

# Chapter 4 Potential Offstream Storage Locations

This chapter describes the evaluation of the offstream storage projects north of the Delta. These proposed sites would provide a range of potential water supply reliability benefits and would also serve similar project purposes. Four of the locations—Red Bank Project, Thomes-Newville (Newville) Reservoir, Colusa Reservoir Complex, and Sites Reservoir—were identified in the CALFED ROD as the preferred locations for north-of-the Delta offstream storage.

Through the public scoping process, two additional sites, —Cottonwood Reservoir Complex and Veteran’s Lake—were recommended for further evaluation.

## Reservoir Location Descriptions

Locations for offstream storage evaluated during the NODOS feasibility study are described below and shown on Figure 4-1.

- **Colusa Reservoir Complex:** The Colusa Reservoir Complex is in north-central Colusa County and south-central Glenn County, approximately 12 miles southwest of the community of Willows and 10 miles west of Maxwell. Colusa Reservoir Complex would include the area of the proposed Sites Reservoir and the Colusa Cell. The Colusa Cell would be due north of Sites Reservoir, and could be constructed with the Sites Reservoir facilities to form a single 28,000-acre reservoir. The inundation area of the Colusa Cell is in the Logan Creek and Hunter Creek watersheds (35,000 acres), with the associated United States Geological Survey (USGS) subbasins. A mean full pool elevation of 520 feet<sup>1</sup> would inundate approximately 14,000 acres in the Colusa Cell, and could store an additional 1.2 MAF. The maximum storage of the Colusa Reservoir Complex would be 3.0 MAF. The Colusa Cell would require a total of 16 dams (all dams for Sites Reservoir and four additional major dams along Logan ridge: one for Logan Creek, and three for Hunter Creek and its tributaries). The Colusa Reservoir Complex requires seven saddle dams, compared to the nine required for Sites Reservoir. The Colusa Reservoir Complex would provide greater total storage capacity (up to 64 percent greater storage capacity than Sites Reservoir).
- **Cottonwood Reservoir Complex:** Cottonwood Reservoir is in northwestern Tehama County, approximately 21 miles southwest of Anderson. The Cottonwood Reservoir Complex could be designed as a 0.4 MAF reservoir

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<sup>1</sup> Elevations in this document are based on the National Geodetic Vertical Datum.

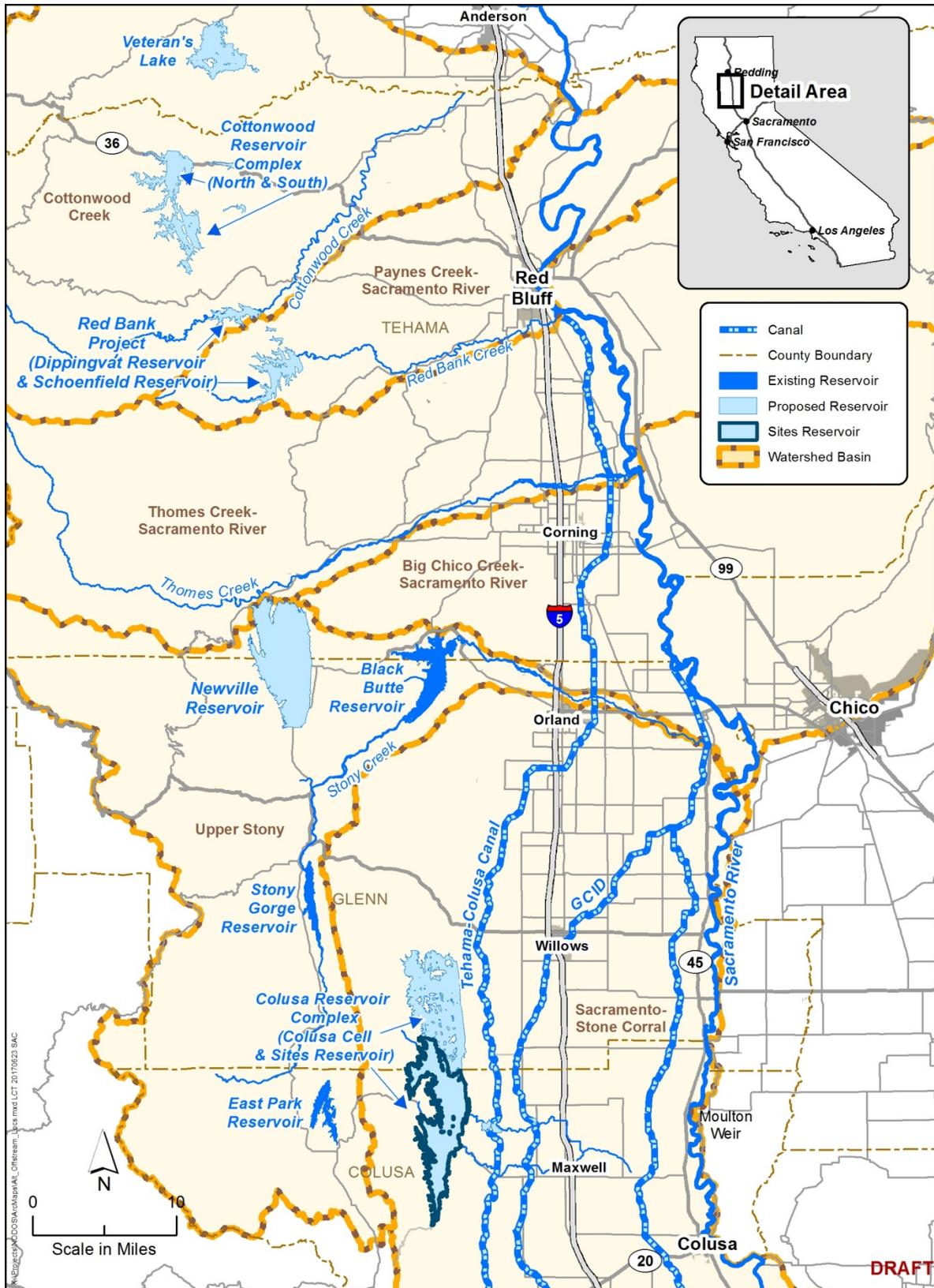


Figure 4-1. Alternative Offstream Locations for NODOS/Sites Reservoir Project

- (Cottonwood South Reservoir) or as a 1 MAF reservoir (Cottonwood South Reservoir and Cottonwood North Reservoir). At 0.4 MAF, the reservoir (Cottonwood South Reservoir) would cover 3,400 acres. At 1 MAF, the reservoir would cover 7,100 acres at a mean pool elevation of 1,300 feet. The Cottonwood South Reservoir would be filled by runoff from 179,500 acres in the South Fork Cottonwood Creek, Salt Creek, and Hensley Creek watersheds. The Cottonwood North Reservoir would be filled by runoff from 84,000 acres from the Beegum Creek and Dry Creek watershed. Cottonwood South Reservoir would be formed by a dam on Salt Creek just upstream from Dexter Gulch, 4 miles south of SR 36. Cottonwood North Reservoir would be formed by a dam on Dry Creek just downstream from the confluence with Pentacola Gulch, on Route 36.
- **Newville Reservoir:** Newville Reservoir would be situated in north-central Glenn County and south-central Tehama County, approximately 18 miles west of the city of Orland and 23 miles west-southwest of the city of Corning. This proposed reservoir project would be in portions of the North Fork Stony Creek watershed (51,200 acres) and the Thomes Creek watershed (123,500 acres) and the associated USGS subbasins. A small diversion along Thomes Creek would transfer water to Newville Reservoir in the North Fork Stony Creek watershed. Alternative reservoir sizes of 1.9 and 3.0 MAF were evaluated, with associated normal water surface elevations (WSEs) of 905 and 980 feet, and corresponding reservoir surface areas of 14,500 and 17,000 acres, respectively. Newville Reservoir would be upstream from Black Butte Lake. Constructing a dam on North Fork Stony Creek and a small saddle dam at Burrows Gap would form the smaller proposed reservoir. Up to five additional saddle dams and a dike would be required for the 3.0 MAF reservoir alternative. Multiple conveyance options are possible using existing infrastructure, such as canals, new infrastructure, tunnels, and/or pipelines, or a combination of new and existing mechanisms to provide increased flexibility and reliability in the operation of existing and new infrastructure.
- **Red Bank Project:** The Red Bank Project is in northwestern Tehama County, approximately 17 miles west of the city of Red Bluff. This reservoir complex would include a diversion on South Fork Cottonwood Creek at Dippingvat Reservoir; two small reservoirs in the headwaters of North Fork Red Bank Creek (Blue Door and Lanyan Reservoirs); and a larger storage reservoir on Red Bank Creek (Schoenfield Reservoir). The South Fork Cottonwood Creek watershed is relatively large (81,900 acres), and the Red Bank Creek watershed is relatively small (27,300 acres). Dippingvat Reservoir would have a normal pool elevation of 1,205 feet and an inundation area of 1,800 acres. Schoenfield Reservoir, with a normal pool elevation of 1,017 feet, would inundate 2,770 acres and have a storage capacity of 0.25 MAF. Both Dippingvat Reservoir and Schoenfield Reservoir would be constructed on perennial streams, and be considered onstream facilities.
- **Sites Reservoir:** Sites Reservoir is in northern-central Colusa County and southern-central Glenn County, approximately 10 miles west of the community of Maxwell. Water would be diverted from the Sacramento River to fill the reservoir. The proposed reservoir inundation area includes most of Antelope Valley and the small community of Sites. The reservoir is in the Funks Creek and Stone Corral Creek watersheds (59,700 acres), with the associated USGS subbasins. A mean full pool elevation of 520 feet would inundate 14,000 acres, and could store a maximum of 1.81 MAF. Alternative reservoir sizes of

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1.27 and 1.81 MAF are under consideration. At 1.27 MAF, six saddle dams and two major dams (Sites and Golden Gate Dams) would be required. At 1.81 MAF, Sites Reservoir would require the construction of two major dams (Sites and Golden Gate Dams) and nine saddle dams along the southern edge of the Hunter Creek watershed. Diversions from the CBD, the Sacramento River, Stony Creek, and local tributaries would provide potential sources of water supply for the NODOS/Sites Reservoir Project.

- **Veteran's Lake:** Veteran's Lake would be in southwestern Shasta County near Ono, approximately 17 miles west of Anderson; the lake would inundate 5,100 acres and store up to 0.6 MAF at a mean pool elevation of 1,050 feet. Veteran's Lake would be filled from the North Fork Cottonwood Creek, Middle Fork Cottonwood Creek, and Jerusalem Creek watersheds covering 109,500 acres. Veteran's Lake would be formed by Roaring Dam on Roaring Creek and by Crow Dam on Crow Creek and six small saddle dams along the ridge between Roaring Creek and Bee Creek. Roaring Creek Dam would be approximately 3 miles downstream from Bland Road, off of Platina Road.

### Summary of Evaluation of Potential Locations

The IAIR (Reclamation and DWR 2006b) evaluated the Colusa Complex, the Newville Reservoir, the Red Bank Project, and the Sites Reservoir. The 2013 Progress Report (Reclamation and DWR 2013) subsequently evaluated the Cottonwood Reservoir Complex and Veteran's Lake. These investigations are described in Appendix A, Plan Formulation.

The primary findings of the evaluation of potential reservoir locations are summarized in Table 4-1. The Colusa Reservoir Complex and Sites Reservoir score highest across the most categories, have appreciably lower environmental impacts, and can leverage existing conveyance systems for diversion and release of water (this leverage notably reduces cost and environmental impacts). The initial cost analysis in the PFR (Reclamation and DWR 2008) found the cost per acre-foot of supply was \$64 for Sites Reservoir, compared to \$235 for the Colusa Reservoir Complex. Because Sites Reservoir is smaller, it would also have fewer environmental impacts than the Colusa Complex. Therefore, Sites Reservoir was selected as the preferred reservoir location.

Table 4-1. Summary of Evaluation of Offstream Storage Locations

<b>Evaluation Category</b>	<b>Colusa Reservoir Complex</b>	<b>Cottonwood Reservoir Complex</b>	<b>Thomes-Newville Reservoir</b>	<b>Red Bank Project</b>	<b>Sites Reservoir</b>	<b>Veteran's Lake</b>
Storage	3.3 MAF <b>Score: HIGH</b>	0.4 to 1.0 MAF <b>Score: HIGH</b>	1.8 to 3.0 MAF <b>Score: HIGH</b>	0.2 to 0.4 MAF <b>Score: LOW</b>	1.2 to 1.9 MAF <b>Score: HIGH</b>	0.6 to 1.0 MAF <b>Score: HIGH</b>
Potential water sources	Colusa Basin Drain Grindstone Creek Little Stony Creek Sacramento River Stony Creek Thomes Creek Logan Creek Funks Creek Stone Corral Creek <b>Score: HIGH</b>	Beegum Creek Cold Fork Creek Clear Creek South Fork Cottonwood Creek Cottonwood Creek Dry Creek Hensley Creek Sacramento River Salt Creek Weemasoul Creek <b>Score: HIGH</b>	Sacramento River Stony Creek Thomes Creek North Fork Stony Creek <b>Score: HIGH</b>	South Fork Cottonwood Creek North Fork Red Bank Creek Red Bank Creek <b>Score: LOW</b>	Colusa Basin Drain Grindstone Creek Little Stony Creek Sacramento River Stony Creek Thomes Creek Funks Creek Stone Corral Creek <b>Score: HIGH</b>	Clear Creek Cottonwood Creek Crow Creek Duncan Creek Jerusalem Creek Roaring Creek Sacramento River Wilson Creek North Fork Cottonwood Creek Middle Fork Cottonwood Creek <b>Score: HIGH</b>
Conveyance facilities	Existing Tehama-Colusa and Glenn-Colusa Canals with supplemental intake <b>Score: HIGH</b>	No existing facilities <b>Score: LOW</b>	No existing facilities <b>Score: LOW</b>	No existing facilities <b>Score: LOW</b>	Existing Tehama-Colusa and Glenn-Colusa Canals with supplemental intake <b>Score: HIGH</b>	No existing facilities <b>Score: LOW</b>
Distance for conveyance to the Sacramento River for statewide benefit	14 miles <b>Score: HIGH</b>	25 miles <b>Score: LOW</b>	23 miles <b>Score: LOW</b>	16 miles <b>Score: HIGH</b>	14 miles <b>Score: HIGH</b>	15 miles <b>Score: HIGH</b>
Avoidance of Impacts to fisheries	New diversion south of Hamilton City <b>Score: HIGH</b>	Impact to Cottonwood Creek <b>Score: LOW</b>	Impact to Thomes Creek <b>Score: LOW</b>	Impact to Cottonwood Creek <b>Score: LOW</b>	New diversion south of Hamilton City <b>Score: HIGH</b>	Impact to Cottonwood Creek <b>Score: LOW</b>
Avoidance of Environmental impacts in inundated area	Annual grasslands <b>Score: MEDIUM</b>	Blue oak woodland <b>Score: LOW</b>	Annual grasslands More oak woodland <b>Score: LOW</b>	Foothill pine woodland <b>Score: LOW</b>	Rangeland <b>Score: MEDIUM</b>	Blue oak woodland and valley oak woodland <b>Score: LOW</b>

MAF = million acre-feet

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