

M e m o r a n d u m

Date : October 19, 1998

To : Lester Snow, Executive Director
CALFED Bay-Delta ProgramFrom : Naser J. Bateni, Chief
Northern District
Department of Water Resources

Subject: Status Report – North of the Delta Offstream Storage Investigation

This memorandum transmits a progress report on the status of the Department of Water Resources' North of the Delta Offstream Storage Investigation. Attached are memorandums from the units participating in the investigation. These studies are continuing and therefore, not complete.

Introduction

This investigation is funded by Proposition 204, the "Safe, Clean, Reliable Water Supply Act." The Act directed DWR to investigate "Offstream storage upstream of the Delta that will provide storage and flood control benefits in an environmentally sensitive and cost-effective manner." DWR, in coordination with CALFED staff, compiled a comprehensive list of potential reservoir sites and selected four of the most promising reservoir sites for engineering and environmental investigation. Future studies may involve additional sites as required by the regulatory process. This investigation is divided into individual studies. Environmental studies focus on identifying major issues which could potentially stop a project from being constructed. Engineering studies focus on identifying major project features and cost estimates. These studies are closely coordinated with your staff.

Project Descriptions

The four potential offstream storage projects are Sites, Colusa, Thomes-Newville, and Red Bank. A brief description of each project is provided below for general orientation and for defining nomenclature. A more detailed description of these projects and a location map are provided in the attached Water Supply Evaluations Section's Memorandum.

Sites and Colusa Projects

The Sites and Colusa Projects are about 10 miles west of Maxwell. Sites Reservoir would lie in the Antelope Valley and is formed by constructing dams on Stone Corral and Funks creeks. Colusa Reservoir would be a northern enlargement of the Sites Reservoir that includes Logan and Hunters creek drainages.

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Colusa Reservoir forms one continuous body of water. The northern half of the Colusa Reservoir is referred to as the Colusa cell. Figure 1 depicts this nomenclature and displays the geographic relationship between the two reservoirs, which are considered two separate projects. Potential water would be imported to these reservoirs through conveyance and pumping facilities. Water sources for the two reservoirs could include local tributaries such as Stony Creek, Thomes Creek, the Colusa Basin Drain, and the Sacramento River.

Thomes-Newville Project

The Thomes-Newville Project is on the North Fork of Stony Creek, about 20 miles west of Orland and six miles upstream of the existing Black Butte Reservoir. The reservoir would be formed by constructing one major dam on Stony Creek and a relatively small diversion dam on Thomes Creek. Water could be imported to the reservoir from local tributaries such as Stony Creek, Thomes Creek, and Red Bank Creek, and the Sacramento River.

Red Bank Project

The Red Bank Project is approximately 17 miles west of Red Bluff. It would be created by constructing two moderate-size and two small reservoirs in the upper South Fork Cottonwood Creek and Red Bank Creek Watersheds. South Fork Cottonwood Creek water is diverted and conveyed into the Red Bank Creek drainage for storage.

Environmental Investigations

DWR initiated several biological studies to identify endangered, threatened, or sensitive plant and wildlife species that exist within the reservoir inundation areas, along with cultural resources studies. Most of these studies are incomplete as they require two seasons of field surveys. A brief summary of findings for each study is listed below. More detailed discussions can be found in the attached memorandums.

Vegetation and Vernal Pools Studies

The dominant natural plant community in the Sites, Colusa, and Thomes-Newville reservoir areas is California annual grassland. The Red Bank project is dominated by blue oak, mixed oak, foothill pine, and chaparral. Less than two percent of the total inundation area of each reservoir is wetlands. The acreage of wetlands within the inundation zones of the reservoir areas is shown in Table 1. No

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State or federally listed plant species have been found in the 1998 field surveys. However, the density and diversity of sensitive plant species is greater within the Thomes-Newville Reservoir area than the Sites or Colusa reservoir areas.

Elderberry plants were found in all the reservoir areas. While the plant is not listed, it is the critical habitat of the Valley Elderberry Longhorn Beetle, which is federally listed as threatened. Table 1 shows the numbers of stems found. These numbers represent stems that must be mitigated.

With the exception of the Red Bank project, vernal pools are present in all the proposed reservoir areas. Table 1 shows the acreage of vernal pools within the inundation zones of the reservoir areas. Vernal pools were not surveyed for the presence of listed invertebrates but for the existence of potential habitat. While the acreage of vernal pool habitat at the Sites Reservoir is more than that at the Thomes-Newville Reservoir, field observations indicate that the highest quality habitat is at Thomes-Newville.

Table 1. Vegetation, Threatened and Endangered Plants, and Vernal Pools by Reservoir Area

Reservoir Project	Wetlands (Acres)	Sensitive Plants No. T&E Species	Elderberries (Stems)	Vernal Pools (Acres)
Red Bank	83	0	460	0
Thomes-Newville	413	0	327	26
Sites Reservoir	201	0	632	73
Colusa Cell	312	0	38	12

Wildlife and Fishery Studies

At this time, no threatened or endangered mammals have been documented in any of the reservoir inundation areas. Some special status species have been found. Table 2 summarizes findings from the wildlife studies. The wildlife data for the Thomes-Newville project in Table 2 are results from studies conducted in the 1970s and 1980s. No new data were collected for this phase of the investigation in the Thomes-Newville project area.

Chinook salmon and steelhead have been documented in South Fork Cottonwood Creek, primary water supply source for the Red Bank project, and Thomes Creek, primary water supply source for the Thomes-Newville project. A single chinook salmon carcass was found this summer in Antelope Valley Creek, a tributary to Stone Corral Creek, above the Sites Reservoir area. A single California red-legged frog was found this summer in the Red Bank project area.

Table 2. Number of Threatened and Endangered Wildlife Species Found by Reservoir Area

Reservoir Project	Birds	Mammals	Fish, Reptiles, and Amphibians
Red Bank	1	0	3
Thomes-Newville ^{/1}	4	0	2
Sites Reservoir	1	0	1
Colusa Cell	2	0	0

^{/1} These results are taken from studies conducted in the 1970s and 1980s.

Current field survey data indicate that a larger number of threatened, endangered, and special concern bird species are present in the Thomes-Newville area than the other project areas. Wintering bald eagles have been found in all the reservoir areas. However, in other areas, construction of reservoirs have been found to improve habitat for bald eagles. Willow flycatchers have been observed in the Thomes-Newville area during migration. Bank swallows have been detected along Thomes Creek below the Thomes-Newville project area.

Cultural Resources

With field surveys substantially complete at the Red Bank project area, 33 archaeological sites have been recorded. No testing has been done at any of the project areas to judge significance of these sites. This will be done in the next phase of the investigation. Previous archaeological surveys at Thomes-Newville have recorded 117 sites. The field surveys at the Sites Reservoir area are only 35 percent complete at this time. Thus far, 24 archaeological sites have been recorded. Surveys have not yet begun in the Colusa Cell area.

In summary, these studies indicate that, thus far, no single species or resource has been identified as an issue of such magnitude that it could not be addressed through appropriate design, mitigation, and enhancement for any of these proposed projects. However, the cumulative cost of environmental mitigations for each project is an important element in determining the comparative feasibility of each project.

Engineering Investigations

Engineering investigations have focused on the major features of each of the potential projects. Water supply studies, geological exploration of damsites and faults, and initial design of dams, spillways, canals, stream diversions, pumping plants, and power generation facilities have been the main activities. For the most part, these activities are continuing. Cost estimates are not yet complete. A brief summary of findings for the main studies is listed below.

Geological Studies

Geological studies have focused on seismic, foundation, and construction material issues. There is generally less recorded seismic activity on the west side of the Sacramento Valley, where these offstream storage projects are, than in the Sierra Nevada or Coastal areas. Table 3 shows the preliminary design parameters from the seismic studies. These potential reservoir sites lie within broad seismic source areas. The worse case scenerio is that an earthquake may occur directly beneath a reservoir. However, these seismic sources are buried deep beneath the surface.

Table 3. Draft Preliminary Design Parameters

Project	Maximum Credible Earthquake (Mw)	Horizontal Distance (kilometers)	Depth (kilometers)	Peak Acceleration (g)	Duration (Seconds)	Predominant Period (Seconds)
Sites-Colusa	7.0	0	10	0.70	26	0.32
Thomes-Newville	7.0	0	10	0.70	26	0.32
Red Bank	8.3	0	35	0.72	28.5	0.42

Dam foundation studies are not yet complete, but no evidence of any insurmountable conditions has been detected. Faults are present at the damsites, but

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thus far there are no indications of recent geological activity. Foundation geology for the reservoirs consists of sandstones and mudstones; a common foundation for dams on the westside of the Sacramento Valley.

Construction materials for earth-filled dams appear to be plentiful in all the project areas. Materials for concrete features of the projects are available within reasonable hauling distances.

Engineering Studies

Potential water supply sources for these offstream storage projects could include: South Fork Cottonwood, Red Bank, Elder, Thomes, and Stony creeks, the Colusa Basin Drain, the Feather River, and the Sacramento River. Current studies indicate that as much as 270 thousand acre-feet per year could be available from local tributaries, and up to 140 thousand acre-feet per year from the Colusa Basin Drain.

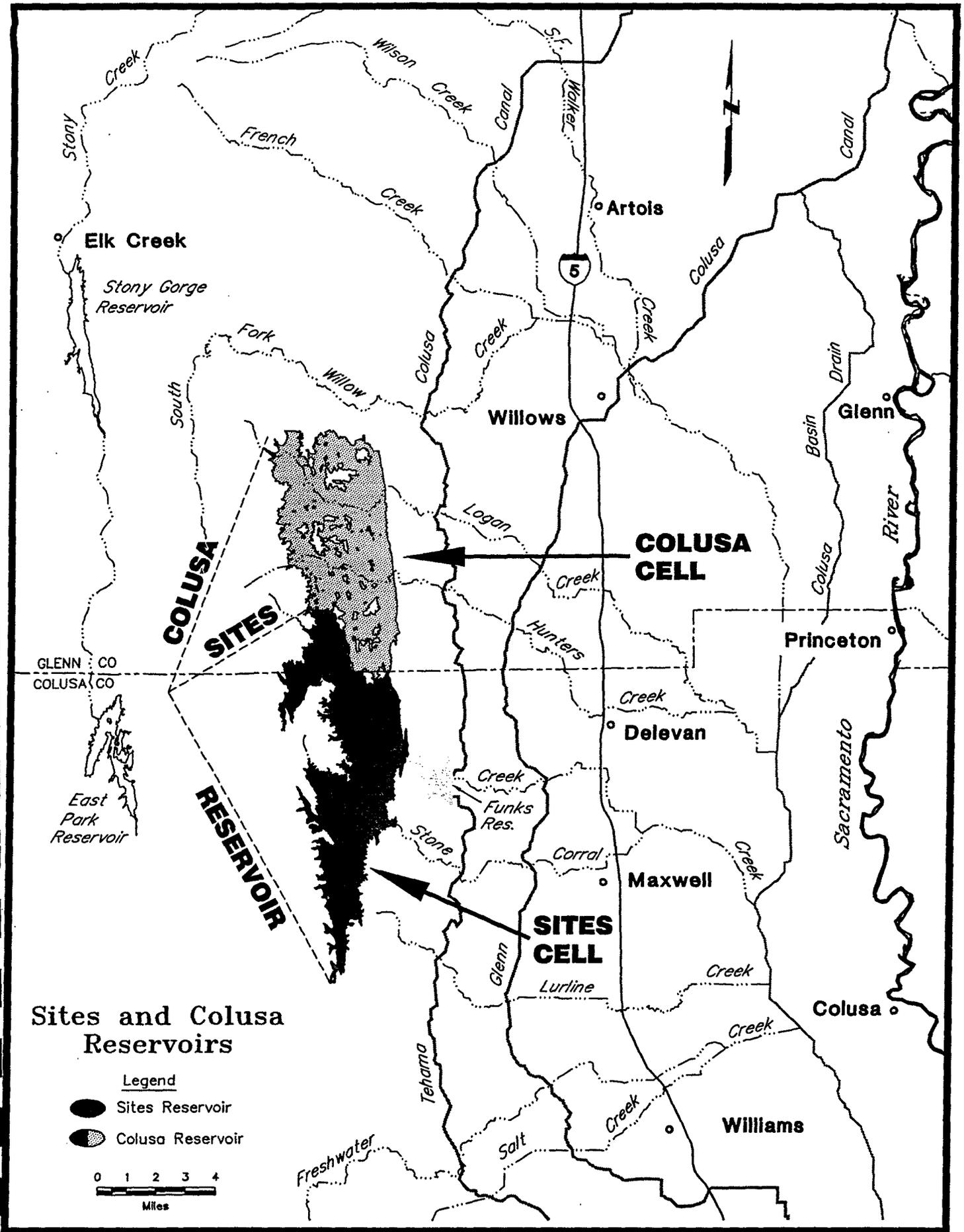
Various sizes of reservoirs are being considered. Table 4 shows basic data for a brief comparison of the storage reservoirs for each project. Colusa Reservoir, although larger, is far less efficient than Sites Reservoir as a location to store water. Colusa's large dam volumes compared to the Thomes-Newville and the Sites projects make it far more costly. However, the Colusa Reservoir, at 3.1 maf of storage will be compared with a large 3.1 maf Thomes-Newville Reservoir. Operation studies are being conducted to determine the proposed projects' yield.

Conveyance facilities are a major component of all projects. Cost estimates for local tributary conveyance is not yet complete. However, initial cost estimates for the Sacramento River conveyance to Sites and Colusa reservoirs indicate that the least costly option is to use the existing Tehama-Colusa Canal and the Glenn-Colusa Irrigation District Canal with some modifications. DWR has recently begun to consider the Feather River as a potential water supply source for these offstream storage projects. Current studies will be expanded to investigate a pipeline/canal facility from Lake Oroville to Sites Reservoir.

I hope this memorandum and the attachments will be useful to CALFED. Additional detailed information is available in our office. Please have your staff contact our office for additional information. If you have any questions, please contact me at (530) 529-7342. We have enjoyed working closely with your staff. Your staff's assistance and cooperation is greatly appreciated.

Table 4. Offstream Storage Features by Reservoir

Reservoir Project	Capacity TAF	Surface Area ACRES	Dam Name	Height FT	Total Volume MCY
Red Bank (Cottonwood Cr)	100	1,270	Dippingvat	250	5.4
Red Bank (Red Bank Cr)	250	2,770	Schoenfield	300	4.4
Thomes-Newville (Small)	1,800	14,000	Newville Saddle Dam: 1	320 70	19
Thomes-Newville (Large)	3,100	17,000	Newville Saddle Dams	400 Up to 150	32
Sites (Small)	1,200	12,000	Sites Golden Gate Saddle Dams: 7	240 250 Up to 90	14
Sites (Large)	1,800	14,000	Sites Golden Gate Saddle Dams: 7	280 290 Up to 130	26
Colusa	3,100	28,000	Sites Golden Gate Hunters Owens Prohibition Logan Saddle Dams: 7	280 290 270 260 260 260 Up to 130	101



Sites and Colusa Reservoirs

Legend

-  Sites Reservoir
-  Colusa Reservoir



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