for you next week. I'll get those over to the Jacobs team and get something on the calendar. In the meantime, we'll work on getting you an email with workarounds in the next day or so.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Thursday, April 21, 2022 2:37 PM
To: Jerry Brown <jbrown@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Cooper, Ashley <ACooper@nrdc.org>
Subject: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Jerry and Ali,

My colleague Ashley has been running a few scenarios through the Daily Diversion Tool for me, and we've run into a problem where the spreadsheet tool does not seem to accurately report results if the Delta outflow criteria starts in the month of December and includes months for the next year (starting value of 12 in cell C26 in the User_Specifications tab). The same problem occurs for us if we try to set Delta outflow criteria that includes December in cell C27. Setting Delta outflow criteria in the User_Specifications tab works if we limit the criteria to the months of January through May or June (and it appears to work if we sent it for January to December), but we can't seem to get the model to work if the outflow criteria includes the starting month of December and runs through the spring.

Are we doing something wrong? Would you please check to see if you have similar problems on your end?

Thanks,
Doug

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Thursday, April 14, 2022 4:36 PM
To: Obegi, Doug <dobegi@nrdc.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Doug – thanks for the message. Ali is out this week on vacation. Regarding the study, thank you for passing this along to us. I'm pretty sure the team is aware of the paper. Jason, the prime author, does work for ICF on the project. Ali will have more to say about it when she returns. Regarding the daily diversion tool, we'd be happy to get the right people together with your folks to work through any questions. Just let us know how we can help.

Jerry

From: Doug Obegi <dobegi@nrdc.org>
Date: Thursday, April 14, 2022 at 3:27 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>
Subject: FW: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Dear Jerry and Ali,

Thank you again for sending us the daily diversion tool, and to Jerry for coffee/tea the other morning. I wanted to follow up with two things for you:

First, I wanted to make sure that you were aware of this new peer reviewed scientific study which concludes that for juvenile winter-run Chinook salmon, migratory survival down the Sacramento River is reduced when flows are less than approximately 24,000 cfs (equivalent to 700 cubic meters per second). We've submitted this paper to CDFW (see below), and wanted to make sure that this was included in the JPA's administrative record for NEPA/CEQA since this was new information that was not available at the time of the public comment period on the EIS/EIR.

Second, we've been analyzing the potential changes in water diversions to storage using the daily diversion tool, and it appears that the proposed change to the bypass flow of 10,700 cfs from Oct to June results in an approximately 25% reduction in diversions to storage. It sounds like that is similar to what y'all are finding (our numbers are lower than what WRMWSD reported to their Board). In addition, as we have been exploring the model, we're not sure that the Delta outflow requirements in the model are actually working to limit water diversions to storage. It may be (probably is!) user error on our part, but if we're not able to get the model to work right in the next week or two we may want to check in to make sure the model is actually working correctly.

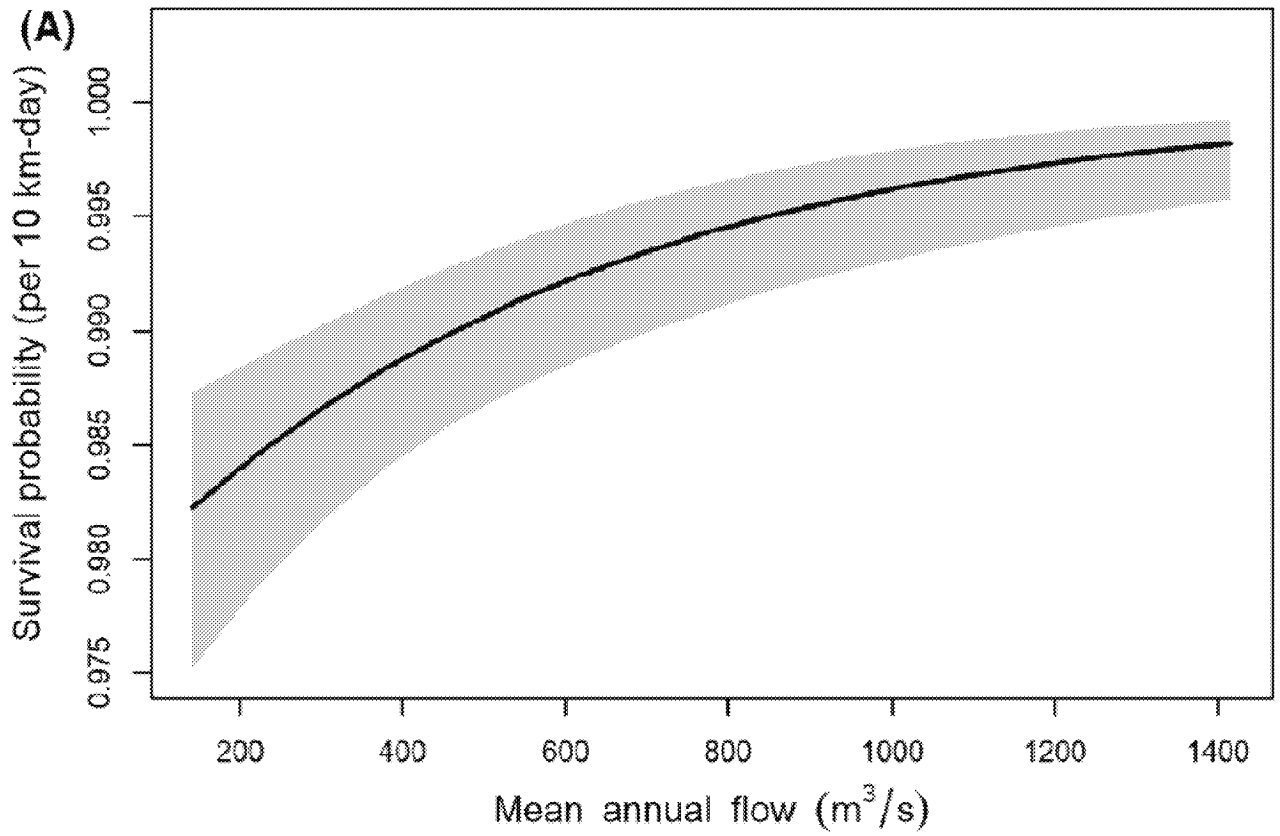
Thanks,
Doug

From: Obegi, Doug
Sent: Friday, March 25, 2022 10:52 AM
To: Kristal Davis-Fadtke <Kristal.Davis-Fadtke@wildlife.ca.gov>
Cc: jon@baykeeper.org
Subject: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Hi Kristal,

I wanted to make sure you were aware of this new paper, which finds that for winter-run Chinook salmon, juvenile migratory survival down the Sacramento River is reduced when flows are less than around 24,000 cfs / 700 cubic meters per second:

"For example, when flow is less than about 700 m3/s, given the confidence interval, pulse flows will have a high probability of having a positive effect on survival. The relationship also indicates what the magnitude of the effect may be. For example, when mean annual flow is 600 m3/s, a pulse flow is going to have half the effect of a pulse event than when mean annual flow is 200 m3/s."



This paper indicates that at least for hatchery winter-run Chinook salmon, higher bypass flow thresholds for Sites Reservoir than 10,700 cfs are necessary to fully mitigate impacts and avoid further reductions in juvenile survival of this endangered species.

Best,
Doug

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Friday, March 25, 2022 9:23 AM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

Attached is the published paper. Thanks for your interest.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:39 PM
To: Hassrick, Jason <Jason.Hassrick@icf.com>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Aha – thanks!

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Tuesday, February 1, 2022 12:38 PM
To: Obegi, Doug <dobegi@nrdc.org>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

We did not work up cumulative survival because that is something that Arnold is preparing for a separate paper. As I mentioned to you before, I'll send out the finalized paper to you after I go through the proofs. I should receive them from the journal this week.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:17 PM
To: arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Sorry, no, I was interested in whether y'all had calculated what the survival rate down the length of the Sacramento River would be at different flow levels, based on the survival rate per 10 km reach shown in the flow:survival curve in Figure 8A. In other words, converting the flow:survival graph in Figure 8A into survival down the entire river rather than per 10 km segment.

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 12:09 PM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,
We have overall river survival by year, and flow varies by year. Is that what you are looking for? I will pull up that data for you.
Arnold

On Tue, Feb 1, 2022 at 11:36 AM Obegi, Doug <dobegi@nrdc.org> wrote:

> While I have your ear… Did y'all calculate what the overall change in survival is in the Sacramento River at the different flow levels in Figure 8A (the cumulative change in survival over the entire river at the various flow levels on that curve, rather than the change per 10 km, assuming flows and other covariables held constant)?

> **From:** Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
> **Sent:** Tuesday, February 1, 2022 11:32 AM
> **To:** Obegi, Doug <dobegi@nrdc.org>
> **Cc:** miles.daniels@noaa.gov
> **Subject:** Re: FW: Request for pre-publication copy of your recent manuscript
>
> Great!

On Tue, Feb 1, 2022 at 11:31 AM Obegi, Doug <dobegi@nrdc.org> wrote:

Yeah, it came through and I'm looking at it now.

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 11:32 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Were you able to download it? I got a system message saying it was too large.

On Tue, Feb 1, 2022 at 11:24 AM Obegi, Doug <dobegi@nrdc.org> wrote:

Thanks Arnold! Look forward to reading the paper.

Take care,

Doug

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 10:57 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hello Doug,

Please find attached the early online version of the paper. Let me know if you have any questions about it.

Cheers,

Arnold

On Mon, Jan 31, 2022 at 1:49 PM Obegi, Doug <dobegi@nrdc.org> wrote:

Congratulations to you both on this new paper published in CJFAM! Very cool. Any chance that one of you has a pre-publication version that you could share with me?

From: Obegi, Doug
Sent: Monday, January 31, 2022 1:24 PM
To: jason.hassrick@icf.com
Subject: Request for pre-publication copy of your recent manuscript

Hi Jason,

I hope you're doing well these days. Congratulations on your new paper published in CJFAM! (https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1002/nafm.10748)

Do you have a pre-publication version of the manuscript that you would be willing to share with me, since the paper is currently not open access?

Thanks,

Doug

DOUG OBEGI

*Senior Attorney**

Water Program

NATURAL RESOURCES

DEFENSE COUNCIL

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Tel: 831-331-9947
arnold.ammann@noaa.gov

From: Edward Ring [ed@edwardring.com]
Sent: 4/25/2022 1:06:58 PM
To: Kevin Spesert [kspesert@sitesproject.org]
CC: Jerry Brown [jbrown@sitesproject.org]; Jeff Sutton (jsutton@tccanal.com) [jsutton@tccanal.com]; Keith Dunn (keithdunn@me.com) [keithdunn@me.com]
Subject: Per my voicemail: Just one follow up question about the Sites Project

Kevin,

To follow up on the voicemail I just left for you, this email is to ask what the current design for Sites estimates to be the rate at which water can be pumped into the reservoir.

If this is not settled yet, can you at least provide me a range of rates being considered? GPS, acre feet per day, whatever.

Having this information will offer insight into how much runoff Sites will be able to collect during major storms.

Thank you,

Edward Ring
916-524-7534

-------- Forwarded Message --------
Subject: One follow up question about the Sites Project
Date: Fri, 22 Apr 2022 21:16:02 -0700
From: Edward Ring <ed@edwardring.com>
To: Kevin Spesert <kspesert@sitesproject.org>
CC: Jerry Brown <jbrown@sitesproject.org>, Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>, Keith Dunn (keithdunn@me.com) <keithdunn@me.com>

Kevin,

First of all please call me Ed. Thank you for your email.

I have one follow up question:

How fast can water be pumped into the proposed Sites Reservoir. The Preliminary Project Description (page 2-3) says "Alternative Value Planning (VP) 5 involved a 1.3 million-acre-feet (MAF) reservoir and used an existing regulating reservoir (Funks Reservoir) and a new regulating reservoir (the Terminal Regulating Reservoir [TRR]) to fill Sites Reservoir with releases (1,000 cubic feet per second [cfs]) from the southern end of the TC Canal through a pipeline that went to the CBD."

I'm not sure I understand this. I believe it says the fill rate is 1,000 CFS, which equates to 265 acre feet per day. But that's not very much, since that means it would take 1,000 days to add 265,000 acre feet, which is only 18 percent of the reservoir's planned capacity.

So I'm missing something. What is the planned rate at which Sites can be filled?

Thank you,

Ed

On 4/15/2022 5:09 PM, Kevin Spesert wrote:

Mr. Ring,

Here are the answers to your questions from the email below.

1 - The Authority...since its founding in 2010 and through its development of the project...has proposed and worked to advance a 1.8-million-acre foot reservoir as its maximum sized project.

2 - The Authority proposed a 1.8-million-acre foot reservoir as part of its Proposition 1 WSIP proposed project

3 - As part of a value planning process conducted in 2019-2020, the Authority right-sized the project to address project affordability, permitting and constructability challenges. This process resulted in an Authority proposed 1.5 million-acre-foot reservoir...which is the reservoir size the Authority is currently advancing.

3A - There are 2 major dam sites for the project. The Sites Dam is approximately 267 feet high and the Golden Gate Dam is approximately 287 feet high. It is important to note that we are still in the preliminary engineering phase of the project and the sizes of the dam structures could change. The current estimated project cost is approximately $4.0 billion, however this number will continue to be refined as more project development activities are completed over the next couple of years (engineering, design, geotechnical investigations, permitting, etc.)

4 - Pump storage was included in the Authority's WSIP proposed project. However, as part of the value planning process mentioned in answer 3…it was removed from the project due to affordability, permitting and constructability concerns.

Here is a link to our website that includes links to several of the resource documents for the project https://sitesproject.org/project-documents/

And here is a link to our recirculated revised draft EIR/EIS…there is a lot of background information located here https://sitesproject.org/environmental-review/

Please feel free to give me a call if you have any additional questions.

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone (530) 632-4071

From: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, April 15, 2022 12:42 PM
To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Subject: Re: Questions about the Sites Project

Edward, I would direct these questions to the Sites JPA staff. I haves cc'ed the Executive Director Jerry Brown hereto.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
P.O. Box 1025
Willows, CA 95988

Ph: (530) 934-2125
Cell: (530) 301-1030
jsutton@tccanal.com

Sent from my I Phone

On Apr 15, 2022, at 12:18 PM, Edward Ring <ed@edwardring.com> wrote:

Jeffrey,

This email is to ask you some questions about the Sites Reservoir project that I cannot find on your website. You may recall I worked last year on an attempt to qualify an initiative to fund water projects. I am working now on a report in support of the Sites Project and other water projects and need some information. It seems to me that you or someone you can refer me to would know the answers to these few questions. I am on a deadline and am hoping to get some answers in the next few days which is why I am contacting you. Here they are:

1 - What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?

2 - What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?

3 - What is the current proposed storage capacity?

If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

For all three questions, I'm not asking about the projected annual yield. I'm asking how much water would the reservoir hold if it was full.

Also,

4 - Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?

Any details and any source documents you can provide either via PDF or URLs would be much appreciated.

Thank you,

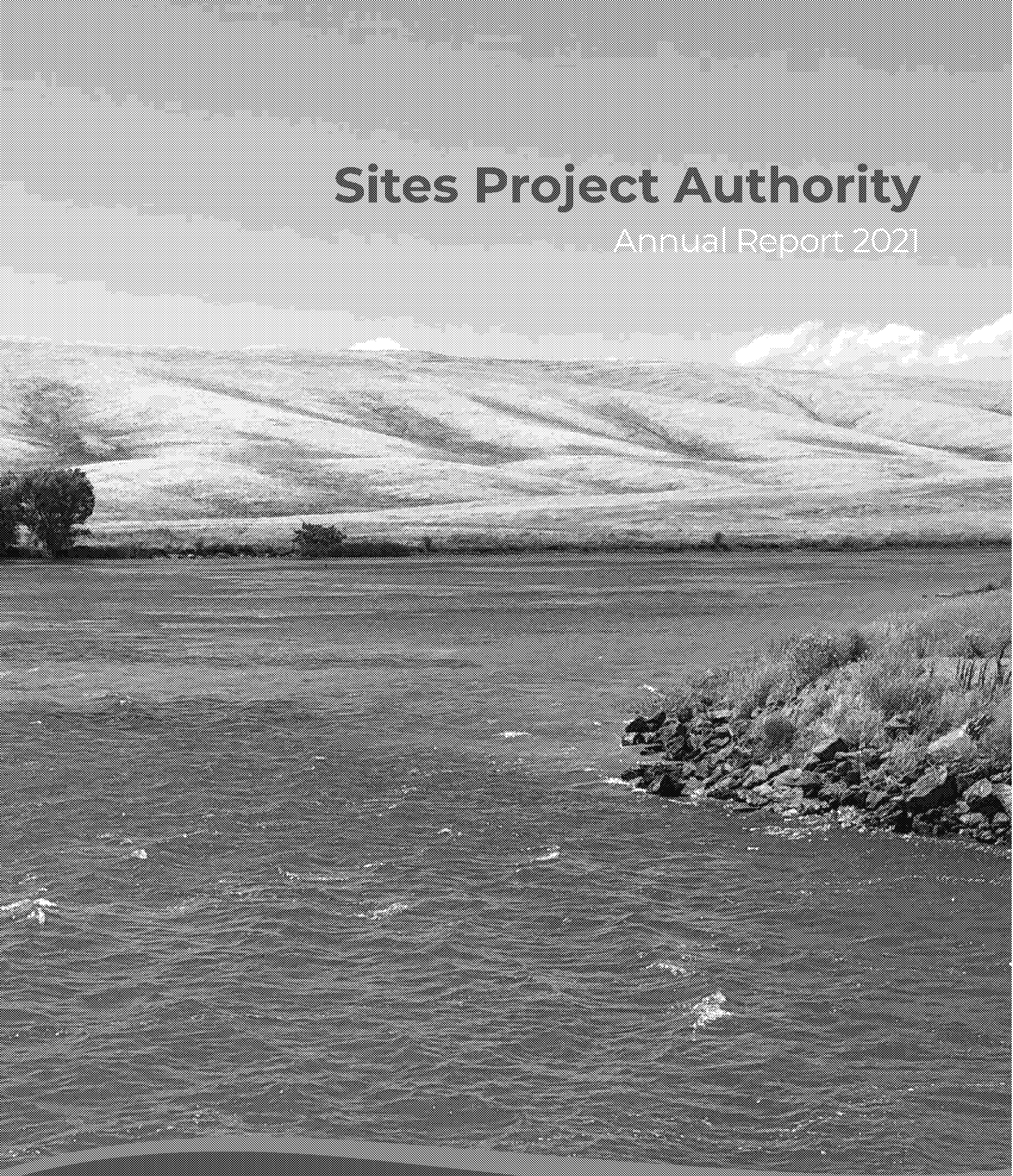
Edward Ring
916-524-7534

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Edward Ring
https://MoreWaterNow.com
916-524-7534

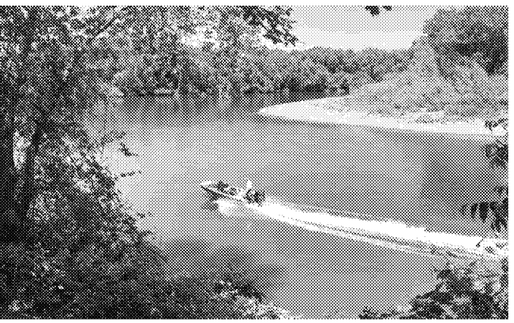
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Sites Project Authority

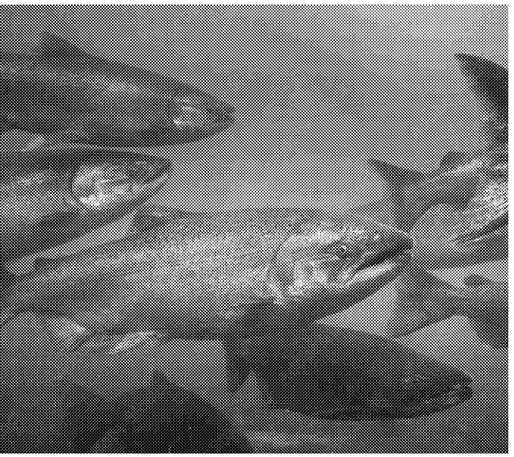
Annual Report 2021

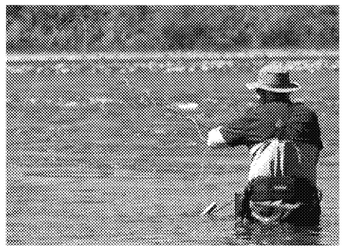


Sites













Jerry Brown
Sites Project Authority
Executive Director

Since joining Sites in 2020, Jerry continues to take Sites Reservoir from planning to groundbreaking.

> “Over the past year, the Authority, along with the Sites Reservoir Committee, was supported by the groundswell of public concern for California’s water future, propelling this important project forward. Climate conditions are evolving, and we must take Sites Reservoir from theory to reality to create more flexibility in our water management, and we must do this together.”

Letter from the Sites Board Chair

In 2021, the Sites Project Authority made extraordinary achievements to ensure Sites Reservoir is affordable, permittable, and buildable – taking the project from the planning phase into final design and marching steadily toward the start of construction. As we move toward the final stages of planning and development these next two years, our mission to create a more resilient water supply for the environment, people, and farms remains strong.

We met several key milestones last year that we are building upon in 2022, and each achievement in 2021 kept Sites Reservoir on track to build water resiliency for Californians in the face of harsh drought conditions and climate change. This year we’ve seen once again how drought can harm our environment and local communities. Public water agencies, irrigation districts, and state resource agencies participating in Sites Reservoir know the impacts and challenges of drought firsthand. But challenges often present us with an opportunity to create innovative solutions – solutions like Sites Reservoir.

Sites Reservoir is critically important for Californians. The project provides an opportunity to protect the environment, prepare for worsening drought conditions by creating water supply resiliency, provide flood control for vulnerable communities, and create jobs for working families. Last year, Sites Reservoir was deemed feasible by the California Water Commission, received additional funding through federal investments, and experienced an outpouring of support from stakeholders.

One major highlight of this past year was the release of the Revised Draft Environmental Impact Report/ Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) for public comment and review. This created an important opportunity to gather input from Californians as we further define and enhance the proposed project. Significant improvements have been made to the project over the past several years, including changes that prioritize the environment and the health of the Sacramento Valley watershed.

It is our goal to deliver the best project possible, one that benefits all of California.

2021 was also a year of relationship and coalition building. We continued the important work of collaborating with stakeholders across the state, with particular focus on connecting with individuals in the local communities where Sites Reservoir will be built. We consulted with Native American tribes, collaborated with resource agencies, engaged with labor unions who represent working families, and continued engagement with the local, state, and federal public agencies that are at the heart of this project.

The stage is set to move forward with Sites Reservoir, and we are excited for what’s to come.

I want to personally thank our members, stakeholders, and the many local, state, and federal partners that helped us advance Sites Reservoir this year. We look forward to a successful year to come as we advance a project that is affordable, permittable, and buildable.

Sincerely,
Fritz Durst

Fritz Durst

Chairman, Sites Project Authority Board of Directors





Draft_0016842

Building momentum toward a modern water solution for California

The time to address California's statewide water challenges is NOW!

Sites Reservoir participants are **diverse and each have unique needs,** but every participant is unified in their dedication and commitment to making Sites Reservoir a reality.

THE UNFORTUNATE TRUTH: OUR WATER FUTURE IS IN CRISIS

In 2021, California experienced the second worst drought in the last 7 years, and the outlook for 2022 looks equally dire. We need multi-faceted water supply solutions for our environment, families, and farms to flourish.

Droughts and other extreme weather conditions exacerbated by climate change require a diverse and holistic set of solutions. These solutions include **water reuse, desalination, and groundwater recharge, along with the robust surface water storage that Sites Reservoir will provide.** To implement these solutions successfully, we must remain proactive and operate with trust and transparency.

THE CHALLENGE

Today we face extreme droughts and floods, rising temperatures, declining fish populations, aging infrastructure, and population growth.

Our demands for water to serve our communities, fuel our economy, and revitalize our environment have increased far beyond what the system was designed to reliably and sustainably support.

A MULTI-BENEFIT SOLUTION

Sites Reservoir is a unique multi-benefit water storage project that provides a resilient and reliable supply of water for California's environment, communities, and farms during dry periods.

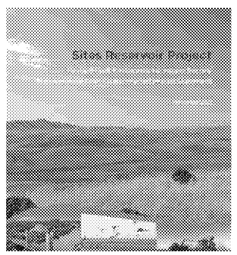
Sites Reservoir will also provide agencies with flexibility to use new water supplies how and when they need them most. This will protect communities from drought, empower farmers to provide a reliable food supply, and maintain necessary flows to protect fish populations that have become especially vulnerable during these recent periods of severe drought.

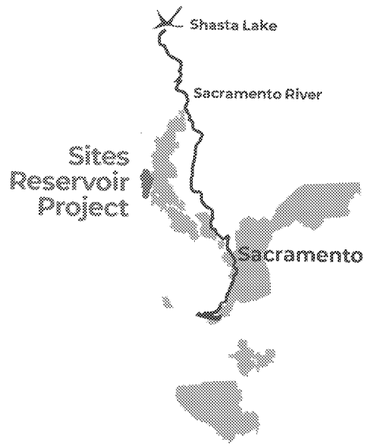
Sites Reservoir will add resilient new water supply and storage as vital tools for Californians and the environment to secure a better future in a changing climate.

Watch our video "Build Sites Now" to learn how Sites Reservoir is an important solution to addressing climate change and drought.

Sites
Build Sites Now
sitesproject.org

Review the RDEIR/SDEIS that describes the Sites Reservoir and includes a detailed environmental analysis.





Participants Include:

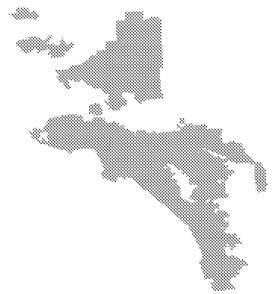
9 Sacramento Valley governing agencies

23 Reservoir Committee members

All participants continued their support for Sites Reservoir in 2021.

These participants represent more than 24.5 million people, more than 500,000 acres of farmland, and the environmental resource agencies that have stewardship over rivers, fish, and habitat within the watershed.

30 participants span California



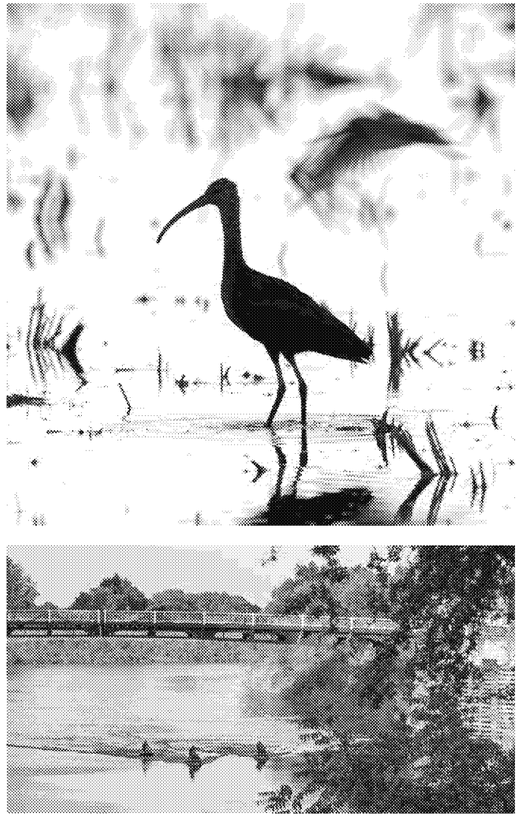
Blue shading represents participant service areas; does not account for State and Federal participation.

Draft_0016843

Sites Reservoir will be an asset for all of California

While located in the Sacramento Valley, Sites Reservoir has significant local, state, and federal benefits.

Owning storage in Sites Reservoir provides options and flexibility for water managers. Sites Reservoir will have dedicated environmental water storage and supply that will provide agencies with tools to better serve our dynamic environment.



SITES RESERVOIR DELIVERS:

Climate-resilient Water Supply
Sites Reservoir has been purposely designed to work best under the most challenging climate change scenarios.

Water for the Environment
Environmental water will be managed by state resource agency managers who will decide how and when this water is used—creating an environmental water management tool for the state that does not currently exist.

Integrated Infrastructure
Sites Reservoir tightly integrates into state and federal water project operations, which improves resiliency and reliability and makes efficient use of new and existing infrastructure.

Regional Flood Control
Sites Reservoir captures and stores excess runoff from atmospheric river events to reduce the impact of flooding in local creeks while protecting levees through coordination with existing flood control reservoirs.

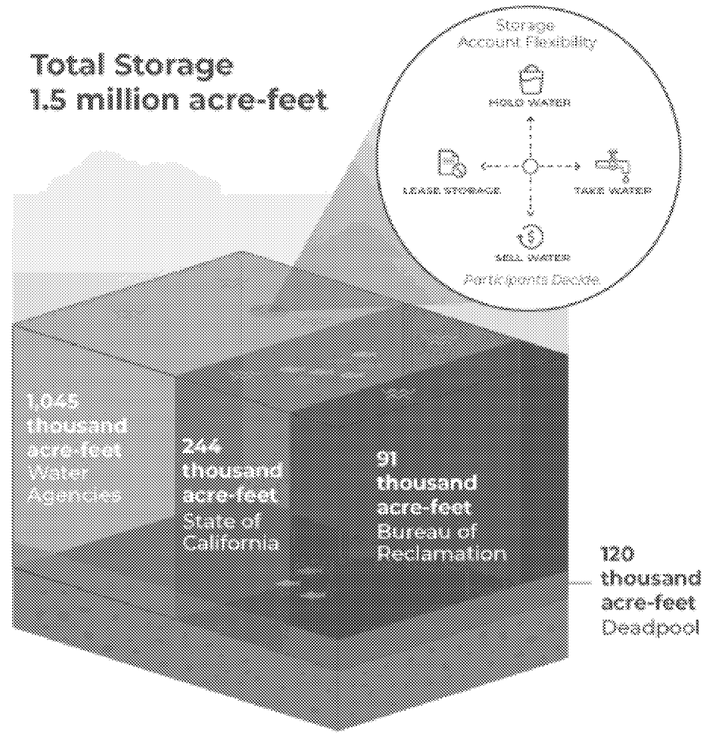
Sites Reservoir creates flexibility.

If Sites were constructed and operational at the start of our current drought (2021), we would have approximately 1 million acre-feet of additional water stored for use.

Participating agencies own their storage accounts in the Sites Reservoir. This ownership includes storage space and a share of protective diversions from the Sacramento River.

Participants receive:
- Off-stream storage that does not spill
- Storage in the largest watershed in the state
- A new, affordable water supply
- Flexibility to receive water when their agency needs it the most.

Flexibility is vital when it comes to managing water. Sites Reservoir allows Participants to:
- Decide when to fill and release water
- Lease storage or transfer water
- Sell all or a share of their storage.



Approximate storage account sizes in 2021.

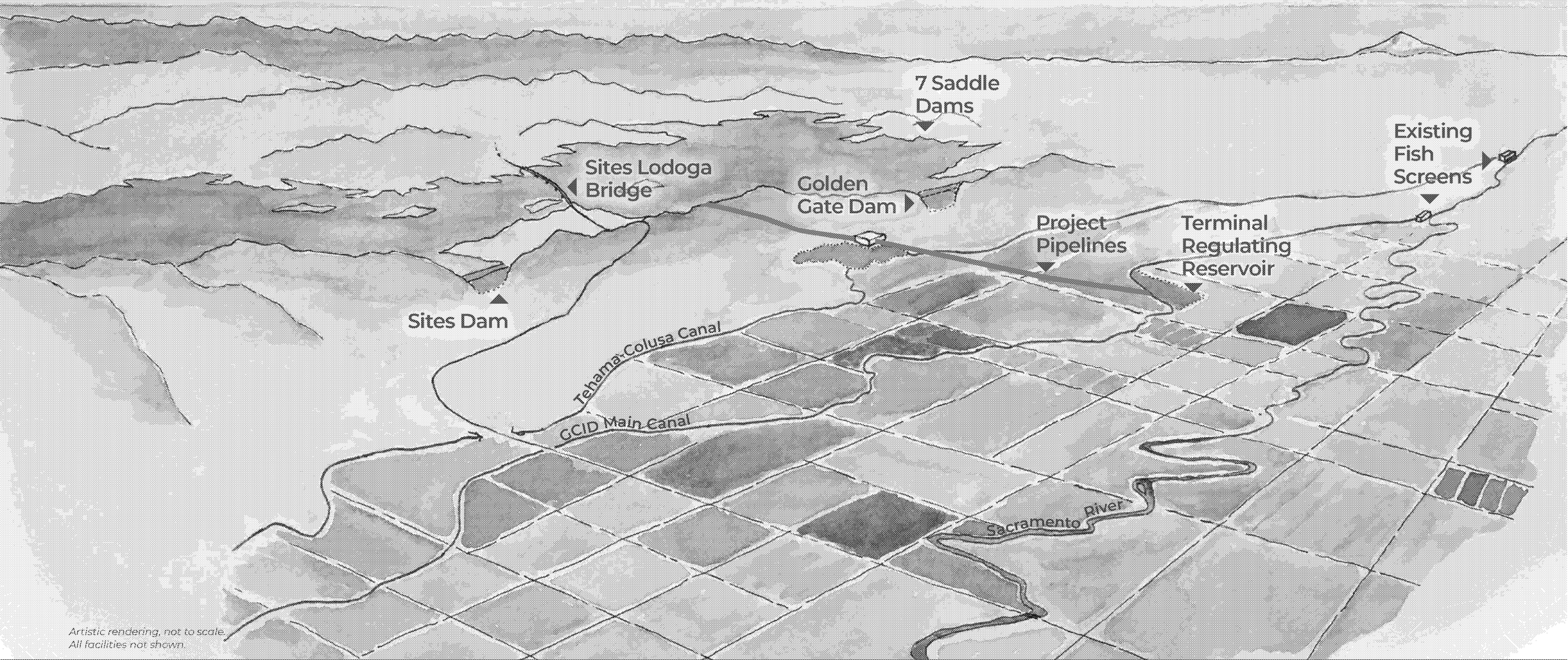
BUILDING AN EFFECTIVE SOLUTION FOR RESILIENCY IN A CHANGING CLIMATE

Sites Reservoir represents a commitment to California' s environment, families, and farms. The commitment is for a better future for every individual, California's agricultural industry, and the environment, even during challenging periods of drought.

Draft_0016844

Sites Reservoir has evolved to be affordable, permittable, and buildable

Sites Reservoir leverages the best of the **existing** infrastructure, seamlessly melding the old to the new. Mutual benefits to all local partners become a reality as a result.



Artistic rendering, not to scale. All facilities not shown.

Sites Reservoir uses proven fish protection, which allows safe passage for migrating fish

The existing state-of-the-art fish screens at Red Bluff and Hamilton City confirm that Sites water is diverted in a manner that supports protection of migrating fish.

GCID Fish Screen
Approximately 40 miles from Sites Reservoir

Completed in 2002, the 1,110-foot-long fish screen helps improve conditions for protected species in the Sacramento River.

Red Bluff Pumping Plant Fish Screen
Approximately 65 miles from Sites Reservoir

The second largest diversion on the Sacramento River.

Completed in 2012, the 1,118-foot-long fish screen includes 60 screen bays, seven fish refuge bays, four automated screen cleaning mechanisms, and a sediment removal system.

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THE STAGE IS SET TO MOVE FORWARD.

2021

Completed Feasibility Requirements to Maintain State and Federal Funding Eligibility

- Met Proposition 1 Feasibility Requirements to remain eligible for $836 million award:
  - Submitted Final WSIP Feasibility Report and 75% non-public cost share materials
  - RDEIR/SDEIS public release
  - California Water Commission Determination of Feasibility hearing
- Approved Storage Principles (participants' local control and flexibility)
- Continued ongoing coordination: Proposition 1 Roundtable group, local and statewide coordination
- Advanced permitting and water right elements
- Received WIIN Act funds appropriations ($80 million) for Fiscal Year 2022
- Developed feasibility total project cost estimate
- Maintained transparent information exchange (workshops, updated website, and media)
- Conducted nine workshops on the "three big questions" for participants
- Advanced to 10% design level

2022

Complete Environmental Documentation

- Final EIR/EIS
- Notice of Determination/Record of Decision
- Operations Agreements (state and federal partners)
- Facilities Use Agreements (local partners)
- Procurement/delivery strategy
- Detailed project schedule

2023

Advance Toward Financing

- Final WSIP funding
- Water right order and permit
- Administration of Public Benefits Agreements (state agencies)
- Benefits and Obligations Contract (participants)
- Bank finance, loan applications
- Mitigation Acquisition Master Plan
- DSOD Permit Application for Construction
- Final State and Federal Aquatic and Terrestrial Permits
- Geotechnical investigations and engineering design (key permits)
- Land Acquisition Master Plan and Right-of Way Manual
- Advance to 30% design level

2024

Concluding the Planning Phase

- Geotechnical investigations and engineering design (secondary permits)
- Acquire land from willing sellers
- Initiate permits for construction and operations

These achievements, and each of the next steps, will take this project from the planning phase into final design and right-of-way acquisition.

Cost determined and funding secured
which resulted in continued eligibility for additional funding to make Sites a reality.

Environmental planning completed
which paves the way for advanced design documents and key permits.

Construction begins in 2024
which will provide California's environment, families, and farms a range of solutions to sustainably manage water in a drought.

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2021 Highlights and Milestones

Extraordinary achievements keep Sites Reservoir affordable, permittable, and buildable, and take Sites from the planning phase into final design and, ultimately, to construction.

Each achievement in 2021 kept Sites on track to remain affordable, permittable, and buildable while developing an effective organization. The Authority kept the Project affordable by maintaining eligibility for additional state and federal funding. Permitting advancements included the issuance of the RDEIR/SDEIS for public review. The Feasibility Cost Estimate and Plan of Finance provide participants with assurances on project cost and funding.

Affordable

Completed State Funding Feasibility Requirements

Conducted nine workshops focused on "three big questions" related to financing and satisfying the Proposition 1 requirement for 75% non-public cost share: What do we get? What does it cost us? and How do we pay for it? Following the Authority's submission of the State Feasibility Report, the California Water Commission deemed the Project feasible, which satisfied a key milestone to advancing toward construction. OUTCOME: **Leveraging crucial funds, including a $20 million inflation adjustment to the Proposition 1 award, Sites Reservoir remained eligible for $836 million in state funding.**

Obtained unprecedented federal funding

Following the Secretary of Interior's Federal Feasibility Determination (qualifying the project for up to 25% cost share under the WIIN Act), the Authority worked with federal partners to meet conditions to remain eligible for and secure additional WIIN Act funds. OUTCOME: **$80 million in federal appropriations for Fiscal Year 2022 – the largest of the WIIN Act storage projects – bringing the total to $104 million.**

Permittable

Released RDEIR/SDEIS for public review and comment

In coordination with Reclamation, the Authority released the RDEIR/SDEIS in November 2021 for public review and comment through two public meetings. OUTCOME: **The Authority remains committed to fostering informed public decision-making about Sites Reservoir.**

Continued permit applications

Key permit applications advanced in coordination with state and federal agencies, and included executing staffing agreements to expedite the permitting process. OUTCOME: **The Authority advanced permitting and water right elements to provide greater certainty to participants and improve understanding with resource agencies.**

Worked together with non-governmental organizations (NGOs)

The Authority held small group meetings and workshops with members of NGOs related to water rights, water quality, fisheries, terrestrial species, and project ecosystem benefits. OUTCOME: **Through transparent discussions, the Authority collaborated with NGOs to advance the RDEIR/SDEIS and overall permitting.**

Buildable

Developed the Feasibility Cost Estimate

Following a collaborative effort with Participants, the Authority developed the Feasibility Cost Estimate in June 2021. This estimate provides participants with improved cost certainty. OUTCOME: **The Feasibility Cost Estimate gives participants a higher degree of certainty in the Project's affordability.**

Advanced facilities to approximately 10% design

Following additional analysis and completion of geotechnical investigations, the Authority advanced the Project facilities to approximately 10% design. OUTCOME: **The 10% design effort supports completion of permit applications.**

Effective Organization

Continued 5 Years of Successful External Financial Audits

Responsible management of expenses and funding culminated in 5 years of successful external financial audits. OUTCOME: **The Authority continues to be committed to fiscal responsibility and transparent decision-making.**

Promoted efficiency through improved processes

Following completion of the Strategic Plan, the Authority developed the delegation of authority matrix to promote efficient decision making. The Authority also developed policies and procedures to strengthen the organization. OUTCOME: **The Authority continues to mature the organization.**

Sites Reservoir continues to receive unprecedented funding and support and made significant progress to advance permittability, affordability, buildability, and effectiveness.



The RDEIR/SDEIS is a comprehensive description of the Project and overview of the environmental analysis

Working jointly with Reclamation, the Authority developed the RDEIR/SDEIS for public release on November 12.

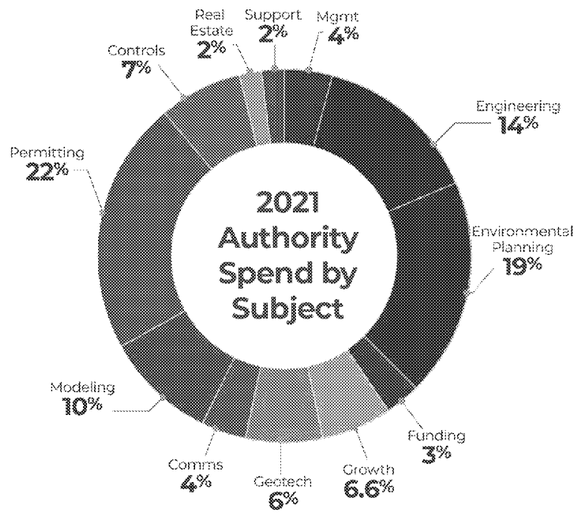
The draft document includes an analysis of the potential environmental impacts of construction, operation, and maintenance of the Sites Project.

Through a truly collaborative effort, the Authority worked with state and federal agencies, local agencies in the Project area, Native American representatives, and NGOs to develop the document. The Authority hosted two public meetings to provide information and accept public comments on the document. Preparing several document components in Spanish aided in accessibility for local communities.

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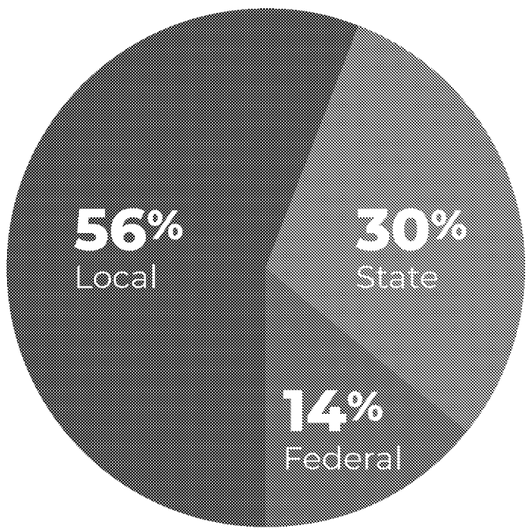
Costs, Funding, and Schedule

In 2021, the Authority focused resources on completing feasibility to maintain eligibility for state and federal funding and continued to progress through the planning phase. The Authority also completed its comprehensive work plan—a $33.5 million effort with local, state, and federal funding sources that provided the deliverables, schedule, and operational budget to satisfy the state's requirements for continued Proposition 1 eligibility. The Authority remained focused on leveraging local investments by maximizing both federal and state funding. The Authority amended the financial assistance agreement with Reclamation and received $80 million in appropriations for Fiscal Year 2022, the largest of the WIIN Act storage projects. Working with the state of California, the Authority received a $20 million inflationary increase to its Proposition 1 funding award and extended the Early Funding Agreement to include work beyond 2021.

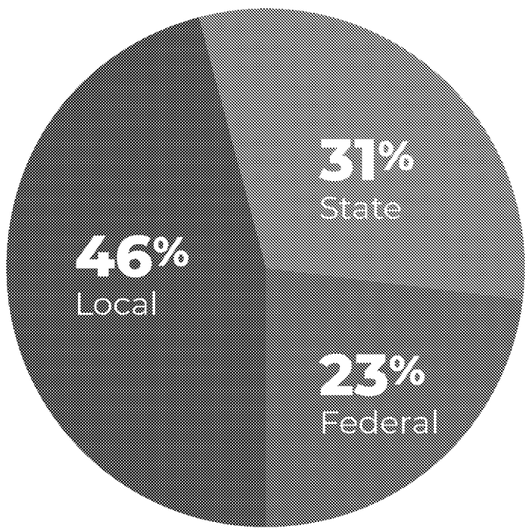


The California Water Commission also found the Project to be feasible in December 2021, which kept the Authority eligible for its conditional $836 million Proposition 1 award. Total local investment reached $43.8 million in 2021, which has been leveraged to approximately $79 million in total project revenue to date with state and federal support. With the recent federal appropriations and continued early funding from the state, the forecast shows improved leveraging of local funds through 2022.

Cost Share (Actual)
Since 2015 through December 31, 2021



Cost Share (Forecast)
Since 2015 through December 31, 2022



Authority 2021 Sources and Uses of Funds*

Income	
Membership Admin/Authority	$505,000
Membership Water	$6,654,800
Proposition 1 Funding	$11,487,000
WIIN Act Funding	$2,342,000
Refund and Reimbursements	$50,000
Interest	$33,000
Total Income	$21,071,800

Expense	
Total Expense	$18,895,447

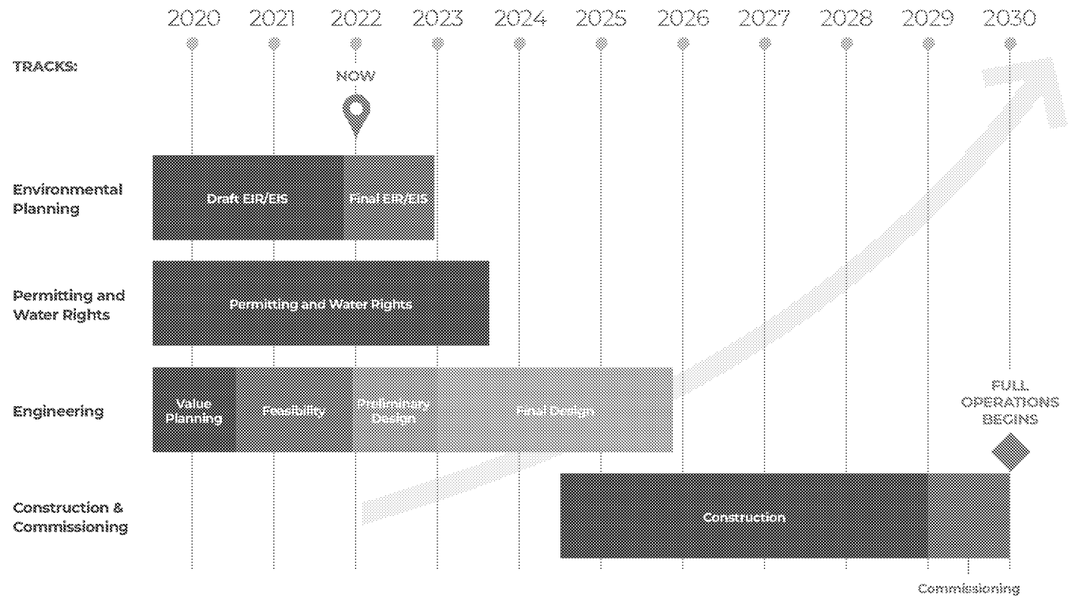
**unaudited, rounded to the nearest dollar*

$80 million

in federal appropriations for Fiscal Year 2022

This funding is the largest of the WIIN Act storage projects and indicates dedication and commitment to bringing Sites Reservoir to fruition.

Sites Reservoir Project Schedule



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Diverse Statewide Support for Sites Reservoir

RECLAMATION DISTRICT 108

Carter Mutual Water Company | Colusa County Water District
Cortina Water District | Davis Water District | LaGrande Water District

Printed on recycled paper

Sites

2021 Annual Report

Draft_0016849

From: Okita, David@DWR [David.Okita@water.ca.gov]
Sent: 4/26/2022 10:24:36 AM
To: Heydinger, Erin [erin.heydinger@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Sun, Yung-Hsin [yung-hsin.sun@stantec.com]; FitzHugh, Thomas [thomas.fitzhugh@stantec.com]
Subject: Re: Cumulative Flow Study

Erin - can you contact the two Stantec Staff cc'd in this email to provide data. They can provide better detail what they need than I do.

Thanks...

David Okita, PE
Department of Water Resources
530 902-7588

From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Tuesday, April 26, 2022 8:44 AM
To: Okita, David@DWR <David.Okita@water.ca.gov>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Cumulative Flow Study

Hi Dave,

The baseline we're using is called the "benchmark baseline" which was originally developed by Reclamation and DWR in 2020 and was updated in November 2021. It includes actions from both ROC on LTO and the SWP ITP. We do use the latest version in our updated modeling. Based on the email thread below and another Jerry forwarded to me, I think it is the same the one you're referring to, but we may need to have our modeling teams discuss to know for sure. That said, we have two versions that use that baseline – one with climate change hydrology (2035 CT) and one without.

Hope that helps – let me know if you'd like to jump on a call quickly to get this ironed out.

Thanks!
Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Okita, David@DWR <David.Okita@water.ca.gov>
Sent: Tuesday, April 26, 2022 6:39 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: Re: Cumulative Flow Study

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Is the "historical baseline" that you mention the 2019 CASIM2 that DWR provided to all WSIP projects? or your own version?

David Okita, PE
Department of Water Resources
530 902-7588

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 25, 2022 6:06 PM
To: Okita, David@DWR <David.Okita@water.ca.gov>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Cumulative Flow Study

Hi David – We'd be happy to provide what we have. We have updated the modeling since we last provided to you.

A quick question for you – we have CALSIM using a historical baseline and using a 2035 central tendency (a climate change scenario). I think that last time we provided the historical baseline. Is this what you would like again? If so, we are finishing up the historical run and would be able to get that over next week some time.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Jerry Brown <jbrown@sitesproject.org>
Sent: Monday, April 25, 2022 8:55 AM
To: Heydinger, Erin <erin.heydinger@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: Cumulative Flow Study

Can you help Dave out with the information he is requesting?

From: "Okita, David@DWR" <David.Okita@water.ca.gov>
Date: Monday, April 25, 2022 at 6:46 AM
To: Jerry Brown <jbrown@sitesproject.org>, Maureen Martin <mmartin@ccwater.com>
Subject: Cumulative Flow Study

We are restarting the cumulative flow study for all 7 WSIP studies after some contracting delays when the original contract expired at the end of last year. Stantec is continuing the work.

For background... I had circulated a draft report (6/21/21) that AECOM prepared on cumulative flows - this report was more qualitative. The intent was to do a staged approach to the analysis. The comments we got back led us to decide to do a CALSIM2 post processing analysis - this is what we are working on now. In summary, what we are doing is starting with the Sites CALSIM model and "layering" on LVE operations. The other 4 projects (Pacheco not included) are added post processing. This will be explained better in the drat report we will be providing to all projects.

You both provided CALSIM modeling for this effort. The Chino Project had asked DWR to prepare an update CALSIM2 model that has updated BO and ITP restrictions. We prepared this and distributed (October 2021) to all project for use at their discretion.

My question for Sites and LVE is whether you used the DWR updated CALSIM2 model to update any studies. If so we can use that information in the Stantec new work. Otherwise we will go with what was provided by your staff last year.

David Okita, PE
Department of Water Resources
530 902-7588

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2022 10:37:10 AM
To: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Subject: RE: Cumulative Flow Study

No problem! Yes, let just get Jacobs together with Stantec and they can figure this out. I think we are the same, but this is all so nuanced, that the modelers should chat and figure this out. Yung-Hsin and Thomas are great and great to work with. Can you coordinate a call with them all and get to the bottom of this? I don't need to be involved. Thank you!!

Ali

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From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Tuesday, April 26, 2022 8:47 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Cumulative Flow Study

Oops – I just sent my last email to Dave and didn't see this one. I'm pretty sure based on the email Jerry forwarded from Maureen that we're talking about the same thing. The baseline we use was developed with both DWR and Reclamation and is their latest joint model. But it would be probably be good to get the modeling teams to talk directly so we can be sure we're all speaking the same language.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, April 26, 2022 8:41 AM
To: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: FW: Cumulative Flow Study

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Erin – Can you check with Steve on this? I think we did not use the DWR model, but I think what we used was close.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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I am not totally sure. Let me check and get back to you.

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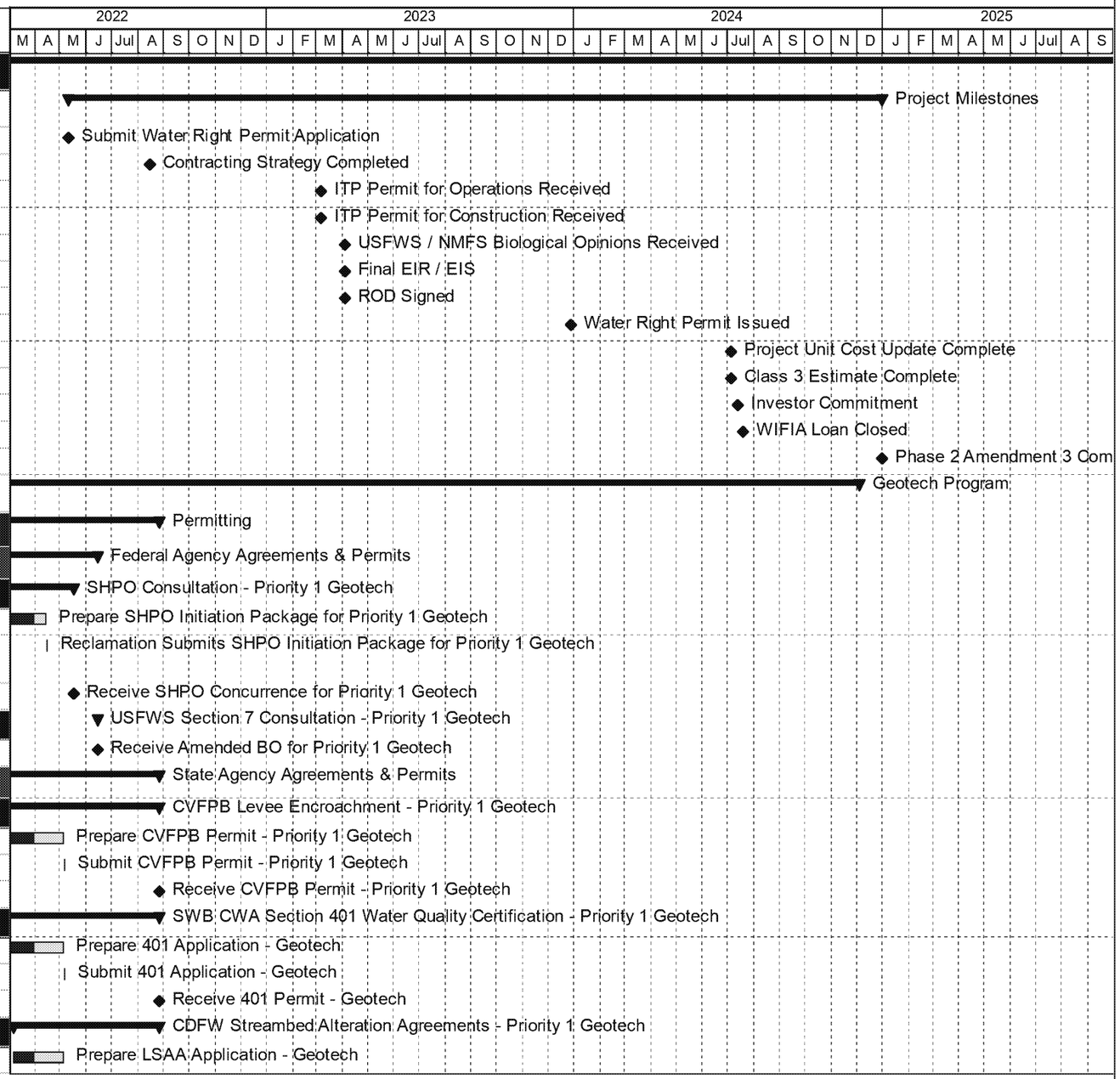
David Okita, PE
Department of Water Resources
530 902-7588

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Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
1	**Sites Reservoir Project DD: 31-Mar-2022**		1775	01-Sep-20 A	28-Feb-29
2	**Project Milestones**		661	10-May-22	31-Dec-24
3	MS-1050	Submit Water Right Permit Application	0		10-May-22
4	MS-1100	Contracting Strategy Completed	0		16-Aug-22
5	MS-1320	ITP Permit for Operations Received	0		06-Mar-23
6	MS-1340	ITP Permit for Construction Received	0		06-Mar-23
7	MS-1150	USFWS / NMFS Biological Opinions Received	0		04-Apr-23
8	MS-1200	Final EIR / EIS	0		04-Apr-23
9	MS-1300	ROD Signed	0		04-Apr-23
10	MS-1400	Water Right Permit Issued	0		28-Dec-23
11	MS-1450	Project Unit Cost Update Complete	0		05-Jul-24
12	MS-1700	Class 3 Estimate Complete	0		05-Jul-24
13	MS-1500	Investor Commitment	0		12-Jul-24*
14	MS-1600	WIFIA Loan Closed	0		19-Jul-24
15	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*
16	**Geotech Program**		679	01-Mar-21 A	04-Dec-24
17	**Permitting**		105	01-Mar-21 A	26-Aug-22
18	**Federal Agency Agreements & Permits**		54	02-Aug-21 A	15-Jun-22
19	**SHPO Consultation - Priority 1 Geotech**		34	02-Aug-21 A	17-May-22
20	SHPO-240	Prepare SHPO Initiation Package for Priority 1 Geotech	11	02-Aug-21 A	14-Apr-22
21	SHPO-250	Reclamation Submits SHPO Initiation Package for Priority 1 Geotech	1	15-Apr-22	15-Apr-22
22	SHPO-260	Receive SHPO Concurrence for Priority 1 Geotech	0		17-May-22
23	**USFWS Section 7 Consultation - Priority 1 Geotech**		0	15-Jun-22	15-Jun-22
24	BA-120	Receive Amended BO for Priority 1 Geotech	0		15-Jun-22
25	**State Agency Agreements & Permits**		105	01-Mar-21 A	26-Aug-22
26	**CVFPB Levee Encroachment - Priority 1 Geotech**		105	01-Nov-21 A	26-Aug-22
27	CVFPB-100	Prepare CVFPB Permit - Priority 1 Geotech	26	01-Nov-21 A	05-May-22
28	CVFPB-110	Submit CVFPB Permit - Priority 1 Geotech	1	06-May-22	06-May-22
29	CVFPB-120	Receive CVFPB Permit - Priority 1 Geotech	0		26-Aug-22
30	**SWB CWA Section 401 Water Quality Certification - Priority 1 G**		105	01-Mar-21 A	26-Aug-22
31	401-100	Prepare 401 Application - Geotech	26	01-Mar-21 A	05-May-22
32	401-110	Submit 401 Application - Geotech	1	06-May-22	06-May-22
33	401-120	Receive 401 Permit - Geotech	0		26-Aug-22
34	**CDFW Streambed Alteration Agreements - Priority 1 Geotech**		105	07-Mar-22 A	26-Aug-22
35	1600-100	Prepare LSAA Application - Geotech	26	07-Mar-22 A	05-May-22



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
36	1600-110	Submit LSAA Application - Geotech	1	06-May-22	06-May-22
37	1600-120	Receive LSAA Permit - Geotech	0		26-Aug-22
38	**Environmental**		107	03-Jan-22 A	30-Aug-22
39	**Geotech EA/IS**		107	03-Jan-22 A	30-Aug-22
40	EA-200	Geotech P1A EA/IS	83	03-Jan-22 A	27-Jul-22
41	EA-220	Geotech Trench & Test Pits IS	86	29-Apr-22	30-Aug-22
42	**Real Estate**		549	10-Jan-22 A	30-May-24
43	**Land Access Agreements**		549	10-Jan-22 A	30-May-24
44	A1240	Survey Access Agreements	43	10-Jan-22 A	31-May-22
45	**Colusa County**		549	22-Mar-22 A	30-May-24
46	LAAC-1100	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #1	75	22-Mar-22 A	15-Jul-22
47	LAAC-1200	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #2	189	22-Mar-22 A	29-Dec-22
48	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	19-Jun-23
49	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
50	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24
51	**Yolo County**		429	22-Mar-22 A	08-Dec-23
52	LAAY-1100	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #1	75	22-Mar-22 A	15-Jul-22
53	LAAY-1200	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #2	189	22-Mar-22 A	29-Dec-22
54	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	19-Jun-23
55	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
56	**Glenn County**		549	22-Mar-22 A	30-May-24
57	LAAG-1100	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #1	75	22-Mar-22 A	15-Jul-22
58	LAAG-1200	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #2	189	22-Mar-22 A	29-Dec-22
59	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	120	30-Dec-22	19-Jun-23
60	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
61	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24



Remaining Level of Effort
Actual Level of Effort
Actual Work
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Milestone
Summary

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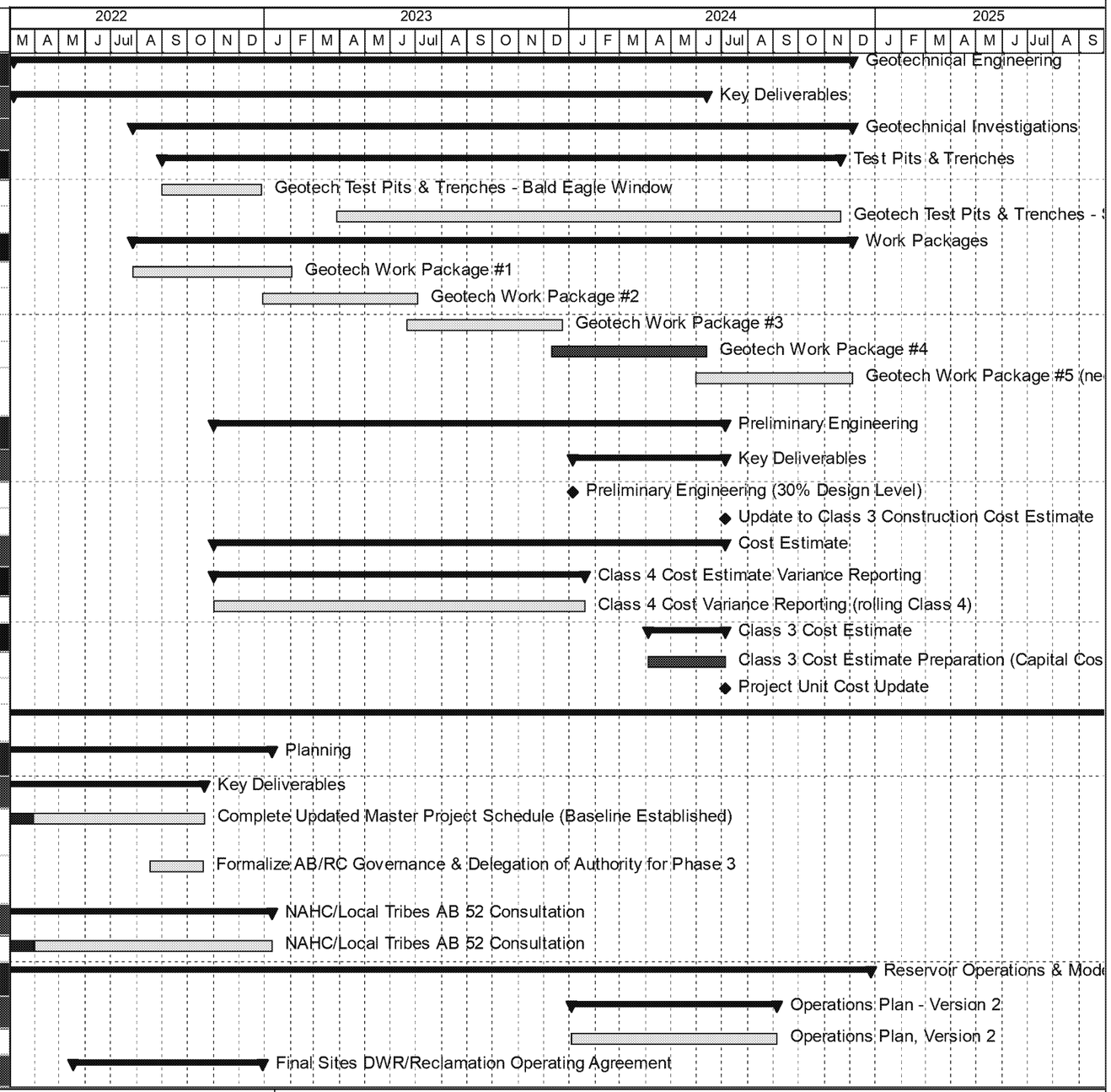
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
62	**Geotechnical Engineering**		679	07-Mar-22 A	04-Dec-24
63	**Key Deliverables**		559	07-Mar-22 A	13-Jun-24
64	**Geotechnical Investigations**		596	28-Jul-22	04-Dec-24
65	**Test Pits & Trenches**		564	31-Aug-22	20-Nov-24
66	TPT-1100	Geotech Test Pits & Trenches - Bald Eagle Window	81	31-Aug-22	28-Dec-22
67	TPT-1200	Geotech Test Pits & Trenches - Short Term Pemit Window	420	29-Mar-23	20-Nov-24
68	**Work Packages**		596	28-Jul-22	04-Dec-24
69	GWP-1100	Geotech Work Package #1	130	28-Jul-22	02-Feb-23
70	GWP-1200	Geotech Work Package #2	130	30-Dec-22	03-Jul-23
71	GWP-1300	Geotech Work Package #3	130	20-Jun-23	22-Dec-23
72	GWP-1400	Geotech Work Package #4	130	11-Dec-23	13-Jun-24
73	GWP-1500	Geotech Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	130	31-May-24	04-Dec-24
74	**Preliminary Engineering**		423	02-Nov-22	05-Jul-24
75	**Key Deliverables**		129	04-Jan-24	05-Jul-24
76	KD-1180	Preliminary Engineering (30% Design Level)	0		04-Jan-24
77	KD-1190	Update to Class 3 Construction Cost Estimate	0		05-Jul-24
78	**Cost Estimate**		423	02-Nov-22	05-Jul-24
79	**Class 4 Cost Estimate Variance Reporting**		304	02-Nov-22	18-Jan-24
80	C4E-1000	Class 4 Cost Variance Reporting (rolling Class 4)	304	02-Nov-22	18-Jan-24
81	**Class 3 Cost Estimate**		65	04-Apr-24	05-Jul-24
82	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	04-Apr-24	05-Jul-24
83	CU-1000	Project Unit Cost Update	0		05-Jul-24
84	**Overall Project**		1774	01-Sep-20 A	28-Feb-29
85	**Planning**		195	01-Sep-20 A	09-Jan-23
86	**Key Deliverables**		144	24-Jan-22 A	21-Oct-22
87	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	144	24-Jan-22 A	21-Oct-22
88	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3	45	17-Aug-22	19-Oct-22
89	**NAHC/Local Tribes AB 52 Consultation**		194	01-Sep-20 A	09-Jan-23
90	STA-120	NAHC/Local Tribes AB 52 Consultation	194	01-Sep-20 A	09-Jan-23
91	**Reservoir Operations & Modeling**		693	01-Nov-20 A	26-Dec-24
92	**Operations Plan - Version 2**		173	03-Jan-24	04-Sep-24
93	KD-1510	Operations Plan, Version 2	173	03-Jan-24	04-Sep-24
94	**Final Sites DWR/Reclamation Operating Agreement**		156	18-May-22	30-Dec-22



Remaining Level of Effort
Actual Level of Effort
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95	OP-1005	Final Sites DWR /Reclamation Operating Agreement	156	18-May-22	30-Dec-22
96	**Provide Operations Input on Response to Comments & Fi**		36	11-May-22	30-Jun-22
97	FO-1110	Perform Modeling for Final EIR/EIS	25	11-May-22	15-Jun-22
98	FO-1080	Provide Operations Input on Response to Comments & Final EIR/EIS	20	03-Jun-22	30-Jun-22
99	**BA/ITP Modeling**		22	01-Nov-20 A	29-Apr-22
100	OP-450	BA/ITP Modeling Support	22	01-Nov-20 A	29-Apr-22
101	OP-360	Appendices for BA/ITP	22	01-Apr-21 A	29-Apr-22
102	**Water Rights Modeling**		442	03-Jan-22 A	29-Dec-23
103	A1200	Water Rights Modeling Support	441	03-Jan-22 A	28-Dec-23
104	A1210	Documentation for Water Rights	442	03-Jan-22 A	29-Dec-23
105	**Refined Daily Operations Model**		130	01-Jul-22	09-Jan-23
106	A1220	Refined Daily Operations Model	130	01-Jul-22	09-Jan-23
107	**Update to CalSim 3**		240	17-Jan-24	26-Dec-24
108	A1230	Update to CalSim 3	240	17-Jan-24	26-Dec-24
109	**Sites Specific Model**		258	10-Jan-23	16-Jan-24
110	OS-1150	Develop Participant Specific Model	258	10-Jan-23	16-Jan-24
111	**Project Agreements & Funding**		695	01-Jun-21 A	30-Dec-24
112	**Key Deliverables**		349	29-Mar-23	13-Aug-24
113	KD-1255	Complete Loan Applications	0		29-Mar-23
114	KD-1260	Reclamation Benefits Agreement Executed	0		26-May-23
115	KD-1230	Execute Final Facilities Use Agreements	0		21-Jul-23
116	KD-1520	Agreements for Administration of Public Benefits Executed	0		31-Jul-23
117	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		12-Jul-24
118	KD-2600	Close WIFIA Loan	0		19-Jul-24
119	KD-1310	Receive WSIP Final Award from CWC	0		13-Aug-24
120	**Inter-Agency Agreements**		338	01-Jun-21 A	31-Jul-23
121	**Benefits & Obligations Contract with Participants**		315	01-Mar-22 A	27-Jun-23
122	BO-1100	Finalize Guiding Principles	65	01-Mar-22 A	30-Jun-22
123	BO-1200	Finalize Plan of Finance	190	01-Mar-22 A	30-Dec-22
124	BO-1300	Develop Benefits & Obligations Contract with Participants	125	03-Jan-23	27-Jun-23
125	**Facility Use Agreeements**		332	27-Aug-21 A	21-Jul-23
126	FO-1020	Final TCCA Facility Use Agreement	332	27-Aug-21 A	21-Jul-23
127	FO-1030	Final GCID Facility Use Agreement	332	27-Aug-21 A	21-Jul-23
128	FO-1040	Final CBD Facility Use Agreements	332	27-Aug-21 A	21-Jul-23
129	**Agreements for Administration of Public Benefits**		338	31-Mar-22	31-Jul-23



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

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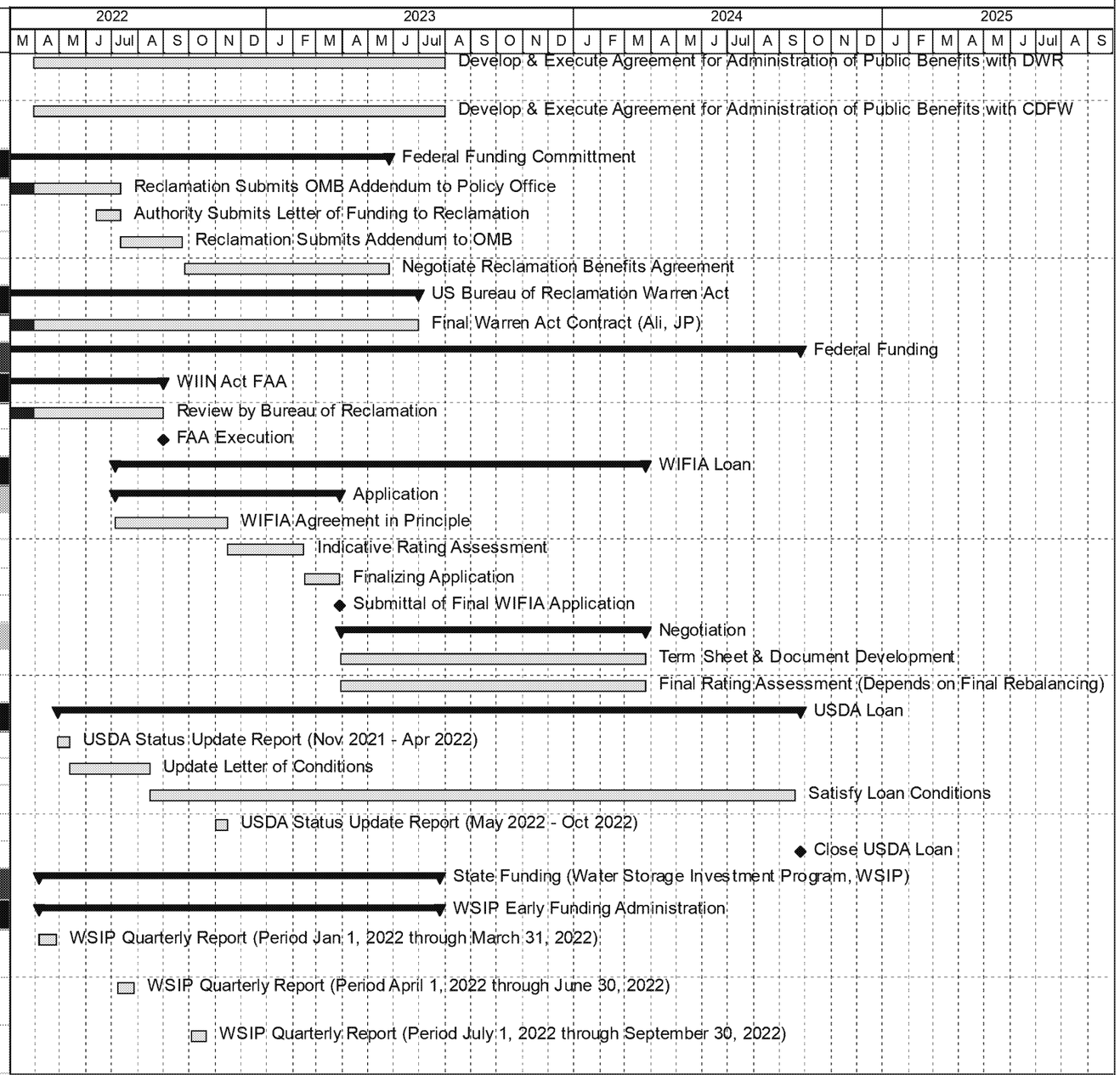
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
130	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR	338	31-Mar-22	31-Jul-23
131	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW	338	31-Mar-22	31-Jul-23
132	**Federal Funding Committment**		294	07-Feb-22 A	26-May-23
133	WIIN-1150	Reclamation Submits OMB Addendum to Policy Office	71	07-Feb-22 A	11-Jul-22
134	WIIN-1160	Authority Submits Letter of Funding to Reclamation	20	13-Jun-22	11-Jul-22
135	WIIN-1180	Reclamation Submits Addendum to OMB	53	12-Jul-22	23-Sep-22
136	WIIN-1170	Negotiate Reclamation Benefits Agreement	170	26-Sep-22	26-May-23
137	**US Bureau of Reclamation Warren Act**		318	01-Jun-21 A	30-Jun-23
138	FED-090	Final Warren Act Contract (Ali, JP)	318	01-Jun-21 A	30-Jun-23
139	**Federal Funding**		631	17-Jan-22 A	25-Sep-24
140	**WIIN Act FAA**		108	17-Jan-22 A	31-Aug-22
141	WIIN-1120	Review by Bureau of Reclamation	108	17-Jan-22 A	31-Aug-22
142	WIIN-1140	FAA Execution	0		31-Aug-22
143	**WIFIA Loan**		436	05-Jul-22	25-Mar-24
144	**Application**		186	05-Jul-22	29-Mar-23
145	WIFIA-110	WIFIA Agreement in Principle	95	05-Jul-22	15-Nov-22
146	WIFIA-120	Indicative Rating Assessment	60	16-Nov-22	14-Feb-23
147	WIFIA-130	Finalizing Application	30	15-Feb-23	28-Mar-23
148	WIFIA-140	Submittal of Final WIFIA Application	0		29-Mar-23
149	**Negotiation**		250	30-Mar-23	25-Mar-24
150	WIFIA-210	Term Sheet & Document Development	250	30-Mar-23	25-Mar-24
151	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	30-Mar-23	25-Mar-24
152	**USDA Loan**		610	29-Apr-22	25-Sep-24
153	USDA-1030	USDA Status Update Report (Nov 2021 - Apr 2022)	10	29-Apr-22	12-May-22
154	USDA-1050	Update Letter of Conditions	65	13-May-22	15-Aug-22
155	USDA-1060	Satisfy Loan Conditions	530	16-Aug-22	18-Sep-24
156	USDA-1040	USDA Status Update Report (May 2022 - Oct 2022)	10	02-Nov-22	15-Nov-22
157	USDA-1070	Close USDA Loan	0		25-Sep-24
158	**State Funding (Water Storage Investment Program, WSIP)**		330	06-Apr-22	25-Jul-23
159	**WSIP Early Funding Administration**		330	06-Apr-22	25-Jul-23
160	WSIP-1210	WSIP Quarterly Report (Period Jan 1, 2022 through March 31, 2022)	15	06-Apr-22	26-Apr-22
161	WSIP-1220	WSIP Quarterly Report (Period April 1, 2022 through June 30, 2022)	15	08-Jul-22	28-Jul-22
162	WSIP-1230	WSIP Quarterly Report (Period July 1, 2022 through September 30, 2022)	15	03-Oct-22	21-Oct-22



Remaining Level of Effort
Actual Level of Effort
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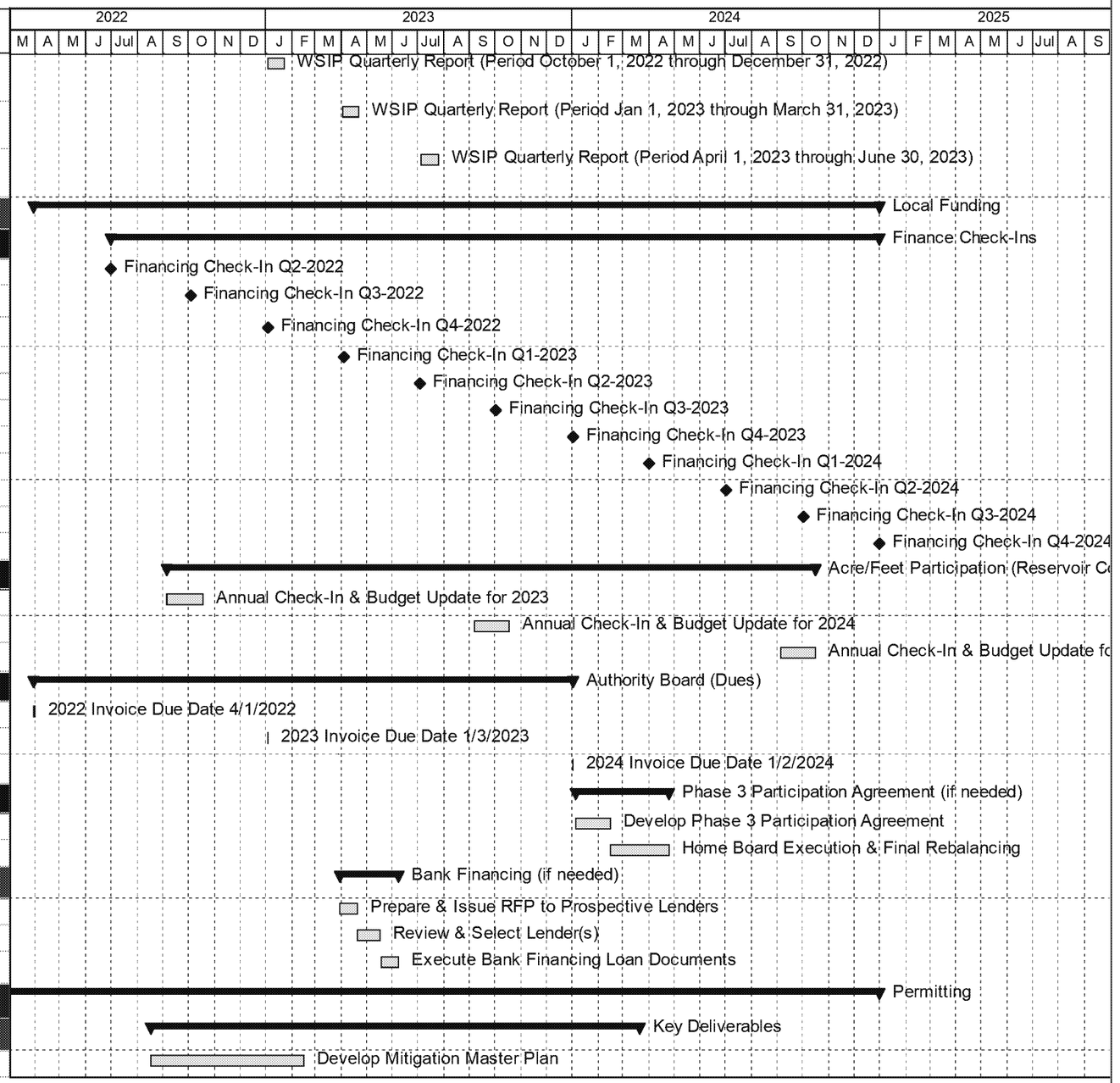
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
163	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	15	03-Jan-23	23-Jan-23
164	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23
165	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23
166	**Local Funding**		695	31-Mar-22	30-Dec-24
167	**Finance Check-Ins**		629	01-Jul-22	30-Dec-24
168	FC-1250	Financing Check-In Q2-2022	0		01-Jul-22
169	FC-1260	Financing Check-In Q3-2022	0		03-Oct-22
170	FC-1270	Financing Check-In Q4-2022	0		03-Jan-23
171	FC-1280	Financing Check-In Q1-2023	0		03-Apr-23
172	FC-1290	Financing Check-In Q2-2023	0		03-Jul-23
173	FC-1300	Financing Check-In Q3-2023	0		02-Oct-23
174	FC-1310	Financing Check-In Q4-2023	0		02-Jan-24
175	FC-1320	Financing Check-In Q1-2024	0		01-Apr-24
176	FC-1330	Financing Check-In Q2-2024	0		01-Jul-24
177	FC-1340	Financing Check-In Q3-2024	0		01-Oct-24
178	FC-1350	Financing Check-In Q4-2024	0		30-Dec-24
179	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		536	06-Sep-22	16-Oct-24
180	AF-1100	Annual Check-In & Budget Update for 2023	30	06-Sep-22	17-Oct-22
181	AF-1200	Annual Check-In & Budget Update for 2024	30	06-Sep-23	17-Oct-23
182	AF-1300	Annual Check-In & Budget Update for 2025	30	05-Sep-24	16-Oct-24
183	**Authority Board (Dues)**		443	31-Mar-22	02-Jan-24
184	AB-2100	2022 Invoice Due Date 4/1/2022	2	31-Mar-22	01-Apr-22
185	AB-2200	2023 Invoice Due Date 1/3/2023	1	03-Jan-23	03-Jan-23*
186	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*
187	**Phase 3 Participation Agreement (if needed)**		80	04-Jan-24	24-Apr-24
188	PA-1100	Develop Phase 3 Participation Agreement	30	04-Jan-24	14-Feb-24
189	PA-1200	Home Board Execution & Final Rebalancing	50	15-Feb-24	24-Apr-24
190	**Bank Financing (if needed)**		50	30-Mar-23	08-Jun-23
191	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	30-Mar-23	19-Apr-23
192	BF-1200	Review & Select Lender(s)	20	20-Apr-23	17-May-23
193	BF-1300	Execute Bank Financing Loan Documents	15	18-May-23	08-Jun-23
194	**Permitting**		695	04-Jan-21 A	30-Dec-24
195	**Key Deliverables**		403	17-Aug-22	21-Mar-24
196	KD-1460	Develop Mitigation Master Plan	125	17-Aug-22	15-Feb-23



Remaining Level of Effort
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Actual Work
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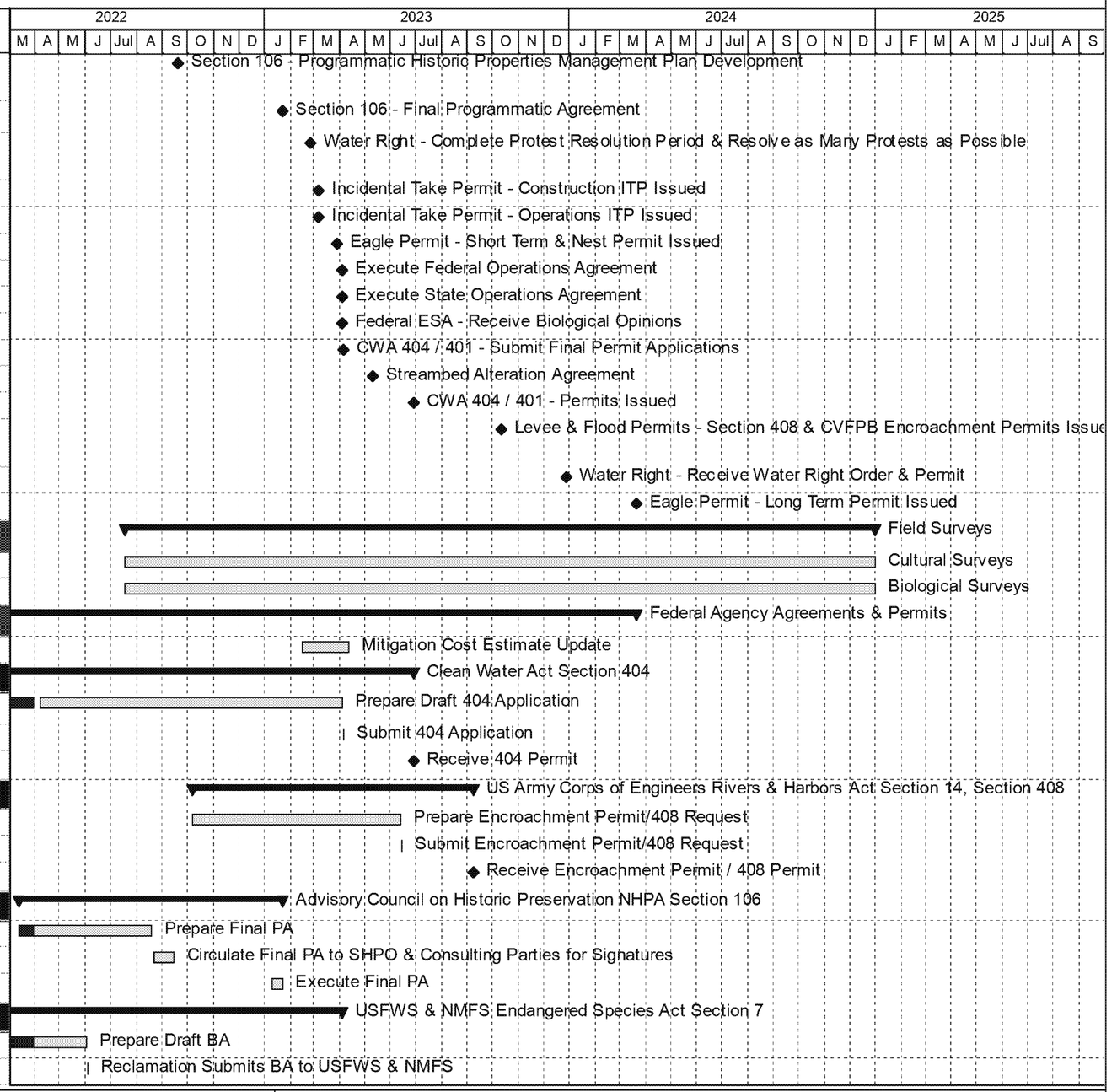
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
197	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		19-Sep-22
198	KD-1350	Section 106 - Final Programmatic Agreement	0		23-Jan-23
199	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		24-Feb-23
200	KD-1370	Incidental Take Permit - Construction ITP Issued	0		06-Mar-23
201	KD-1380	Incidental Take Permit - Operations ITP Issued	0		06-Mar-23
202	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		28-Mar-23
203	KD-1240	Execute Federal Operations Agreement	0		04-Apr-23
204	KD-1250	Execute State Operations Agreement	0		04-Apr-23
205	KD-1340	Federal ESA - Receive Biological Opinions	0		04-Apr-23
206	KD-1390	CWA 404 / 401 - Submit Final Permit Applications	0		05-Apr-23
207	KD-1420	Streambed Alteration Agreement	0		10-May-23
208	KD-1400	CWA 404 / 401 - Permits Issued	0		29-Jun-23
209	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		11-Oct-23
210	KD-1330	Water Right - Receive Water Right Order & Permit	0		28-Dec-23
211	KD-1440	Eagle Permit - Long Term Permit Issued	0		21-Mar-24
212	**Field Surveys**		620	18-Jul-22	30-Dec-24
213	RE-1030	Cultural Surveys	620	18-Jul-22	30-Dec-24
214	RE-1040	Biological Surveys	620	18-Jul-22	30-Dec-24
215	**Federal Agency Agreements & Permits**		500	11-Jan-21 A	21-Mar-24
216	CE-1570	Mitigation Cost Estimate Update	40	16-Feb-23	12-Apr-23
217	**Clean Water Act Section 404**		311	04-Feb-21 A	29-Jun-23
218	404-050	Prepare Draft 404 Application	250	04-Feb-21 A	04-Apr-23
219	404-120	Submit 404 Application	1	05-Apr-23	05-Apr-23
220	404-130	Receive 404 Permit	0		29-Jun-23
221	**US Army Corps of Engineers Rivers & Harbors Act Section 14,**		233	07-Oct-22	08-Sep-23
222	408-150	Prepare Encroachment Permit/408 Request	172	07-Oct-22	13-Jun-23
223	408-160	Submit Encroachment Permit/408 Request	1	14-Jun-23	14-Jun-23
224	408-170	Receive Encroachment Permit / 408 Permit	0		08-Sep-23
225	**Advisory Council on Historic Preservation NHPA Section 106**		205	14-Mar-22 A	23-Jan-23
226	106-081	Prepare Final PA	100	14-Mar-22 A	19-Aug-22
227	106-092	Circulate Final PA to SHPO & Consulting Parties for Signatu	18	22-Aug-22	15-Sep-22
228	106-102	Execute Final PA	10	10-Jan-23	23-Jan-23
229	**USFWS & NMFS Endangered Species Act Section 7**		256	11-Jan-21 A	04-Apr-23
230	BA-200	Prepare Draft BA	45	11-Jan-21 A	02-Jun-22
231	BA-210	Reclamation Submits BA to USFWS & NMFS	1	03-Jun-22	03-Jun-22



Remaining Level of Effort | Remaining Work | Summary
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

Project ID: Sites / Project Name: Sites Reservoir Project DD: 31-Mar-2022
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Data Date: 31-Mar-22 / Print Date: 14-Apr-22

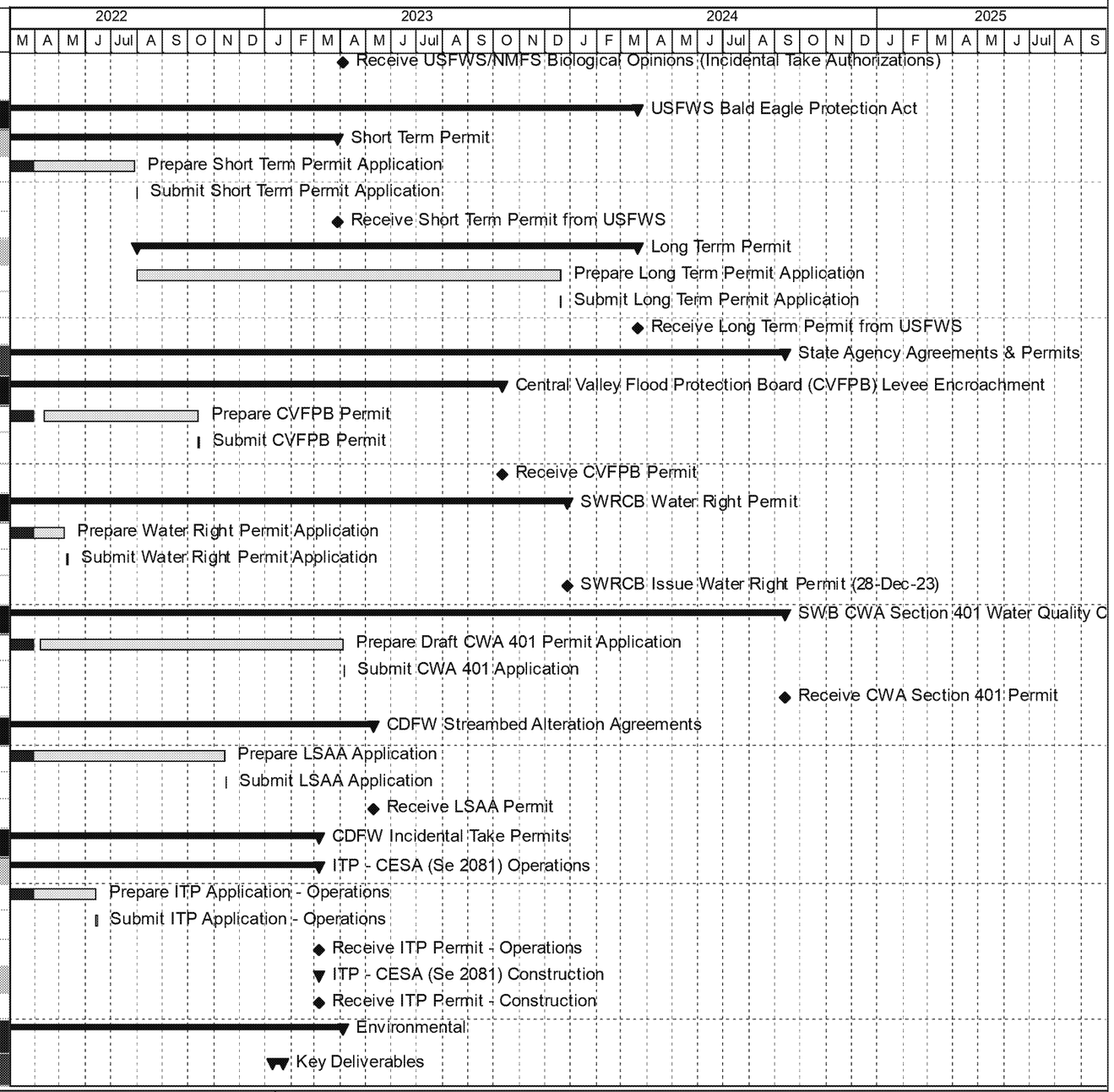
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
232	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		04-Apr-23
233	**USFWS Bald Eagle Protection Act**		500	03-Jan-22 A	21-Mar-24
234	**Short Term Permit**		251	03-Jan-22 A	28-Mar-23
235	USFWS-110	Prepare Short Term Permit Application	85	03-Jan-22 A	29-Jul-22
236	USFWS-120	Submit Short Term Permit Application	1	01-Aug-22	01-Aug-22
237	USFWS-130	Receive Short Term Permit from USFWS	0		28-Mar-23
238	**Long Terrm Permit**		414	02-Aug-22	21-Mar-24
239	USFWS-140	Prepare Long Term Permit Application	350	02-Aug-22	19-Dec-23
240	USFWS-150	Submit Long Term Permit Application	1	20-Dec-23	20-Dec-23
241	USFWS-160	Receive Long Term Permit from USFWS	0		21-Mar-24
242	**State Agency Agreements & Permits**		622	04-Jan-21 A	12-Sep-24
243	**Central Valley Flood Protection Board (CVFPB) Levee Encroac**		381	13-Dec-21 A	11-Oct-23
244	CVFPB-200	Prepare CVFPB Permit	130	13-Dec-21 A	13-Oct-22
245	CVFPB-210	Submit CVFPB Permit	1	14-Oct-22	14-Oct-22
246	CVFPB-220	Receive CVFPB Permit	0		11-Oct-23
247	**SWRCB Water Right Permit**		441	01-Feb-21 A	28-Dec-23
248	WRP-100	Prepare Water Right Permit Application	27	01-Feb-21 A	06-May-22
249	WRP-110	Submit Water Right Permit Application	2	09-May-22	10-May-22
250	WRP-120	SWRCB Issue Water Right Permit (28-Dec-23)	0		28-Dec-23
251	**SWB CWA Section 401 Water Quality Certification**		616	04-Jan-21 A	12-Sep-24
252	401-200	Prepare Draft CWA 401 Permit Application	250	04-Jan-21 A	04-Apr-23
253	401-210	Submit CWA 401 Application	1	05-Apr-23	05-Apr-23
254	401-220	Receive CWA Section 401 Permit	0		12-Sep-24
255	**CDFW Streambed Alteration Agreements**		282	10-Jan-22 A	10-May-23
256	1600-200	Prepare LSAA Application	160	10-Jan-22 A	14-Nov-22
257	1600-210	Submit LSAA Application	1	15-Nov-22	15-Nov-22
258	1600-220	Receive LSAA Permit	0		10-May-23
259	**CDFW Incidental Take Permits**		235	11-Jan-21 A	06-Mar-23
260	**ITP - CESA (Se 2081) Operations**		235	11-Jan-21 A	06-Mar-23
261	2081-100	Prepare ITP Application - Operations	52	11-Jan-21 A	13-Jun-22
262	2081-110	Submit ITP Application - Operations	1	14-Jun-22	14-Jun-22
263	2081-120	Receive ITP Permit - Operations	0		06-Mar-23
264	**ITP - CESA (Se 2081) Construction**		0	06-Mar-23	06-Mar-23
265	2081-220	Receive ITP Permit - Construction	0		06-Mar-23
266	**Environmental**		256	03-Jan-22 A	04-Apr-23
267	**Key Deliverables**		10	09-Jan-23	23-Jan-23



Remaining Level of Effort
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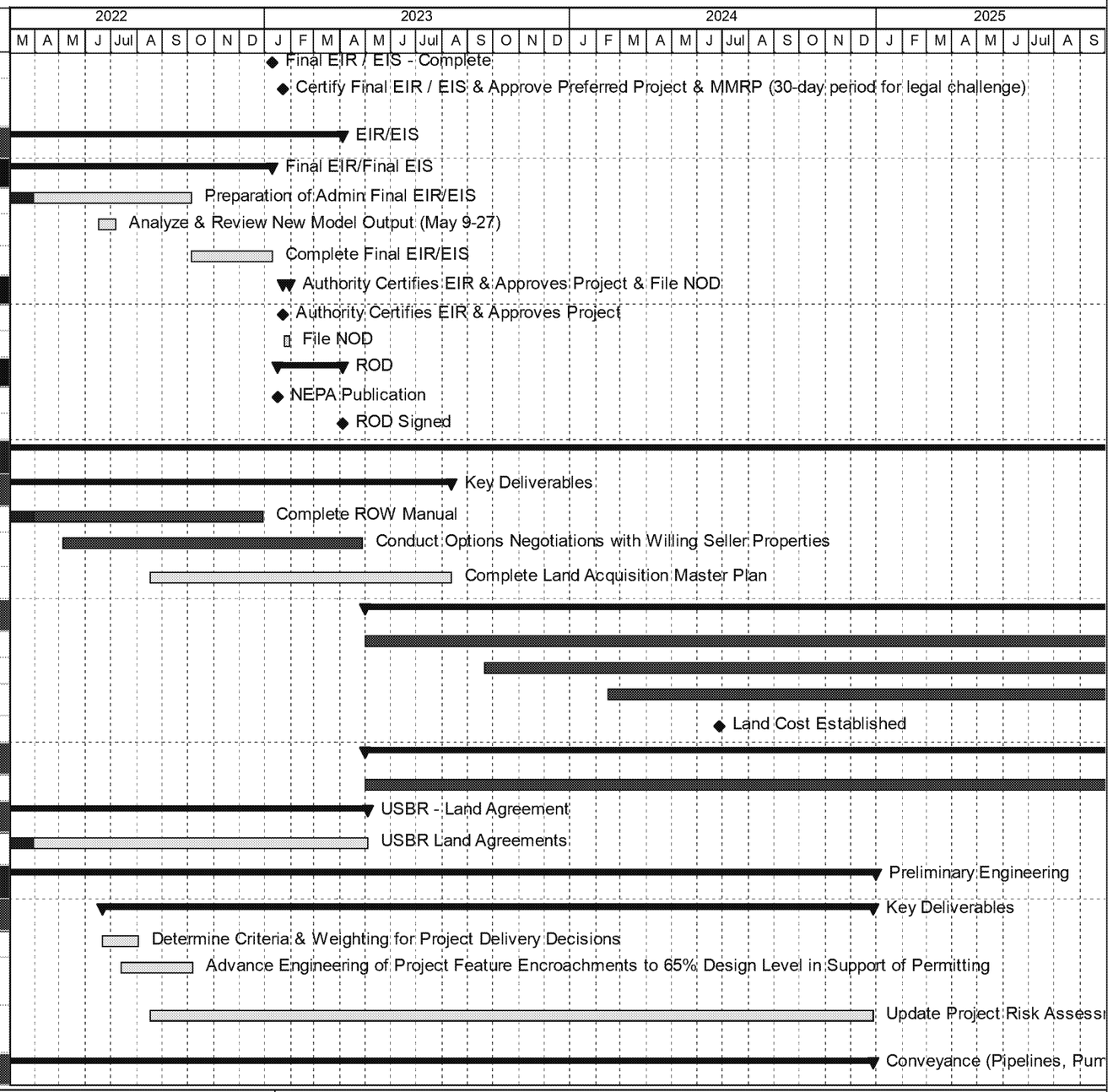
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
268	KD-1470	Final EIR / EIS - Complete	0		09-Jan-23
269	KD-1480	Certify Final EIR / EIS & Approve Preferred Project & MMRP (30-day period for legal challenge)	0		23-Jan-23
270	**EIR/EIS**		256	03-Jan-22 A	04-Apr-23
271	**Final EIR/Final EIS**		195	03-Jan-22 A	09-Jan-23
272	EIR-210	Preparation of Admin Final EIR/EIS	132	03-Jan-22 A	05-Oct-22
273	EIR-220	Analyze & Review New Model Output (May 9-27)	15	16-Jun-22	07-Jul-22
274	EIR-250	Complete Final EIR/EIS	63	06-Oct-22	09-Jan-23
275	**Authority Certifies EIR & Approves Project & File NOD**		5	23-Jan-23	30-Jan-23
276	EIR-370	Authority Certifies EIR & Approves Project	0		23-Jan-23
277	EIR-380	File NOD	5	24-Jan-23	30-Jan-23
278	**ROD**		56	16-Jan-23	04-Apr-23
279	EIR-440	NEPA Publication	0		16-Jan-23
280	EIR-450	ROD Signed	0		04-Apr-23
281	**Real Estate**		1774	02-Nov-20 A	28-Feb-29
282	**Key Deliverables**		347	03-Jan-22 A	11-Aug-23
283	KD-1495	Complete ROW Manual	190	03-Jan-22 A	30-Dec-22
284	KD-1500	Conduct Options Negotiations with Willing Seller Properties	250	04-May-22	28-Apr-23
285	KD-1490	Complete Land Acquisition Master Plan	250	17-Aug-22	11-Aug-23
286	**Land Acquisition**		1500	01-May-23	28-Feb-29
287	RE-1060	Construction Package 1 - Land Acquisition	1500	01-May-23	28-Feb-29
288	RE-1070	Construction Package 2 - Land Acquisition	1400	21-Sep-23	28-Feb-29
289	RE-1080	Construction Package 3 - Land Acquisition	1300	15-Feb-24	28-Feb-29
290	RE-1050	Land Cost Established	0		27-Jun-24
291	**Relocation**		1500	01-May-23	28-Feb-29
292	RE-1100	Relocation Assistance, as Needed	1500	01-May-23	28-Feb-29
293	**USBR - Land Agreement**		278	02-Nov-20 A	04-May-23
294	FED-100	USBR Land Agreements	278	02-Nov-20 A	04-May-23
295	**Preliminary Engineering**		695	03-Jan-22 A	30-Dec-24
296	**Key Deliverables**		637	21-Jun-22	27-Dec-24
297	KD-1120	Determine Criteria & Weighting for Project Delivery Decisions	30	21-Jun-22	02-Aug-22
298	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	60	14-Jul-22	06-Oct-22
299	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	597	17-Aug-22	27-Dec-24
300	**Conveyance (Pipelines, Pump Stations, Canals)**		694	03-Jan-22 A	27-Dec-24



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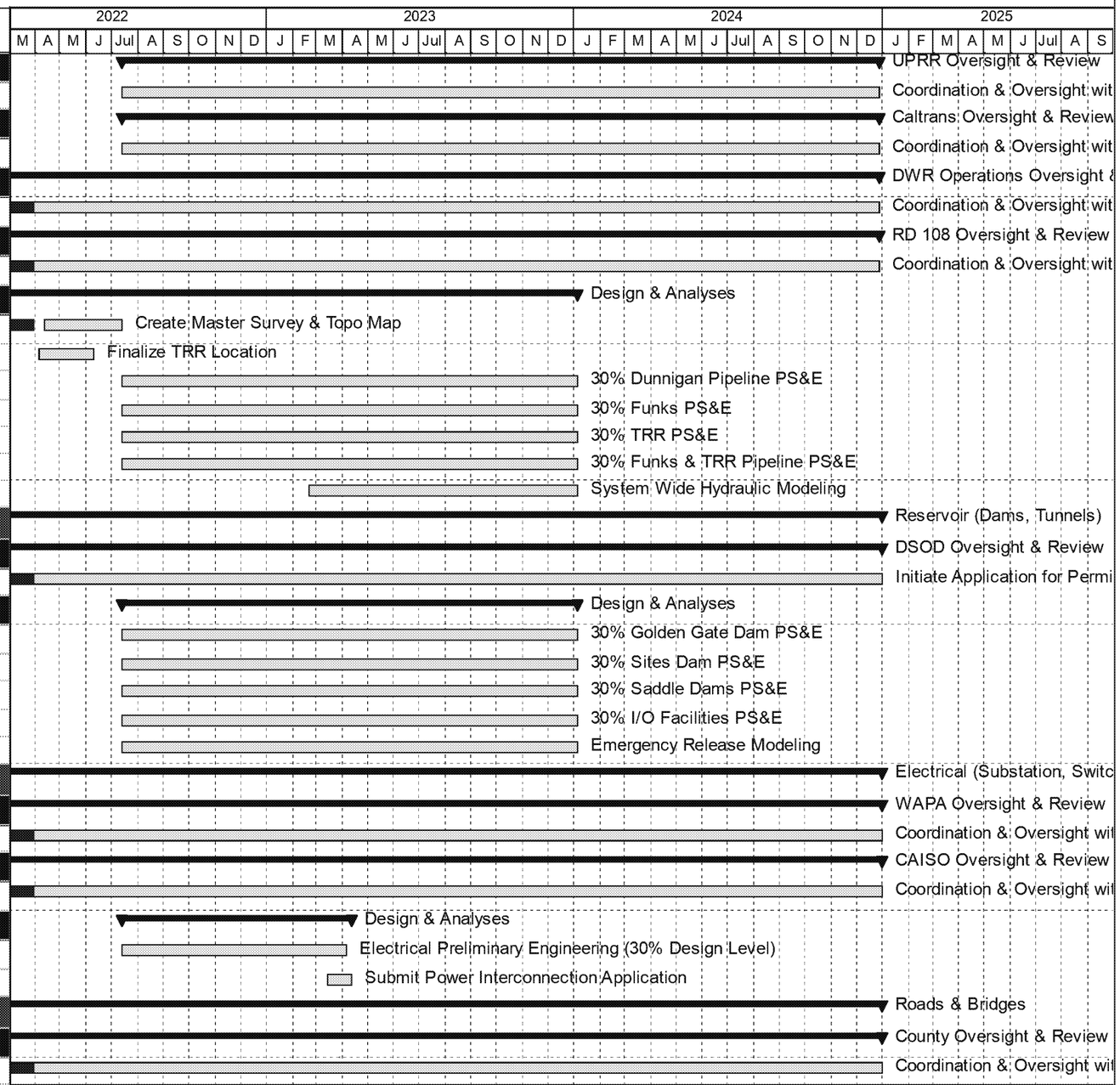
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
301		**UPRR Oversight & Review**	621	14-Jul-22	27-Dec-24
302	A1110	Coordination & Oversight with UPRR	621	14-Jul-22	27-Dec-24
303		**Caltrans Oversight & Review**	621	14-Jul-22	27-Dec-24
304	A1120	Coordination & Oversight with Caltrans	621	14-Jul-22	27-Dec-24
305		**DWR Operations Oversight & Review (KLOG)**	694	03-Jan-22 A	27-Dec-24
306	A1130	Coordination & Oversight with Department of Water Resourc	694	03-Jan-22 A	27-Dec-24
307		**RD 108 Oversight & Review**	694	03-Jan-22 A	27-Dec-24
308	A1140	Coordination & Oversight with Reclamation District 108	694	03-Jan-22 A	27-Dec-24
309		**Design & Analyses**	441	01-Feb-22 A	04-Jan-24
310	KD-1140	Create Master Survey & Topo Map	65	01-Feb-22 A	13-Jul-22
311	KD-1150	Finalize TRR Location	46	06-Apr-22	09-Jun-22
312	KD-1630	30% Dunnigan Pipeline PS&E	372	14-Jul-22	04-Jan-24
313	KD-2010	30% Funks PS&E	372	14-Jul-22	04-Jan-24
314	KD-2020	30% TRR PS&E	372	14-Jul-22	04-Jan-24
315	KD-2030	30% Funks & TRR Pipeline PS&E	372	14-Jul-22	04-Jan-24
316	KD-2080	System Wide Hydraulic Modeling	220	21-Feb-23	04-Jan-24
317		**Reservoir (Dams, Tunnels)**	695	01-Feb-22 A	30-Dec-24
318		**DSOD Oversight & Review**	695	01-Feb-22 A	30-Dec-24
319	KD-1100	Initiate Application for Permit to Construct from DSOD	695	01-Feb-22 A	30-Dec-24
320		**Design & Analyses**	372	14-Jul-22	04-Jan-24
321	KD-1660	30% Golden Gate Dam PS&E	372	14-Jul-22	04-Jan-24
322	KD-2040	30% Sites Dam PS&E	372	14-Jul-22	04-Jan-24
323	KD-2050	30% Saddle Dams PS&E	372	14-Jul-22	04-Jan-24
324	KD-2060	30% I/O Facilities PS&E	372	14-Jul-22	04-Jan-24
325	KD-2070	Emergency Release Modeling	372	14-Jul-22	04-Jan-24
326		**Electrical (Substation, Switchyard, Transmission Line)**	695	03-Jan-22 A	30-Dec-24
327		**WAPA Oversight & Review**	695	03-Jan-22 A	30-Dec-24
328	A1150	Coordination & Oversight with WAPA	695	03-Jan-22 A	30-Dec-24
329		**CAISO Oversight & Review**	695	03-Jan-22 A	30-Dec-24
330	A1160	Coordination & Oversight with CAISO	695	03-Jan-22 A	30-Dec-24
331		**Design & Analyses**	188	14-Jul-22	11-Apr-23
332	KD-1640	Electrical Preliminary Engineering (30% Design Level)	185	14-Jul-22	06-Apr-23
333	KD-1200	Submit Power Interconnection Application	20	15-Mar-23	11-Apr-23
334		**Roads & Bridges**	695	03-Jan-22 A	30-Dec-24
335		**County Oversight & Review**	695	03-Jan-22 A	30-Dec-24
336	A1170	Coordination & Oversight with County Authorities	695	03-Jan-22 A	30-Dec-24



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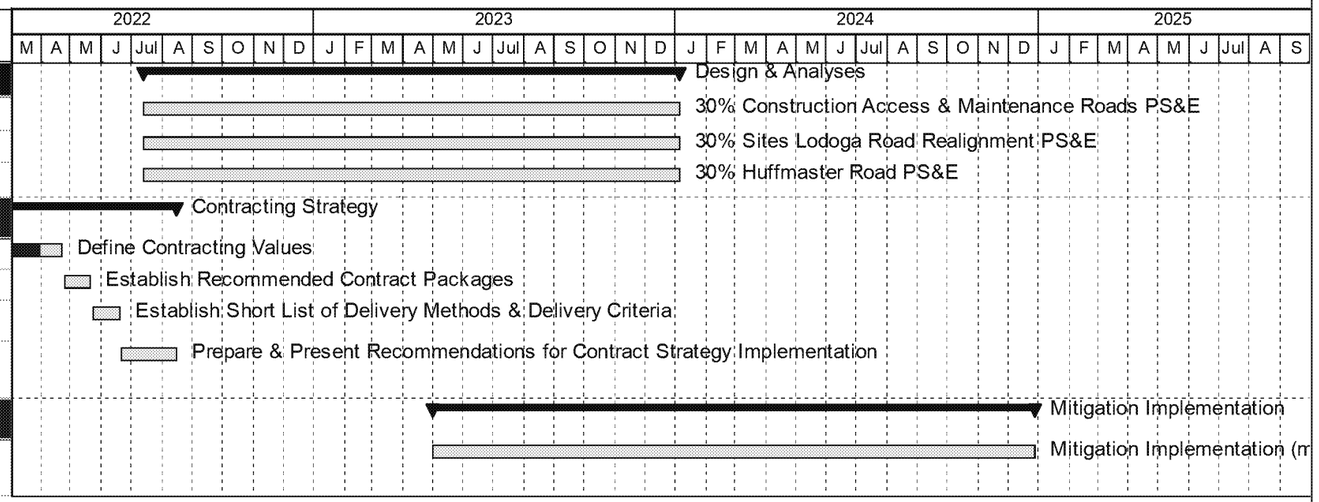
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Schedule

#	Activity ID	Activity Name	Remaining Duration	Start	Finish
337	**Design & Analyses**		372	14-Jul-22	04-Jan-24
338	KD-1650	30% Construction Access & Maintenance Roads PS&E	372	14-Jul-22	04-Jan-24
339	KD-2090	30% Sites Lodoga Road Realignment PS&E	372	14-Jul-22	04-Jan-24
340	KD-2100	30% Huffmaster Road PS&E	372	14-Jul-22	04-Jan-24
341	**Contracting Strategy**		97	03-Jan-22 A	16-Aug-22
342	CS-1100	Define Contracting Values	17	03-Jan-22 A	22-Apr-22
343	CS-1200	Establish Recommended Contract Packages	20	25-Apr-22	20-May-22
344	CS-1300	Establish Short List of Delivery Methods & Delivery Criteria	20	23-May-22	20-Jun-22
345	CS-1400	Prepare & Present Recommendations for Contract Strategy Implementation	40	21-Jun-22	16-Aug-22
346	**Mitigation Implementation**		420	01-May-23	27-Dec-24
347	MI-1100	Mitigation Implementation (more information needed to expand detail)	420	01-May-23	27-Dec-24



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Sites Project Authority

Request for Proposal
Sites Winter-Run Chinook Salmon
Lifecycle Modeling
RFP No. 22-03

April 26, 2022

Submittal Deadline
May 16, 2022
Noon Pacific Standard Time (PST)

Form of Submittal
Electronic Submittal Only
jtrapasso@sitesproject.org

Contact Person
Joe Trapasso
Program Operations Manager
Sites Reservoir Project
jtrapasso@sitesproject.org

Request For Proposal
Sites Winter-Run Chinook Salmon
Lifecycle Modeling

1.0 GENERAL

The Sites Project Authority (Authority) is currently soliciting a proposal from the University of California, Santa Cruz (UCSC) to conduct Sites Reservoir Project winter-run chinook salmon lifecycle modeling (WRLCM).

There is no express or implied obligation for the Authority to reimburse UCSC for any expenses incurred in preparing the proposal related to this request for proposals (RFP). Materials submitted by UCSC are subject to public inspection under the California Public Records Act (Government Code Sec. 6250), unless specifically exempt.

2.0 BACKGROUND

The Sites Reservoir is located 10 miles west of the town of Maxwell in rural Glenn and Colusa counties. This Project will be up to a 1.5 million acre-foot off-stream surface water storage facility. It will divert stormwater flows from the Sacramento River, after all other water rights and regulatory requirements are met, for subsequent release for environmental use and use by California communities, farms and businesses when called upon, primarily planned for use in drier years. It will be the state's 7th largest reservoir when built and would increase surface water storage in the Sacramento Valley in the range of 15%. For additional Project location and other Project information please visit the Project website at www.sitesproject.org.

The Authority is developing applications for environmental permits and responding to comments on its Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement. To support this work, the Authority desires to further assess the effect of Project operations by evaluating water operations on the population dynamics of the Sacramento River winter-run Chinook (SRWRC). The WRLCM was developed in 2014 (Hendrix et al) and has since been used to predict how proposed actions affect population metrics including cohort replacement rate, escapement, and smolt production. The implementation of the WRLCM to evaluate water operations is a significant advancement over lifestage-specific models that have been used because it can integrate the effect of water operations across the entire lifecycle and multiple environmental conditions. Therefore, the Authority would like to contract to run the WRLCM to provide additional insight into the potential Project effects.

3.0 REQUESTED SITES WINTER-RUN CHINOOK SALMON LIFECYCLE MODELING SERVICES

The requested services include an application of the WRLCM to evaluate the effects of proposed Project operations on SRWRC population dynamics to inform the Authority's Biological Assessment. The Authority has planned a 3-phased approach to evaluating proposed Project operations on SRWRC population dynamics. Phases one and two consists of running three proposed Project operations: baseline (No Project), and two action alternatives. The third phase will consist of proposed Project operations that are informed by the results of the first two phases. Therefore, the services are categorized into the following three tasks:

- **Task 1** – Evaluating effects of initial 3 proposed Project operations on SRWRC population dynamics.
- **Task 2** - Evaluating effects of a second batch of 3 proposed Project operations on SRWRC population dynamics.
- **Task 3** - Evaluating effects of a third batch of 3 proposed Project operations on SRWRC population dynamics.

Tasks 1 through 3 will each include the following six subtasks:

1. **Project Management** - Project management includes providing a point of contact for the Authority, ensuring progress and deliverables, and attending meetings with Authority.
2. **Database Management** - Database management includes managing a SQL database to house data received from the Authority for each proposed action. This database will store results from CalSim II and the HEC5Q model to simulate temperature in the Sacramento River.
3. **Generate habitat capacity estimates** - Habitat capacity models estimate the number of individuals that saturate a given habitat area with specific environmental conditions. Within the WRLCM, habitat capacity estimates inform the density dependent movement function to determine if fry remain in a given geographic area or move downstream.
4. **Generate delta smolt survival estimates** - The enhanced Particle Tracking Model (ePTM) is a mechanistic model that combines hydrodynamics and fish behavior to simulate Delta survival and routing for out-migrating smolts. Therefore, the ePTM submodel estimates the important vital rate of Delta smolt survival for the WRLCM.
5. **Generate WRLCM results** - Results should include relative differences between baseline and alternative scenarios in population metrics such as the cohort replacement rate, escapement, Delta smolt survival, and smolt production.

6. **Communicating WRLCM results** - This subtask includes meeting with and communicating results with Authority staff.

Assumptions: Beyond use of the WRLCM, it is assumed that submodels would include habitat capacity models and ePTM. UCDC shall use the most up-to-date, quality-controlled versions of the WRLCM and submodels to evaluate proposed Project operations.

4.0 CONTRACT TERMS

The term of the contract will be from the execution date of the contract through March 31, 2023. Work will be performed on a fixed price basis.

5.0 GENERAL RFP REQUIREMENTS

UCSC is requested to contact the identified Authority Contact Person for this procurement at jtrapasso@sitesproject.org. if there are any RFP questions or clarifications needed. The Contact Person will set up a meeting between the Authority and UCSC to respond to the questions.

5.1 Proposal Submittal

Receipt of the following material is **requested by May 16, 2022, Noon PST**:

- An electronic copy of the proposal and all its appendices in a single PDF file emailed to:
  Joe Trapasso
  Sites Project Authority Program Operations Manager
  jtrapasso@sitesproject.org

- The proposal should include the following:

  Brief Transmittal Letter listing RFP No.22-03.

  Sections: Page sizes are limited to 8.5 by 11 and 11-point font minimum, not including transmittal letter and potential cover page.

  1. Work Plan/Scope of Services
  2. Schedule
  3. Project Team
  4. Statement of Experience and Qualifications
  5. Cost Estimate with Backup Information
  6. Potential Comments to Authority's Standard Consulting Agreement

Appendices:

A. Key Staff Resumes

5.2 Other Required Information Specific Requirements:

Transmittal Letter

The brief transmittal letter should summarize the key points contained in the proposal, as well as provide the name, title, email address, and telephone number of the person who is the technical lead for the services.

1. Work Plan/Scope of Services

Provide a description of the approach and methods to be used to meet the RFP's requested services. It is important to Include all assumptions and caveats.

2. Schedule

Provide comments and expand the sequence and schedule of activities as needed to the RFP schedule (see Exhibit A) that outlines the services provided and approach to achieving the RFP's requested services.

3. Project Team

Provide a list of **key** personnel directly assigned to the effort, along with responsibilities and resumes. Resumes should not be longer than 2 pages and included in Appendix A to the proposal.

4. Statement of Experience and Qualifications

Provide a brief statement on the UCSC's experience and qualifications related to the requested modeling services.

5. Cost Estimate with Backup

Provide the costs to perform the identified modeling services per task that includes staff (with hourly rates) and other direct costs.

6. Comments to Authority's Standard Consulting Services Agreement

Exhibit B is the Authority's proposed Consulting Services Agreement for the subject services. Carefully review and comment as necessary on any of the articles set forth in the Consulting Agreement.

If UCSC takes any exceptions to any provision in the proposed Agreement, propose alternative language and/or terms and conditions deem appropriate in Section 6 of the

proposal. The Authority will give all such proposed changes due consideration but shall be under no obligation to accept or adopt them.

UCSC shall identify the nature and extent of insurance policies that it has and will keep in place during the term of the contract, including general liability, workers compensation and professional liability.

6.0 EVALUATION AND APPROVAL PROCESS

Authority staff will evaluate UCSC's proposal relative to the completeness of the submitted proposal and the criteria listed in Section 5. Authority staff will contact and discuss with UCSC any proposal questions or clarifications needed.

Negotiations to resolve any UCSC potential contract issues with the Authority's Standard Consulting Services Contract will be conducted. After contract negotiations have been successfully completed, Authority staff will recommend to the Authority approval of a contract with UCSC for the identified modeling services.

From: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 4/26/2022 1:17:50 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Okay… I've read through this twice now and looked up the reference in ROC on LTO they mention, and this is still confusing to me. It seems like the transfer volumes were included in the NAA, and the only action considered was expanding the transfer window but keeping the volumes the same. That said, no transfers were included in CalSim for either the NAA or the proposed action besides Lower Yuba River Accord. So I'm not entirely sure if water has been quantitatively evaluated. Either way, it would seem to me like since Sites is doing its own environmental document and ESA consultation, and it is including the same level of detail in its baseline as is included in the BiOp, that we don't need to separately consider the volumes discussed in ROC on.

John – since this is an ICF work product, do you want to save it somewhere in the permitting area on SP? I didn't upload it.

We can discuss next steps on Friday – I'll add it to our agenda.

Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

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From: Briard, Monique <Monique.Briard@icf.com>
Sent: Tuesday, April 19, 2022 8:17 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <John.Spranza@hdrinc.com>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning,

Attached is the memo summarizing how transfers were covered in ROC on LTO NEPA and ESA.

Thanks,
Monique

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 4, 2022 9:28 AM
To: John Spranza <John.Spranza@hdrinc.com>; Briard, Monique <Monique.Briard@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I think this all sounds good Monique. I am good with them reaching out to Steve. Thanks for the heads up on schedule. That sounds good to me.

I am good with adding them to the contract also.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Sunday, April 3, 2022 10:51 AM
To: Briard, Monique <Monique.Briard@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

I will keep an eye out for the approvals.

John Spranza

D 916.679.8858 M 818.640.2487

From: Briard, Monique <Monique.Briard@icf.com>
Sent: Friday, April 1, 2022 2:01 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: Spranza, John <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Ali,

Gregg and Matty are on-board to provide you the requested write-up. They'll need to reach out to Steve Micko to talk with him about some of the details. I'm assuming that is acceptable, please let me know otherwise. Also, they've requested additional time that will push the delivery of the write up to the 15th.

Lastly, I'll need to add them to the project so John, please keep an eye out for the approval request.

Thanks,
Monique

From: Briard, Monique
Sent: Thursday, March 31, 2022 10:14 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>

Cc: John Spranza <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Hi Ali,

I've reached out to Matty and Gregg to ask for input from them and will let you know if they have any questions or need more time once I hear back from them.

Thanks,
Monique

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, March 30, 2022 10:14 AM
To: Briard, Monique <Monique.Briard@icf.com>; Williams, Nicole <Nicole.Williams@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>
Cc: John Spranza <John.Spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: Sites - Movement of water within or separate from "transfer water" in ROC on LTO

Hi ICF team – We are working to determine if our water would move within or separate from "transfer water" as defined/covered in the ROC on LTO. To figure this out, we could use some more background on how transfer water was covered in the ROC on LTO NEPA and ESA efforts. It looks like Gregg Ellis and Matilda Evoy-Mount from ICF were the project managers for the ROC efforts. I am wondering if ICF can put together a one or two page summary of how transfers were covered in ROC on LTO NEPA and ESA? Things I am thinking of –

1. Were transfers in the baseline/No Action?
2. Were transfers in the modeling or addressed qualitatively?
3. Were transfers addressed differently between the NEPA and ESA document?

We're generally trying to figure out the approach the ROC on LTO efforts took on transfers to see if we have a similar approach/fit within the approach/how that compares to what Sites is doing, etc. So would appreciate a write up focusing on the ROC on LTO approach.

It would be wonderful to have this by end of next week. Let me know if you need more time.

I will be on vacation starting next Friday, April 8 (starting the afternoon), so please also send to Erin and John. Thank you!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2022 5:10:52 PM
To: Whittington, Chad/SAC [Chad.Whittington@jacobs.com]; steve.micko@jacobs.com; Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi all – Doug said the works around are working for them and they don't need to have a call. So no need to hold time for this. I did let him know that we are happy to chat if he is having any more challenges.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Whittington, Chad/SAC <Chad.Whittington@jacobs.com>
Sent: Tuesday, April 26, 2022 1:51 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; steve.micko@jacobs.com; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Ali,

Sorry for the late response! Anytime between 10 am and 2 pm on Thursday works for me.

Chad

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 25, 2022 8:53 AM
To: Micko, Steve/SAC <Steve.Micko@jacobs.com>; Whittington, Chad/SAC <Chad.Whittington@jacobs.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: [EXTERNAL] FW: Question regarding the Sites Reservoir Daily Diversion Tool
Importance: High

Hi all – See below. Doug would like to have a call. Let me know if you have availability sometime Thursday, 4/28 from 10 AM to 2 PM.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Friday, April 22, 2022 1:53 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Cooper, Ashley <ACooper@nrdc.org>
Cc: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Thanks Ali. Appreciate the quick response, and nice to know that it wasn't just user error on our end! Happy to talk with you more next week about this; as of now, it looks like Ashley and I are both available:

Wednesday, 4/27: before 12 pm or 1-3 pm
Thursday, 4/28: between 9 am and 3:30 pm

Let us know if there are any slots that work for your folks during those dates and times. Hope you have a good weekend.

Best,
Doug

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 21, 2022 6:08 PM
To: Obegi, Doug <dobegi@nrdc.org>; Cooper, Ashley <ACooper@nrdc.org>
Cc: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Doug – I talked with the Jacobs team and they indicated that the tool isn't quite set up for what you are trying to accomplish. However, the Jacobs team can provide some work arounds. I've asked them to put some initial thoughts in an email. But I do think that it would be best to have a call to discuss.

Would you and Ashley be good to get on the phone next week to discuss? From there, we can either walk you through the work arounds or we can revise the tool and get you a revised version.

I need to coordinate with the Jacobs team on their availability, but if you'd like to chat, let me know if there are days/times that work for you next week. I'll get those over to the Jacobs team and get something on the calendar. In the meantime, we'll work on getting you an email with workarounds in the next day or so.

Ali

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Thursday, April 21, 2022 2:37 PM
To: Jerry Brown <jbrown@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Cooper, Ashley <ACooper@nrdc.org>
Subject: Question regarding the Sites Reservoir Daily Diversion Tool

Hi Jerry and Ali,

My colleague Ashley has been running a few scenarios through the Daily Diversion Tool for me, and we've run into a problem where the spreadsheet tool does not seem to accurately report results if the Delta outflow criteria starts in the month of December and includes months for the next year (starting value of 12 in cell C26 in the User_Specifications tab). The same problem occurs for us if we try to set Delta outflow criteria that includes December in cell C27. Setting Delta outflow criteria in the User_Specifications tab works if we limit the criteria to the months of January through May or June (and it appears to work if we sent it for January to December), but we can't seem to get the model to work if the outflow criteria includes the starting month of December and runs through the spring.

Are we doing something wrong? Would you please check to see if you have similar problems on your end?

Thanks,
Doug

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Thursday, April 14, 2022 4:36 PM
To: Obegi, Doug <dobegi@nrdc.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Doug – thanks for the message. Ali is out this week on vacation. Regarding the study, thank you for passing this along to us. I'm pretty sure the team is aware of the paper. Jason, the prime author, does work for ICF on the project. Ali will have more to say about it when she returns. Regarding the daily diversion tool, we'd be happy to get the right people together with your folks to work through any questions. Just let us know how we can help.

Jerry

From: Doug Obegi <dobegi@nrdc.org>
Date: Thursday, April 14, 2022 at 3:27 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>
Subject: FW: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Dear Jerry and Ali,

Thank you again for sending us the daily diversion tool, and to Jerry for coffee/tea the other morning. I wanted to follow up with two things for you:

First, I wanted to make sure that you were aware of this new peer reviewed scientific study which concludes that for juvenile winter-run Chinook salmon, migratory survival down the Sacramento River is reduced when flows are less than approximately 24,000 cfs (equivalent to 700 cubic meters per second). We've submitted this paper to CDFW (see below), and wanted to make sure that this was included in the JPA's administrative record for NEPA/CEQA since this was new information that was not available at the time of the public comment period on the EIS/EIR.

Second, we've been analyzing the potential changes in water diversions to storage using the daily diversion tool, and it appears that the proposed change to the bypass flow of 10,700 cfs from Oct to June results in an approximately 25% reduction in diversions to storage. It sounds like that is similar to what y'all are finding (our numbers are lower than what WRMWSD reported to their Board). In addition, as we have been exploring the model, we're not sure that the Delta outflow requirements in the model are actually working to limit water diversions to storage. It may be (probably is!) user error on our part, but if we're not able to get the model to work right in the next week or two we may want to check in to make sure the model is actually working correctly.

Thanks,

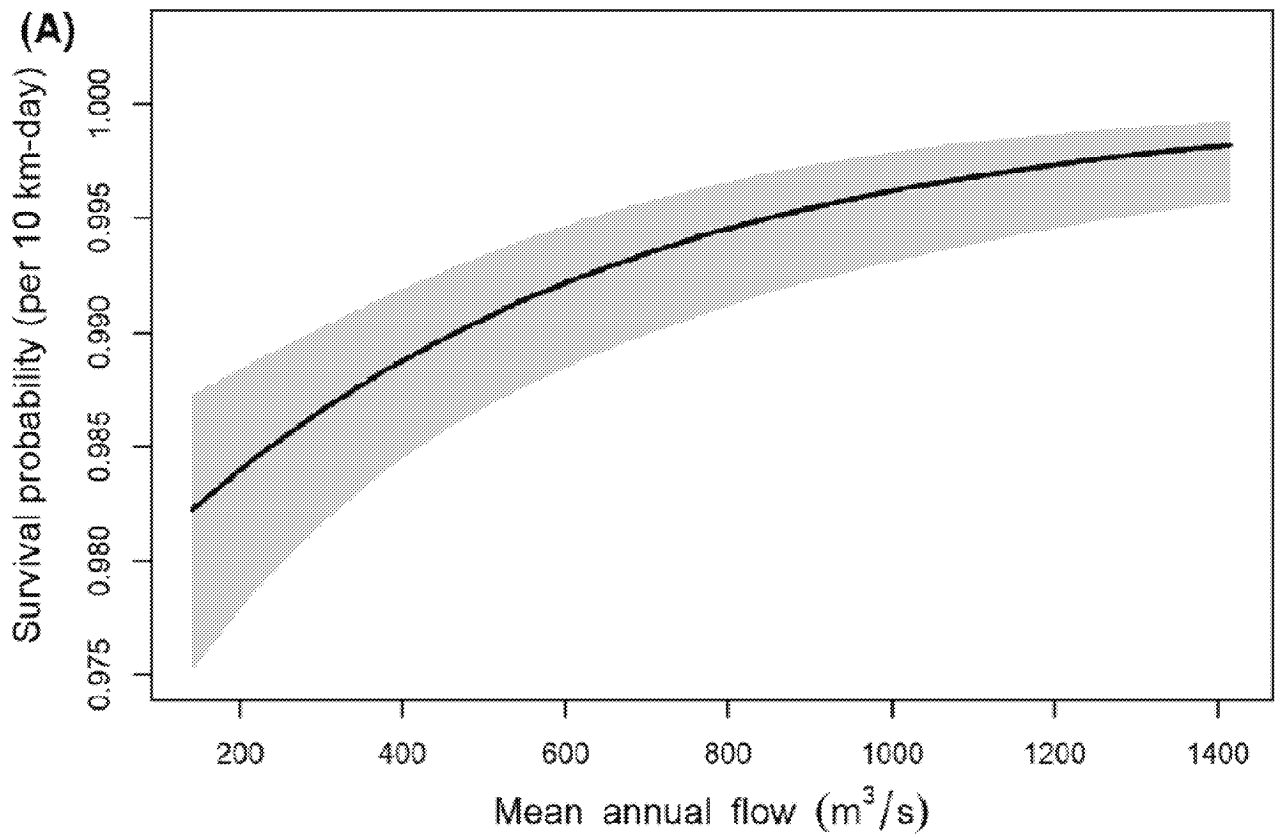
Doug

From: Obegi, Doug
Sent: Friday, March 25, 2022 10:52 AM
To: Kristal Davis-Fadtke <Kristal.Davis-Fadtke@wildlife.ca.gov>
Cc: jon@baykeeper.org
Subject: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Hi Kristal,

I wanted to make sure you were aware of this new paper, which finds that for winter-run Chinook salmon, juvenile migratory survival down the Sacramento River is reduced when flows are less than around 24,000 cfs / 700 cubic meters per second:

"For example, when flow is less than about 700 m3/s, given the confidence interval, pulse flows will have a high probability of having a positive effect on survival. The relationship also indicates what the magnitude of the effect may be. For example, when mean annual flow is 600 m3/s, a pulse flow is going to have half the effect of a pulse event than when mean annual flow is 200 m3/s."



This paper indicates that at least for hatchery winter-run Chinook salmon, higher bypass flow thresholds for Sites Reservoir than 10,700 cfs are necessary to fully mitigate impacts and avoid further reductions in juvenile survival of this endangered species.

Best,
Doug

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Friday, March 25, 2022 9:23 AM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

Attached is the published paper. Thanks for your interest.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:39 PM
To: Hassrick, Jason <Jason.Hassrick@icf.com>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Aha – thanks!

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Tuesday, February 1, 2022 12:38 PM
To: Obegi, Doug <dobegi@nrdc.org>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

We did not work up cumulative survival because that is something that Arnold is preparing for a separate paper. As I mentioned to you before, I'll send out the finalized paper to you after I go through the proofs. I should receive them from the journal this week.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:17 PM
To: arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Sorry, no, I was interested in whether y'all had calculated what the survival rate down the length of the Sacramento River would be at different flow levels, based on the survival rate per 10 km reach shown in the flow:survival curve in Figure 8A. In other words, converting the flow:survival graph in Figure 8A into survival down the entire river rather than per 10 km segment.

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 12:09 PM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,
We have overall river survival by year, and flow varies by year. Is that what you are looking for? I will pull up that data for you.
Arnold

On Tue, Feb 1, 2022 at 11:36 AM Obegi, Doug <dobegi@nrdc.org> wrote:

> While I have your ear… Did y'all calculate what the overall change in survival is in the Sacramento River at the different flow levels in Figure 8A (the cumulative change in survival over the entire river at the various flow levels on that curve, rather than the change per 10 km, assuming flows and other covariables held constant)?
>
> **From:** Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
> **Sent:** Tuesday, February 1, 2022 11:32 AM
> **To:** Obegi, Doug <dobegi@nrdc.org>
> **Cc:** miles.daniels@noaa.gov
> **Subject:** Re: FW: Request for pre-publication copy of your recent manuscript
>
> Great!
>
> On Tue, Feb 1, 2022 at 11:31 AM Obegi, Doug <dobegi@nrdc.org> wrote:
>
> > Yeah, it came through and I'm looking at it now.
> >
> > **From:** Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
> > **Sent:** Tuesday, February 1, 2022 11:32 AM
> > **To:** Obegi, Doug <dobegi@nrdc.org>
> > **Cc:** miles.daniels@noaa.gov
> > **Subject:** Re: FW: Request for pre-publication copy of your recent manuscript
> >
> > Were you able to download it? I got a system message saying it was too large.
> >
> > On Tue, Feb 1, 2022 at 11:24 AM Obegi, Doug <dobegi@nrdc.org> wrote:
> >
> > > Thanks Arnold! Look forward to reading the paper.
> > >
> > > Take care,
> > >
> > > Doug
> > >
> > > **From:** Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
> > > **Sent:** Tuesday, February 1, 2022 10:57 AM
> > > **To:** Obegi, Doug <dobegi@nrdc.org>
> > > **Cc:** miles.daniels@noaa.gov
> > > **Subject:** Re: FW: Request for pre-publication copy of your recent manuscript
> > >
> > > Hello Doug,
> > >
> > > Please find attached the early online version of the paper. Let me know if you have any questions about it.
> > >
> > > Cheers,
> > >
> > > Arnold

On Mon, Jan 31, 2022 at 1:49 PM Obegi, Doug <dobegi@nrdc.org> wrote:

Congratulations to you both on this new paper published in CJFAM! Very cool. Any chance that one of you has a pre-publication version that you could share with me?

From: Obegi, Doug
Sent: Monday, January 31, 2022 1:24 PM
To: jason.hassrick@icf.com
Subject: Request for pre-publication copy of your recent manuscript

Hi Jason,

I hope you're doing well these days. Congratulations on your new paper published in CJFAM! (https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1002/nafm.10748)

Do you have a pre-publication version of the manuscript that you would be willing to share with me, since the paper is currently not open access?

Thanks,

Doug

_____

DOUG OBEGI

*Senior Attorney**

Water Program

NATURAL RESOURCES
DEFENSE COUNCIL

111 SUTTER ST., 21ST FLOOR

SAN FRANCISCO, CA 94104

T 415.875.6100
DOBEGI@NRDC.ORG
NRDC.ORG

Please save paper.
Think before printing.

** Admitted to practice in California*

--

Arnold J. Ammann
National Marine Fisheries Service
Fisheries Ecology Division

110 McAllister Way
Santa Cruz, CA 95060
Tel: 831-331-9947
arnold.ammann@noaa.gov

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From: Micko, Steve/SAC [Steve.Micko@jacobs.com]
Sent: 4/26/2022 5:16:47 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Whittington, Chad/SAC [Chad.Whittington@jacobs.com]; Heydinger, Erin [erin.heydinger@hdrinc.com]
Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

Great! Glad things are working out.
Always happy to chat with him too.

Best,
Steve

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, April 26, 2022 5:11 PM
To: Whittington, Chad/SAC <Chad.Whittington@jacobs.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>
Subject: [EXTERNAL] RE: Question regarding the Sites Reservoir Daily Diversion Tool

Hi all – Doug said the works around are working for them and they don't need to have a call. So no need to hold time for this. I did let him know that we are happy to chat if he is having any more challenges.

Ali

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Subject: RE: Question regarding the Sites Reservoir Daily Diversion Tool

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Wednesday, 4/27: before 12 pm or 1-3 pm
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Would you and Ashley be good to get on the phone next week to discuss? From there, we can either walk you through the work arounds or we can revise the tool and get you a revised version.

I need to coordinate with the Jacobs team on their availability, but if you'd like to chat, let me know if there are days/times that work for you next week. I'll get those over to the Jacobs team and get something on the calendar. In the meantime, we'll work on getting you an email with workarounds in the next day or so.

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Cc: Cooper, Ashley <ACooper@nrdc.org>
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Jerry

From: Doug Obegi <dobegi@nrdc.org>
Date: Thursday, April 14, 2022 at 3:27 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>
Subject: FW: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Dear Jerry and Ali,

Thank you again for sending us the daily diversion tool, and to Jerry for coffee/tea the other morning. I wanted to follow up with two things for you:

First, I wanted to make sure that you were aware of this new peer reviewed scientific study which concludes that for juvenile winter-run Chinook salmon, migratory survival down the Sacramento River is reduced when flows are less than approximately 24,000 cfs (equivalent to 700 cubic meters per second). We've submitted this paper to CDFW (see

below), and wanted to make sure that this was included in the JPA's administrative record for NEPA/CEQA since this was new information that was not available at the time of the public comment period on the EIS/EIR.

Second, we've been analyzing the potential changes in water diversions to storage using the daily diversion tool, and it appears that the proposed change to the bypass flow of 10,700 cfs from Oct to June results in an approximately 25% reduction in diversions to storage. It sounds like that is similar to what y'all are finding (our numbers are lower than what WRMWSD reported to their Board). In addition, as we have been exploring the model, we're not sure that the Delta outflow requirements in the model are actually working to limit water diversions to storage. It may be (probably is!) user error on our part, but if we're not able to get the model to work right in the next week or two we may want to check in to make sure the model is actually working correctly.

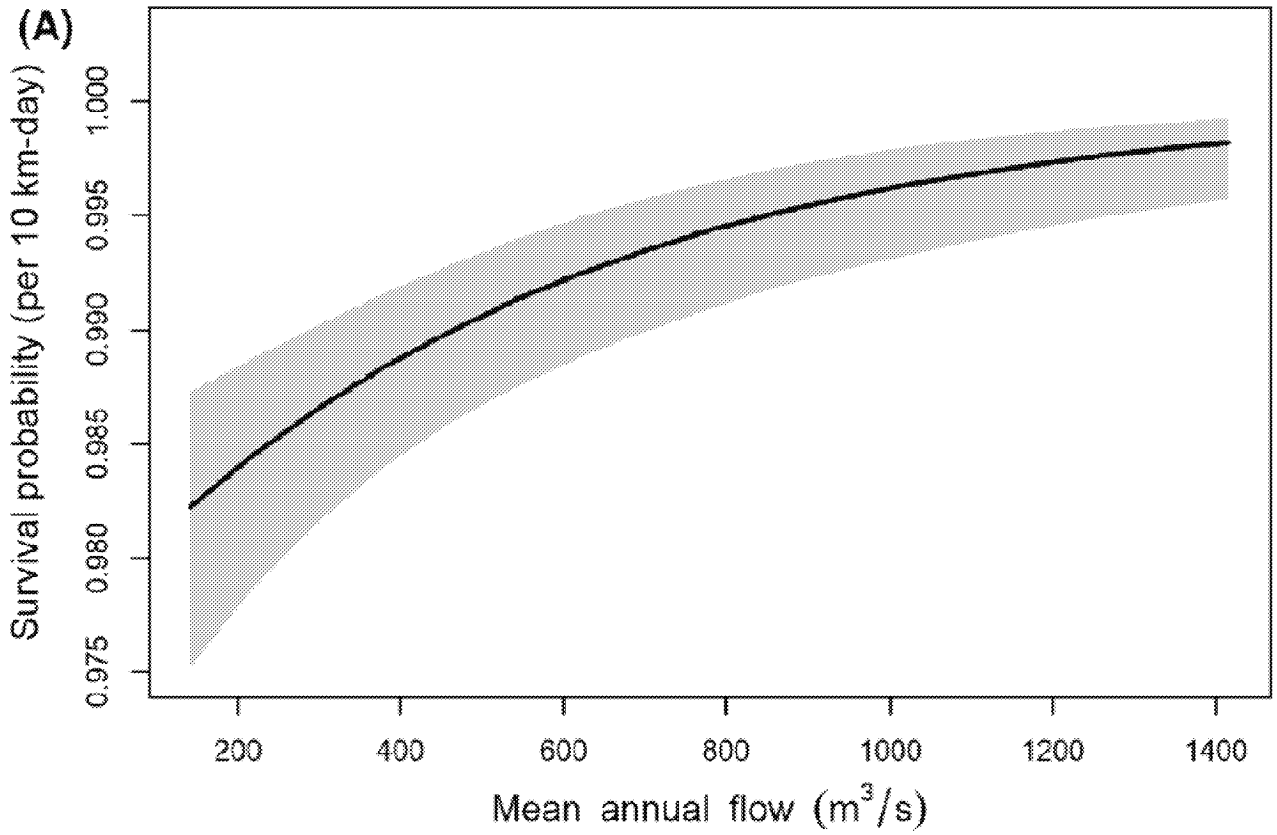
Thanks,
Doug

From: Obegi, Doug
Sent: Friday, March 25, 2022 10:52 AM
To: Kristal Davis-Fadtke <Kristal.Davis-Fadtke@wildlife.ca.gov>
Cc: jon@baykeeper.org
Subject: New study concludes Sac River flows less than 21,000 cfs reduce winter-run survival

Hi Kristal,

I wanted to make sure you were aware of this new paper, which finds that for winter-run Chinook salmon, juvenile migratory survival down the Sacramento River is reduced when flows are less than around 24,000 cfs / 700 cubic meters per second:

"For example, when flow is less than about 700 m3/s, given the confidence interval, pulse flows will have a high probability of having a positive effect on survival. The relationship also indicates what the magnitude of the effect may be. For example, when mean annual flow is 600 m3/s, a pulse flow is going to have half the effect of a pulse event than when mean annual flow is 200 m3/s."



This paper indicates that at least for hatchery winter-run Chinook salmon, higher bypass flow thresholds for Sites Reservoir than 10,700 cfs are necessary to fully mitigate impacts and avoid further reductions in juvenile survival of this endangered species.

Best,
Doug

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Friday, March 25, 2022 9:23 AM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

Attached is the published paper. Thanks for your interest.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:39 PM
To: Hassrick, Jason <Jason.Hassrick@icf.com>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Aha – thanks!

From: Hassrick, Jason <Jason.Hassrick@icf.com>
Sent: Tuesday, February 1, 2022 12:38 PM

To: Obegi, Doug <dobegi@nrdc.org>; arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,

We did not work up cumulative survival because that is something that Arnold is preparing for a separate paper. As I mentioned to you before, I'll send out the finalized paper to you after I go through the proofs. I should receive them from the journal this week.

Jason

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Tuesday, February 1, 2022 12:17 PM
To: arnold.ammann <arnold.ammann@noaa.gov>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: RE: FW: Request for pre-publication copy of your recent manuscript

Sorry, no, I was interested in whether y'all had calculated what the survival rate down the length of the Sacramento River would be at different flow levels, based on the survival rate per 10 km reach shown in the flow:survival curve in Figure 8A. In other words, converting the flow:survival graph in Figure 8A into survival down the entire river rather than per 10 km segment.

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 12:09 PM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov; Hassrick, Jason <Jason.Hassrick@icf.com>; Perry, Russell <rperry@usgs.gov>
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hi Doug,
We have overall river survival by year, and flow varies by year. Is that what you are looking for? I will pull up that data for you.
Arnold

On Tue, Feb 1, 2022 at 11:36 AM Obegi, Doug <dobegi@nrdc.org> wrote:

> While I have your ear… Did y'all calculate what the overall change in survival is in the Sacramento River at the different flow levels in Figure 8A (the cumulative change in survival over the entire river at the various flow levels on that curve, rather than the change per 10 km, assuming flows and other covariables held constant)?

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 11:32 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Great!

On Tue, Feb 1, 2022 at 11:31 AM Obegi, Doug <dobegi@nrdc.org> wrote:

> Yeah, it came through and I'm looking at it now.

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 11:32 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Were you able to download it? I got a system message saying it was too large.

On Tue, Feb 1, 2022 at 11:24 AM Obegi, Doug <dobegi@nrdc.org> wrote:

> Thanks Arnold! Look forward to reading the paper.
>
> Take care,
>
> Doug

From: Arnold Ammann - NOAA Federal <arnold.ammann@noaa.gov>
Sent: Tuesday, February 1, 2022 10:57 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: miles.daniels@noaa.gov
Subject: Re: FW: Request for pre-publication copy of your recent manuscript

Hello Doug,

Please find attached the early online version of the paper. Let me know if you have any questions about it.

Cheers,

Arnold

On Mon, Jan 31, 2022 at 1:49 PM Obegi, Doug <dobegi@nrdc.org> wrote:

> Congratulations to you both on this new paper published in CJFAM! Very cool. Any chance that one of you has a pre-publication version that you could share with me?

From: Obegi, Doug
Sent: Monday, January 31, 2022 1:24 PM
To: jason.hassrick@icf.com
Subject: Request for pre-publication copy of your recent manuscript

Hi Jason,

I hope you're doing well these days. Congratulations on your new paper published in CJFAM! (https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1002/nafm.10748)

Do you have a pre-publication version of the manuscript that you would be willing to share with me, since the paper is currently not open access?

Thanks,

Doug

DOUG OBEGI

*Senior Attorney**

Water Program

NATURAL RESOURCES
DEFENSE COUNCIL

111 SUTTER ST., 21ST FLOOR
SAN FRANCISCO, CA 94104
T 415.875.6100
DOBEGI@NRDC.ORG
NRDC.ORG

Please save paper.
Think before printing.

* *Admitted to practice in California*

--

Arnold J. Ammann
National Marine Fisheries Service
Fisheries Ecology Division
110 McAllister Way
Santa Cruz, CA 95060
Tel: 831-331-9947
arnold.ammann@noaa.gov

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From: Edward Ring [ed@edwardring.com]
Sent: 4/27/2022 10:34:51 AM
To: Kevin Spesert [kspesert@sitesproject.org]
CC: Jerry Brown [jbrown@sitesproject.org]; Jeff Sutton (jsutton@tccanal.com) [jsutton@tccanal.com]; Keith Dunn (keithdunn@me.com) [keithdunn@me.com]
Subject: At what rate can Sites be filled during storms?

Kevin,

Please let me know if you will be able to answer my final follow up question. I am on a deadline to complete my report.

How fast Sites can be filled during storms is an important variable to include. Is there a range of GPS rates still being considered, or is this still completely up in the air? Is this a sensitive topic that cannot be discussed?

If possible it would be great to hear from you on this.

Thank you,

Edward Ring
916-524-7534

On 4/25/2022 1:06 PM, Edward Ring wrote:

Kevin,

To follow up on the voicemail I just left for you, this email is to ask what the current design for Sites estimates to be the rate at which water can be pumped into the reservoir.

If this is not settled yet, can you at least provide me a range of rates being considered? GPS, acre feet per day, whatever.

Having this information will offer insight into how much runoff Sites will be able to collect during major storms.

Thank you,

Edward Ring
916-524-7534

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From: Edward Ring <ed@edwardring.com>
To: Kevin Spesert <kspesert@sitesproject.org>
CC: Jerry Brown <jbrown@sitesproject.org>, Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>, Keith Dunn (keithdunn@me.com) <keithdunn@me.com>

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First of all please call me Ed. Thank you for your email.

I have one follow up question:

How fast can water be pumped into the proposed Sites Reservoir. The Preliminary Project Description (page 2-3) says "Alternative Value Planning (VP) 5 involved a 1.3 million-acre-feet (MAF) reservoir and used an existing regulating reservoir (Funks Reservoir) and a new regulating reservoir (the Terminal Regulating Reservoir [TRR]) to fill Sites Reservoir with releases (1,000 cubic feet per second [cfs]) from the southern end of the TC Canal through a pipeline that went to the CBD."

I'm not sure I understand this. I believe it says the fill rate is 1,000 CFS, which equates to 265 acre feet per day. But that's not very much, since that means it would take 1,000 days to add 265,000 acre feet, which is only 18 percent of the reservoir's planned capacity.

So I'm missing something. What is the planned rate at which Sites can be filled?

Thank you,

Ed

On 4/15/2022 5:09 PM, Kevin Spesert wrote:

Mr. Ring,

Here are the answers to your questions from the email below.

1 - The Authority...since its founding in 2010 and through its development of the project...has proposed and worked to advance a 1.8-million-acre foot reservoir as its maximum sized project.

2 - The Authority proposed a 1.8-million-acre foot reservoir as part of its Proposition 1 WSIP proposed project

3 - As part of a value planning process conducted in 2019-2020, the Authority right-sized the project to address project affordability, permitting and constructability challenges. This process resulted in an Authority proposed 1.5 million-acre-foot reservoir...which is the reservoir size the Authority is currently advancing.

3A - There are 2 major dam sites for the project. The Sites Dam is approximately 267 feet high and the Golden Gate Dam is approximately 287 feet high. It is important to note that we are still in the preliminary engineering phase of the project and the sizes of the dam structures could change. The current estimated project cost is approximately $4.0 billion, however this number will continue to be refined as more project development activities are completed over the next couple of years (engineering, design, geotechnical investigations, permitting, etc.)

4 - Pump storage was included in the Authority's WSIP proposed project. However, as part of the value planning process mentioned in answer 3…it was removed from the project due to affordability, permitting and constructability concerns.

Here is a link to our website that includes links to several of the resource documents for the project https://sitesproject.org/project-documents/

And here is a link to our recirculated revised draft EIR/EIS…there is a lot of background information located here https://sitesproject.org/environmental-review/

Please feel free to give me a call if you have any additional questions.

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone (530) 632-4071

From: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, April 15, 2022 12:42 PM
To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Subject: Re: Questions about the Sites Project

Edward, I would direct these questions to the Sites JPA staff. I haves cc'ed the Executive Director Jerry Brown hereto.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
P.O. Box 1025
Willows, CA 95988
Ph: (530) 934-2125
Cell: (530) 301-1030
jsutton@tccanal.com

Sent from my I Phone

On Apr 15, 2022, at 12:18 PM, Edward Ring <ed@edwardring.com> wrote:

Jeffrey,

This email is to ask you some questions about the Sites Reservoir project that I cannot find on your website. You may recall I worked last year on an attempt to qualify an initiative to fund water projects. I am working now on a report in support of the Sites Project and other water projects and need some information. It seems to me that you or someone you can refer me to would know the answers to these few questions. I am on a deadline and am hoping to get some answers in the next few days which is why I am contacting you. Here they are:

1 - What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?

2 - What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?

3 - What is the current proposed storage capacity?

If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

For all three questions, I'm not asking about the projected annual yield. I'm asking how much water would the reservoir hold if it was full.

Also,

4 - Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?

Any details and any source documents you can provide either via PDF or URLs would be much appreciated.

Thank you,

Edward Ring
916-524-7534

--

Edward Ring
https://MoreWaterNow.com
916-524-7534

--

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https://MoreWaterNow.com
916-524-7534

From: Kevin Spesert [kspesert@sitesproject.org]
Sent: 4/27/2022 11:28:43 AM
To: JP Robinette [jrobinette@sitesproject.org]; Luu, Henry [Henry.Luu@hdrinc.com]
Subject: FW: At what rate can Sites be filled during storms?

Per our discussion

From: Edward Ring <ed@edwardring.com>
Sent: Wednesday, April 27, 2022 10:35 AM
To: Kevin Spesert <kspesert@sitesproject.org>
Cc: Jerry Brown <jbrown@sitesproject.org>; Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>; Keith Dunn (keithdunn@me.com) <keithdunn@me.com>
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From: JP Robinette [jrobinette@sitesproject.org]
Sent: 4/27/2022 1:41:37 PM
To: Luu, Henry [Henry.Luu@hdrinc.com]; Kevin Spesert [kspesert@sitesproject.org]
Subject: Re: At what rate can Sites be filled during storms?

I agree with your math (just checked it). I think this is good to go.

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Wednesday, April 27, 2022 11:54 AM
To: Kevin Spesert <kspesert@sitesproject.org>; JP Robinette <jrobinette@sitesproject.org>
Subject: RE: At what rate can Sites be filled during storms?

Kevin,

Assuming a 1.5 million acre-feet (MAF) reservoir capacity and a max diversion rate of 3,900cfs (2,100cfs from the TCC and 1,800cfs from the GCID), the math is as follows:

- Conversion factor of 43559.9 cubic-feet (converting from acre-foot to cubic-foot)
- It will take about 194 days to divert 1.5MAF

Henry M. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Kevin Spesert <kspesert@sitesproject.org>
Sent: Wednesday, April 27, 2022 11:29 AM
To: JP Robinette <jrobinette@sitesproject.org>; Luu, Henry <Henry.Luu@hdrinc.com>
Subject: FW: At what rate can Sites be filled during storms?

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Per our discussion

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Cc: Jerry Brown <jbrown@sitesproject.org>; Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>; Keith Dunn (keithdunn@me.com) <keithdunn@me.com>
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4 - Pump storage was included in the Authority's WSIP proposed project. However, as part of the value planning process mentioned in answer 3...it was removed from the project due to affordability, permitting and constructability concerns.

Here is a link to our website that includes links to several of the resource documents for the project https://sitesproject.org/project-documents/

And here is a link to our recirculated revised draft EIR/EIS...there is a lot of background information located here https://sitesproject.org/environmental-review/

Please feel free to give me a call if you have any additional questions.

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone (530) 632-4071

From: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, April 15, 2022 12:42 PM
To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Subject: Re: Questions about the Sites Project

Edward, I would direct these questions to the Sites JPA staff. I haves cc'ed the Executive Director Jerry Brown hereto.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
P.O. Box 1025
Willows, CA 95988
Ph: (530) 934-2125
Cell: (530) 301-1030
jsutton@tccanal.com

Sent from my I Phone

On Apr 15, 2022, at 12:18 PM, Edward Ring <ed@edwardring.com> wrote:

Jeffrey,

This email is to ask you some questions about the Sites Reservoir project that I cannot find on your website. You may recall I worked last year on an attempt to qualify an initiative to fund water projects. I am working now on a report in support of the Sites Project and other water projects and need some information. It seems to me that you or someone you can refer me to would know the answers to these few questions. I am on a deadline and am hoping to get some answers in the next few days which is why I am contacting you. Here they are:

1 - What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?

2 - What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?

3 - What is the current proposed storage capacity?

If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

For all three questions, I'm not asking about the projected annual yield. I'm asking how much water would the reservoir hold if it was full.

Also,

4 - Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?

Any details and any source documents you can provide either via PDF or URLs would be much appreciated.

Thank you,

Edward Ring
916-524-7534

--
Edward Ring
https://MoreWaterNow.com
916-524-7534

--
Edward Ring
https://MoreWaterNow.com
916-524-7534

STATEMENT OF WORK (SOW)

1. **Public Law**, including Section and Sub-section verbatim, which provides Reclamation authority to award Financial Assistance for this project. Provide a statement that directly relates the activities to be funded to the referenced authority.

The Sites Reservoir Project is administered in accordance with Section 4007 of the Water Infrastructure Improvements for the Nation Act (WIIN Act; P.L. 114-322, Dec 16, 2016) from Department of the Interior, Bureau of Reclamation which provides federal support for the construction of state-led surface water storage projects in the 17 arid reclamation states.

2. **Background**: *Clear background for program and project.*

The Sites Reservoir is a proposed off-stream reservoir that will be filled by pumping water from the Sacramento River. The project includes the Sites Reservoir and new facilities to integrate with both the existing Tehama-Colusa Canal (TC Canal) and Glenn-Colusa Irrigation District (GCID) Main Canal. Once constructed, the Sites Reservoir will be one of the state's largest reservoirs and will substantially increase surface water storage in the Sacramento Valley. The project's facilities will be independently owned and operated by the Authority under its own water rights and other regulatory requirements, in cooperation with the U.S. Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR)—operators of the Central Valley Project (CVP) and State Water Project (SWP), respectively.

Water Infrastructure Improvements for the Nation (WIIN) Act funding will allow the project to provide operations modeling and feasibility- and preliminary-level designs while also supporting the right-of-entry and landowner coordination required to complete the geotechnical field work. The project scope is funding-limited, and deliverables are identified based on the level of funding available to the project. The scope outlined in the following sections will allow the Authority to support the development of the revised Draft EIR/EIS and prepare feasibility- and preliminary-level designs.

3. **Non-Competitive Selection (if applicable Per ACM 01-02):** *The merit based selection of a recipient for a financial assistance agreement through any means other than a competition must follow the noncompetitive selection process. A non-competitive selection may be made as either a discretionary or non-discretionary selection.*

    (1) Mandatory/Non-Discretionary. Selection of a recipient for a financial assistance agreement may be made without competition if Reclamation has no discretion in regards to the selection of the recipient for the proposed award. Non-discretionary selection must be based on either a statutorily mandated recipient or on other preexisting

agreements or arrangements which remove Reclamation's discretion in the selection process.

(2) Discretionary Selection. Non-competitive selection of a financial assistance recipient may be made on a discretionary basis when circumstances would limit selection to a single entity. The justification must include how the selection is both based upon merit and in the best interest of the government. The allowable justifications for a non-competitive discretionary selection are as follows.

(a) Unsolicited Proposal. The proposed recipient submitted an unsolicited application for funding for a project or activity which represents a unique or innovative idea, method, or approach which is not the subject of a current or planned contract, financial assistance agreement, or funding opportunity, but is deemed advantageous to the funding program's objectives.

(b) Continuation. The activity to be funded is necessary for the satisfactory completion of, or is a continuation of an activity currently being funded, and for which competition would have a significant adverse effect on the continuity of the activity.

(c) Unique Qualifications. The proposed recipient is uniquely qualified to perform the activity based upon a variety of demonstrable factors such as location, property ownership, technical expertise, or other factors which preclude other entities from performing the proposed activities.

(d) Legislative Intent. The language in the applicable authorizing legislation or legislative history clearly indicates Congress' intent to restrict the award to a particular recipient.

(e) Emergencies. There is insufficient time available for an adequate competitive process due to a compelling or urgent circumstance such as a substantial danger to health or safety.

Pursuant to Reclamation's Directives and Standard ACM 01-02 Section 5 A. (2)(b), Reclamation's Discretionary Selection of Sites Reservoir Authority is based on the continuation of funding for a project that has received past funding.

4. **Public Purpose (grants and cooperative agreements must have this)**: *Prove sufficient explanation as to how the project will assist the recipient in accomplishing its public purpose/needs, which are authorized by the public law. Demonstrate that the project is not primarily for the direct benefit of Reclamation or other Federal government agencies.*

Sites has requested funding to apply towards modeling, engineering, geotechnical and real estate services. These services provide the foundation by which the Sites Reservoir Authority can

accomplish its ultimate vision, to provide affordable water that is sustainably managed for California's farms, cities, and environment for generations to come. Funding moves the Sites Project closer to providing California the benefits the reservoir project is being designed to provide. These benefits include improved water supply, improved water supply reliability, incremental Level 4 water supply for refuges, improved survival of anadromous fish, enhance the Delta ecosystem, provide opportunities for recreation, and provide flood damage reduction. These benefits reach the general public, the environment, the economy, as well as local, state, and federal agencies.

5. **Objectives**: *Describe specifically what the agreement will be accomplishing; demonstrating that it is an undertaking of a clearly defined objective that supports the purpose.*

The agreement will accomplish 4 objectives that directly support the purpose of the Sites Reservoir Project.

Objective 1:
The operations modeling performed under this agreement will provide analysis needed to support permitting efforts and water rights applications. This includes the EIR/EIS, Biological Assessment/Incidental Take Permit and future climate change scenarios. This objective will also develop Version 1 of the Sites Reservoir Operations Plan.

Objective 2:
The Engineering tasks performed under this agreement will provide the preliminary hydraulics modeling, a Class IV cost estimate, a DSOD engagement plan, a constructability analysis, a program design/construction/permit and implementation schedule, an environmental feasibility support and the preparation of a Geotechnical Permit Planning and Investigation Plan. Preliminary engineering efforts will advance the design to 30%.

Objective 3:
The geotechnical tasks performed under this agreement will consist of field data collection, preparing geotechnical data reports, preliminary planning for design, and work plans for design-level geologic and geotechnical data needs.

Objective 4:
The real estate tasks performed under this agreement involves the engagement of up to 25 landowners/tenants/entities for temporary right-of-entry access.

6. **Benefits:** *Explain the benefits to be derived from the performance of the project. Demonstrate that the activity to be undertaken is of a public benefit and is in furtherance of Reclamation mission.*

The Sites Reservoir Project will offer several benefits to California on the state, regional, and local level.

Improve Water Supply and Water Supply Reliability. The water stored and released from Sites Reservoir will allow for improved water supply and reliability for participants in the project and California on the state, regional, and local level.

Provide Incremental Level 4 Water Supply for Refuges. The State has committed to invest in incremental Level 4 water supply for refuges at an undetermined level. Level 4 refuge demand is located primarily south of the Sacramento-San Joaquin Delta (Delta).

Improve the Survival of Anadromous Fish. The Authority is supportive of actions that benefit salmon, steelhead, and other anadromous fish species of concern in the Sacramento River watershed. Exchanges with Reclamation enable the conservation of the coldwater pool in Shasta and Folsom Lakes. The species benefit from improved coldwater pool management, lower river water temperatures, and supplemental flows to prevent the dewatering of redds.

Enhance the Delta Ecosystem. Water released from Sites Reservoir would be conveyed to the Yolo Bypass toe drain to convey biomass to the Delta to help supply food for Delta smelt.

Provide Opportunities for Recreation. State funding will support the construction of new recreation facilities, including the Stone Corral Creek Recreation Area on the east side of the reservoir, a boat ramp on the west side of the reservoir, and the Peninsula Hills Recreation Area on the west side of the reservoir.

Provide Flood Damage Reduction. Once completed, Sites Dam will reduce the likelihood of flooding in the Stone Corral Creek watershed, and Golden Gate Dam will improve flood damage reduction for extreme events on Funks Creek.

7. **Period of Performance:** *(date of execution through month/date/year). Agreements and/or modifications **will not** exceed a total of 5 years.*

   January 1, 2021 through June 30, 2023

8. **Scope of Work**: *MUST have detailed descriptions of project objectives. The project plan must describe, in detail, the activities to be undertaken, including the proposed work, reporting, major tasks, and project milestones including the identification of the anticipated start and ending dates of all major stages/objectives of the project proposal.*

Descriptions of the objectives of the project activities funded under this agreement are provided below.

Objective 1 – Operations Modeling

Operations modeling will evaluate the operations for up to three alternatives to be included in the EIR/EIS. This will also include modeling support for the Biological Assessment (BA)/Incidental Take Permit (ITP) and future climate change scenarios. This task will provide additional analysis of the preferred alternative specific to preparation of the BA/ITP and other analyses needed to support permitting efforts and water rights application. This task will also include fisheries modeling, climate change analysis of potential future hydrologic and sea level rise conditions, and mercury modeling with a qualitative assessment of mercury effects.

This task will also involve develop Version 1 of the Sites Reservoir Operations Plan.

Major Tasks:

- Full operations analysis
- EIR/EIS modeling support
- BA/ITP modeling support
- Develop documentation for EIR/EIS
- Develop documentation for BA/ITP
- Operations Plan, Version 1

Objective 1 Outcome: Modeling will support the revised Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)

Objective 2 – Engineering

Engineering efforts will support the environmental impact assessment of the preferred project identified through the value planning process. Work will include completing feasibility-level designs and drawings of project features. This information will be used in estimating quantities and assessing impacts, assessing haul routes, identifying construction activities and schedules, and identifying key operation and maintenance activities for the EIS/EIR.

The engineering task will provide the preliminary hydraulics modeling, providing three types of models that are needed to size the facility components to meet the needs of the project. A Class IV cost estimate, including mitigation measures, will be developed for the facilities and associated mitigation measures developed by the environmental/permitting team. The engineering technical feasibility will include confirming public benefits and non-public benefits that will be quantified using physical and monetary measures. A benefits-based cost allocation will be included to support the demonstration of economic feasibility. A benefit-to-cost ratio will be developed to demonstrate that the expected benefits of the project equal or exceed the expected costs. The cost allocation will also be used to develop a cost assignment for the project; this information will demonstrate that sufficient funds will be available from public and non-public sources.

Engineering will provide a constructability analysis to demonstrate that the facilities can be constructed using existing technology and availability of construction materials, work force, and equipment. This effort may include evaluating and identifying feasible construction methods, viable materials and sources, construction phasing, site access, potential haul routes, temporary and permanent bridges, coffer dams in water bodies to allow construction in the dry, potential tunneling methods, long-lead items and durations, time periods when delivery of irrigation water can and cannot be interrupted, and flood constraints in the Colusa Basin Drain and Sacramento River. As the project progresses from preliminary to final design, it is expected that the constructability analysis will be updated and refined.

Based on the feasibility-level designs, engineering will develop a Program Design/Construction/Permit and Implementation Schedule, along with a Geotechnical Permit Planning and Investigation Plan that will include the execution of the feasibility-phase geotechnical exploration program that was conducted in 2020 and 2021.

Environmental feasibility will include conducting a feasibility-level design for the purpose of supporting the feasibility-level project description, construction cost estimates, and environmental documentation and permitting. This effort is needed to achieve the facility definition required for Class IV cost estimates and the information required for the Draft EIS/EIR. This will also include confirming environmental feasibility with mitigation.

Development of the Geotechnical Investigation Work Plans (GIWPs) for the final design phase will involve coordination with the geotechnical team, which will provide the details of the investigation methodology. Two GIWPs will be prepared: one for DSOD jurisdictional facilities (dams, inlet/outlet tower and tunnels, and spillway) and one for non-DSOD jurisdictional facilities (roads and bridge).

Preliminary engineering efforts will also be undertaken to advance from feasibility-level design (10%) to preliminary design (30%). This will be carried out for the preferred project, as identified in the Draft EIR/EIS.

Major Tasks:

- Preliminary hydraulics model
- Class IV cost estimate
- DSOD engagement plan
- Engineering – technical feasibility
- Environmental feasibility support (project design/feasibility design)
- Geotechnical Permit Planning and Investigation Plan
- Preliminary engineering

Objective 2 Outcome: Supports the environmental impact assessment of the preferred project identified through the value planning process.

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Objective 3 – Geotechnical

The geotechnical task involves work associated with planning, permitting, and execution of field data collection and support for Reclamation field teams at a select number of exploration points. The field data collection will inform and support the Sites Authority Feasibility Study and further development of the overall project description.

This task will include conducting field data collection in the Funks to TRR area and the proposed Dunnigan pipeline alignment area extending from the TCC to the Sacramento River. It will also include conducting a borrows study of TRR pipeline alignment soils and the location soils based on findings from the field exploration.

This task involves preparing two geotechnical data reports corresponding with field data collection activities. Each report will summarize all research and field activities conducted relevant to the study area, with chapters outlining findings and conclusions based on the information gathered during desktop and field activities, and specific chapters addressing data requests. Reports will be complete with field data logs, CPT and field survey reports completed by Reclamation, a geologic and geomorphic study technical memorandum completed by Fugro, borrow studies completed by Fugro, site plans depicting limits of the study, data locations and significant findings, and figures showing our interpretation of findings.

Preliminary planning for design-level geologic and geotechnical engineering investigations involves conducting a data gap assessment of geologic and geotechnical data needs related to each facility/feature proposed for the project.

Work plans for design-level geologic and geotechnical engineering investigations involves preparing two geologic and geotechnical engineering work plans describing the need for and methods to be used during design-level geologic and geotechnical engineering investigations.

Major Tasks:

- Field data collection work plan/cost estimate
- Geotechnical data reports
- Preliminary planning for design
- Site plan with proposed borings

Objective 3 Outcome: Inform and support the Sites Authority Feasibility Study and further development of the overall project description.

Objective 4 – Real Estate

The real estate task involves work associated with land, real estate, right-of-way, interagency coordination, and public/landowner engagement considerations in support of the engineering, environmental, permitting, geotechnical, and communications efforts for the Sites Reservoir

Project, in addition to programmatic real estate development for near-term land access, future land needs, land acquisition, and land management, in support of the Authority's objectives. This assumes an effort of engaging up to 25 landowners/tenants/entities for temporary right-of-entry access.

Major Tasks:

- Real estate landowner coordination

Objective 4 Outcome: Coordination with landowners regarding project developments

9. **Milestones/Timeline/Schedule**: *The project plan must describe, in detail, the activities to be undertaken, including the proposed work, reporting, major tasks, and project milestones including the identification of the anticipated start and ending dates of all major stages/tasks of the project proposal. It is highly recommended that the milestones within the SOW are constructed around the reporting frequency. For example, if the reporting frequency is semi-annual, then there would be milestones for each semi-annual period.*

A schedule with tasks and deliverables is presented below:

Task No.	Task	Deliverable	Estimated Start Date	Estimated Completion Date
01	Operations Modeling	Full operations analysis complete	11/23/20	03/30/21
01	Operations Modeling	Operations plan, Version 1	11/01/20	12/31/21
01	Operations Modeling	Appendices for BA/ITP	03/01/22	07/01/22
02	Engineering	Preliminary hydraulics modeling	09/01/20	06/30/21
02	Engineering	Class IV estimate	09/01/20	06/30/21
02	Engineering	Technical feasibility	10/01/20	02/28/22
02	Engineering	Environmental feasibility	09/01/20	12/30/21
02	Engineering	Geotechnical permit planning	11/01/20	02/20/22
02	Engineering	Preliminary engineering	01/03/22	12/30/22
03	Geotechnical	Geotechnical work plans	11/01/20	08/30/21
03	Geotechnical	Field data collection	01/04/21	08/30/21
03	Geotechnical	Date evaluation and reporting	01/04/21	10/30/21
04	Right-of-way	Right-of-entry	01/01/21	12/30/22

10. **Recipient Responsibilities:** *If the SOW contains construction activities, the Recipient is responsible for construction inspection, oversight, and acceptance. If applicable, the Recipient shall also coordinate and obtain approvals from site owners and operators.*

Responsibilities of Sites Project Authority:

The responsibilities of Sites Project Authority are described below and incorporated as part of this Agreement.

1. Perform all tasks specified in the proposal.

2. Ensure that project activities are in compliance with all relevant local, State, and Federal regulations.

3. Recognize the contribution of Reclamation through documents and in any public statements, publications, or signage relevant to the project.

4. Comply with the reporting and distribution requirements of this Agreement. Submit reports and correspondence to:

Vanessa King
Grants Officer Technical Representative
Bureau of Reclamation
2800 Cottage Way
Sacramento CA 95825

5. Provide Reclamation with manuscripts published in scientific journals, as data warrant. Promptly provide to Reclamation, at the Recipient's sole cost, electronic files of all field data, photographs, and research products including reports, analyses, databases, and models, as applicable, that are produced by the Recipient in connection with the investigations undertaken through this Agreement, whether published or not.

If the agreement is a Cooperative Agreement, the proposal must include both the responsibilities of the recipient and of Reclamation. Please review the information below:

11. **Reclamation Responsibilities: (REQUIRED IF COOPERATIVE AGREEMENT)** Must clearly state as to how Reclamation's responsibilities constitute *"substantial involvement."* in which the GOTR participates and collaborates jointly with the recipient partner, volunteer, scientist, technician, or other personnel, in carrying out the scope of work, trains recipient personnel, or details federal personnel to work on the project effort.

If Substantial involvement between Reclamation and the Recipient is anticipated during the performance of this Agreement, then add the following statement and outline the activities

and responsibilities that Reclamation will perform in support of the agreement that constitute substantial involvement:

Substantial involvement by Reclamation is anticipated during the performance of activities funded under this cooperative agreement. In support of this Agreement, Reclamation will be responsible for the following:

Cooperative Agreements must include the responsibilities of the recipient and of Reclamation:

Responsibilities of Reclamation:

1. Act as Federal liaison in the conveyance of funding from Reclamation to the Regents of the University of California, Oakland.

2. Assist in the preparation of project reports submitted by Sites Project Authority and coordinate and attend meetings with stakeholders to analyze and synthesize data.

3. Actively participate in restoration work in order to ensure compliance with the National Environmental Policy Act and Endangered Species Act. Sites Project Authority and the Bureau of Reclamation Area Office will work together to obtain all applicable state and local permits for work to be performed under this grant.

12. **Budget:** *As an Attachment, must provide a DETAILED budget (including Reclamation, Recipients and other entity contribution) using the Recommended Budget Table Format. Budget documents must include supporting documents for each line items (with justification), an approved indirect cost rate, if applicable. Budget must be reviewed and approved by GOTR before submitting to MP-3800.*

13. **Pre-Award Incurrence of Costs:** *Provide date with justification. Incurrence of costs is authorized (if approved by the GO) if the cost was incurred after the agreement was entered into, and would have been allowable, allocable, and reasonable under the terms and conditions of the agreement.*

The Applicant will submit a request for approval of the pre-award incurrence of costs effective from January 1, 2021.

14. **Cost Sharing Requirement:** (*List of participants/collaborators (including type of recipient and amount). If program authority requires a cost share/match, provide a copy of the Public Law, section and sub-section, verbatim.*

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At least 50% non-Federal cost-share is required for costs incurred under this Agreement. If pre-award costs are authorized, reimbursement of these costs is limited to federal cost share percentage identified in this agreement.

Funding Source	Original Funding Amount ($)	Amendment 1	Total Funding Amount ($)
Non-federal entities	—	—	—
Participation partners funding	6,900,247	—	6,900,247
Subtotal (non-federal)	**6,900,247**	**—**	**6,900,247**
Requested Reclamation funding	6,900,000	—	6,900,000
Total	**$13,800,247**	**—**	**$13,800,247**

15. Reporting: *Any type of special reporting beyond Reclamation's requirement.*

Reports and Deliverables

In compliance with the terms of the Sites Project Authority's (Authority) Financial Assistance Agreement with Reclamation, the Authority will submit performance and financial reports describing the progress completed during the previous quarter. The performance reports include a summary of percent complete, deliverable status, and work anticipated for the next period whereas the financial report includes a budget status reported in the form of the appropriate federal template (SF-425). Separate from the FAA reporting, the Authority will also continue to provide quarterly financial reports to Reclamation in compliance with cost share reporting requirements.

Financial Status Report	Interim	Final
Format	Hard copy	Hard copy
Form	SF-425	SF-425
Reporting Frequency	Quarterly	Due upon completion of agreement period of performance
Reporting Period	3/31, 6/30, 9/30, 12/31	Entire period of performance
Due Date	Within 30 days after the end of the Reporting Period	Within 90 days after the completion date of the agreement
Send one original to each:	GO and GOTR	GO and GOTR

16. Recipient Key Personnel: *(contact information) Name of person Project/Program Manager, Title, Address, Phone, Email and etc.*

Recipient
Sites Project Authority
112 Old Highway 99 West
Maxwell, CA 95955
530-438-2309

DUNS # 0812668150000
TIN # 90-0635251
Special District Government

Points of Contact (POC)
Joe A. Trapasso
112 Old Highway 99 West
Maxwell, CA 95955
Program Operations Manager
530-387-1102
jtrapasso@sitesproject.org

Jerry Brown
112 Old Highway 99 West
Maxwell, CA 95955
Executive Director
925-260-7417
jbrown@sitesproject.org

17. GOTR: *(contact information) Name of person, Title, Address, Phone, Email and etc.*

Bureau of Reclamation, Interior Region 10, California-Great Basin, Division of Planning
Vanessa King
Bureau of Reclamation
2800 Cottage Way
Sacramento CA 95825
(916) 978-5077

18. Post-Award Monitoring Plan: *A completed and signed post-award monitoring plan for agreement's with a total estimated federal amount in excess of $500,000.00.*

The Sites Project Authority is responsible for oversight of the completion of activities supported under this agreement. Sites Project Authority must monitor activities to ensure compliance with

applicable Federal requirements and performance expectations are being achieved. Monitoring by the non-Federal entity must cover each program, function, or activity.

Performance progress reports will be submitted quarterly as described in the reporting section above.

19. Government-Furnished Property: *Must clearly state if government furnished property is provided.*

N/A

20. Real Property: *Must clearly state if real property is acquired.*

No real property is being acquired as part of this request.

21. Research Agreement: *Include a statement if the agreement will result in Patents and Inventions.*

The agreement will not result in Patents and Inventions being created.

22. Recipient Signature

Joe Trapasso

Joe A. Trapasso
Program Operations Manager

Draft_0016917

From: Edward Ring [ed@edwardring.com]
Sent: 4/28/2022 12:49:18 PM
To: Kevin Spesert [kspesert@sitesproject.org]
CC: Jerry Brown [jbrown@sitesproject.org]; Jeff Sutton (jsutton@tccanal.com) [jsutton@tccanal.com]; Keith Dunn (keithdunn@me.com) [keithdunn@me.com]
Subject: Re: At what rate can Sites be filled during storms?

Kevin,

3900 cfs is 7736 acre feet per day. That is a good number to know. I understand the regulatory environment etc will affect what eventually is possible.

By the way, my earlier calculations were off, I used 1000 gps instead of the 1000 cfs. Sorry.

Thank you for this information.

Ed

On 4/28/2022 12:45 PM, Kevin Spesert wrote:

Ed,

I talked with our technical team regarding your question about how long it would take to fill the reservoir.

The project is sized to divert at roughly 3,900cfs. Based on this, if the 1.5MAF reservoir was completely empty it would take approximately 194 days to fill.

It is important to note that there are a lot of variables in when and how long the project would be able to divert water from the Sacramento River during times of high flows/storms…which are all based on the project's permit requirements…which are still a work in progress with the regulatory agencies.

Thanks!

Kevin

From: Kevin Spesert
Sent: Wednesday, April 27, 2022 11:37 AM
To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>; Keith Dunn (keithdunn@me.com) <keithdunn@me.com>
Subject: RE: At what rate can Sites be filled during storms?

Ed,

I have forwarded your question to our technical team…they would be in a better position to answer your question.

I will forward you their response when it is completed. They are really busy with several project deadlines right now…but they know you are on a deadline as well.

Thanks!

Kevin

From: Edward Ring <ed@edwardring.com>
Sent: Wednesday, April 27, 2022 10:35 AM
To: Kevin Spesert <kspesert@sitesproject.org>
Cc: Jerry Brown <jbrown@sitesproject.org>; Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>; Keith Dunn (keithdunn@me.com) <keithdunn@me.com>
Subject: At what rate can Sites be filled during storms?

Kevin,

Please let me know if you will be able to answer my final follow up question. I am on a deadline to complete my report.

How fast Sites can be filled during storms is an important variable to include. Is there a range of GPS rates still being considered, or is this still completely up in the air? Is this a sensitive topic that cannot be discussed?

If possible it would be great to hear from you on this.

Thank you,

Edward Ring
916-524-7534

On 4/25/2022 1:06 PM, Edward Ring wrote:

Kevin,

To follow up on the voicemail I just left for you, this email is to ask what the current design for Sites estimates to be the rate at which water can be pumped into the reservoir.

If this is not settled yet, can you at least provide me a range of rates being considered? GPS, acre feet per day, whatever.

Having this information will offer insight into how much runoff Sites will be able to collect during major storms.

Thank you,

Edward Ring
916-524-7534

-------- Forwarded Message --------

Subject: One follow up question about the Sites Project
Date: Fri, 22 Apr 2022 21:16:02 -0700
From: Edward Ring <ed@edwardring.com>
To: Kevin Spesert <kspesert@sitesproject.org>
CC: Jerry Brown <jbrown@sitesproject.org>, Jeff Sutton (jsutton@tccanal.com) <jsutton@tccanal.com>, Keith Dunn (keithdunn@me.com) <keithdunn@me.com>

Kevin,

First of all please call me Ed. Thank you for your email.

I have one follow up question:

How fast can water be pumped into the proposed Sites Reservoir. The Preliminary Project Description (page 2-3) says "Alternative Value Planning (VP) 5 involved a 1.3 million-acre-feet (MAF) reservoir and used an existing regulating reservoir (Funks Reservoir) and a new regulating reservoir (the Terminal Regulating Reservoir [TRR]) to fill Sites Reservoir with releases (1,000 cubic feet per second [cfs]) from the southern end of the TC Canal through a pipeline that went to the CBD."

I'm not sure I understand this. I believe it says the fill rate is 1,000 CFS, which equates to 265 acre feet per day. But that's not very much, since that means it would take 1,000 days to add 265,000 acre feet, which is only 18 percent of the reservoir's planned capacity.

So I'm missing something. What is the planned rate at which Sites can be filled?

Thank you,

Ed

On 4/15/2022 5:09 PM, Kevin Spesert wrote:

Mr. Ring,

Here are the answers to your questions from the email below.

1 - The Authority...since its founding in 2010 and through its development of the project...has proposed and worked to advance a 1.8-million-acre foot reservoir as its maximum sized project.

2 - The Authority proposed a 1.8-million-acre foot reservoir as part of its Proposition 1 WSIP proposed project

3 - As part of a value planning process conducted in 2019-2020, the Authority right-sized the project to address project affordability, permitting and constructability challenges. This process resulted in an Authority proposed 1.5 million-acre-foot reservoir...which is the reservoir size the Authority is currently advancing.

3A - There are 2 major dam sites for the project. The Sites Dam is approximately 267 feet high and the Golden Gate Dam is approximately 287 feet high. It is important to note that we are still in the preliminary engineering phase of the project and the sizes of the dam structures could change. The current estimated project cost is approximately $4.0 billion, however this number will continue to be refined as more project development activities are completed over the next couple of years (engineering, design, geotechnical investigations, permitting, etc.)

4 - Pump storage was included in the Authority's WSIP proposed project. However, as part of the value planning process mentioned in answer 3...it was removed from the project due to affordability, permitting and constructability concerns.

Here is a link to our website that includes links to several of the resource documents for the project https://sitesproject.org/project-documents/

And here is a link to our recirculated revised draft EIR/EIS...there is a lot of background information located here https://sitesproject.org/environmental-review/

Please feel free to give me a call if you have any additional questions.

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone (530) 632-4071

From: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, April 15, 2022 12:42 PM

To: Edward Ring <ed@edwardring.com>
Cc: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Subject: Re: Questions about the Sites Project

Edward, I would direct these questions to the Sites JPA staff. I haves cc'ed the Executive Director Jerry Brown hereto.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
P.O. Box 1025
Willows, CA 95988
Ph: (530) 934-2125
Cell: (530) 301-1030
jsutton@tccanal.com

Sent from my I Phone

On Apr 15, 2022, at 12:18 PM, Edward Ring <ed@edwardring.com> wrote:

Jeffrey,

This email is to ask you some questions about the Sites Reservoir project that I cannot find on your website. You may recall I worked last year on an attempt to qualify an initiative to fund water projects. I am working now on a report in support of the Sites Project and other water projects and need some information. It seems to me that you or someone you can refer me to would know the answers to these few questions. I am on a deadline and am hoping to get some answers in the next few days which is why I am contacting you. Here they are:

1 - What is the maximum potential storage capacity in the area where the Sites Reservoir is planned?

2 - What was the original proposed storage capacity, as it appeared in the earliest official Sites Project Proposal?

3 - What is the current proposed storage capacity?

If possible for questions two and three it would also be helpful to know the proposed height of the dam and the projected total cost.

For all three questions, I'm not asking about the projected annual yield. I'm asking how much water would the reservoir hold if it was full.

Also,

4 - Was pump storage part of the original proposal, and if it is no longer part of the current proposal, why not?

Any details and any source documents you can provide either via PDF or URLs would be much appreciated.

Thank you,

Edward Ring
916-524-7534
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