TASK 3.6 FEASIBILITY ANALYSIS FOR FUTURE OPERATIONS OF LAKE CURRY

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TASK 3.6 FEASIBILITY ANALYSIS FOR FUTURE OPERATIONS OF LAKE CURRY

INTRODUCTION

This analysis focused on future ownership and funding for operation of Lake Curry as a conservation project to benefit steelhead trout. Several other analyses - Water Right Legal Concerns (Task 3.2) and New Diversion (Task 3.4), were incorporated into this report and are attached as appendices. The following alternatives were chosen for evaluation after discussion in a Technical Advisory Committee meeting.

1. City of Vallejo retains ownership of the lake and revises its licensed water right to allow for a high flow water diversion from Suisun Creek into the Putah South Canal to transport water to the City water treatment plant. Water releases from Lake Curry to Suisun Creek to support steelhead trout would be a requirement of the water right revision.

2. Purchase of the reservoir from the City of Vallejo by a conservation group, and operation of the reservoir for the benefit of the steelhead trout in Suisun Creek.

3. Operation of Lake Curry to develop a steelhead trout and riparian habitat mitigation bank.

4. Purchase and management of the lake for water supply to direct diverters along the creek and for instream fish habitats.

5. Management of the lake for increased freshwater flows to Suisun Marsh.

6. Sale of the lake for housing development with restrictions requiring releases from Lake Curry to Suisun Creek for instream flows.

SUMMARY OF TASK 3.2 WATER RIGHT LEGAL CONCERNS

Attorney Peter Kiel completed an analysis of the water right for Lake Curry and the requirements for changing the water right. The complete report is contained in Appendix A and excerpted here.

Lake Curry Water Right

Lake Curry is a municipal water supply reservoir located on Suisun Creek that is owned by the City of Vallejo. The City of Vallejo constructed Lake Curry as a municipal water supply reservoir pursuant to a State-issued appropriative water right in 1922. That appropriative water right is administered by the State Water Resources Control Board. Water diversion and storage in Lake Curry is authorized by Water Right License 5278 (Application 001908). The application for the water right permit was filed with the Board on July 15, 1920. The original permit for License 5278 was issued May 3, 1922. The License demonstrating that the use of water under the permit was perfected was issued June 5, 1959. The License authorizes the direct diversion of 7.0 cfs from January 1 to December 31, and collection to storage of 5,400 acre-feet between November 1 to May 1. The maximum direct diversion and collection to storage in a calendar year cannot exceed 5,058.9 acre-feet. The authorized place of use is the City of Vallejo, as shown on a map filed with the State Water Board (the date of which is not specified). The only authorized purpose of use of Lake Curry water is municipal.

The City used water from Lake Curry for municipal purposes until 1992 when the California Department of Health Services (whose drinking water regulatory authority is now vested in the State Water Resources Control Board Division of Drinking Water) determined that the water treatment facilities at Lake Curry did not comply with applicable water quality standards. Since 1992, the City has made periodic but not consistent releases from Lake Curry to Suisun Creek.

The City worked with Congressman George Miller to pass federal legislation (HR 1235) to allow for water sourced from Lake Curry to be put into the federal Putah South Canal to move the water to their treatment plant. In November 2000, Congress authorized the Bureau of Reclamation to enter into a contract to permit use of the lower section of the Solano Project Putah South Canal facilities for such purposes. In 2003, the City initiated a joint California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) analysis of alternatives for delivery of Lake Curry water to the City's service area, including the rediversion into the Putah South Canal of water from Suisun Creek. The City never finalized the analysis. The CEQA/NEPA notice is included as Appendix B.

The City is at risk of forfeiting its Lake Curry water right for non-use. A water right is subject to forfeiture following five years of consecutive non-use or reduced use. Non-use of the Lake Curry water may also allow downstream diverters to appropriate the water. Water released from a lake without intent to recapture is typically considered abandoned water that is water subject to appropriation by others. Further, a claim by a downstream diverter that water released from Lake Curry is subject to appropriation may cause the Water Board to investigate the Lake Curry water right and initiate a forfeiture proceeding.

Water Rights Downstream of Lake Curry

The City has often expressed concerns that the water they release from Lake Curry to Suisun Creek is diverted by landowners along the creek and does not benefit steelhead trout. Streamflow gaging completed for this grant demonstrated this is not the case during the summer months.

As part of the legal analysis other water rights downstream of the lake were reviewed. Table 1 lists surface water rights of record for Upper Suisun Creek downstream of Lake Curry in the reaches most relevant for instream flow releases. Figures 1-3 depict the water rights listed in the table. The lowermost reach of Suisun Creek is a tidally-influenced section of the creek just upstream from Suisun Marsh that does not provide for summer and fall juvenile fish rearing habitat. Diversions from the lowest reach are not anticipated to affect releases from Lake Curry and are not considered further in this analysis. Tributaries to Suisun Creek are not analyzed because diversions in tributaries cannot impact releases from Lake Curry.

Table 1 lists the eleven appropriative water right Permits or Licenses (denoted by its Application Number beginning with "A") and Statements of Water Diversion and Use for riparian water right claims (denoted by Statement Number beginning with "S") in the first two stream reaches below Lake Curry, organized from upstream to downstream. For riparian water rights, each point of diversion requires a separate Statement of Water Diversion and Use. The table lists the diverter name, the maximum annual quantity of diversion (for diversions to water storage ponds or reservoirs) and rate of diversion (for direct diversions without storage), the months of diversion, and notes about water use. Three of the riparian water right claims (S003080, S002577, and S002891) are inactive, meaning there are no diversions under the claims or the diverter has ceased reporting diversions. Two other riparian right claimants with active statements have reported zero water diversions over the last three years (S002842 [claimed use is in-

creek cattle drinking], and S008244). One water right permit holder reported zero use in three of the last four years, and notes the pump was damaged and inoperable (A015916).

The remaining five water points of diversion have potential to affect releases from Lake Curry:

- Water right A017055 (License 007339) is a water right license authorizing the diversion to offstream storage not to exceed 20 acre-feet annually between January 1 and May 1, at a maximum rate of diversion limited to 110 gallons per minute, and subject to minimum bypass flow requirements in Suisun Creek (3 cfs from January 1 to March 31 and 1.5 cfs from April 1 to May 1). The uses of the diverted water are irrigation, frost protection and heat control of a vineyard. This diversion will not significantly affect new releases from Lake Curry because of the relatively low rate of diversion from Suisun Creek and the protective minimum bypass flows.
- S000781 is a claim of riparian right by the rightholder of A017055 for direct diversion from May through October, with annual quantities ranging from 0 (2018) to 9.3 acre-feet (2014) in recent years. This diversion has the potential to affect new releases from Lake Curry because of the volumes of diversion during periods of low streamflow.
- A024398 is a water right permit authorizing the diversion to offstream storage not to exceed 98 acre-feet per year from December through June, at a maximum rate of 1.0 cfs, and subject to minimum bypass flow requirements in Suisun Creek (10 cfs from December 1 through February 29, 3 cfs for March 1 through April 30, and 1 cfs for May 1 through June 1). The uses of the diverted water are irrigation, frost protection and heat control of a vineyard. The protective bypass flows required by this right would lessen the potential impact to Suisun Creek flows.
- S008244 and S022579 are riparian right claims for direct diversion for irrigation purposes of the same property served by A024398. Maximum annual quantities diverted were 6.1 acre-feet (2015) for S008244 and 17.3 acre-feet (2012) for S022579; however, there have been no diversions reported under either claim for several years. Further, there is no working pump for S008244. Outreach to the owner of S008244 and S022579 may be necessary to understand the owner's potential future water diversions and extent to which the diversion may affect Lake Curry releases.

Review of these water right records indicates that existing water right diversions have limited potential to affect summer releases from Lake Curry. It should also be noted that farmers along Suisun Creek in Solano County receive water from the Solano Irrigation District and are unlikely to divert water from Suisun Creek.

Table 1. Water rights recorded in Upper Suisun Creek

SWDU*/ Application	Owner	Quantity / Use	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	NOTES
S003080	Helen Chadbourne	9.5 afa / Stockwatering and/or Irrigation	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	INACTIVE or NOT REPORTING. The information is unclear because the last Supplemental SWDU was filed in 2002, but it did not list quantities. The most recent Supplemental SWDU listing amounts used was filed in 1996.
S002842	Imboden Trust	0.056 afa / 200 gallons per day / Stockwatering				DD	DD	DD							
S002577	William Imboden	216,000 gallons per year / Stockwatering													INACTIVE or NOT REPORTING. It is unclear whether the water is directly diverted or stored, although the initial statement references a 5 acre-feet storage reservoir. S002577 references Stockpond Certificate 3091 which allows storage of 3 afa. The stockpond is located on an unnamed stream tributary to Gordon Valley Creek.
A015916	Bartholomew	0.02 cfs / Irrigation; Stockwatering					DD	DD	DD	DD	DD	DD	DD (until 11/15)		No water was diverted in 2015.
S000781	Twin Creeks	2-9 afa / Irrigation; Heat Protection						DD	DD	DD	DD				Recent June, July and August diversions have ranged between 1.3 and 4.5 AF per month, also used for frost protection as recently as 2012
A017055	Twin Creeks	20 afa (see notes) / Irrigation; Recreation	DOS	DOS	DOS	DOS	DOS								One of the two sources for this license is an unnamed creek. The amount used shall not exceed 20 afa from either or both sources; 110 gpm limit on diversion to off-stream storage (applies to Suisun Creek POD); diversion season is Jan 1 to May 1 There were no reported diversions for 2016. See notes for S002891.
S002891	Thompson	30 afa / Irrigation				DD	DD	DD							INACTIVE or NOT REPORTING. The last supplemental SWDU was filed in 1995. The initial SWDU notes that this water is used in addition to water diverted under A017055 (L0007339). POU was Napa Co. APN 033-140-019 and POD was Napa Co. APN 033-140-016. Also, recreational use; 1 cfs limit on diversion to off-stream storage (applies to Suisun Creek PODs); diversion season is Dec 1 to Jun 1
A024398	Chateau Ste. Michelle	98 afa / Fire protection; Heat control; Frost protection; Irrigation	DOS	DOS	DOS	DOS	DOS	DOS						DOS	Related to S008244 and S022579. Includes fill and refill.
S022579	Chateau Ste. Michelle	12.2 afa / Irrigation; Frost protection; Heat control			DD	DD		DD	DD	DD	DD				Quantity, use and season are based on the initial SWDU filed in 2012. Ownership changed in 2016, in March 2016, 1.2 afa was directly diverted, and between June - Oct., 1.3 afa was beneficially used. S022579 is related to S008244 and A024398 (P016723).
S008244	Chateau Ste. Michelle	6.1 afa / Irrigation; Heat protection						DD	DD	DD	DD				No reported use in 2016. 6.1 afa was reported in 2015, and 5.5 afa was reported in 2014. S008244 is related to A024398 (P016723) and S022579.
A030244	Hoy	19 afa / Fire protection; Stockwatering	DOS	DOS	DOS	DOS							DOS	DOS	One of the two sources of this permit is an unnamed stream. This permit also includes a POD to storage and rediversion. Paragraph 20 of the permit states that the total amount of water under this permit and License 12972 (A027982) shall not exceed 19 afa. Based on L012972, it appears that the POD to storage and rediversion applies to the unnamed stream.

* SWDU = Statement of Water Diversion and Use; afa = acre feet annual; cfs = cubic feet per second

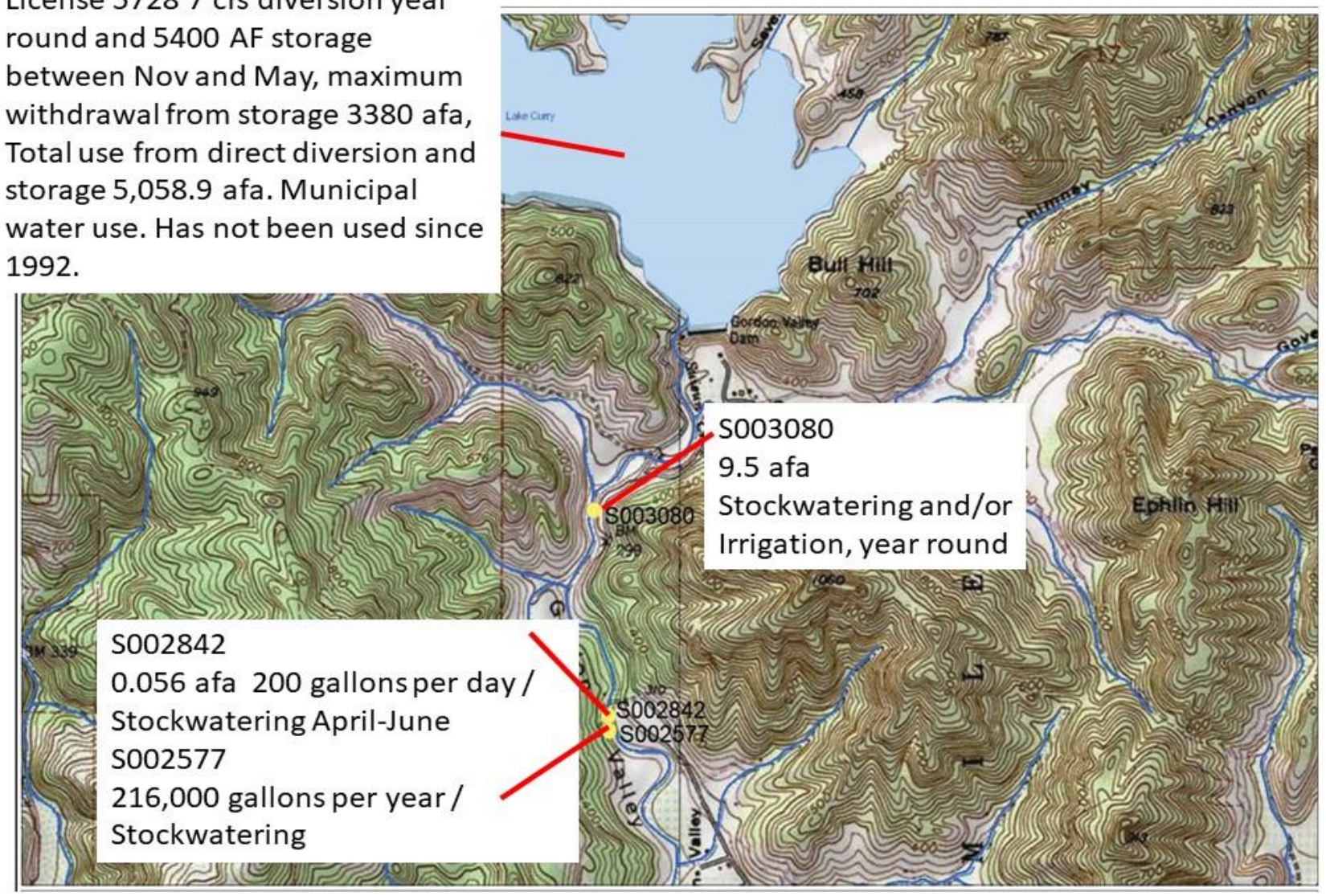

Figure 1. Water rights along Suisun Creek downstream of Lake Curry

Figure 2. Water rights along Suisun Creek downstream of Lake Curry

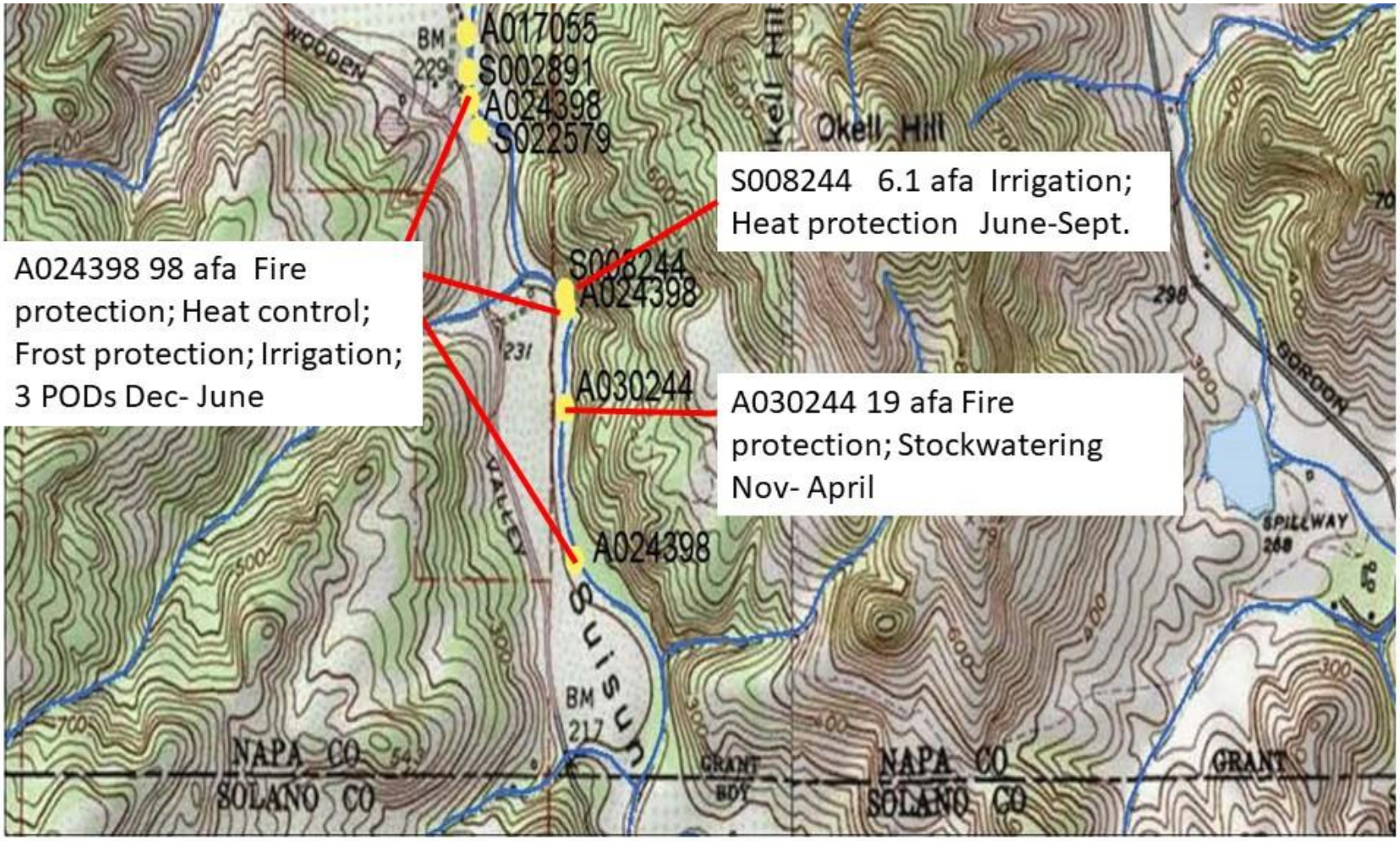

Figure 3. Water rights along Suisun Creek downstream of Lake Curry

ALTERNATIVE 1

DESCRIPTION OF ALTERNATIVE

City of Vallejo retains ownership of the lake and revises its licensed water right to allow for a high flow water diversion from Suisun Creek into the Putah South Canal to transport water to the City water treatment plant. Water releases from Lake Curry to Suisun Creek to support steelhead trout would be a requirement of the water right revision.

As described previously in 2003, the City of Vallejo proposed several alternatives to re-establish the use of water from Lake Curry for municipal use. These included repairing/rebuilding a transmission pipeline from the lake and releasing water from the lake in the summer into Suisun Creek, and rediverting water into the PSC at the crossing of Suisun Creek for delivery of water to the City's water treatment facility. This second alternative would allow for both use of the City's water right and for summertime stored water releases for instream habitats for threatened species. However, the City did not pursue either project alternative.

Water Availability Analysis and Results

As part of this grant, Wagner and Bonsignore Consulting Civil Engineers prepared an analysis of installing a new diversion at Suisun Creek where it crosses the PSC and created a preliminary design and cost estimate. We have included excerpts from the report here which is included as Appendix C.

The analysis of wet-season water availability for Suisun Creek at the PSC crossing was based on evaluation of limited hydrologic data for the historic period of January 2007 to March 2018. There is no reliable wet season streamflow data available for Suisun Creek below Lake Curry Dam, therefore the analysis relied on other data available for this period to estimate streamflow conditions. The water availability analysis considered three scenarios:

1. Pumping rate limited to 7 cfs.
2. Pumping rate limited to 14 cfs, not to exceed 30-day equivalency for 7 cfs rate (equates to about 416.5 acre-feet).
3. Pumping rate optimized to maximize diversion amount while conforming to 30-day equivalency for 7 cfs equivalency.

The analysis for scenarios 1, 2 and 3 were based on the following data sets, methodology, and assumptions:

- The historical period of January 2007 to March 2018 was selected because this was the period that continuous lake level data was available for Lake Curry. Hourly lake level data was acquired from the City of Vallejo. We converted the hourly lake level data to average daily lake level.
- The radial gates at the spillway structure were fixed in the open position during the study period. We assumed the Lake Curry permanent spillway crest is at Elev. 377.1 ft. based on a 2003 report prepared by Dennis Jackson. Lake levels above this elevation would result in flow over the spillway. Spill flows were computed based on the standard equation for a broad-crested rectangular weir having a crest length of 46 feet per original Lake Curry spillway plans on file with the California Department of Water Resources, Division of Safety of Dams (DSOD).
- Computed daily Lake Curry spill flows during Water Years (WY) 2008 to 2017 are shown graphically in Appendix C. During this 10-year period Lake Curry spilled in 6 years (WY 2010 to

2013 and in 2016 and 2017); however, the extent of annual spill volume varied widely, ranging from a low of about 104 acre-feet in 2012 to a high of 22,504 acre-feet in2017.

- For protection of instream resources, it was assumed that a minimum instream flow would be maintained in Suisun Creek at the PSC crossing before diversions at that location would be allowed. The minimum instream flow at this location was assumed to be the statistical February median flow (FMF). The ability to divert water at the PSC crossing was therefore limited to days when Lake Curry Dam was spilling *and* the flow of Suisun Creek at the PSC crossing was above the assumed minimum bypass flow.
- There is no reliable wet season gaged flow data available for Suisun Creek. To estimate daily flow in Suisun Creek at the PSC crossing we referenced historical gage data for USGS gaging station #1145800 Napa River Near Napa (Napa River gage) and adjusted the daily flow record to Suisun Creek based on differences in drainage and mean annual precipitation using the USGS StreamStats tool. Based on this reckoning, flows for Suisun Creek at PSC were estimated to be about 16.5 percent of Napa River gaged flows. For a 60-year period of record for the Napa River gage (1960 to 2019), the FMF for the Napa River gage was computed to be about 223 cfs. Based on StreamStats the FMF, adjusted to Suisun Creek at the PSC crossing, was computed to be about 36.7 cfs.
- Gaged streamflow data for Suisun Creek below Lake Curry Dam collected by CLSI in 2019 and 2020 indicates significant channel losses during the dry season. Channel losses can be attributed to uptake by riparian vegetation, possible infiltration, and possible losses to groundwater. CLSI did not complete wet season stream flow measurements and therefore no reliable data are available regarding wet season channel losses in Suisun Creek. While it is possible that channel losses occur during the wet season, based on the premise that diversions at the PSC crossing would only occur when Lake Curry is spilling, i.e., during wet conditions, it was assumed that there would be no channel losses during diversion periods.
- The evaluation of water availability was further conditioned such that diversions from Suisun Creek to the PSC would only be made when Lake Curry was spilling, which necessarily resulted in potential diversions occurring only during the wet season. Release of water from storage for rediversion at the PSC crossing when Lake Curry was not spilling, or during the dry season, was indicated to be contrary to the overall project objective of enhancing downstream habitat for anadromous fish, since it would deplete stored water supply needed for fish releases later in the dry season.

Scenario 1 – Maximum pumping rate = 7 cfs

For Scenario 1 a maximum pumping rate of 7 cfs, commensurate with the direct diversion rate specified in License 5728, was used. Table 2 shows the monthly amounts of water that could have been diverted from Suisun Creek to the PSC based on the foregoing diversion and bypass conditions. Based on a maximum diversion rate of 7 cfs, water would have been available to divert in 6 of the 10 complete water years evaluated. The annual diversion amount averaged over 10 years was about 262 acre-feet. The range of water available annually varied from 0 to almost 1,300 acre-feet (2017).

Scenario 2 – Maximum pumping rate = 14 cfs, not to exceed 30-day equivalency for 7 cfs rate

The data for Lake Curry for 2007 to 2018 indicates periods when spill flows exceed 7 cfs and water could be diverted at a rate higher than 7 cfs provided over any 30-day period the equivalent volume for the 7 cfs rate was not exceeded. Table 3 shows the monthly amounts of water that could have been diverted from Suisun Creek to the PSC based on a maximum diversion rate of up to 14 cfs and application of the 30-day rule. As indicated in the second column of Table 2, increased diversion rates (above 7 cfs used in

Scenario 1) for Water Years 2010-2013 and 2016 would have resulted in increased diversion amounts. For the very wet year of 2017, we evaluated increased diversion rates on a monthly basis. The annual diversion amount averaged over 10 years for Scenario 2 was about 313 acre-feet, an increase of 51 acre-feet over the value in Scenario 1. The range of water available annually varied from 0 to about 1,358 acre-feet (2017), an increase of about 66 acre-feet over the amount in Scenario 1.

Scenario 3 – Maximum pumping rate optimized while adhering to 30-day equivalency for 7 cfs rate

In certain years during the study period, the rate of diversion could be higher than 14 cfs without violating the 30-day rule for 7 cfs. Table 4 shows "optimized" diversion rates for certain years, up to 21.7 cfs in 2013, that could be implemented without violating the 30-day rule. The annual diversion amount averaged over 10 years for Scenario 3 was about 325 acre-feet, an increase of 63 acre-feet over the amount for Scenario 1, and 12 acre-feet more than the amount for Scenario 2. For the very wet year of 2017, the amount was the same as Scenario 2, (1,358 acre-feet).

Based on historical precipitation records for the Atlas Peak station, average water year precipitation for the 2007 to 2018 period is about 86% of long-term average, indicating an overall dry period. This period includes the critical drought years of 2012 to 2015, as well as the very wet 2017. Accordingly, a longer study period that is more in line with long-term average precipitation conditions would likely show greater availability. Based on this limited data set, it appears that some water would be available for diversion in water years having precipitation equal to or greater than the long-term average precipitation.

Suisun Creek at Putah South Canal Crossing
Computed Monthy Diversion Amount Based on Diversion Rate of 7 cfs (acre-feet)

WY	Months												
	October	November	December	January	February	March	April	May	June	July	August	September	Total[1]
2007	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	110	115	71	0	0	0	0	0	296
2011	0	0	0	0	117	415	124	0	0	0	0	0	656
2012	0	0	0	0	0	10	76	0	0	0	0	0	86
2013	0	0	58	0	0	0	0	0	0	0	0	0	58
2014	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	230	0	0	0	0	0	0	230
2017	0	0	0	320	389	352	232	0	0	0	0	0	1,292
2018	0	0	0	0	0	-	-	-	-	-	-	-	-
Average	0	0	5	29	51	102	46	0	0	0	0	0	262

Note:
1. Complete Water Years only.

Table 2. Scenario 1 Diversion Amounts

Suisun Creek at Putah South Canal Crossing
Computed Monthly Diversion Amount Based on Diversion Rate of 14 cfs (acre-feet)

WY	Optimized Diversion Rate (cfs)	Months												
		October	November	December	January	February	March	April	May	June	July	August	September	Total[2]
2007	-	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	14	0	0	0	0	173	192	120	0	0	0	0	0	485
2011	7.2	0	0	0	0	120	425	127	0	0	0	0	0	672
2012	11.8	0	0	0	0	0	10	93	0	0	0	0	0	104
2013	14	0	0	93	0	0	0	0	0	0	0	0	0	93
2014	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	13.5	0	0	0	0	0	416	0	0	0	0	0	0	416
2017	7[3]	0	0	0	320	389	352	297	0	0	0	0	0	1,358
2018	-	0	0	0	0	0	-	-	-	-	-	-	-	-
Average		0	0	8	29	57	127	58	0	0	0	0	0	313

Note:

1. Diversion rate for Water Years 2010-2013 and 2016 optimized to confrom with 30-day rule for 7 cfs equivalent, but not exceeding 14 cfs with a specified optimal flow rate had their values computed using the specified flow rate all other computation used 7 cfs as its flow rate limitation.

2. Complete Water Years only.

3. Water Year 2017 diversion rate was further optimized based on a monthly disaggregation.

Table 3. Scenario 2 Diversion Amounts

Suisun Creek at Putah South Canal Crossing
Optimized Computed Allowable Diversion Rate (acre-feet)

WY	Optimized Diversion Rate (cfs)	Months												
		October	November	December	January	February	March	April	May	June	July	August	September	Total[2]
2007	-	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	19.7	0	0	0	0	207	220	154	0	0	0	0	0	581
2011	7.2	0	0	0	0	120	425	127	0	0	0	0	0	672
2012	11.8	0	0	0	0	0	10	93	0	0	0	0	0	104
2013	21.7	0	0	117	0	0	0	0	0	0	0	0	0	117
2014	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	13.5	0	0	0	0	0	416	0	0	0	0	0	0	416
2017	7[3]	0	0	0	320	389	352	297	0	0	0	0	0	1,358
2018	-	0	0	0	0	0	-	-	-	-	-	-	-	-
Average		0	0	11	29	60	129	61	0	0	0	0	0	325

Note:

1. Water Years 2010-2013 and 2016 optimized to conform with 30-day rule, for 7 cfs equivalency
2. Complete Water Years only.
3. Water Year 2017 diversion rate was further optimized based on a monthly disaggregation.

Table 4. Scenario 3 Diversion Amounts

Conceptual Suisun Creek Pump Station

Suisun Creek at PSC Crossing, Physical Setting

An aerial view of Suisun Creek at the PSC crossing is provided in Figure 4. Suisun Creek crosses under the PSC via a 78-inch diameter concrete pipe inverted siphon. Two as-built plan sheets prepared by the U.S. Bureau of Reclamation (USBR) and dated February 2, 1959, are provided in Appendix C. USBR Drawing No. 433-D-533 shows a General Plan and Longitudinal Section (profile) of the inverted siphon pipe. USBR Drawing No. 433-D-534 shows details of transition structures at the entrance and exit of the siphon pipe. The transition structure at the entrance includes a radial gate and flashboard structures for flow control; the siphon exits freely to the PSC at the downstream end of the inverted siphon (Figure 5 and 6). PSC flow capacity is indicated in Drawing No. 433-D-534 to be 320 cfs upstream of the inverted siphon and 180 cfs downstream.

The right-of-way for the PSC is generally a strip of land that encompasses the canal itself and access roads on both sides, with additional land area on the upstream side of the inverted siphon. A concrete bridge within the right-of-way on the easterly side of the siphon provides vehicular access over Suisun Creek.

Just upstream of the siphon crossing Suisun Creek makes a sweeping bend from south to east. This has resulted in scour of the right bank of Suisun Creek about 100± feet upstream of the siphon, as evidenced by the existence of broken concrete rubble at this location. The scour and rubble may also be attributable to discharges of drain water from agriculture lands west of the PSC via a large diameter CMP culvert entering the creek on the right bank near this location.

Conceptual Pump Station Design

Because the Suisun Creek channel is lower in elevation than the PSC, diversions from the creek into the PSC would need to be pumped. The conceptual design of the pump station was driven by several assumed constraints:

- To avoid creating an obstruction to fish migration it was assumed that there would be no barrier constructed across the creek to pool water for pumping.
- A fish screen meeting the requirements of NOAA Fisheries and CDFW for anadromous fish was assumed to be required.
- It was assumed that some redundancy should be provided, i.e., at least two pumps and at least two intakes with separate fish screens.

The pump station could be constructed on either the left or right bank of Suisun Creek (Figure 4). Because the right bank appears to have had previous scour issues and may require additional scour protection measures, the left bank may be the preferred location. In addition, per Appendix C, there is more space on the left bank relative to property boundaries. If the pump station were located on the right bank a buried pipeline would convey pumped water to the PSC downstream of the siphon. If the pump station is located on the left bank a buried pipeline would convey pumped water to the upstream siphon transition structure and discharge it immediately downstream of the radial gate/flashboard control structure at that location.

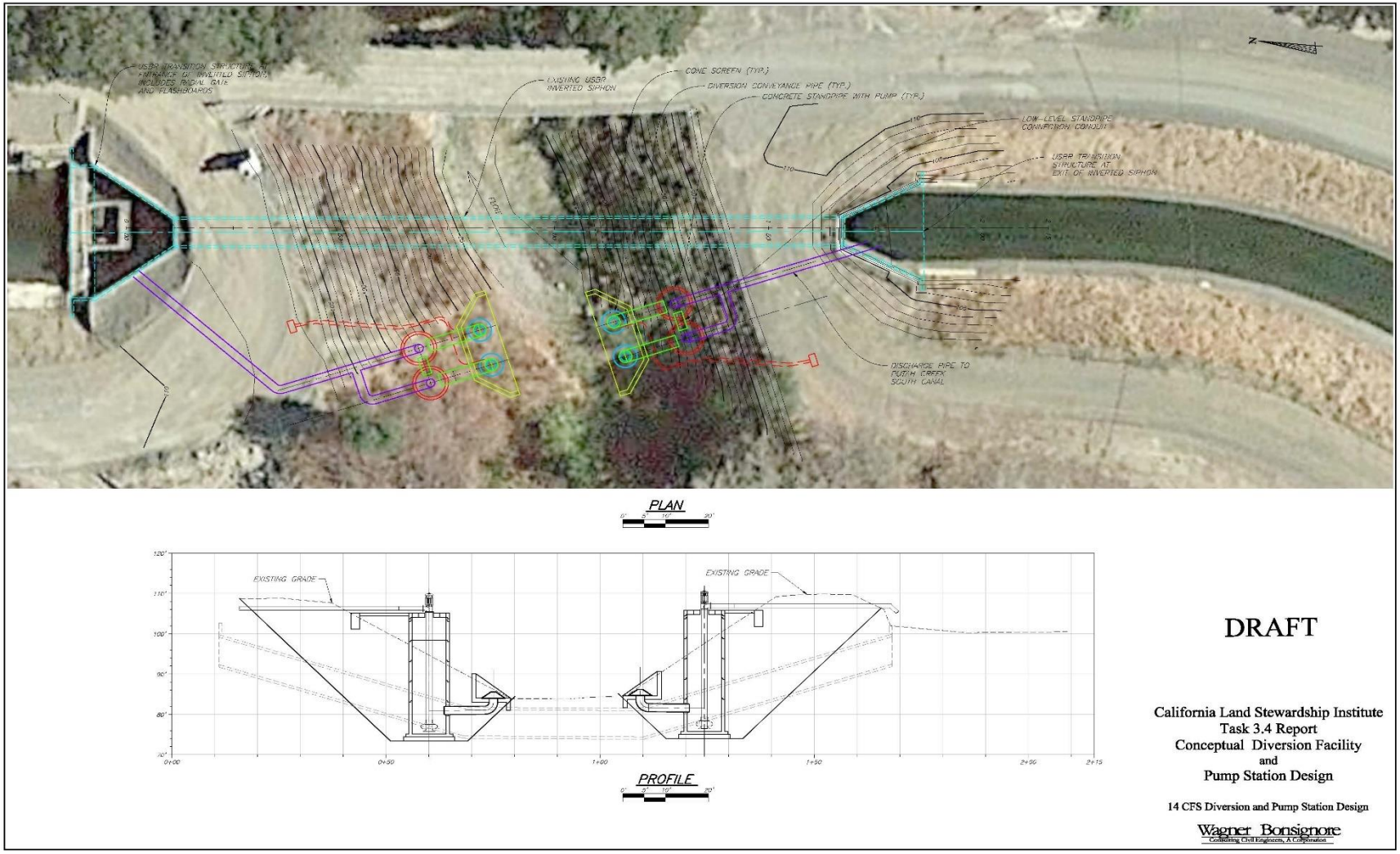

Figure 4. Conceptual Design for Diversion Facility at Suisun Creek and the Putah South Canal

Figure 5. Entrance to inverted siphon (10/24/2019).

Figure 6. Exit from inverted siphon (10/24/2019)

For protection of fish, the pump station design utilizes cone screens as manufactured by ISI Intake Screens, Inc. (ISI). Product information for ISI cone screens is provided in Appendix C. As shown, the screen unit consists of a stainless steel wedge-wire conical screen with a hydraulic motor-driven rotating external brush for self-cleaning. An internal baffle directs flow through the screen into an intake pipe exiting the bottom of the screen.

As shown on Figure 4, water passing through the above described cone screens would gravity flow via a pipe to a large-diameter to a reinforced concrete standpipe sump pump on the stream bank. Pumps are assumed to be variable-speed electric motor-driven vertical turbine pumps powered from the grid, but alternatively could be powered by a permanent or portable generator unit. Water level sensors in the sump would control pump operations and would be configured to preclude pumping if the flow in the creek is less than the minimum bypass flow required for protection of instream resources.

Three conceptual pump stations configurations were evaluated for the three pumping rate scenarios (7 cfs, 14 cfs, and 21 cfs). The proposed pump station design concept for each pumping scenario is relatively consistent in concept. Each pump station scenario includes cone-type fish screens with a conveyance intake pipelines leading to a standpipe sump structure which contains the variable-speed pump. The relative size of the screen and standpipe structures increases between the 7 cfs and the 14 cfs pump station designs.

The 7 cfs pump station design is proposed to require two 48” diameter cone screens, each with a 24” diameter pipeline conveying water from the diversion inlet, located below the cone screen, to a 60” diameter concrete standpipe. Each pump station unit would be sized to divert about 3.5 cfs for a total pumped diversion rate of 7 cfs when both pump units are operated simultaneously. A low-level conduit would connect the two standpipes to allow the two pumps to run in alternating cycles when diversion flowrates available are less than 7 cfs.

The 14 cfs pump station design is similar to the 7 cfs pump station except the two cone screens would be 66” diameter, the diversion conveyance pipeline is 36” diameter, and the concrete standpipe would be 84” diameter.

The 21 cfs pump station design is essentially the same as the 14 cfs pump station except a third diversion and pumping “unit” would be added adjacent to the two pumping units of the 14 cfs design.

STEPS TO IMPLEMENTATION

State Water Resources Control Board requirements

The proposed project involves constructing a pump station facility on Suisun Creek for making diversions into the Putah South Canal (PSC) for wet season deliveries. With regard to water rights, the project would require the City to file of a “Petition for Change” with the SWRCB to add a point of diversion to License 5728 on Suisun Creek at the Putah South Canal (PSC) crossing. Implementation of the project would require the approval of the petition by the SWRCB, typically in the form of a Board Order and/or an amended license. The petition process involves public notice, with opportunity for protests to be filed by downstream right holders if they believe that the proposed change could impact their ability to divert under their right. In addition, any individual, group, or regulatory agency may file a protest based on potential adverse impacts to the environment or the public interest. Petitions are subject to

environmental review under the California Environmental Quality Act (CEQA). Before approving a petition for change the SWRCB must make the following findings:

- The change does not initiate a new water right;
- The change can be made without injuring other legal users of water including the environment, and
- The change is in the public interest.

The SWRCB's approval of a petition to add a point of diversion would allow the City to exercise the direct diversion element of License 5728 from Suisun Creek at the PSC crossing (provided any other permits required by other regulatory agencies are obtained). License 5728 limits the rate of direct diversion at the present point of diversion (Lake Curry Dam) to 7 cfs. This same diversion rate limitation would apply to the added point of diversion at the PSC. Further, under the concept that a right holder shall not be allowed to divert more water at a new downstream point of diversion than what would have been available at its present point of diversion, we expect that the evaluation of water available for the proposed project, as well as its future operation, necessarily requires reckoning water availability at the original licensed point of diversion, i.e., Lake Curry Dam.

The Lake Curry water right license allows for *direct diversion* and diversion by *collection to storage*. This is a nuanced but an important distinction in the administration of appropriative water rights by the State of California. Title 23 of California Code of Regulations (CCR), sections 657 and 658, characterize these terms as follows:

> *"657. Regulation of Water.*
> *Regulation of water means the direct diversion of water to a tank or reservoir in order that the water may be held for use at a rate other than the rate at which it may be conveniently diverted from its source. For licensing purposes, refill, in whole or in part, held in a tank or reservoir for less than 30 days shall be considered regulation of water."*
>
> *"658. Storage of Water.*
> *Storage of water means the collection of water in a tank or reservoir during a time of higher stream flow which is held for use during a time of deficient stream flow. For licensing purposes all initial collections within the collection season plus refill, in whole or in part, held in a tank or reservoir for more than 30 days shall be considered water diverted for storage except as provided in Section 735(c)."*

The application of the above terms to analysis of reservoir operations is often referred to as "the 30-day rule" and is used by the SWRCB to disaggregate and quantify the use of water made by direct diversion from the use of water made by withdrawal from reservoir storage. Generally, on an instantaneous basis, the release of water from a reservoir for a beneficial use is considered to be direct diversion to the extent there is concurrent natural inflow to the reservoir (i.e., "pass-through"). In the case where the reservoir is rising while a release is being made, the entire release would be considered direct diversion. In the case where a release is being made and the reservoir is falling, the release could be classified partly as direct diversion (to the extent there is inflow to the reservoir) and partly as a withdrawal from storage if there is concurrent inflow to the reservoir. If there is no concurrent inflow, the entirely of the release would be considered withdrawal from storage. The disaggregation of direct diversion from storage withdrawal can be complicated when the 30-day rule is applied and requires an after-the-fact calculation based on monitoring data.

It is uncertain if the 30-day rule could be applied to the proposed project, that is, diverting water at the new point of diversion at rates higher than 7 cfs if the amount diverted over any 30-day period did not exceed the equivalent 30-day amount. Both CCR sections 657 and 658 state that the 30-day rule shall be used "for licensing purposes". It is uncertain whether the licensed direct diversion rate, established through application of the 30-day rule to pre-license operations, was determined to be a maximum instantaneous rate or whether the 30-day rule applies to the stated 7 cfs rate. Documents in the SWRCB's file for License 5728 suggest (but are not definitive) that this issue was considered prior to licensure in 1959 and that the 30-day rule did not apply. In the course of its work on this project CLSI attempted to meet with SWRCB staff and the City, in part to discuss the potential applicability of the 30-day rule to License 5728. However, the City cancelled the meeting and SWRCB staff declined to meet with CLSI and its consultants without the City's concurrence. Because the applicability of the 30-day rule to License 5728 remains an open question, this analysis considered a diversion rate of 7 cfs as well as higher rates to assess the effect of the 30-day rule on yield, should it be deemed to be applicable to License 5728.

As part of any change to the Lake Curry water right a condition requiring a release schedule for dry, normal and wet years would be added to the revised water right (see Lake Curry model report, CLSI 2021).

Additional permits for this alternative would be needed from the Ca. Dept. of Fish and Wildlife (1600 Lakebed and Stream Alteration permit), US Army Corps of Engineers (Clean Water Act 404 permit) and San Francisco Regional Water Quality Control Board (Clean Water Act 401 permit) for installation of the diversion structure in Suisun Creek. A permit from Solano County may also be needed.

There may also be a need to purchase private property to build the diversion facility.

The Bureau of Reclamation would need to act in partnership with the City of Vallejo in the design and permit stage of the project, complete CEQA/NEPA compliance together and complete a contract allowing the City to use the PSC to transport their water diverted from Suisun Creek.

Following design, permitting, CEQA/NEPA compliance and possible property purchase the City would need to complete final design and engineering and a bidding process for construction contractors. Once completed this alternative would allow the City to utilize its water right in Lake Curry.

COSTS

Estimated Construction Cost for Conceptual Design

The estimated construction cost for each pump station conceptual design was developed based on estimated unit and lump sum cost values for project elements and components. Detailed cost estimates are provided on Tables 5, 6, and 7.

Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility
Engineer's Estimate of Probable Cost for Construction of
7 cfs Diversion Facility

Direct Construction Costs

Item No.	Description		Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$49,700
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servi	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	2,000	CY	$21	$42,000
6	Backfill	2,000	CY	$37	$74,000
7	60" Dia. Concrete Manhole Structures	2	Job	Lump Sum	$15,000
8	Concrete Intake Structure	16	CY	$1,800	$28,800
9	24" Dia. Conveyance Pipes	40	LF	$100	$4,000
10	Concrete/CLSM Backfill	30	CY	$180	$10,400
11	12" Dia. Steel Discharge Piping	1	Job	Lump Sum	$11,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$11,000
13	Access Walkway to Structure	1	Job	Lump Sum	$8,000
14	8 oz. Geotextile Fabric	800	SF	$0.30	$240
15	18" Minus Riprap	190	Ton	$45	$8,550
16	3" PVC Conduit	100	LF	$20	$2,000
17	48" ISI Model C66-18 Brushed Cone Screen	2	Job	Lump Sum	$34,000
18	Hydraulic Power Unit	2	Job	Lump Sum	$26,000
19	Pumping System, 2-20 Hp Pumps	1	Job	Lump Sum	$299,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$30,000
	Subtotal Direct Construction				$670,690
	Contingency @ 25%				$168,000
Total Direct Construction					**$838,690**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 12%	$101,000
B	Geotechnical Investigation @ 6%	$50,000
C	Biological Review and Permitting @ 16%	$134,000
D	Construction Inspection @ 5%	$42,000
E	Contract Administration @ 2%	$17,000
	Subtotal Engineering and Admin.	$344,000
	Contingency @ 25%	$86,000
Total Engineering and Administration		**$430,000**
Total Estimated Construction Cost		**$1,268,690**
Total Estimated Construction Cost - Rounded		**$1,300,000**

Table 5. Engineer's Estimate for Construction Costs for Scenario 1

Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility
Engineer's Estimate of Probable Cost for Construction of
14 cfs Diversion Facility

Direct Construction Costs

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$61,600
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servi	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	2,000	CY	$21	$42,000
6	Backfill	2,000	CY	$37	$74,000
7	84" Dia. Concrete Manhole Structures	2	Job	Lump Sum	$27,000
8	Concrete Intake Structure	16	CY	$1,800	$28,800
9	36" Dia. Conveyance Pipes	40	LF	$150	$6,000
10	Concrete/CLSM Backfill	45	CY	$180	$13,100
11	24" Dia. Steel Discharge Piping	1	Job	Lump Sum	$22,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$22,000
13	Access Walkway to Structure	1	Job	Lump Sum	$8,000
14	8 oz. Geotextile Fabric	800	SF	$0.30	$240
15	18" Minus Riprap	190	Ton	$45	$8,550
16	3" PVC Conduit	100	LF	$20	$2,000
17	66" ISI Model C66-18 Brushed Cone Screen	2	Job	Lump Sum	$40,000
18	Hydraulic Power Unit	2	Job	Lump Sum	$26,000
19	Pumping System, 2-40 Hp Pumps	1	Job	Lump Sum	$398,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$35,000
	Subtotal Direct Construction				$831,290
	Contingency @ 25%				$208,000
Total Direct Construction					**$1,039,290**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 10%	$104,000
B	Geotechnical Investigation @ 5%	$52,000
C	Biological Review and Permitting @ 15%	$156,000
D	Construction Inspection @ 4%	$42,000
E	Contract Administration @ 1.5%	$16,000
	Subtotal Engineering and Admin.	$370,000
	Contingency @ 25%	$93,000
Total Engineering and Administration		**$463,000**
Total Estimated Construction Cost		**$1,502,290**
Total Estimated Construction Cost - Rounded		**$1,500,000**

Table 6. Engineer's Estimate for Construction Costs for Scenario 2

Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility
Engineer's Estimate of Probable Cost for Construction of
~21 cfs Diversion Facility

Direct Construction Costs

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$90,600
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servi	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	3,100	CY	$21	$65,100
6	Backfill	3,100	CY	$37	$114,700
7	84" Dia. Concrete Manhole Structures	3	Job	Lump Sum	$40,500
8	Concrete Intake Structure	22	CY	$1,800	$39,600
9	36" Dia. Conveyance Pipes	60	LF	$150	$9,000
10	Concrete/CLSM Backfill	90	CY	$180	$21,200
11	24" Dia. Steel Discharge Piping	1	Job	Lump Sum	$33,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$33,000
13	Access Walkway to Structure	1	Job	Lump Sum	$10,000
14	8 oz. Geotextile Fabric	1000	SF	$0.30	$300
15	18" Minus Riprap	230	Ton	$45	$10,350
16	3" PVC Conduit	150	LF	$20	$3,000
17	66" ISI Model C66-18 Brushed Cone Screen	3	Job	Lump Sum	$60,000
18	Hydraulic Power Unit	3	Job	Lump Sum	$39,000
19	Pumping System, 3-40 Hp Pumps	1	Job	Lump Sum	$597,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$40,000
	Subtotal Direct Construction				$1,223,350
	Contingency @ 25%				$306,000
Total Direct Construction					**$1,529,350**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 8%	$122,000
B	Geotechnical Investigation @ 4%	$61,000
C	Biological Review and Permitting @ 14%	$214,000
D	Construction Inspection @ 3%	$46,000
E	Contract Administration @ 1%	$15,000
	Subtotal Engineering and Admin.	$458,000
	Contingency @ 25%	$115,000
Total Engineering and Administration		**$573,000**
Total Estimated Construction Cost		**$2,102,350**
Total Estimated Construction Cost - Rounded		**$2,100,000**

Table 7. Engineer's Estimate for Construction Costs for Scenario 3

Table 8. Summary of Estimated Construction Costs by Scenario

Scenario	Max Diversion Rate (cfs)	Total Estimated Construction Cost
1	7	$1,300,000
2	14	$1,500,000
3	~21	$2,100,000

Costs for project elements are estimated based on several different methods depending on the information available or known for each element at this conceptual level of design. Site construction work was estimated using "prevailing wage" equipment rates from the 2021-22 Equipment Rental Rate from the California Department of Transportation, labor rates from the California Department of Industrial Relations, and daily production estimates for the equipment and labor provided. Equipment and structures were estimated from quotes for similar items and adjusted to current-day prices based on the "Composite trend" index values as reported in the *Bureau of Reclamation's Construction Cost Trends* and for variances in project design. The pumping system can be a highly variable cost element with regard to operational flow rates and system mechanical or operational requirements. The pump costs provided are based on personal communications with a pump system designer with relevant experience with a similar diversion pumping system recently installed for a private project in Napa County. Pumping system costs are further adjusted based on pump horsepower requirements and cost increases for more stringent mechanical system operational and design standards we expect will be required for a public agency project.

Included in the total construction cost estimate are estimates for engineering design, geotechnical investigation, biological review and permitting, contract administration and construction inspection. These costs are estimated as a percentage of the direct construction cost and are for conceptual project cost evaluations only and shall not be considered as a proposal for such services. The proposed biological review and permitting are proposed to be subsequent and in addition to the biological reviews and permitting associated with the water right permit actions which would be required for the project.

Not included in the construction cost estimates are costs associated with the approval of a Petition for Change for License 5748 by the SWRCB and all related studies, surveys, and analyses that would be required to further evaluate and develop this project. Also not included are management and maintenance costs for Lake Curry and treatment and delivery costs for the diverted water.

In 2016 NBS prepared a water rate study for the City of Vallejo including the Lakes System. The Lakes system includes several other out of city limits reservoirs in addition to Lake Curry. This study found that the Lakes system does not have adequate reserve funds for operating, rehabilitation and replacement and other needs and currently owes $3 million to the City of Vallejo (NBS 2016). Figure 7 from the study depicts reserve funds for the Lakes system.

Table 9 shows the cost per acre foot of water using the new diversion is fairly high and may make the use of the Lake Curry water right infeasible. If the Lakes System is already very low on reserve funds and needs significant capital improvement (NBS 2016) it would seem that the City would benefit from the use of their other sources of available water (North Bay Aqueduct, Lake Berryessa) rather than trying to develop additional infrastructure to use the relatively small Lake Curry water right.

Table 9. Cost per acre foot of water diverted

Scenario	Max Diversion Rate (cfs)	10-year Avg. Diversion Amount (af)	Annualized Cost ($)	Average-Annual Unit Cost ($/af)
1	7	262	$75,200	287
2	14	313	$86,700	277
3	~21	325	$121,400	374

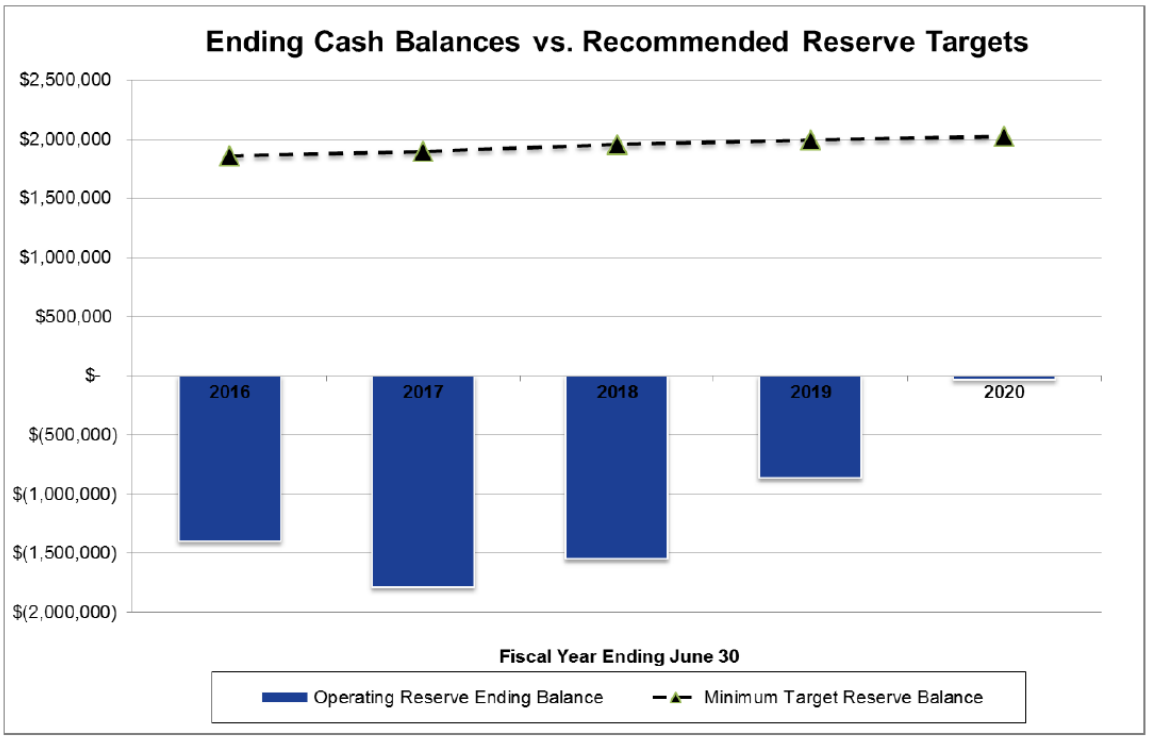

Figure 7. Evaluation of operating reserves for City of Vallejo Lakes System. From NBS 2016.

BENEFITS

Alternative One would provide for instream habitat for threatened steelhead trout through a required release schedule for Lake Curry as well as create a new point of diversion so that the City of Vallejo could use their water right and avoid losing this right for lack of use since 1992.

In the 5 years of this grant, the City has completely shut off releases of water to Suisun Creek four times for months at a time drying up the creek and resulting in the loss of listed threatened steelhead trout. We know of a number of other additional incidents prior to 2017 where the City has also shut off the releases (Rice July 18, 2016, Capp July 19, 2016, Capp May 4, 2015). A Ca. Dept. of Fish and Wildlife staff found dead steelhead in Suisun Creek in 2016 due to the stoppage of releases from Lake Curry. This track record demonstrates that it is highly unlikely that the City of Vallejo will voluntarily release water from Lake Curry and that takings of an endangered species will continue. State and federal agencies have been aware of these actions by the City of Vallejo for many years (Wheeland 2004 and 2005;

Edmondson 2004) but have not taken any enforcement actions. This lack of enforcement makes it very easy for the City to continue to manage Lake Curry in a way that results in the taking of a threatened species and violates state and federal endangered species acts. Only a formal change to the Lake Curry water right with state and federal agencies requiring a schedule of releases to Suisun Creek for the maintenance of steelhead trout habitats is likely to remedy this situation.

TIMELINE

The design and permitting portion of the project would take 2-10 years. The State Water Board might prioritize this petition for a change in a water right due to the benefits provided to a listed threatened species. Construction would require 1-2 years.

POTENTIAL SOURCES OF FUNDING

There are a number of state and federal grant programs that could provide funds for the diversion structure and dedication of Lake Curry stored water to maintain instream habitat for threatened steelhead trout. These grants include:

State Water Resource Control Board – Drinking Water State Revolving Fund.
This program funds public drinking water facilities through principal forgiveness loans and grants.

Ca. Water Commission – Water Storage Investment Program.
This program will fund the public benefit portion of reoperation of reservoirs.

Ca. Dept. of Fish and Wildlife – Fisheries Restoration Grant Program.
This alternative could be eligible for funding as instream habitat restoration or dedication of Lake Curry water releases for instream flow

Wildlife Conservation Board – Proposition 1 Streamflow Enhancement Program
This alternative may be eligible for funding through a dedication of the Lake Curry water releases for instream flows.

Ca. Department of Water Resources- Integrated Regional Water Management program
This alternative may qualify for funding through this regional program for water reliability and instream flow enhancement.

Ca. State Coastal Conservancy – Coastal resource program
The conservancy may be able to contribute to the diversion structure funding if a permanent dedication of the Lake curry water to instream flows is included.

Environmental Protection Agency – Water Infrastructure Finance and Innovation Act Program
This alternative may qualify for a loan from this program for the diversion project.

ALTERNATIVE 2

DESCRIPTION OF ALTERNATIVE

The City of Vallejo through prior water department directors Franz Nestlerode (Marcus 2012) and Martin Querin (Marcus 2016) have discussed the need to sell Lake Curry, as the City is not able to use its water right and managing the lake and its adjacent lands costs the City money every year. There is no use of the Lake Curry lands by Vallejo residents or other public members. Currently (2021) the City states it does not want to sell Lake Curry.

Through this alternative a conservation group or public agency would purchase the City of Vallejo's 1220 acres, including Lake Curry. The land would be managed for environmental conservation and Lake Curry would be managed to provide releases to Suisun Creek to support threatened steelhead trout. Depending on the agency/organization involved, Lake Curry and its adjacent lands could become a public park.

The Napa County Regional Park and Open Space District is interested in managing Lake Curry and its adjacent lands for environmental protection, public open space and to provide releases to Suisun Creek (Chris Cahill 2021).

The Association of Bay Area Governments indicates Lake Curry and Suisun Creek watershed as a Priority Conservation Area for natural landscape protection and identifies the Napa County Regional Park and Open Space District as the likely management agency (ABAG 2021) (Figure .8).

The Nature Conservancy in its "Conserving the Landscapes of Napa County" (2003) identified Lake Curry and the Upper Suisun Creek watershed as a high priority area for acquisition and environmental protection (Figure 9).

The Napa County General Plan (2008) designates Lake Curry and its adjacent lands as public open space with no public access (Figure 10). Policies in the general plan include:

> Policy ROS-15: The County, in coordination with and generally by working through the Napa County Regional Park and Open Space District, shall plan for and reserve land for recreational facilities and encourage non-commercial recreational development, including both parks and a comprehensive system of trails, in a manner and to the extent consistent with agricultural, water quality, and natural resource protection goals and the Trails Policy contained in this Element (Policy ROS-10). The following recreational opportunity is one of the County of Napa's priorities which shall be addressed in greater detail in a park and recreation master plan to be prepared by the Napa County Regional Park and Open Space District:
> Focus on improving public access to and recreational facilities on existing public lands, such as watershed lands owned by water districts, and state and federal lands located primarily in the eastern parts of the county

STEPS TO IMPLEMENTATION

There is significant interest from several organizations to change Lake Curry from an unused municipal water supply reservoir to a park that protects wildlife habitats and fish habitats in Suisun Creek. An agency such as the Napa Open Space District would need to follow these steps to implement this alternative:

- Complete a conceptual plan for the purchase and management of Lake Curry and adjacent lands as a public park and environmental preserve.
- Complete an appraisal of the value of these lands
- Complete an analysis of the minimum level of improvements to roads, installation of restrooms, trails and other amenities that are needed to open the area to the public.
- Complete an annual maintenance budget for the site as a public park and for the management of releases into Suisun Creek. One of the concerns for an agency purchasing an aging reservoir is the future cost of maintenance of the dam and the risks of failure and damage. The Napa Open Space District would need to review these issues carefully.
- The District would need to seek funding and negotiate with the City of Vallejo for the purchase

COSTS
It is not possible to prepare a cost estimate for this alternative.

BENEFITS
This alternative would create a different ownership for Lake Curry and adjacent lands and allow public access to public lands. Additionally, it would create a park dedicated to environmental protection and providing releases to Suisun Creek.

TIMELINE
Depending on the availability of funds and willingness of City of Vallejo to sell Lake Curry and its adjacent lands, this project could require 5-15 years.

POTENTIAL SOURCES OF FUNDING
The following are potential sources of grant funds for this alternative:

Ca. Dept. of Parks and Recreation – Land and Water Conservation Fund. Regional Park Program

Ca. State Coastal Conservancy – San Francisco Bay Watershed Program

Ca. Dept. of Fish and Wildlife – Endangered Species Conservation and Recovery Land Acquisition Grant Program, Prop. 68 Improve Conditions for Fish and Wildlife

Wildlife Conservation Board – Land Acquisition Program, Land Acquisition and Habitat Enhancement and Restoration Program

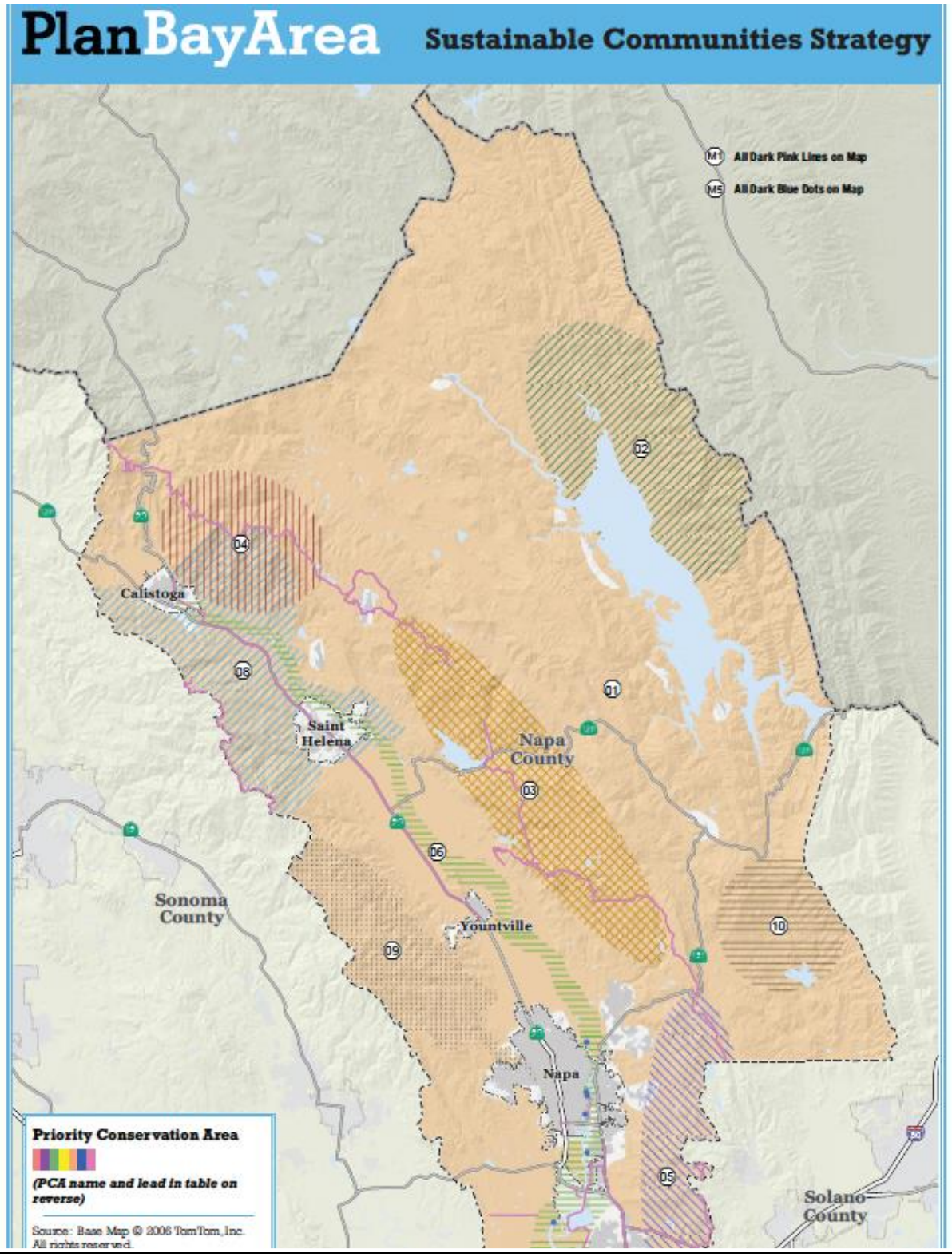

Figure 8. Priority Conservation Areas. Lake Curry is indicated in area 10.

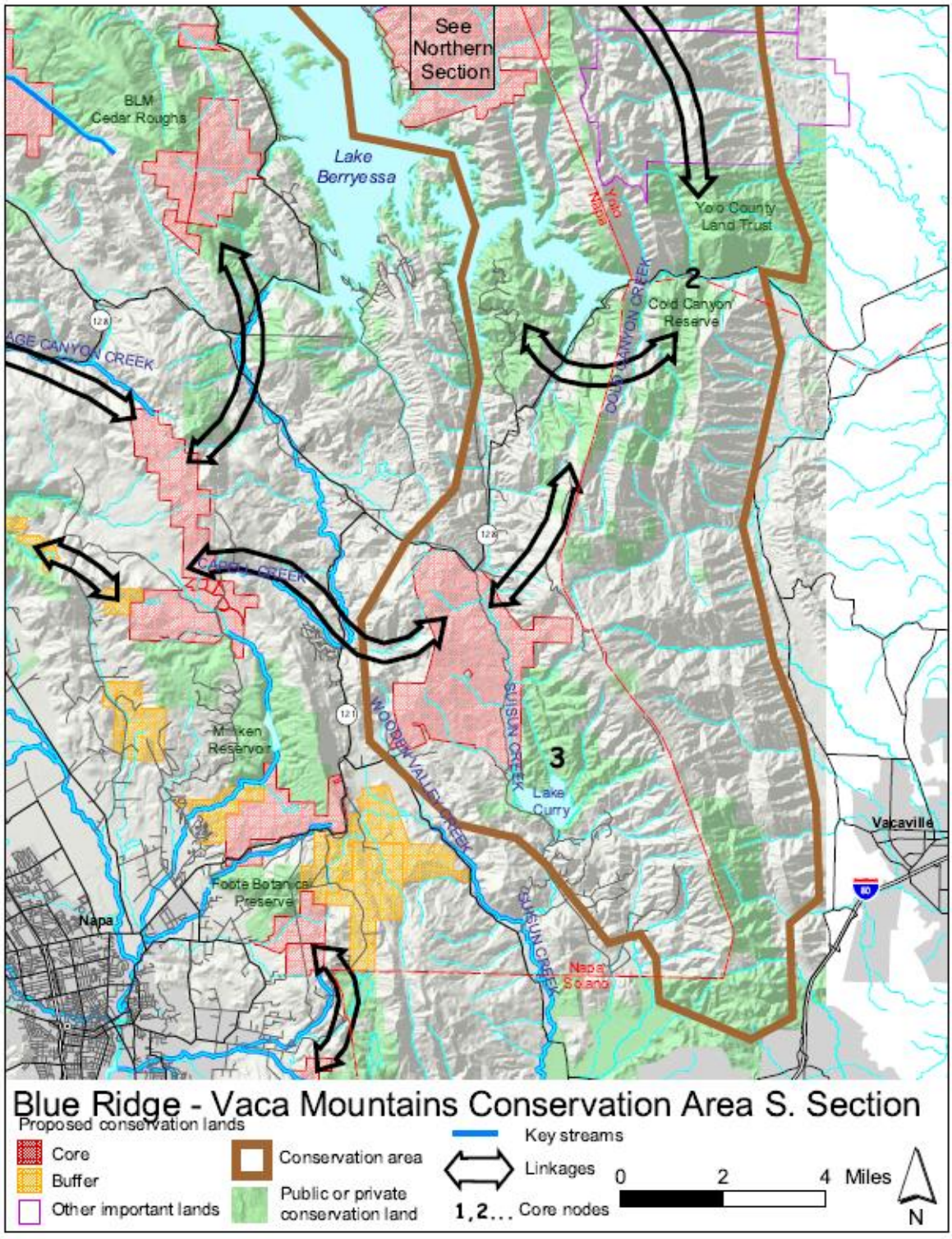

Figure 9. The Nature Conservancy priorities for acquisition in one portion of Napa County includes Lake Curry and Suisun Creek

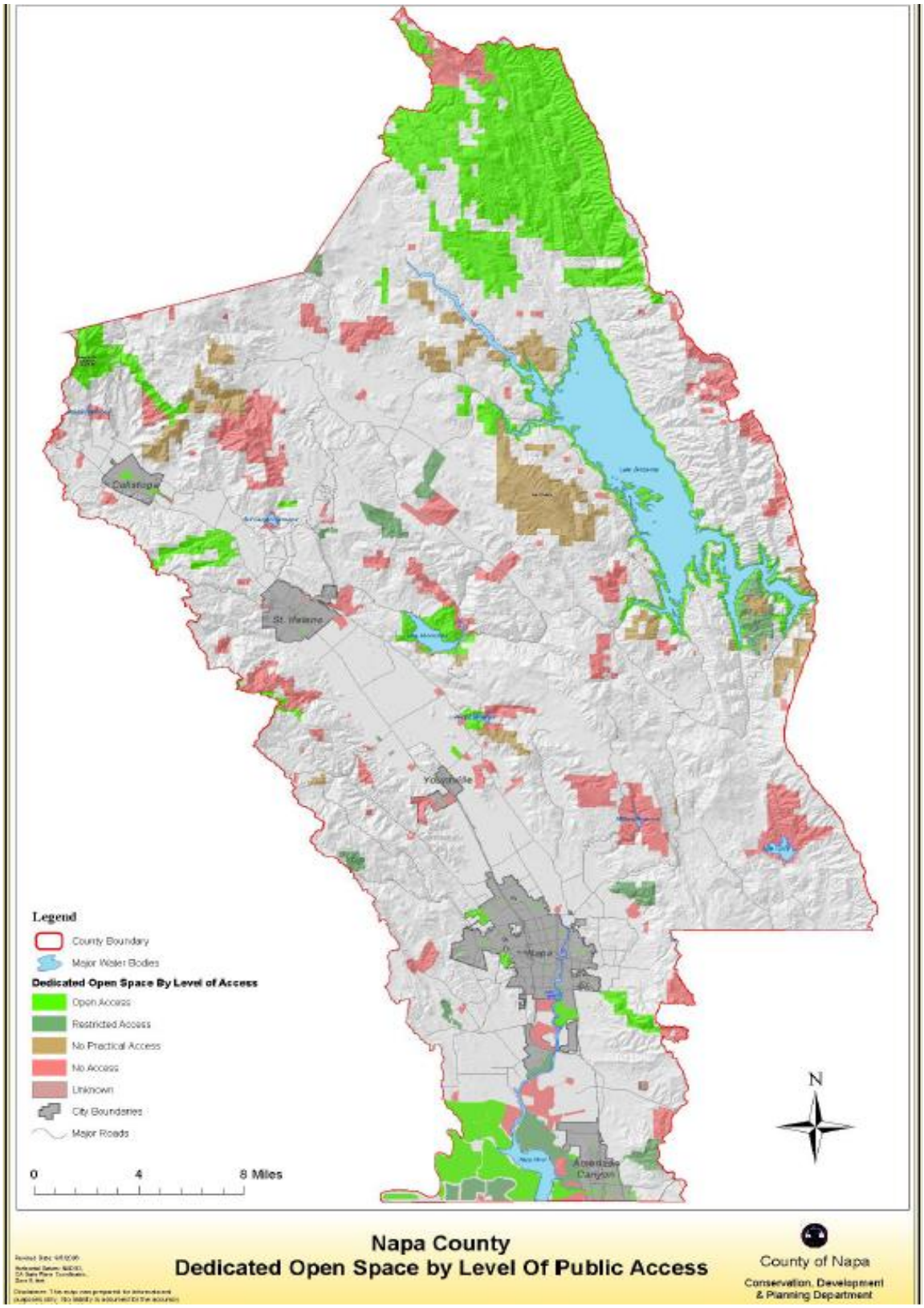

Figure 10. Open space element of the Napa County General Plan shows Lake Curry as public open space with no access.

ALTERNATIVE 3

DESCRIPTION OF ALTERNATIVE

Regulation and requirements for mitigation of project impacts often creates numerous small, fragmented habitat reserves. The creation of conservation and mitigation banks are an alternative approach. These banks are generally large, connected areas of preserved, restored, enhanced, or constructed habitats (for example, wetlands) that are set aside for the express purpose of providing mitigation for project impacts to wetlands, threatened and endangered species, and other sensitive resources. Broadly speaking, a bank is privately or publicly owned land managed for its natural resource values. In exchange for permanently protecting the land and resources, and managing them according to a written agreement with the regulatory agencies, the bank sponsor is issued credits that it may sell to project proponents who need to satisfy legal requirements for mitigating the environmental impacts of projects. A privately owned conservation or mitigation bank is a free-market enterprise that offers landowners economic incentives to protect natural resources, and that can save time and money for parties with mitigation responsibilities by simplifying the regulatory compliance process. Conservation banks generally protect threatened or endangered species habitat or other sensitive resources, while mitigation banks conserve existing, restored, enhanced, or created wetland habitats that may also provide habitat for listed species. Conservation and mitigation banking is important to federal and state agencies because banks provide regulatory efficiencies, environmental benefits, and economic advantages.

Here are some descriptions of existing mitigation banks (Westervelt Ecological Services, Wildlands Inc. 2021) that include salmonid habitats:

The **Bullock Bend Mitigation Bank** is a 119.65-acre site in Yolo County, California that has been approved by the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife and National Oceanic Atmospheric Administration to provide credits for impacts to salmon, steelhead, Swainson's hawk, other waters of the U.S., and riparian habitat.

Surrounded on three sides by the Sacramento River, restoration of the site has re-established connectivity between the river and the historic floodplain through the breach of a farm berm on the south side of the property. This has allowed the river water to naturally flood the property, creating off-channel salmonid rearing habitat. Habitat types developed at the bank include restored floodplain riparian, enhanced riparian floodplain forest and enhanced shaded riverine aquatic habitat.

The proposed **Honker Bay Conservation Bank** is located on approximately 112 acres along the southern edge of Suisun Marsh in Solano County. The bank will restore, enhance, and permanently protect the conservation values of the site, providing compensatory mitigation that may be required by federal, state, and local agencies to offset effects of development activities on tidal marsh and aquatic habitat that supports state- and federally listed fish. The Bank is currently under review by the Conservation Bank Review Team (CBRT) consisting of the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW). Covered species include: Green Sturgeon, Southern Distinct Population Segment (DPS) (Acipenser medirostris) – federally threatened; Steelhead, Central Valley DPS (Oncorhynchus mykiss) – federally threatened; Steelhead, Central California Coast DPS – federally threatened; Chinook Salmon, Sacramento River Spring-run (O. tshawytscha) – federally and state threatened; Chinook Salmon, Sacramento River Winter-run (O.

tshawytscha) – federally and state endangered; Delta Smelt (Hypomesus transpacificus) – federally threatened and state endangered; Longfin Smelt (Spirinchus thaleichthys) – state threatened.

The **North Delta Fish Conservation Bank (NDFCB**) is an approximate 830-acre site located in the southern Yolo Bypass which is part of the Sacramento Delta, in Yolo County, California. The majority of the site is located on Liberty Island adjacent to the approved and constructed Liberty Island Conservation Bank. A small portion of the NDFCB is located on lands to the north of Liberty Island. Liberty Island is 5,000-acre island located in the southern Yolo Bypass, just west of the Port of Sacramento Deepwater Shipping Channel in the tidal Sacramento-San Joaquin Delta. Historically this site was farmed until the farm levees surrounding the site breached in 1997 and the site was never reclaimed. The NDFCB will provide high quality habitat for all native fish species occurring in the Delta including: the federally endangered Sacramento River winter-run Chinook salmon; the federally threatened Central Valley spring-run Chinook salmon, California Central Valley steelhead, delta smelt; Central Valley fall- and late fall-run Chinook salmon, a federal species of concern, and longfin smelt, a California State threatened species.

Designed to enhance and create habitat for Delta native fish, the project also includes removal of two agricultural levees which will enhance tidal circulation within the flooded island. After implementation the project will result in: enhancement of over 630 acres of tidal marsh complex, including emergent marsh, seasonal wetland, riparian scrub shrub, and shallow open water habitats; over 57 acres of tidal channel enhancement; and over 30 acres of tidal emergent marsh creation through the removal of levees and lowering a portion of the existing floodplain habitat.

The Salmonid and Delta Smelt service area includes the boundaries of the legal Delta. This service area also provides Riparian SRA (shaded riverine aquatic) habitat and Tule Marsh SRA habitat. The service area is the area where a project can be located and use the credits in the bank for mitigation.

The **Liberty Island Conservation Bank** is located in the southern Yolo Bypass in Yolo County, CA. The Bank is centrally located at the lower end of the Yolo Bypass just west of the Port of Sacramento Deepwater Shipping Channel in the tidal Delta, approximately five miles west of the Community of Courtland and 10 miles north of the City of Rio Vista.

Prior to 1997, Liberty Island was a 10-square-mile island in agricultural production due to its maintained levees. At its agricultural peak, Liberty Island had paved roads, power and telephone lines, homes, farm buildings, and even a school. The private levees protecting the island failed numerous times over the years. After each levee failure the residents of Liberty Island reclaimed their farms until the floods of 1997. After the floods of 1997, the island was allowed to begin the long reversion to its natural state. Today the majority of the 5,000-acre Liberty Island is flooded and only the northern 1,000 acres are without permanently inundated levees.

The Bank consists of 186 acres located on the still leveed northernmost tip of Liberty Island. Approved in July 2010 by the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Wildlife, the Bank provides compensatory mitigation for permitted projects affecting special-status Delta fish species within the region. The Bank provides habitat for all Delta fish species including: the federally endangered Sacramento River winter-run Chinook salmon; the federally threatened Central Valley spring-run Chinook salmon, California Central Valley Steelhead, delta smelt, and Central Valley fall- and late fall-run Chinook salmon, federal species of concern.

Fremont Landing Conservation Bank was approved in October 2006 by the National Marine Fisheries Service ("NMFS") to provide compensatory credits for project impacts through the preservation and restoration/creation of riparian forest and shaded riverine aquatic (SRA) habitats. The Bank is located north of Interstate 5 and immediately west of the Sacramento River and provides riparian, wetland, and open-water habitat along the Sacramento River at river mile 80 near the mouth of the Feather River. The primary goal of the Bank is to preserve, restore, and create riparian and floodplain wetland habitats on the 100-acre site which will improve special-status fisheries habitat for Central Valley Chinook salmon and steelhead and provide offsite mitigation for impacts to these species within the region.

STEPS TO IMPLEMENTATION

The concept for this alternative is that the release of water from Lake Curry creates steelhead trout habitat in Suisun Creek and could become a bank for others who need to mitigate for project effects on this threatened species. To establish the bank a number of agreements with the City of Vallejo and streamside owners would need to be established. According to the Ca Dept of Fish and Wildlife Conservation and Mitigation Banking Guidelines (2019), a mitigation or conservation bank requires the following: a conservation easement over the property that would provide the credits, submittal of a restoration design for the bank, submittal of a prospectus, and approval by a group of five agencies. The bank sponsor would need to provide documentation of how the bank would operate and how the sponsor would maintain the habitat conditions.

The upper 3-4 miles of Suisun Creek if provided with adequate water releases from Lake Curry could be considered a conservation bank for threatened steelhead trout. To implement this concept, the bank sponsor would need to negotiate with all the streamside landowners to purchase a conservation easement over the creek channel and riparian corridor extending at least 50 feet from the top of bank. In many locations additional riparian tree planting would be needed and vineyard or other land uses would need to be removed. Additionally, the bank sponsor would need to have either a long-term agreement with the City of Vallejo to release a minimum amount of water from Lake Curry in dry, normal and wet years to sustain steelhead habitats or purchase the reservoir for this purpose.

COSTS

The largest expense of this alternative would be the purchase of conservation easements along Suisun Creek, replanting and restoring the riparian corridor and reaching an agreement with the City of Vallejo to assure releases form Lake Curry. Table 10 is from the U.S. Corps of Engineers Sacramento District website and list the costs of the projects that provide mitigation credits for a number of different banks in California. The bank sponsor should be able to pass through most of this cost to those who purchase bank credits. However, it is important to note that the existing banks described above are large areas where multiple species are benefitted and therefore the cost to provide each credit is lower. It is not clear that a bank on upper Suisun Creek would provide more than steelhead trout and riparian habitats for which credits could be sold.

BENEFITS

Since this alternative would protect steelhead habitat on upper Suisun Creek in perpetuity it has great benefits for this threatened species. As a bank the habitat would have to be maintained over the long term. The bank sponsor may also be able to profit from the creation of a mitigation/conservation bank.

TIMELINE

The purchase of conservation easements, restoration designs, regulatory applications and approvals, and completion of an agreement with the City of Vallejo will require between 5-10 years to complete due to the many parties involved and the uncertainty in securing all the needed parts of the project.

POTENTIAL SOURCES OF FUNDING

Mitigation banks are not eligible for public grant programs. Funds will need to come thorough private financing. There are two major companies that operate banks in California – Westervelt Ecological Services and Wildland Inc. They might be able to serve as consultants in developing an upper Suisun Creek mitigation/conservation bank.

Name	Description	Amount	Point of Contact	Approval Date
Long John's Meadow Restoration Project, Tuolumne County, CA	Restoration of a stream and wet meadow in Stanislaus National Forest	$20,000	Tracy Weddle (209) 965-3434 x5321 tweddle@fs.fed.us	19 Nov 2007
Cosumnes Floodplain Mitigation Bank, Sacramento County, CA	Sale of 9 floodplain mosaic re-establishment credits	$1,117,000	Greg Sutter Westervelt Ecological Services (916) 646-3644 gsutter@westerveltecologicalservices.com	10 Dec 2009
Cummings Stathos, Sacramento County, CA	Vegetative restoration of 1.56 acres of streamside habitat and preservation and management of surrounding 7.83 acres	$335,357.30	Aimee Rutledge Sacramento Valley Conservancy (916) 425-5879 bond13mac@aol.com	10 Dec 2009
Van Vleck Mitigation Bank, Sacramento County, CA	Sale of 2.13 vernal pool creation credits	$585,750	Greg Sutter Westervelt Ecological Services (916) 646-3644 gsutter@westerveltecologicalservices.com	10 Dec 2009
Warren Property, Placer County, CA	Restoration of 0.34 acres of intermittent stream habitat and enhancement of 1.60 acres of seasonal wetland habitats, and preservation and management of surrounding 33.4-acre property.	$35,910	Barry Anderson (530) 878-7048 barry.botany@usamedia.tv	10 Dec 2009
Leland Watershed Improvement Project, Tuolumne County, CA	Restoration of a stream and wet meadow in Stanislaus National Forest	$30,000	Tracy Weddle, (209) 965-3434 x5321 tweddle@fs.fed.us	8 Apr 2010
Lower Ash Creek Wildlife Area Restoration, Modoc and Lassen Counties	Stream and meadow restoration within 2, 415-ac area	$200,000.00	Todd Sloat Pit Resource Conservation District (530) 336-5456 tsloat@citilink.net	1 Aug 2011
Stillwater Plains Mitigation Bank Wetland Restoration, Shasta County	Sale of 3.33 vernal pool re-establishment credits	$499,500.00	Glenn Hawes Stillwater Plains Mitigation Bank, Inc. (530) 227-0662 wanda@hawesranch.com	1 Aug 2011

Table 10. Mitigation Banks and Costs of Credits. From: US Army Corps of Engineers Sacramento District Website: Approved In-Lieu Fee Program Mitigation Projects.

Name	Description	Amount	Point of Contact	Approval Date
River Ranch Mitigation Bank, Yolo County	Sale of 0.86 marsh and 2.07 riparian re-establishment credits	$263,700.00	Wildlands - see above	1 Aug 2011
Swainsons Grasslands Preserve, Placer County	Restore 1800 linear feet of creek, re-establish 5 acres of seasonal wetland, plant 10 acres of freshwater scrub-shrub & 2 acres of oak savannah	$500,000.00	Jessica Pierce Placer Land Trust (530) 887-9222 jessica@placerlandtrust.org	1 Aug 2011
Upper Dotta Canyon Restoration, Plumas County	Re-establish connectivity of channel with floodplain in 253-acre area	$441,184.00	Leslie Mink Plumas Corporation Feather River Coordinated Resource Management (530) 283-3739, leslie@plumascounty.org	1 Aug 2011
Spanish Creek in Meadow Valley, Plumas County	Re-alignment and Restoration of 3,800 linear feet of stream	$464,750.00	Terry Benoit Plumas Corporation, Feather River Coordinated Resource Management, (530) 283-3739 terry@plumascounty.org	1 Aug 2011
Humbug Valley-Yellow Creek Meadow Restoration, Plumas County	Restoration of channel and floodplain in 109-acre area	$297,400.00	Kara Rockett, Plumas Corporation, Feather River Coordinated Resource Management, (530)283-3739 kara@plumascounty.org	1 Aug 2011
Kern River Watershed Meadows and Stream Restoration, Tulare County	Restore stream, re-establish 1/3-acre meadow, protect 2 miles of stream and 20-acre meadow	$62,950.00	Todd Ellsworth, Inyo National Forest (760)873-2547 tellsworth@fs.fed.us	1 Aug 2011
Vernal Pool Re-establishment @ SMUD Nature Preserve Bank, Sacramento County	Sale of 3 vernal pool re-establishment credits	$500,000.00	Ron Scott, SMUD (916) 732-5114 rscott@smud.org	1 Aug 2011
Lower Cosumnes River Floodplain Restoration, Sacramento County	Re-connect 150-acre floodplain to river and re-establish sloughs	$333,000.00	Patrick Britton, Ducks Unlimited, Inc., (916) 852-2000, pbritton@ducks.org	1 Aug 2011
Los Banos, Volta Unit Wetland Habitat Restoration, Merced County	Establish 120 acres and enhance 50 acres of emergent marsh	$204,240.00	Richard Wright, California Waterfowl Association, (916) 275-1020 rich_wright@calwaterfowl.org	1 Aug 2011
Shell Meadow Restoration	Stablilize and protect 2.5 acres of meadow threatened by headcuts in stream	$22,300	Tracy Weddle (209) 965-3434 x 5321, tweddle@fs.fed.us, USDA Forest Service, Stanislaus National Forest, Summit Ranger District, #1 Pinecrest Lake Road, Pinecrest, CA 95364	20 Jun 2013
Ladies Valley Riparian Enhancement	Stabilize 800 lf of stream, re-vegetate 15 acres of floodplain and streambank with natives	$86,890	Elena DeLacy, (530)295-2190, elena@arconservancy.org, P.O. Box 562, Coloma, CA 95613	20 Jun 2013
Upper Ash Creek Wildlife Area Restoration	Fill existing gullies and enhance 8,500' riparian corridor, create 7.5 acres of ponds	$400,000	Todd Sloat, Pit Resource Conservation District, (530) 336-5456, tsloat@citilink.net	20 Jun 2013
Kern Plateau Meadow Habitat Improvement	Restore up to 6 acres of wet meadow and protect 20 acres of meadow and 2 miles of stream channel	$118,925	Todd Ellsworth, (760)873-2547, tellsworth@fs.fed.us, 351 Pacu Lane, Suite 200, Bishop, Ca 93514	20 Jun 2013
Toad Hill Mitigation Bank	Sale of 1.78 vp creation credits	$423,809	Brian Monaghan, (916)435-3555, bmonaghan@wildlandsinc.com, 3855 Atherton Road, Rocklin, CA 95765	20 Jun 2013
River Ranch Mitigation Bank	Sale of 2.36 freshwater marsh re-establishment credits & 2.36 riparian re-est. credits	$424,800	Brian Monaghan, (916)435-3555, bmonaghan@wildlandsinc.com, 3855 Atherton Road, Rocklin, CA 95765	20 Jun 2013
Meridian Ranch Mitigation Bank	Sale of 2 "Water of the U.S. Creation" credits	$300,000	Travis Hemmen, (916)646-3644x204, themmen@westervelt.com, 600 North Market Blvd., Suite 3, Sacramento, CA 95834	20 Jun 2013
Cosumnes Floodplain Mitigation Bank	Sale of 2 floodplain mosaic wetland credits	$260,000	Travis Hemmen, (916)646-3644x204, themmen@westervelt.com, 600 North Market Blvd., Suite 3, Sacramento, CA 95834	20 Jun 2013
Long Meadow Restoration	Preserve and enhance 35-acre meadow by restoring 375' of stream to reconnect with floodplain	$247,235	Nina Hemphill, (559)784-1500x1161, nphemphill@fs.fed.us, 1839 So. Newcomb, Porterville, CA 93257	20 Jun 2013

Table 10 (cont.). Mitigation Banks and Costs of Credits. From: US Army Corps of Engineers Sacramento District Website: Approved In-Lieu Fee Program Mitigation Projects.

ALTERNATIVE 4

DESCRIPTION OF ALTERNATIVE

Through this alternative, downstream diverters would purchase Lake Curry and manage lake releases for maintenance of instream habitat and diversions for creekside owners. Our six streamflow gages did not record any abrupt drops in flow during the May to October irrigation period from 2017-2020 (CLSI 2021), indicating no frequent or widespread summer diversion from Suisun Creek. When a diversion pump is turned on, the flow level of the creek will drop abruptly.

The inventory of water rights (Table 1 and Figure 1-3) showed most of the major water rights have winter diversion periods and require bypass flows. These appropriative rights would not need water for summer diversions as provided by this alternative.

Without a large need by existing diverters for summertime water diversions it is unlikely diverters would invest the funds needed to purchase and manage Lake Curry. This alternative is not feasible.

ALTERNATIVE 5

DESCRIPTION OF ALTERNATIVE

This alternative would provide summertime releases of water from Lake Curry for instream flows in Suisun Creek and provide freshwater flow into Suisun Marsh. Suisun Marsh is a brackish marsh located between the tidal San Francisco Bay and freshwater Delta. In dry years tidal flows extend further upstream, making Suisun Marsh saltier and changing the plants and animals that can survive in the marsh. In concept, releasing stored water over the summer could provide greater freshwater flows into Suisun Marsh.

CLSI (2021) monitoring studies from 2017-2020 showed that a minimum release of 2.5 cfs is needed to provide connected flow from the lake to the county line (Station 5). Our studies from 2002-2011 found that releases of 3-6 cfs reach the downstream area of Suisun Creek and thus flow into Suisun Marsh (LMA 2011). Figure 11 shows lower Suisun Creek and Suisun Marsh and its tidal channels. Several different flow paths stretching from Suisun Creek to Suisun Bay are outlined in blue. Tidal flows typically extend to the railroad crossing. Release of water from Lake Curry might reduce salinities near the inland portions of Suisun Marsh near the creek confluence. However, due to the small volume of water being released it is unlikely these releases would not reduce salinities over a large area of the Marsh.

Additionally, higher salinity conditions in Suisun Marsh are primarily associated with drought years. In dry years the recommended release scenarios for Lake Curry are 2.5 cfs released from May –Sept, 2.5 cfs released from Oct.-Dec, 4 cfs released from Jan-March and 3 cfs released in April (CLSI and Storesund Consulting 2021). With this size release, much of the flow will likely infiltrate into the streambed and evaporate, and will have little effect on salinity in the Marsh.

Releasing water from Lake Curry to provide freshwater to Suisun Marsh in dry years is not a feasible alternative. The other portion of this alternative - releases of water from Lake Curry to Suisun Creek to maintain instream flows for threatened steelhead trout is feasible and alternatives 1, 2, 3 and 6 include this concept.

Figure 11. Flow paths for freshwater from Suisun Creek in Suisun Marsh.

ALTERNATIVE 6

DESCRIPTION OF ALTERNATIVE

This alternative would involve selling Lake Curry and its adjacent property for the development of rural residential homes, possibly with vineyards. There are similar rural residential subdivisions in Gordon Valley and Suisun Valley. Real estate projections show continued and increased demand for this type of development in Napa County and the bay area (Santarelli 2021). There would be a requirement to implement the flow releases from Lake Curry to Suisun Creek to sustain steelhead trout.

Figure 12 shows the parcels owned by the City of Vallejo and nearby areas. Including the acreage of Lake Curry the City owns 1220 acres in three parcels. Figure 12 also depicts the rural residential subdivision along Gordon Valley Road and Wooden Valley Cross Road on Quail Hill. The parcel size in the Gordon Valley subdivision is 5-40 acres. The parcel sizes for the newer Quail Hill subdivision range from 4-40 acres. Table 11 lists a selection of current listings for rural residential lots and houses in the Lake Curry area (MLS 2021).

Currently the zoning for the three parcels that make up the Lake Curry property is Agricultural Watershed (Appendix D) which allows for 1-3 houses/cottages per parcel.

Table 11. Rural residential houses and lots for sale in Lake Curry area

Address	Description	List Price
6670 Gordon Valley Road, Napa	13 acre lot	$329,000
90 Grandview Dr., Napa	40 acre lot has roads	$525,000
1300 Wooden Valley Road, Napa	2 bd, r.5 bath house on 4.86 acres	$1,149,000
1755 Wooden Valley Rd, Napa	6 bd, 6 bath house on 3.27 acres	$2,207,000
1771 Wooden Valley Rd, Napa	2 bd, 1 bath on 0.88 acres	$487,000
1000 Wooden Valley Cross Road, Napa	21.5 vineyard, 25 acres reservoir and small house on 49.5 acres	$7,995,000
0 Quail Ridge Dr., Napa	10.9 acre lot	$999,000
28788 Mankas Corner Rd., Fairfield	3 bd, 2 bath house om 15.5 acres with orchard	$2,450,000
3062 Mix Canyon Rd., Fairfield	40 acre lot	$390,000
2939 Mix Canyon Rd., Fairfield	24.4 acre lot	$395,000
2775 Mix Canyon Rd., Fairfield	5.25 acre lot	$179,000
0 Highway 128, Napa	160 acre lot	$549,000
310 Country Club Lane, Napa	5 bd, 3 bath house on 10,500 sq. ft. lot	$799,950
7215 Pleasants Valley Rd., Vacaville	6 acre lot	$600,000

From: Multiple Listing Service accessed from websites: Zillow.com, Realtor.com, countryestatesinc.com, compass.com. July 2021

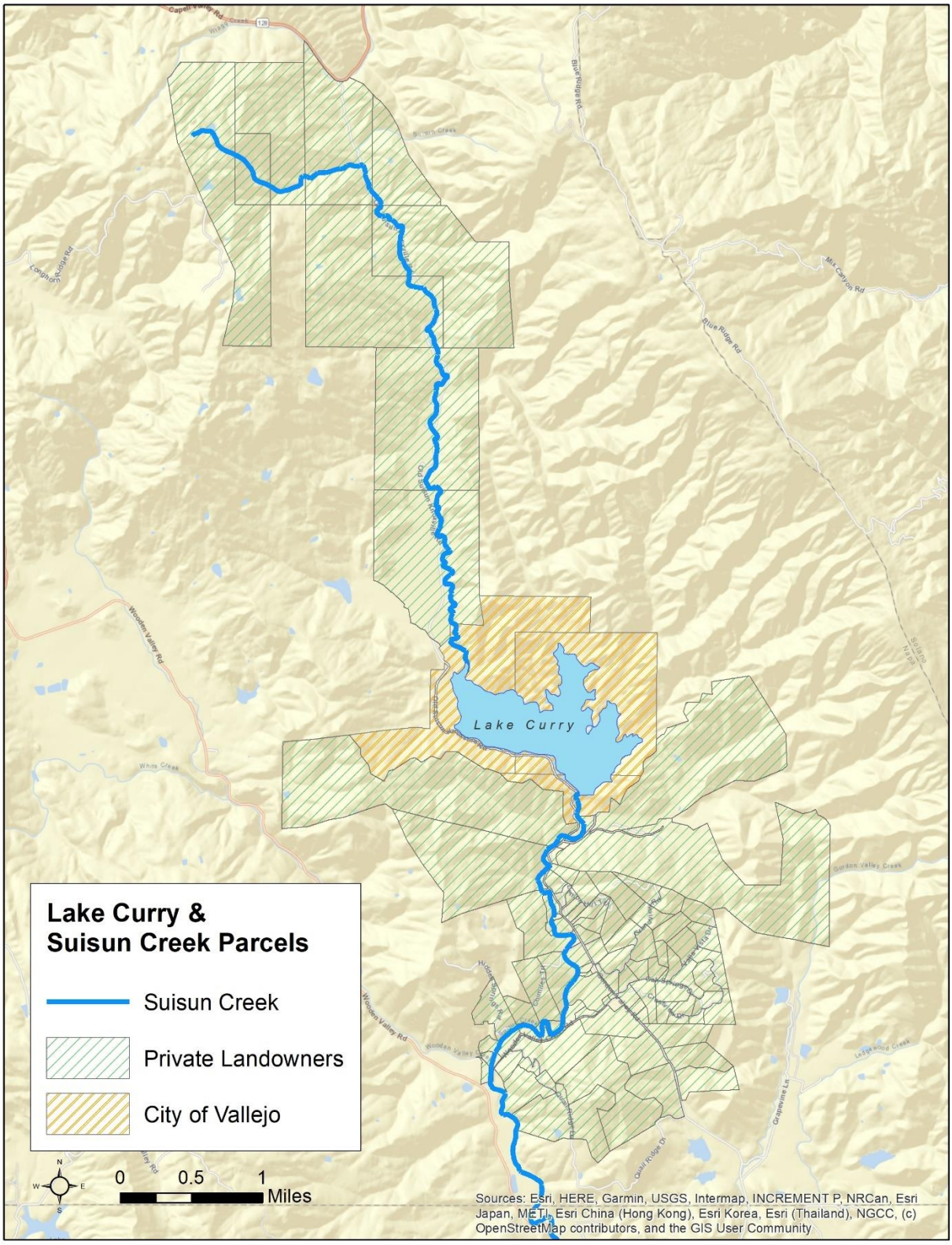

Figure 12. Lake Curry and adjacent lands and nearby parcels

STEPS TO IMPLEMENTATION

Currently the Lake Curry property can only be developed for 3-9 houses on the 3 parcels. However, with a change in ownership to a developer and a permit process with Napa County a larger number of houses and parcels may be allowed. Depending on the purchase price and site constraints for building sites (steep slopes, unstable soils), a developer could complete a donation or conservation easement over most of the site in exchange for a larger number of building sites. It is also possible that the lake and an area around it could become a park and other portions of the property could be developed. Drinking water supply and environmental constraints would need to be evaluated. As part of the development, there would be a requirement that Lake Curry release water to maintain steelhead trout in Suisun Creek.

In general, the steps to implement this alternative consist of:

- Sell the City property to a developer or option to a developer
- Complete a draft plan incorporating environmental constraints, open space preservation, management of Lake Curry for releases to Suisun Creek and development of rural residential houses
- Work with Napa County to negotiate a site plan that balances environmental preservation benefits and housing development. Consider creating a park that includes Lake Curry.
- Complete the permit and CEQA process and funding process
- Implement project

COSTS

We are not able to create a cost estimate for this alternative.

BENEFITS

This alternative could implement long term plan for implementation of releases from Lake Curry to benefit listed threatened steelhead trout while allowing the City of Vallejo to sell their property for a different land use. This alternative might also allow for a public park to be established as part of a housing development.

TIMELINE

Developments of this type take 5-15 years to complete due to the need for design and environmental evaluations, land purchase, preparation of a draft development plan, CEQA compliance, permitting and approvals prior to construction.

SOURCES OF FUNDING

This alternative would require private funding; there are few sources of public funds for this type of housing development. If a park is included there may be grants that could fund public park development.

RECOMMENDED ALTERNATIVES

We recommend Alternatives 2 and 3 as the best scenarios to implement releases from Lake Curry into Suisun Creek to support threatened steelhead trout. Both of these alternatives would require new ownership of Lake Curry and use of the reservoir for environmental purposes.

Over the past 10 years the City of Vallejo has shut off releases to Suisun Creek numerous times and dried up steelhead habitat in Suisun Creek. The City's actions have resulted in take of a listed threatened species. Unfortunately, this track record does not support implementation of Alternative 1 by the City. Additionally, it is not clear that the cost of constructing and operating a diversion at the Putah South Canal will be offset by the value of the water that can be diverted. There are other sources of water that the City has rights to that are far cheaper than the estimated cost per acre-foot of the water that would be available through the new diversion. The City has not used its Lake Curry water right since 1992 and clearly has not needed this water supply. Changing the ownership and purpose of Lake Curry from an unused municipal water supply reservoir to a park with releases to Suisun Creek to support steelhead trout (Alternative 2) or a reservoir to supply releases to Suisun Creek to create a mitigation/conservation bank for steelhead trout and riparian habitats (Alternative 3) are the most beneficial scenarios.

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Appendix A

Task 3.2 Legal Issues Associated with Reoperation of Lake Curry

DP&F
ATTORNEYS AT LAW

Peter J Kiel
pkiel@dpf-law.com

TO: Laurel Marcus, California Land Stewardship Institute

FROM: Peter J. Kiel

DATE: October 17, 2019

SUBJECT: Legal Issues Associated with Reoperation of Lake Curry

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Dickenson, Peatman & Fogarty (DP&F) provides this evaluation of the legal and regulatory opportunities and constraints of reoperating Lake Curry for environmental and water supply benefits. Specifically, DP&F will address legal issues associated with releases of Lake Curry water into Suisun Creek for rediversion into the Putah South Canal where the water can be delivered to the City of Vallejo or other water users. The releases may be timed to increase streamflow in the late-spring, summer and fall when streamflow is naturally low in order to enhance the rearing habitat of juvenile steelhead, and flows may also be timed to improve steelhead migration and spawning in winter and spring.

I. Overview of Lake Curry Water Rights

Lake Curry is a municipal water supply reservoir located on Suisun Creek that is owned by the City of Vallejo. The City of Vallejo constructed Lake Curry as a municipal water supply reservoir pursuant to a State-issued appropriative water right in 1922. That appropriative water right is administered by the State Water Resources Control Board. Water diversion and storage in Lake Curry is authorized by Water Right License 5278 (Application 001908). The application for the water right permit was filed with the Board on July 15, 1920. The original permit for License 5278 was issued May 3, 1922. The License demonstrating that the use of water under the permit was perfected was issued June 5, 1959. The License authorizes the direct diversion of 7.0 cfs from January 1 to December 31, and collection to storage of 5,400 acre-feet between November 1 to May 1. The maximum direct diversion and collection to storage in a calendar year cannot exceed 5,058.9 acre-feet. The authorized place of use is the City of Vallejo as shown on a map filed with the State Water Board (the date of which is not specified). The authorized purpose of use of the water is municipal.

The City used water from Lake Curry for municipal purposes until 1992 when the California Department of Health Services (whose drinking water regulatory authority is now vested in the State Water Resources Control Board Division of Drinking Water) determined that the water treatment facilities at Lake Curry did not comply with applicable water quality standards. Since 1992 the City has made periodic but not consistent releases from Lake Curry to maintain streamflows in Suisun Creek. In 2003 the City initiated a joint California Environmental Quality Act (CEQA) and National Environmental Policy analysis of alternatives for treatment and delivery of Lake Curry water to the City's service area, including the rediversion into the Putah

South Canal of water released from Lake Curry into Suisun Creek. The City never selected a preferred alternative or finalized the analysis.

The City is at risk of forfeiting a portion of the Lake Curry water right for nonuse. A water right is subject to forfeiture for five years of consecutive non-use or reduced use.[1] Nonuse of the Lake Curry water may also allow downstream diverters to appropriate the water. As described below, water released from a lake without intent to recapture is typically considered abandoned water that is water subject to appropriation by others. Further, a claim by a downstream diverter that water released from Lake Curry is subject to appropriation may cause the Water Board to investigate the Lake Curry water right and initiative a forfeiture proceeding.

The purpose of this project is to assist the City in its evaluation of options to reoperate Lake Curry for both water supply and fisheries benefits and to protect the water right from partial forfeiture.

II. Water Diversions Downstream of Lake Curry

DP&F assessed the potential for water diversions by other rightholders downstream of Lake Curry to conflict with lake releases intended to enhance instream flows. DP&F reviewed the State Water Resource Control Board (State Board or Board) water right database, eWRIMS, to identify surface water rights downstream of Lake Curry in the Suisun Creek watershed. Only riparian and appropriative surface water rights are required to be reported to the State. Groundwater extractions are not reported to the State and are not included in the eWRIMS database. While groundwater and surface water may be in hydrologic continuity in the Suisun Creek watershed, there is no evidence demonstrating that groundwater extractions would have a discernable impact on surface flows. For purposes of this analysis we assume that groundwater extraction will not interfere with lake releases.

Table 1 lists surface water rights of record for Suisun Creek downstream of Lake Curry in the two reaches downstream of the lake are most relevant for instream flow releases. The lowermost reach of Suisun Creek is a tidally-influenced section of the creek just upstream from Suisun Marsh that does not provide for summer and fall juvenile fish rearing habitat. Diversions from the lowest reach are not anticipated to affect releases from Lake Curry and are not

[1] The Board may, after a hearing, revoke all or a portion of a water right license if the Board finds that the licensee has ceased to put the water to that useful or beneficial purpose, or that the licensee has failed to observe any of the terms and conditions in the license. (Water Code § 1675.) Circumstances outside the licensee's control may excuse the nonuse of water, but the State Water Board generally does not consider financial considerations to be good cause. (See Cal. Code Regs., tit. 23, § 844 (cause for extension of time of water right permit construction and beneficial use deadlines).) . Further, because the Water Code grants municipalities various preferences (e.g., Water Code § 1460 ["application . . . by a municipality . . . shall be considered first in right, irrespective of whether it is first in time"] and Water Code § 106 ["policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation"]), the Water Board typically affords municipalities greater leeway and exemptions from the normal requirements to diligently apply water to beneficial use.

considered further in this analysis. Tributaries to Suisun Creek are not analyzed because diversions in tributaries cannot impact releases from Lake Curry.

The table lists the eleven appropriative water right Permits or Licenses (denoted by its Application Number beginning with "A") and Statements of Water Diversion and Use for riparian water right claims (denoted by Statement Number beginning with "S") in the first two stream reaches below Lake Curry, organized from upstream to downstream. (For riparian water rights, each point of diversion requires a separate Statement of Water Diversion and Use.) The water rights are also shown on Maps 1 and 2. The table lists the diverter name, the maximum annual quantity of diversion (for diversions to water storage ponds or reservoirs) and rate of diversion (for direct diversions without storage), the months of diversion, and notes about water use. Three of the riparian water right claims (S003080, S002577, and S002891) are inactive, meaning there are no diversions under the claims or the diverter has ceased reporting diversions. Two other riparian right claimants with active statements have reported zero water diversions over the last three years (S002842 [claimed use is in-creek cattle drinking], and S008244). One water right permit holder reported zero use in three of the last four years, and notes the pump was damaged and inoperable during the 2018 reporting period (A015916). The remaining five water point of diversion have potential to affect releases from Lake Curry:

- Water right A017055 (License 007339) is a water right license authorizing the diversion to offstream storage not to exceed 20 acre-feet annually between January 1 and May 1, at a maximum rate of diversion limited to 110 gallons per minute, and subject to minimum bypass flow requirements in Suisun Creek (3 cfs from January 1 to March 31 and 1.5 cfs from April 1 to May 1). The use of the diverted water is irrigation, frost protection and heat control of a vineyard. This diversion will not significantly affect new releases from Lake Curry because of the relatively low rate of diversion from Suisun Creek and the protective minimum bypass flows.

- S000781 is a claim of riparian right by the rightholder of A017055 for the direct diversion from May through October, with annual quantities ranging from 0 (2018) to 9.3 acre-feet (2014) in recent years. This diversion has the potential to affect new releases from Lake Curry because of the volumes of diversion during periods of low streamflow.

- A024398 is a water right permit authorizing the diversion to offstream storage not to exceed 98 acre-feet per year from December through June, at a maximum rate of 1.0 cfs, and subject to minimum bypass flow requirements in Suisun Creek (10 cfs from December 1 through February 29, 3 cfs for March 1 through April 30, and 1 cfs for May 1 through June 1). The use of the diverted water is irrigation, frost protection and heat control of a vineyard. This diversion has the potential to significantly affect new releases from Lake Curry because of the volumes of diversion during periods of low streamflow although the protective bypass flows would lessen the potential impact.

- S008244 and S022579 are riparian right claims for direct diversion for irrigation purposes of the same property served by A024398. Maximum annual quantities diverted were 6.1 acre-feet (2015) for S008244 and 17.3 acre-feet (2012) for S022579; however, there were no diversions under either claim in 2017 and 2018. Further, there

is no working pump for S008244. Outreach to the owner of S008244 and S022579 may be necessary to understand the owner's potential future water diversions and extent to which the diversion may affect Lake Curry releases.

Review of water right records indicates that existing water right diversions have limited potential to affect releases from Lake Curry. Lake Curry releases can be protected through the options discussed in the following section.

III. Options to Protect Released Water from Downstream Diverters

A. Rights to Releases of Stored Water

The City's water right authorizes the seasonal storage of water, that is, the collection of water in periods of higher stream flow for use during periods of lower streamflow, as well as direct diversion of water, which is the diversion of water for immediate use.[2] Stored water in Lake Curry belongs to the City until it is beneficially used for municipal or other purposes or is abandoned.

A riparian right holder is entitled to divert the natural flow of the stream only. A riparian right holder may not divert water in a stream that would not be present but for the efforts of other parties. For example, a riparian rightholder is not entitled to divert water that was developed by conservation efforts, was imported from another watershed, or was seasonally stored. An appropriator may divert natural flows as well as developed, imported and stored waters that have been abandoned. Accordingly, riparian rightholders downstream of Lake Curry may not divert water that was seasonally stored in Lake Curry and released into Suisun Creek. Appropriators downstream of Lake Curry may divert that was seasonally stored in Lake Curry and released into Suisun Creek only when that released water is abandoned by the City.

The intentional release of stored water to Suisun Creek to supplement natural flows may be legally protected from diversion by others provided that the City provides downstream rightholders notice that the water is surplus to natural flows and is not abandoned.

B. Options to Protect Released Water

There are five diversions downstream of Lake Curry that are large enough to materially affect lake releases. The following options can protect water released from Lake Curry from downstream diverters.

1. Informal Notice and Outreach

The five large diversions are owned by only two vineyard owners, which suggests that the City may be able to reach agreement from the vineyards to not divert the surplus Lake releases through informal outreach. Both vineyard owners are also represented by the same water right

[2] State Water Board accounting rules distinguish storage from direct diversion based on the number of days that the water is retained before use. Water "storage" is the collection of water in storage for at least 30 days.

agent. Informal notice and outreach may be effective and should be the first step in efforts to protect the released water.

2. Forbearance Agreements

If informal outreach is productive, the City could seek formal agreement with downstream diverters. A forbearance agreement is an agreement with a diverter to not divert released water. Forbearance agreements can benefit the City and diverters by providing written documentation that both parties are taking action to benefit the environment. Recognizing that there may be a dispute as to what natural flow would be in the absence of the lake releases, a forbearance agreement may allow the parties to agree that releases can be conducted on a limited term trial basis.

3. State Water Right Enforcement

The City may also request that the State Water Board use its enforcement authority to prevent downstream diverters from diverting the water. State Water Board enforcement is purely discretionary; the Board has no mandatory duty to enforce water right compliance and often lacks the resources to investigate and prosecute unauthorized diversions.

IV. Legal and Regulatory Approvals Necessary to Accomplish Lake Curry Reoperation

The only mechanism to legally reoperate Lake Curry for enhancement of Suisun Creek flows with diversion of the released water at the Putah South Canal is through a State Water Board approval to change the City's water right to add a new point of rediversion. The change may also include the addition of instream flow and fish and wildlife enhancement in Suisun Creek as an authorized purpose of use through what is referred to as a "1707 dedication."

A. Petition for Change to Add Point of Rediversion

Water Code section 1701 allows a permittee or licensee to change the point of diversion and purpose of upon permission of the State Water Board. A licensee's petition for a change in the point of diversion requires sufficient information "to demonstrate a reasonable likelihood that the proposed change will not injure any other legal user of water." (Cal. Water Code § 1701.2(d).) Further, before the Board can grant permission to such a change, the petitioner must establish to the satisfaction of the Board that "the change will not operate to the injury of any legal user of the water involved." (Cal. Water Code § 1702.) The Board can grant permission for the change unconditionally if it determines that the change will not result in the injury of any legal user of water, or the board can impose conditions on the licensee so that the change will not operate to the injury of any legal user with the conditions in place. (See, e.g. SWRCB Dec. 1362 at p. 4; State Water Res. Control Bd. Cases (2006) 136 Cal. App. 4th 674, 782 ("the Board determined there would be no injury as long as the Bureau and the Department ensure that their operations of the joint points of diversion do not cause water levels in the southern Delta to recede to a point where agricultural users cannot divert water for their agricultural use.").)

The City of Vallejo would bear the burden of showing no injury to other users of water. This is most commonly accomplished by demonstrating that the change in point of diversion will not reduce the water available to downstream diverters. The City will likely meet this standard by providing hydrologic modeling that demonstrates that the water can be seasonally stored and released to create flows in excess of natural flows in Suisun Creek, with allowance for conveyance losses such as deep percolation and riparian vegetation evapotranspiration from the lake to the canal.

B. Petition for Change to Add Fish and Wildlife Enhancement in Suisun Creek

Water Code section 1707 authorizes changes to a water right for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water. The Board may approve a petition subject to any terms and conditions which, in the board's judgment, will best develop, conserve, and utilize, in the public interest, the water proposed to be used as part of the change, whether or not the proposed use involves a diversion of water, if the board determines that the proposed change will not increase the amount of water the person is entitled to use and will not unreasonably affect any legal user of water. The legal standard to "not unreasonably affect" a legal user of water is similar to the standard for adding a point of diversion: the change cannot reduce the water available for another user in absence of the instream flow augmentation. Because Suisun Creek flows would be augmented by lake releases, the City will likely be able to provide hydrologic modeling that demonstrates that the water can be seasonally stored and released to create flows in excess of natural flows in Suisun Creek.

C. California Environmental Quality Act and National Environmental Policy Act Compliance

New diversion facilities at Suisun Creek and Putah South Canal and the associated governmental approvals require compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The State Water Board cannot approve the change petitions without completed CEQA compliance. The City would be the lead agency for the CEQA analysis. The US Bureau of Reclamation cannot approve the modification to Putah South Canal without a NEPA analysis. The Bureau would likely be the lead agency for NEPA compliance. The most efficient compliance strategy would be a join CEQA/NEPA document, likely a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR).

D. Approval to Change the Lake Curry Water Rights Will Not Ensure that Water is Available to Divert at Putah South Canal

The State Water Board approval amending the Lake Curry water right to authorize rediversion of water at Putah South Canal does not preclude other diverters downstream from Lake Curry from taking the released water. The mechanisms to protect the released water described above must still be implemented.

IV. Legal and Regulatory Alternatives for Disposition of Lake Curry

The construction of a diversion facility at the Putah South Canal will require an initial capital investment, and reoperation of Lake Curry to provide instream flow benefits in Suisun Creek will require long-term expenditures for operations and maintenance. The City of Vallejo's water utility rate base may not support these expenses. The City may explore alternatives including the sale of water from Lake Curry to third parties, the sale of Lake Curry itself, or the sale of other benefits from reoperation of the lake.

A. Sale of Water to Third Parties

Funds from sale of the water would allow the City of Vallejo to fund the infrastructure improvements and to operate Lake Curry for instream flow releases and water sales. The City currently receives water from both the State Water Project (SWP) and the federal Central Valley Project (CVP). If a water buyer is a CVP or SWP customer, the City may be able to sell a portion of its CVP or SWP supply and use the Lake Curry water within the City's service area. If the City is not able to sell its CVP or SWP water and must instead sell Lake Curry water, the City must obtain State Water Board approval to include the buyer's place of use as an authorized place of use in the Lake Curry water right.

For example, the City could sell water to diverters along Suisun Creek. Water released from storage in Lake Curry would be more reliable than current water supplies derived from the natural flow of Suisun Creek. The City would have to amend its water right to include the purchasers' properties as places of use within its permit. Such a change would require State Water Board approval and CEQA compliance.

B. Operation of Lake Curry as an Environmental Water Bank or Salmonid Habitat Mitigation Bank

While wetland habitat mitigation banking and terrestrial endangered species conservation banks are well-established legal mechanisms to obtain regulatory assurances to conduct activities that may adversely affect terrestrial resources, these tools have been rarely employed for aquatic and fisheries resources. Recent developments in the federal Endangered Species Act (ESA) Safe Harbor Agreement policy may provide a tool to create salmonid habitat mitigation credits from the reoperation of Lake Curry. Section 10(a)(1)(A) of the federal Endangered Species Act authorizes the National Marine Fisheries Service (NMFS) to issue Enhancement of Survival Permits (ESPs). NMFS's Safe Harbor Agreement Policy (64 FR 32717) (Policy) and applicable regulations at 50 C.F.R. § 222.308 allow NMFS to issue ESPs to private and non-federal property landowners or appropriate collaborators who voluntarily undertake activities on their property to enhance, restore, or maintain habitat benefiting ESA-listed species in Safe Harbor Agreements (SHAs). Where the voluntary activities create a net-environmental benefit for the species above the baseline established in the SHA, NMFS may issue an ESP that authorizes incidental "take" of covered species that have increased above the baseline.

Reoperation of Lake Curry could create tangible benefits for federally-listed steelhead. Because an ESP incidental take coverage is issued to the landowner that is party to the SHA and the City does not requires steelhead take coverage, the City could either transfer managerial control of

Lake Curry or collaborate with a water district or other entity seeking steelhead take authorization for activities unrelated to Lake Curry.

C. Sale of Lake Curry to a Commercial Developer with Deed Restriction Requiring Releases for Instream Flows

The City could sell the lake to a commercial developer that is seeking additional water supply or mitigation credits. The sale would be an action subject to CEQA because the change in operation by the new owner may result in a change in the environment. To mitigate potential environmental impacts of the sale, the transfer could include a deed restriction requiring the purchaser to dedicate certain releases to maintain Suisun Creek instream flows.

Table 1

Water Rights Downstream of Lake Curry

SUISUN CREEK DIVERSIONS DOWNSTREAM FROM LAKE CURRY

SWDU/ Application	Owner	Quantity / Use	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Map No.	NOTES
S003080	Helen Chadbourne	9.5 afa / Stockwatering and/or Irrigation	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	1	INACTIVE or NOT REPORTING. The information is unclear because the last Supplemental SWDU was filed in 2002, but it did not list quantities. The most recent Supplemental SWDU listing amounts used was filed in 1996.
S002842	Imboden Trust	0.056 afa / 200 gallons per day / Stockwatering				DD	DD	DD							1	
S002577	William Imboden	216,000 gallons per year / Stockwatering													1	INACTIVE or NOT REPORTING. It is unclear whether the water is directly diverted or stored, athought the initial statement references a 5 acre-feet storage reservoir. S002577 references Stockpond Certificate 3091 which allows storage of 3 afa. The stockpond is located on an unnamed stream tributary to Gordon Valley Creek.
A015916	Bartholomew	0.02 cfs / Irrigation; Stockwatering					DD	DD	DD	DD	DD	DD	DD (until 11/15)		2	No water was diverted in 2015.
S000781	Twin Creeks	2-9 afa / Irrigation; Heat Protection						DD	DD	DD	DD				2	Recent June, July and August diversions have ranged between 1.3 and 4.5 AF per month, also used for frost protection as recently as 2012
A017055	Twin Creeks	20 afa (see notes) / Irrigation; Recreation	DOS	DOS	DOS	DOS	DOS								2	One of the two sources for this license is an unnamed creek. The amount used shall not exceed 20 afa from either or both sources; 110 gpm limit on diversion to off-stream storage (applies to Suisun Creek POD); diversion season is Jan 1 to May 1 There were no reported diversions for 2016. See notes for S002891.
S002891	Thompson	30 afa / Irrigation				DD	DD	DD							2	INACTIVE or NOT REPORTING. The last supplemental SWDU was filed in 1995. The initial SWDU notes that this water is used in addition to water diverted under A017055 (L0007339). POU was Napa Co. APN 033-140-019 and POD was Napa Co. APN 033-140-016. Also recreational use; 1 cfs limit on diversion to off-stream storage (applies to Suisun Creek PODs); diversion season is Dec 1 to Jun 1
A024398	Chateau Ste. Michelle	98 afa / Fire protection; Heat control; Frost protection; Irrigation	DOS	DOS	DOS	DOS	DOS	DOS						DOS	2	Related to S008244 and S022579. Includes fill and refill.
S022579	Chateau Ste. Michelle	12.2 afa / Irrigation; Frost protection; Heat control			DD	DD		DD	DD	DD	DD				2	Quantity, use and season are based on the initial SWDU filed in 2012. Ownership changed in 2016, and in March 2016, 1.2 afa was directly diverted, and between June - Oct., 1.3 afa was beneficially used. S022579 is related to S008244 and A024398 (P016723).
S008244	Chateau Ste. Michelle	6.1 afa / Irrigation; Heat protection						DD	DD	DD	DD				2	No reported use in 2016. 6.1 afa was reported in 2015, and 5.5 afa was reported in 2014. S008244 is related to A024398 (P016723) and S022579.
A030244	Hoy	19 afa / Fire protection; Stockwatering	DOS	DOS	DOS	DOS							DOS	DOS	2	One of the two sources of this permit is an unnamed stream. This permit also includes a POD to storage and rediversion. Paragraph 20 of the permit states that the total amount of water under this permit and License 12972 (A027982) shall not exceed 19 afa. Based on L012972, it appears that the POD to storage and rediversion applies to the unnamed stream.

Map 1 and 2

Water Rights Downstream of Lake Curry

Legend

— Rivers (1:24K)

1: 18,056

0.6 0 0.28 0.6 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

Notes

This map was automatically generated using Geocortex Essentials.

California State Water Resources Control Board

Legend

— Rivers (1:24K)

1: 18,056

0.6 0 0.28 0.6 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

This map was automatically generated using Geocortex Essentials.

Appendix B

Federal Register Notice by the Bureau of Reclamation for Lake Curry Water Supply Project

Lake Curry Water Supply Project, Napa and Solano Counties, CA

A Notice by the Reclamation Bureau on 08/14/2003

DOCUMENT DETAILS

Printed version:
PDF (https://www.govinfo.gov/content/pkg/FR-2003-08-14/pdf/03-20708.pdf)

Publication Date:
08/14/2003 (/documents/2003/08/14)

Agencies:
Bureau of Reclamation (https://www.federalregister.gov/agencies/reclamation-bureau)

Dates:
Reclamation and the City will seek public input on alternatives,

Document Type:
Notice

Document Citation:
68 FR 48634

Page:
48634-48636 (3 pages)

Document Number:
03-20708

DOCUMENT DETAILS

DOCUMENT STATISTICS

Page views:

PUBLISHED DOCUMENT

AGENCY:

Bureau of Reclamation, Interior.

ACTION:

Notice of intent to prepare a joint environmental impact statement/environmental impact report.

SUMMARY:

Pursuant to the National Environmental Policy Act of 1969 as amended, the Bureau of Reclamation proposes to participate in a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) with the City of Vallejo on the City's Lake Curry Water Supply Project.

The Lake Curry Water Supply Project is being proposed by the City of Vallejo (City). The City is proposing to resume use of water from the City's Lake Curry for municipal and industrial uses within the City's service area, and is evaluating alternative delivery methods for conveying the water to the City's Fleming Hill Water Treatment Plant in Vallejo for delivery to the City's service area. The City will be the lead agency under the California Environmental Quality Act (CEQA).

DATES:

Reclamation and the City will seek public input on alternatives, concerns, and issues to be addressed in the EIS/EIR through scoping meetings to be held as follows:

- Wednesday, September 10, at 7 p.m., Vallejo, CA
- Thursday, September 18, at 7 p.m., Suisun, CA

Written comments on the scope of alternatives and impacts should be submitted by September 15, 2003.

Reclamation estimates that the draft EIS/EIR will be available for public review near the end of 2003.

ADDRESSES:

The meeting locations are:

- In Vallejo, CA—Joseph Room, Main Floor, John F. Kennedy Library, 505 Santa Clara Street

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- In Suisun, CA—Suisun Fire Protection District's Valley Station, 4965 Clayton Valley Road

Written comments on the scope of alternatives and impacts to be considered should be sent to the Lake Curry Water Supply Project, c/o Ms. Pamela Sahin, Administrative Analyst II, City of Vallejo Utilities Department, Water Division, 202 Fleming Hill Road, Vallejo, CA 94589-2332. Comments may also be submitted via e-mail to Ms. Sahin at *waterinfo@ci.vallejo.ca.us (mailto:waterinfo@ci.vallejo.ca.us)*.

FOR FURTHER INFORMATION CONTACT:

Mr. Rob Schroeder, Resource Manager, U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office, 7794 Folsom Dam Road, Folsom, CA 95630-1799, Telephone number 916-989-7274. Comments may also be submitted via e-mail to Mr. Schroeder at *rschroeder@mp.usbr.gov (mailto:rschroeder@mp.usbr.gov)*.

SUPPLEMENTARY INFORMATION:

The City is proposing to execute and implement a contract with Reclamation to convey the water from Lake Curry through a portion of Reclamation's Putah South Canal to the Terminal Reservoir for delivery to the City.

Reclamation will consult with the National Marine Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service regarding potential effects of the action on species designated in accordance with the Federal Endangered Species Act (ESA).

The City was issued a Water Right Permit in 1922 and License 5728 in 1959 by the State for storing and using water in Lake Curry for municipal purposes. Lake Curry was an active and important part of the City's water supply system between 1926 and 1992. The City also served water for domestic and stock watering purposes in Gordon and Suisun Valleys along the existing 24-inch diameter Gordon Valley pipeline, which conveyed the water from Lake Curry to the City. The water was treated at a pressure filtration plant near Lake Curry prior to delivery to the City and to connections outside of the City's service area along the Gordon Valley pipeline.

In 1992, the City was compelled to cease delivering water from Lake Curry to domestic users because of stringent water treatment requirements adopted by the California Department of Health Services. Water from the Lake is currently being released to Suisun Creek at a rate of 2 cfs to 3 cfs.

The City has continued to serve the users in Gordon and Suisun Valleys by conveying water from its Green Valley water treatment and Lakes transmission system, using the existing 24-inch diameter Gordon Valley pipeline and a distribution main.

For several years, the City has pursued the right to use a portion of the Putah South Canal, a Federal facility owned and operated by Reclamation, to convey untreated Lake Curry water to the City's Fleming Hill Water Treatment Plant in Vallejo. In November 2000, Congress authorized Reclamation to enter into a contract to permit use of the lower section of the Solano Project Putah South Canal facilities for such purposes. For the City to use the Putah South Canal and Terminal Reservoir to deliver Lake Curry water to the City, it needs to enter such a contract with Reclamation.

The general purposes of the Lake Curry Water Supply Project are to:

- Resume the use of Lake Curry water supplies for municipal and industrial use in the City
- Manager water releases from Lake curry to restore and maintain a healthy ecosystem in Suisun Creek for steelhead trout populations located downstream of Lake Curry, to the extent required by law
- Continue to provide water service to Gordon and Suisun Valley customers
- Enable the City to convey water to the City's service area by using the available capacity in existing facilities (Putah South Canal) owned by Reclamation

Prior to 1992, the City relief on Lake Curry as an important component of the City's water supply. Since 1992, the City has had to rely solely on its other water supply sources to meet the City's needs and obligations. In addition to its Green Valley System (Lakes Madigan and Frey), the City also has an appropriative right in Barker Slough in the Sacramento-San Joaquin Delta, a contract for Solano Project water delivered through the North Bay Aqueduct. Serving water from Lake Curry is critical to the City in meeting its existing and future demands. Serving water from Lake Curry would also assist in enhancing the City's water supply reliability.

The City's Project

The Lake Curry Water Supply project, as currently envisioned, would consist of:

- The City using its existing 24-inch diameter Gordon Valley Pipeline to convey untreated water from Lake Curry south via gravity flow to the Putah South Canal. Water would then flow through the Canal to the Terminal Reservoir then through existing City infrastructure to the existing Fleming Hill Water Treatment Plant for treatment and distribution to the City's users in its service area.
- The City installing a new 6- to 8-inch diameter water distribution pipeline to convey treated water from the City's existing Green Valley Water Treatment Plant north to Gordon Valley customers and to a new 150,000 to 200,000 gallon storage tank. The tank would be used for storage of treated water. The new pipeline would be installed within the County road right-of-way or within the existing easement of the 24-inch diameter pipeline.
- The City releasing a portion of its untreated water supply from Lake Curry to Suisun Creek for protection and maintenance of endangered species and their habitat in the creek.

With implementation of the Project, the City would be required to:

- Execute and implement a long-term contract with Reclamation, pursuant to 43 U.S.C. section 523 (the Warren Act of 1911) for the conveyance of non-Federal project water from Lake Curry through a 5-mile long portion of the federally owned Putah South Canal ending at the Terminal Reservoir.
- Obtain an easement for the installation of new facilities within the existing Reclamation right-of-way (needed to deliver Lake Curry supplies into the Putah South Canal).
- Obtain easements and approvals/permits from Napa and Solano counties.
- Obtain a General Construction Storm Water Permit from the State Water Resources Control Board.
- Conduct a sanitary survey every 5 years of the Lake Curry watershed.

The EIS/EIR will consider a range of alternatives including a Creek Conveyance Alternative and a No Action alternative.

Creek Conveyance Alternative

The Creek Conveyance Alternative consists of the City releasing and conveying all untreated water from Lake Curry into and long Suisun Creek to the intersection of the Putah South Canal. The water would flow in a southerly direction in the open Suisun Creek channel approximately 7 miles to the Putah South Canal where it would be rediverted for delivery to Terminal Reservoir, then to the City's Fleming Hill Water Treatment Plant. With implementation of this alternative, the City would not use the existing 24-inch diameter pipeline to convey untreated Lake Curry water to Vallejo.

The Creek Conveyance Alternative could potentially increase the volume of Lake Curry water available for the protection of threatened steelhead in Suisun Creek. By conveying all untreated water from Lake Curry to the □ Canal in the creek channel, the project would conjunctively use the City's water supply for endangered species and their habitat in the creek.

□ Start Printed Page 48636

A new water diversion facility (consisting of a small diversion dam, a fish screen protection system, and a pump) would be constructed to redivert water from Suisun Creek to the Putah South Canal. The water would then flow in the Putah South Canal to the Terminal Reservoir, then through the City's existing water transmission facilities to the Fleming Hill Water Treatment Plant for treatment and distribution to the City's service area.

In addition, the Creek Conveyance Alternative includes the continued conveyance of treated water north from the City's existing service system (Green Valley Water Treatment Plant) to customers in Gordon Valley and to a new 150,000 to 200,000 gallon storage tank. The tank would be used for storage of treated water. Conveyance of the treated water could be achieved by three different methods. These three methods are described below as Options 1, 2, and 3.

Option 1: This treated water conveyance option includes the continued use of the City's existing 24-inch diameter distribution pipeline to convey treated water from the City's existing service system (Green Valley Water Treatment Plant) to customers in Gordon Valley and to the new water storage tank to be added.

Option 2: This treated water conveyance option includes installation of a 6- to 8-inch diameter pipeline to convey treated water from the City's Green Valley Water Treatment Plant to customers in Gordon Valley and to the new water storage tank. The new pipeline would be installed within the right-of-way of the existing 24-inch diameter pipeline.

Option 3: This treated water conveyance option includes installation of a 6- to 8-inch diameter pipeline to convey treated water from the City's existing service system (Green Valley Water Treatment Plant) to customers in Gordon Valley and to the new water storage tank. The new pipeline would be installed with the existing 24-inch diameter pipeline. The 24-inch diameter pipeline would no longer be used to convey water. Its sole purpose would be to protect the smaller water distribution pipeline that is installed within it.

With implementation of this Creek Conveyance Alternative, regardless of which option is selected, the City would also be required to do the following:

- Construct a new rediversion structure in Suisun Creek, and obtain approval from the State Water Resources Control Board (SWRCB).
- Execute and implement a long-term contract with Reclamation, pursuant to 43 U.S.C. Section 523 (the Warren Act of 1911) for the conveyance of non-Federal water from Lake Curry through a 5-mile long

portion of the federally owned Putah South Canal ending at the Terminal Reservoir.

- Obtain an easement for the installation of new facilities within the existing Reclamation right-of-way (needed to pump Lake Curry supplies to the Putah South Canal).
- Obtained required easements and approvals/permits from Napa and Solano counties.
- Obtain a Section 1603 permit from the California Department of Fish and Game for streambed alterations required for installation of the rediversion facility.
- Obtain a General Construction Storm Water permit from the California State Water Resources Control Board.
- Obtain a Section 404 Permit from the U.S. Army Corps of Engineers.
- Obtain a Section 401 Water Quality Certification/Waiver from the California Regional Water Quality Control Board.
- Conduct a sanitary survey every 5 years of the Lake Curry watershed, and Wooden Valley Creek and all other creeks tributary to Suisun Creek above the point of rediversion.

In addition, with implementation of this alternative, regardless of which option is selected, the City may elect to do the following:

- File a Water Code Section 17017 Water Right Change petition with the SWRCB to provide for the use of the water for fishery and habitat use, and to enable the City to protect the water in the creek from the Gordon Valley Dam downstream to a new point of rediversion of Suisun Creek.

No Project Alternative

The No Project Alternative consists of the City continuing to release water from Lake Curry to Suisun Creek. The purposes of the release are three-fold: (1) To approximate the amount of water that was withdrawn from the lake for municipal and industrial uses prior to 1992, (2) to conserve cold water stored in the lake, and (3) to provide the downstream flood protection that was available from Lake Curry operation prior to 1992.

The No Project Alternative also includes continuation of the City's current operation of the existing 24-inch diameter Gordon Valley Pipeline. Treated water from the City's existing Green Valley Water Treatment Plant would be pumped north in the 24-inch diameter distribution pipeline to customers in Gordon Valley.

Scoping is an early and open process designed to determine the issues and alternatives to be addressed in the EIS/EIR. The following are issues that have been identified to date: Potential effects on steelhead trout populations; potential effects on wetland, upland, and aquatic habitats; potential effects on special-status vegetation and wildlife species; potential construction-related effects on Suisun Creek, along Gordon Valley Road, and natural habitats and residents (including water quality, noise, air quality, and transportation/traffic effects); and potential effects on cultural resources.

The draft EIS/EIR will focus on the impacts and benefits of implementing the various alternatives. It will contain an analysis of the physical, biological, social, and economic impacts arising from the alternatives. In addition, it will address the cumulative impacts of implementation of the alternatives in conjunction with other past, present, and reasonably foreseeable actions.

If special assistance is required at the scoping meetings, contact Mr. Robert Schroeder at Reclamation 916-989-7274. Please notify Mr. Schroeder as far in advance of the workshops as possible to enable Reclamation to secure the needed services. If a request cannot be honored, the requestor will be notified. A telephone

device for the hearing impaired (TDD) is available at 916-989-7275.

Our practice is to make comments, including names and home addresses of respondents, available for public review. Individual respondents may request that we withhold their home address from public disclosure, which we will honor to the extent allowable by law. There also may be circumstances in which would withhold a respondent's identity from public disclosure, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations or business, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public disclosure in their entirety.

Dated: July 7, 2003.

Frank Michny,

Regional Environmental Officer Mid-Pacific Region.

[FR Doc. 03-20708 (/a/03-20708) Filed 8-13-03; 8:45 am]

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Appendix C

Task 3.4 Report - Evaluation of Lake Curry New Diversion

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REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA
6/27/2021

MEMORANDUM

To: Laurel Marcus, Executive Director, California Land Stewardship Institute

From: Nicholas F. Bonsignore, P.E., David P. Lounsbury, P.E.

Date: June 27, 2021

Re: **Suisun Creek Watershed Instream Flow Enhancement Project**
Task 3.4 Report - Evaluation of Lake Curry New Diversion

I. Introduction

By agreement dated November 16, 2016, Wagner & Bonsignore Consulting Civil Engineers (W&B) was retained by the California Land Stewardship Institute (CLSI) to provide engineering services in connection CLSI's Grant Agreement with State of California Wildlife Conservation Board for the Suisun Creek Watershed Instream Flow Enhancement Project. W&B's scope of work is summarized below:

Task 3.4 New Diversion

Determine the feasibility of relocating Lake Curry's point of diversion to Suisun Creek at the Putah South Canal. A concept level engineering review will be completed to provide a cost estimate for a new diversion structure. Evaluate winter stream flows in Suisun Creek and complete a water availability analysis as required by the State Water Resources Control Board to revise the existing Lake Curry water right. A stream flow model will be created and calibrated with the data from the gages installed for this project and any nearby USGS gages. A summary memo on the diversion project will be prepared including the concept level engineering and cost estimate for the new diversion structure and water availability analysis.

II. Background and Project Setting

a) Lake Curry Dam

Lake Curry Dam is located on Suisun Creek in southeastern Napa County; see **Plate I**. The dam is owned and operated by the City of Vallejo (City) and was constructed in 1926. The dam

is an earthen embankment structure and is about 107 feet high and impounds about 10,700 acre-feet.[1] An aerial view of Lake Curry Dam and Reservoir with major features identified is shown in **Figure 1**. Selected record drawings for the Lake Curry Dam spillway are provided in **Appendix A**. Based on 1927 plans, the Lake Curry Dam spillway is a rectangular concrete chute on the right abutment of the dam. Based on 1946 plans, a 5-bay radial gate control structure exists at the spillway crest. The radial gates are non-operational presently and are fixed in the open position, therefore the current storage capacity is less than 10,700 acre-feet.[2] The dam is also equipped with low-level outlet conduit through the base of the dam, and an intake tower in the reservoir allows for drawing water at various reservoir depths as might be needed to meet water quality requirements.

b) Water Right License 5728 (Application 1908)

The diversion of natural inflow at Lake Curry, and beneficial use of such water, is authorized by water right License 5728, which was issued to the City by the State Water Rights Board (SWRB) [3] on June 5, 1959. The priority date of the license is July 15, 1920, which is the date that water right Application 1908 was received by the SWRB. License was granted based in part on an inspection of the project by the State of California Department of Public Works, Division of Water Resources (DPWDWR) [4] on January 22, 1957. License 5728 allows for the following:

- Direct diversion of up to 7 cubic feet per second (cfs) year-round (January 1 to December 31).
- Collection to storage of up to 5,400 acre-feet in Lake Curry during the period of "about November 1 of each year to about May 1 of the succeeding year."
- Maximum withdrawal from storage in any one year of 3,380 acre-feet.
- Total use of water by direct diversion and withdrawal from storage shall not exceed 5,058.9 acre-feet per annum.
- The total amount of water in storage in Lake Curry is limited to 10,700 acre-feet.

[1] State of California, California Natural Resources Agency, Department of Water Resources, Division of Safety of Dams, "Dams Within Jurisdiction of the State of California", September 2020. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Dams-Within-Jurisdiction-of-the-State-of-California-Listed-Alphabetically-by-County.pdf

[2] The storage capacity at the permanent spillway crest elevation is unclear. Various references indicate it to be approximately 8,400 to 9,848 acre-feet. The actual capacity is not relevant to this analysis.

[3] The State Water Rights Board was a predecessor to the State Water Resources Control Board, Division of Water Rights (SWRCB).

[4] The DPWDWR was znother predecessor to the SWRCB.

- Use of water for municipal purposes within the City of Vallejo as shown on a map filed with the SWRB.

As indicated, the license allows for *direct diversion* and diversion by *collection to storage*. This is a nuanced but an important distinction in the administration of appropriative water rights by the State of California. Title 23 of California Code of Regulations (CCR), sections 657 and 658, characterize these terms as follows:

> *"657. Regulation of Water.*
> *Regulation of water means the direct diversion of water to a tank or reservoir in order that the water may be held for use at a rate other than the rate at which it may be conveniently diverted from its source. For licensing purposes, refill, in whole or in part, held in a tank or reservoir for less than 30 days shall be considered regulation of water."*

> *"658. Storage of Water.*
> *Storage of water means the collection of water in a tank or reservoir during a time of higher stream flow which is held for use during a time of deficient stream flow. For licensing purposes all initial collections within the collection season plus refill, in whole or in part, held in a tank or reservoir for more than 30 days shall be considered water diverted for storage except as provided in Section 735(c)."*

The application of the above terms to analysis of reservoir operations is often referred to as "the 30-day rule" and is used by the SWRCB to disaggregate and quantify the use of water made by direct diversion from the use of water made by withdrawal from reservoir storage. Generally, on an instantaneous basis, the release of water from a reservoir for a beneficial use is considered to be direct diversion to the extent there is concurrent natural inflow to the reservoir (i.e., "pass-through"). In the case where the reservoir is rising while a release is being made, the entire release would be considered direct diversion. In the case where a release is being made and the reservoir is falling, the release could be classified partly as direct diversion (to the extent there is inflow to the reservoir) and partly as a withdrawal from storage. If there is no concurrent inflow, the entirety of the release would be considered withdrawal from storage. The disaggregation of direct diversion from storage withdrawal can be complicated when the 30-day rule is applied and requires an after-the-fact calculation based on monitoring data.

The SWRB conducted a post-license inspection of the project on May 4, 1965, because the City had not filed required annual Reports of Licensee for the years 1962 through 1964. Apart from the City's filing of the past-due reports, and the suggestion that a petition for a change in the licensed place of use may be warranted, the 1965 inspection did not result in any water right actions.

Based on Reports of Licensee (ROL) on file with the SWRCB, it appears the City stopped using water for municipal uses starting in 1992, and there has been no use for municipal proposes from Lake Curry for the nearly 30 years since then. The City's curtailment of water use for

municipal purposes was brought about by the City's decision to forego improvements to water treatment facilities that would have been required to meet new state drinking water standards. In some years, the City has reported use of water for "Fish and Wildlife Preservation and Enhancement", however this is not a use authorized by the license. The City continues to report water diverted to storage to account for refill of the reservoir in the wet season following a dry season drawdown of the lake.

c) Conceptual Water Diversion Project

In the early 2000's the City of Vallejo proposed several alternatives to re-establish the use water from Lake Curry for municipal use. These included repairing/rebuilding a transmission pipeline from the lake and the idea of releasing water from the lake in the summer into Suisun Creek and rediverting water into the Putah South Canal at the crossing of Suisun Creek for delivery of water to the City's water treatment facility. This second alternative would allow for use of the City's water right and provide summertime stored water releases for instream habitats for threatened species. Apparently, neither project was pursued.

The proposed project involves constructing a pump station facility on Suisun Creek for making diversions into the Putah South Canal (PSC) for wet season deliveries. With regard to water rights, the project would require the City to file of a "Petition for Change" with the SWRCB to add a point of diversion to License 5728 on Suisun Creek at the Putah South Canal (PSC) crossing.[5] Implementation of the project would require the approval of the petition by the SWRCB, typically in the form of a Board Order and/or an amended license. The petition process involves public notice, with opportunity for protests to be filed by downstream right holders if they believe that the proposed change could impact their ability to divert under their right. In addition, any individual, group, or regulatory agency may file a protest based on potential adverse impacts to the environment or the public interest. Petitions are subject to environmental review under the California Environmental Quality Act (CEQA). Before approving a petition for change the SWRCB must make the following findings:[6]

- The change does not initiate a new water right;
- The change can be made without injuring other legal users of water including the environment, and
- The change is in the public interest.

[5] A "point of diversion" is a discrete location on a stream where water is taken under control. License 5728 presently allows only one point of diversion, located at Lake Curry Dam, where natural flow can either be directly diverted or collected to storage for later use, subject to terms in the license.

[6] https://www.waterboards.ca.gov/waterrights/water_issues/programs/petitions

The SWRCB's approval of a petition to add a point of diversion would allow the City to exercise the direct diversion element of License 5728 from Suisun Creek at the PSC crossing (provided any other permits required by other regulatory agencies are obtained). License 5728 limits the rate of direct diversion at the present point of diversion (Lake Curry Dam) to 7 cfs. This same diversion rate limitation would apply to the added point of diversion at the PSC. Further, under the concept that a right holder shall not be allowed to divert more water at a new downstream point of diversion than what would have been available at its present point of diversion, we expect that the evaluation of water available for the proposed project, as well as its future operation, necessarily requires reckoning water availability at the original licensed point of diversion, i.e., Lake Curry Dam.[7]

It is uncertain if the 30-day rule discussed above could be applied to the proposed project, that is, diverting water at the new point of diversion at rates higher than 7 cfs if the amount diverted over any 30-day period did not exceed the equivalent 30-day amount. Both CCR sections 657 and 658 state that the 30-day rule shall be used "for licensing purposes". It is uncertain whether the licensed direct diversion rate, established through application of the 30-day rule to pre-license operations, was determined to be a maximum instantaneous rate or whether the 30-day rule applies to the stated 7 cfs rate. Documents in the SWRCB's file for License 5728 suggest (but are not definitive) that this issue was considered prior to licensure in 1959 and that the 30-day rule did not apply.[8] In the course of its work on this project the CLSI attempted to meet with SWRCB staff and the City, in part to discuss the potential applicability of the 30-day rule to License 5728. However, the City cancelled the meeting and SWRCB staff declined to meet with CLSI and its consultants without the City's concurrence. Because the applicability of the 30-day rule to License 5728 remains an open question, this analysis considered a diversion rate of 7 cfs as well as higher rates to assess the effect of the 30-day rule on yield, should it be deemed to be applicable to License 5728.

Based on discussions with CLSI staff the evaluation of water availability was further conditioned such that diversions from Suisun Creek to the PSC would only be made when Lake Curry was spilling, which necessarily resulted in potential diversions occurring only during the wet season. Release of water from storage for rediversion at the PSC crossing when Lake Curry was not spilling, or during the dry season, was indicated to be contrary to the overall project

[7] Adding a new point of diversion downstream of an existing licensed point diversion typically increases the likelihood that water is physically available for diversion due to the larger drainage area and associated increased natural flow accruing to the downstream point. The SWRCB staff has historically considered this situation to be the initiation of a new water right, requiring a new application for permit. Limiting water available for diversion at the new point of diversion based on the occurrence of flow at the original point of diversion avoids this issue.

[8] License 5728 states a "made proof" date of January 22, 1957, which is the date of a DPWDWR inspection. In a memorandum to file dated February 18, 1959, DPWDWR staff concluded that a more rigorous review of City records indicated a direct diversion rate of 8.6 cfs had occurred. The memo notes that the direct diversion rate should be limited to 7 cfs per the permit term. A memo from the City to the SWRB dated March 30, 1959 suggests that the City was made aware of the overage and understood "that there can be no further increase of use under this application permit and license when issued." The City's memo was in reply to a SWRCB letter dated March 6, 1959, which is not in the SWRCB's file, therefore, there is some uncertainty as to whether the 30-day rule was determined to be inapplicable to the City's right.

objective of enhancing downstream habitat for anadromous fish, since it would deplete stored water supply needed for fish releases later in the dry season.

III. Water Availability Analysis and Results

The analysis of wet-season water availability for Suisun Creek at the PSC crossing was based on evaluation of limited hydrologic data for the historic period of January 2007 to March 2018. There is no reliable wet season streamflow data available for Suisun Creek below Lake Curry Dam, therefore the analysis relied on other data available for this period to estimate streamflow conditions. The water availability analysis considered three wet-season scenarios:

(1) Pumping rate limited to 7 cfs.

(2) Pumping rate limited to 14 cfs, not to exceed 30-day equivalency for 7 cfs rate (equates to about 416.5 acre-feet).

(3) Pumping rate optimized to maximize diversion amount while conforming to 30-day equivalency for 7 cfs equivalency.

a) Scenario 1 – Maximum pumping rate: 7 cfs

The evaluation for a maximum pumping rate of 7 cfs, commensurate with the direct diversion rate specified in License 5728, was based on the following data sets, methodology, and assumptions:

i. The historical period of January 2007 to March 2018 was selected because this was the period that continuous lake level data was available for Lake Curry. Hourly lake level data was provided by CLSI consultant Rune Storesund, which we understand was acquired from the City of Vallejo. We converted the hourly lake level data to average daily lake level.

ii. The radial gates at the spillway structure were fixed in the open position during the study period.[9] We assumed the Lake Curry permanent spillway crest is at Elev. 377.1 based on a 2003 report prepared by Dennis Jackson.[10] Lake levels above this elevation would result in flow over the spillway. Spill flows were computed based on the standard equation for a broad-crested rectangular weir having a crest length of 46 feet per original Lake Curry spillway plans on file with the California Department of Water Resources, Division of

[9] Email from Eric J. Holland, P.E., Senior Water Resources Engineer, DWR Division of Safety of Dams, April 20, 2020.

[10] *Assessment of the Effects of Lake Curry on Flood Events in Suisun Creek*, prepared by Dennis Jackson for Laurel Marcus and Associates, November 30, 2003.

Safety of Dams (DSOD). A copy of the 1946 spillway crest structure plan is provided in **Appendix A.**

iii. Computed daily Lake Curry spill flows during Water Years (WY) 2008 to 2017 are shown graphically in **Figure 2**. During this 10-year period Lake Curry spilled in 6 years (WY 2010 to 2013 and in 2016 and 2017), however, the extent of annual spill volume varied widely, ranging from a low of about 104 acre-feet in 2012 to a high of 22,504 acre-feet in 2017. The flows shown exclude any releases that may have been made through the Lake Curry Dam outlet works.

Figure 2 also shows the concurrent daily precipitation record for the Atlas Peak station. The Atlas Peak precipitation station is operated by the California Department of Water Resources and is located about 9 miles northwest of Lake Curry at an elevation of 1,660 feet.[11]

iv. For protection of instream resources, it was assumed that a minimum instream flow would be maintained in Suisun Creek at the PSC crossing before diversions at that location would be allowed. The minimum instream flow at this location was assumed to be the statistical February median flow (FMF).[12] The ability to divert water at the PSC crossing was therefore limited to days when Lake Curry Dam was spilling *and* the flow of Suisun Creek at the PSC crossing was above the assumed minimum bypass flow.

v. There is no reliable wet season gaged flow data available for Suisun Creek. To estimate daily flow in Suisun Creek at the PSC crossing we referenced historical gage data for USGS gaging station #1145800 Napa River Near Napa (Napa River gage) and adjusted the daily flow record to Suisun Creek based on differences in drainage and mean annual precipitation using the USGS StreamStats tool.[13] Based on this reckoning, flows for Suisun Creek at PSC were estimated to be about 16.5 percent of Napa River gaged flows.

For a 60-year period of record for the Napa River gage (1960 to 2019) the FMF for the Napa River gage was computed to be about 223 cfs. Based on StreamStats the FMF adjusted to Suisun Creek at the PSC crossing was computed to be about 36.7 cfs.

vi. Gaged streamflow data for Suisun Creek below Lake Curry Dam collected by CLSI in 2019 and 2020 indicates significant channel losses during the dry season. Channel losses can be attributed to uptake by riparian vegetation, possible infiltration, and possible

[11] Atlas Peak precipitation data acquired from the California Data Exchange Center web site (https://cdec.water.ca.gov) for station ATL.

[12] The selection of FMF as a minimum flow is based on a document entitled *Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversion in Mid-California Coastal Streams, Draft June 17,2002 (Draft Guidelines)*. The Suisun Creek watershed is outside of, but just east, of the geographical area to which the *Draft Guidelines* apply.

[13] https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects

diversions by other right holders on the stream channel. Wet season gage data was either not collected by CLSI or could not be verified based on limited direct stream flow measurements, therefore there is no reliable data available regarding potential wet season channel losses in Suisun Creek.

While it is possible that channel losses occur during the wet season, based on the premise that diversions at the PSC crossing would only occur when Lake Curry is spilling, i.e., during wet conditions, we assumed that uptake by riparian vegetation would be insignificant and there would be accretions to the channel from local runoff that would counteract or exceed infiltration. Downstream right holders are summarized in the Task 3.2 legal issues memorandum-report prepared by Peter J. Kiel for this project, and we conducted our own review of the SWRCB's eWRIMS database. To the extent that these rights are for direct diversion, there would be little to no diversion for irrigation during the wet season, leaving diversions only for domestic and stockwatering needs, which would be relatively small. Three downstream appropriative rights allow wet season diversions to offstream storage, however, the allowed rates of diversion for these rights are relatively low, and all require a minimum bypass flow in Suisun Creek before diversions are allowed.[14] Accordingly, we assumed that there would be no significant wet season channel losses during diversion periods between Lake Curry Dam and the PSC crossing.

vii. **Table 1** shows the monthly amounts of water that could have been diverted from Suisun Creek to the PSC during the 10-year study period based on the foregoing diversion and bypass conditions. Based on a maximum diversion rate of 7 cfs, water would have been available to divert in 6 of the 10 complete water years evaluated. The 10-year average annual diversion amount was about 262 acre-feet. The range of water available annually varied from 0 to 1,292 acre-feet, with the maximum amount occurring in 2017.

b) Scenario 2 – Maximum pumping rate: 14 cfs, not to exceed 30-day equivalency for 7 cfs rate

The data for Lake Curry for 2007 to 2018 indicates periods when spill flows exceed 7 cfs and water could be diverted at a rate higher than 7 cfs provided over any 30-day period the equivalent volume for the 7 cfs rate was not exceeded. With reference to Section II.b herein, this scenario assumes that 30-day rule is applicable to License 5728. The data sets, methodology, and assumptions described in above Paragraphs i through vi for Scenario 1 are also applicable to Scenario 2, except that water would be diverted at rates up to 14 cfs (double the stated license rate) for shorter periods of time so long as the 30-day rule was not violated.

[14] These rights are License 7339 (A017055), Permit 16723 (A024398), and Permit 20869 (A030244), The allowed rates of diversion are 0.24 cfs, 1.0 cfs, and 0.11 cfs, respectively.

Table 2 shows the monthly amounts of water that could have been diverted from Suisun Creek to the PSC based on a maximum diversion rate of up to 14 cfs and application of the 30-day rule. As indicated in the second column of Table 2, increased diversion rates (above 7 cfs used in Scenario 1) for Water Years 2010-2013 and 2016 would have resulted in increased diversion amounts. For the very wet year of 2017 we evaluated increased diversion rates on a monthly basis. The 10-year average annual diversion amount for Scenario 2 was about 313 acre-feet, an increase of 51 acre-feet over the average annual value in Scenario 1. The maximum diversion amount in 2017 was 1,358 acre-feet (2017), an increase of about 66 acre-feet over the maximum year amount in Scenario 1.

c) Scenario 3: Maximum pumping rate optimized while adhering to 30-day equivalency for 7 cfs rate

In certain years during the study period, the rate of diversion could be higher than 14 cfs without violating the 30-day rule for 7 cfs. **Table 3** shows "optimized" diversion rates for certain years, up to 21.7 cfs in 2013, that could be implemented without violating the 30-day rule. The 10-year average annual diversion amount for Scenario 3 was about 325 acre-feet, an increase of 63 acre-feet over the average annual amount for Scenario 1, and 12 acre-feet more than the average annual amount for Scenario 2. For the very wet year of 2017 the amount was the same as Scenario 2, (1,358 acre-feet).

Based on historical precipitation records for the Atlas Peak station, average precipitation for Water years 2008 to 2017 period is about 92% of long-term average, i.e., overall this was a dry period. This period includes the critical drought years of 2012 to 2015, as well as the very wet 2017. Accordingly, a longer study period that is more in line with long-term average precipitation conditions would likely show greater availability. Based on this limited data set and under similar operational conditions, it appears that some water would be available for diversion in water years having precipitation equal to or greater than the long-term average precipitation.

IV. Rediversion of Dry Season Releases from Lake Curry Dam

In August 2020, we participated in a conference call with CLSI and NOAA Fisheries staff to discuss results of our analysis of wet-season operations. Among the topics discussed was the potential for rediversion of stored water released from Lake Curry during the dry season as a way to increase the City's beneficial use of water for municipal purposes under License 5728. From a water rights perspective, rediverting storage releases at the PSC crossing would also require the filing of a Petition for Change with the SWRCB and approval of the petition.

During the call CLSI staff indicated that the PSC capacity was fully utilized during the irrigation season, which would pose a constraint on rediversion of released water when the PSC was in use for irrigation deliveries. Additionally, CLSI staff indicated that for dam releases in the

range of 3 to 5 cfs or less, Suisun Creek loses about 40 percent of the flow released from the dam as reckoned at Williams Road (about 5 miles downstream of the dam and 3 miles upstream of the PSC crossing). Additional losses would be expected in the reach down to the PSC crossing.

Based on stream gage data collected by CLSI in the dry seasons of 2019 and 2020, released flows are usually maintained for about 1.6 miles below the dam (gaging station SC 8.4). Downstream of SC 8.4 flows are consistently depleted by seepage and evaporation, and possibly diversions.[15] The most downstream location that CLSI collected dry season flow data is SC 5.6, which is about 4.4. miles below Lake Curry Dam and about 3.1 miles upstream of the PSC crossing. SC 5.6 is also below the confluence with Wooden Valley Creek and thus is influenced by stream flows accruing from Wooden Valley Creek. The City of Vallejo has no water right entitlement to Wooden Valley Creek, therefore, a rediversion project would require stream flow measuring devices on both streams to disaggregate Wooden Valley Creek flows from Lake Curry releases.

During our August 2020 call NOAA Fisheries staff stated that they could probably accept "low flows" in Suisun Creek below the PSC crossing during the dry season. Per CLSI's Task 2.9 and 2.10 Report for this project, maximum dry season releases in the range of 4 to 6 cfs are contemplated for some of the dry season scenarios being considered. Very simply, at these rates of release, an assumed stream loss of 50 percent in the 8± miles of creek channel between Lake Curry Dam and the PSC crossing would result in flows of 2 to 3 cfs at the crossing. An assumed minimum flow of 1 cfs for instream habitat maintenance at that location would result in 1 to 2 cfs available for rediversion. This equates to about 2 to 4 acre-feet per day, or about 60 to 120 acre-feet per month, which would greatly enhance the wet-season supply discussed in **Section III** herein. However, this operation entails a depletion of Lake Curry storage of about 8 to 12 acre-feet per day (about 240 to 360 acre-feet per month). Accordingly, operational and environmental factors associated with this type of project would need to be better understood before concluding that a dry season rediversion project is worth pursuing.

V. Conceptual Suisun Creek Pump Station

a) Suisun Creek at PSC Crossing, Physical Setting,

An aerial view of Suisun Creek at the PSC crossing is provided in **Figure 3.** The PSC crosses under Suisun Creek via a 78-inch diameter concrete pipe inverted siphon. Two as-built plan sheets prepared by the U.S. Bureau of Reclamation (USBR) and dated February 2, 1959, are provided in **Appendix B**. USBR Drawing No. 433-D-533 shows a General Plan and Longitudinal Section (profile) of the inverted siphon pipe. USBR Drawing No. 433-D-534 shows details of transition structures at the entrance and exit of the siphon pipe. The transition structure at the entrance includes a radial gate and flashboard structures for flow control; the siphon exits freely to the PSC at the downstream end of the inverted siphon (see photos below). PSC flow capacity

[15] Email from CLSI's Barry Hill, April 5, 2021.

is indicated in Drawing No. 433-D-534 to be 320 cfs upstream of the inverted siphon and 180 cfs downstream.

Entrance to inverted siphon (10/24/2019)

Exit from inverted siphon (10/24/2019)

An aerial photo view of the crossing environs prepared by CLSI, and showing approximate parcel boundaries and ownership information, is provided in **Appendix C**. The right-of-way for the PSC is generally a strip of land that encompasses the canal itself and access roads on both sides, with additional land area on the upstream side of the inverted siphon. A concrete bridge within the right-of-way on the easterly side of the siphon provides vehicular access over Suisun Creek.

Just upstream of the siphon crossing Suisun Creek makes a sweeping bend from south to east. This has resulted in scour of the right bank of Suisun Creek about 100± feet upstream of the siphon as evidenced by the existence of broken concrete rubble at this location. The scour and rubble may also be attributable to discharges of drain water from agriculture lands west of the PSC via a large diameter CMP culvert entering the creek on the right bank near this location.

b) Conceptual Pump Station Design

Engineers from W&B conducted a site visit to the project location on October 24, 2019. Access was coordinated by Solano County Water Agency and Solano Irrigation District staff. Because the USBR drawings provided limited information regarding topography, W&B acquired GPS positions on the Suisun Creek channel, key structural features, and surrounding terrain. W&B was assisted by Barry Hill, hydrologist for CLSI. This data was used to prepare a topographic map of the inverted siphon area.

Because the Suisun Creek channel is lower in elevation than the PSC, diversions from the creek into the PSC would need be pumped. The conceptual design of the pump station was driven by several assumed constraints:

- To avoid creating an obstruction to fish migration it was assumed that there would be no barrier constructed across the creek to pool water for pumping.
- A fish screen meeting the requirements of NOAA Fisheries and CDFW for anadromous fish was assumed to be required.
- It was assumed that some redundancy should be provided, i.e., at least two pumps and at least two intakes with separate fish screens.

Based on the above constraints, a conceptual design for the diversion pump station is shown in **Figure 3**. As shown, the pump station could be constructed on either the left or right bank of Suisun Creek. Because the right bank appears to have had previous scour issues and may require additional scour protection measures, the left bank may be the preferred location. In addition, per **Appendix C**, there is more space on the left bank relative to property boundaries. If the pump station is located on the right bank a buried pipeline would convey pumped water to the PSC downstream of the siphon. If the pump station is located on the left bank a buried pipeline would

convey pumped water to the upstream siphon transition structure and discharge it immediately downstream of the radial gate/flashboard control structure at that location.

For protection of fish the pump station design utilizes "cone screens" as manufactured by ISI Intake Screens, Inc. (ISI). Product information for ISI cone screens is provided in **Appendix D**. The screen unit consists of a stainless steel wedge-wire conical screen with a hydraulic motor-driven rotating external brush for self-cleaning. An internal baffle directs flow through the screen into an intake pipe exiting the bottom of the screen. During our August 2020 conference call, NOAA Fisheries staff stated that ISI cone screens are acceptable.

As shown on **Figure 3**, water passing though the above-described cone screens would gravity flow via a pipe to a large-diameter reinforced concrete standpipe pump sumps located on the stream bank. The pumps are assumed to be variable-speed electric motor-driven vertical turbine pumps powered from the grid, but alternatively could be powered by a permanent or portable generator unit. Water level sensors in the sump would control pump operations and would be configured to preclude pumping if the flow in the creek is less than the minimum bypass flow required for protection of instream resources.

Three conceptual pump stations configurations were evaluated for the three pumping rate scenarios (7 cfs, 14 cfs, and 21 cfs); **Figure 3** shows the 14 cfs configuration. The proposed pump station design concept for each pumping scenario is relatively consistent in concept. Each pump station scenario includes cone-type fish screens with a conveyance intake pipelines leading to a standpipe sump structures which contain a variable-speed pump. The relative size of the screen and standpipe structures increases between the 7 cfs and the 14 cfs pump station designs.

The 7 cfs pump station design is proposed to require two 48" diameter cone screens, each with a 24" diameter pipeline conveying water from the diversion inlet, located below the cone screen, to a 60" diameter concrete standpipe. Each pump station unit would be sized to divert about 3.5 cfs for a total pumped diversion rate of 7 cfs when both pump units are operated simultaneously. A low-level conduit would connect the two standpipes to allow the two pumps to run in alternating cycles when diversion flowrates available are less than 7 cfs.

The 14 cfs pump station design is similar to the 7 cfs pump station except the two cone screens would be 66" diameter, the diversion conveyance pipeline is 36" diameter, and the concrete standpipe would be 84" diameter.

The 21 cfs pump station design is essentially the same as the 14 cfs pump station except a third diversion and pumping unit would be added adjacent to the two pumping units of the 14 cfs design.

c) Estimated Construction Cost for Conceptual Design

The estimated construction cost for each pump station conceptual design was developed based on estimated unit and lump sum cost values for project elements and components. Detailed cost estimates are provided on **Tables 4-A, 4-B, and 4-C**, respectively, and are summarized below:

Scenario	Max Diversion Rate (cfs)	Total Estimated Construction Cost
1	7	$1,300,000
2	14	$1,500,000
3	~21	$2,100,000

Costs for project elements are estimated based on several different methods depending on the information available or known for each element at this conceptual level of design. Site construction work was estimated using "prevailing wage" equipment rates from the 2021-22 Equipment Rental Rate from the California Department of Transportation, labor rates from the California Department of Industrial Relations, and daily production estimates for the equipment and labor provided. Equipment and structures were estimated from quotes for similar items and adjusted to current-day prices based on the "Composite trend" index values as reported in the *Bureau of Reclamation's Construction Cost Trends* and for variances in project design. The pumping system can be a highly variable cost element depending upon operational flow rates and system mechanical or operational requirements. The pump costs provided are based on personal communications with a pump system designer with relevant experience with a similar diversion pumping system recently installed for a private project in Napa County. Pumping system costs are further adjusted based on pump horsepower requirements and cost increases for more stringent mechanical system operation and design standards that we expect will be required for a public agency project.

Included in the total construction cost estimate are estimates for engineering design, geotechnical investigation, biological review and permitting, contract administration and construction inspection. These costs are estimated as a percentage of the direct construction cost and are for conceptual project cost evaluations only and shall not be considered as a proposal for such services. The biological review and permitting costs are proposed to be subsequent and in addition to the biological reviews and permitting associated with the water right permit actions which would be required for the project.

Not included in the construction cost estimates are costs associated with the approval of a Petition for Change for License 5748 by the SWRCB and all related studies, surveys, and analyses that would be required to further evaluate and develop this project.

VI) Conclusions

This analysis evaluated water available for diversion from Suisun Creek into the Putah South Canal (PSC) based on the following conditions and assumptions:

- The SWRCB would approve a Petition for Change to add a point of diversion on Suisun Creek at the PSC crossing to the City of Vallejo's water right License 5728 (Application 1908).
- Diversions from Suisun Creek to the PSC would only be made when Lake Curry is spilling and flows in Suisun Creek were greater than the estimated February Median Flow (FMF) reckoned at the PSC crossing (about 36.7 cfs). To avoid the initiation of a new water right, flows available for diversion at the PSC crossing would be based on the occurrence of flow at Lake Curry Dam,
- The study period evaluated was based on available daily reservoir level data for Lake Curry during the period of January 10, 2007 to March 12, 2018. For periods when the reservoir level exceeded the permanent spillway crest elevation, daily spill flows were computed based on a standard weir formula. Spill flows were summarized for the 10 complete water years within the study period (WY 2008 to 2017). Spills occurred in 6 of the 10 years, and in those 6 years the amount spilled annually ranged from a low of about 100 acre-feet to a high of about 22,500 acre-feet.
- Three diversion scenarios were evaluated. *Scenario 1* was based on an assumed maximum rate of division of 7 cfs, commensurate with the direct diversion rate set forth in License 5728. *Scenario 2* assumed a maximum rate of diversion of 14 cfs with a limitation on the maximum amount diverted over any 30-day period to the 7 cfs equivalency (about 416.5 acre-feet). *Scenario 3* was based on optimization of the maximum diversion rate that resulted in a maximum rate of 21.7 cfs and similarly limited by the 30-day rule. Results of the three scenarios are summarized below:

Scenario	Max Diversion Rate (cfs)	10-year Avg. Diversion Amount* (af)	Max Year Diversion Amount (af)
1	7	262	1,292
2	14	313	1,358
3	21.7	325	1,358

* No water was available for diversion in 4 of the 10 years evaluated.

- The study period includes the critical drought years of 2012 to 2015, as well as the very wet 2017. Average precipitation for Water Years 2008 to 2017 was about 92% of long-term average, i.e., overall, this was a drier-than-average period. A longer-term analysis would likely indicate water availability to be marginally greater than the results presented herein.

- The diversion amounts achieved by the project alternatives and their associated estimated construction costs can be compared based on an average-annual cost per acre-foot basis. Estimated construction costs range from about $1.3 million for the 7 cfs scenario to about $2.1 million for the ~21 cfs scenario. The average annual cost can be determined by calculating the cost over a period of years at a certain finance rate. Assuming a period of 30 years at a 4% finance rate, the annualized cost of the project for the three diversion scenarios are shown below. Dividing the annualized cost by the average diversion amounts yields an average annual "unit cost" of the water. The average-annual unit costs for the three diversion scenarios are also shown below. Note that these costs do not include operational and maintenance costs.

Scenario	Max Diversion Rate (cfs)	10-year Avg. Diversion Amount (af)	Total Estimated Construction Cost	Annualized Cost	Average-Annual Unit Cost ($/af)
1	7	262	$1,300,000	$75,200	287
2	14	313	$1,500,000	$86,700	277
3	~21	325	$2,100,000	$121,400	374

  Based on the unit costs shown above, Scenario 2 is the presumptive best alternative and may indicate potential feasibility for further project evaluations. The unit cost values should, however, be further evaluated against availability and estimated cost of other sources of water.

- Based on some very general assumptions and speculation, rediversion of dry season releases from Lake Curry storage could potentially aid the City's utilization of License 5728 for municipal supply, however, constraints on PSC conveyance capacity in the dry season and significant channel losses in Suisun Creek between Lake Curry Dam and the PSC crossing require more detailed study to assess whether such a project is worth further consideration. Reference is made to Peter Kiel's Task 3.2 memorandum-report for permitting and other legal considerations pertaining to a release-from-storage type project.

- Limitations: This analysis was based on historic operations of Lake Curry. During the study period we understand the City did not withdraw water for municipal use but may have made minimal releases during some or all of this period for instream resources. Changes in future operations that differ from those during the study period could affect the prediction of future water availability. Additionally, a minimum bypass flow at the PSC greater than the computed FMF could reduce the availability of water for diversion.

* * * * *

Tables

Table 1

Suisun Creek at Putah South Canal Crossing

Computed Monthy Diversion Amount Based on Diversion Rate of 7 cfs (acre-feet)

WY	Months												
	October	November	December	January	February	March	April	May	June	July	August	September	Total[1]
2007	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	110	115	71	0	0	0	0	0	296
2011	0	0	0	0	117	415	124	0	0	0	0	0	656
2012	0	0	0	0	0	10	76	0	0	0	0	0	86
2013	0	0	58	0	0	0	0	0	0	0	0	0	58
2014	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	230	0	0	0	0	0	0	230
2017	0	0	0	320	389	352	232	0	0	0	0	0	1,292
2018	0	0	0	0	0	-	-	-	-	-	-	-	-
Average	0	0	5	29	51	102	46	0	0	0	0	0	262

Note:

1. Complete Water Years only.

Table 2

Suisun Creek at Putah South Canal Crossing

Computed Monthly Diversion Amount Based on Diversion Rate of 14 cfs (acre-feet)

WY	Optimized Diversion Rate (cfs)	Months												
		October	November	December	January	February	March	April	May	June	July	August	September	Total[2]
2007	-	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	14	0	0	0	0	173	192	120	0	0	0	0	0	485
2011	7.2	0	0	0	0	120	425	127	0	0	0	0	0	672
2012	11.8	0	0	0	0	0	10	93	0	0	0	0	0	104
2013	14	0	0	93	0	0	0	0	0	0	0	0	0	93
2014	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	13.5	0	0	0	0	0	416	0	0	0	0	0	0	416
2017	7[3]	0	0	0	320	389	352	297	0	0	0	0	0	1,358
2018	-	0	0	0	0	0	-	-	-	-	-	-	-	-
Average		0	0	8	29	57	127	58	0	0	0	0	0	313

Note:

1. Diversion rate for Water Years 2010-2013 and 2016 optimized to confrom with 30-day rule for 7 cfs equivalent, but not exceeding 14 cfs.
2. Complete Water Years only.
3. Water Year 2017 diversion rate was further optimized based on a monthly disaggregation.

Table 3

Suisun Creek at Putah South Canal Crossing

Optimized Computed Allowable Diversion Rate (acre-feet)

WY	Optimized Diversion Rate (cfs)	Months												
		October	November	December	January	February	March	April	May	June	July	August	September	Total[2]
2007	-	-	-	-	-	0	0	0	0	0	0	0	0	-
2008	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	19.7	0	0	0	0	207	220	154	0	0	0	0	0	581
2011	7.2	0	0	0	0	120	425	127	0	0	0	0	0	672
2012	11.8	0	0	0	0	0	10	93	0	0	0	0	0	104
2013	21.7	0	0	117	0	0	0	0	0	0	0	0	0	117
2014	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	7	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	13.5	0	0	0	0	0	416	0	0	0	0	0	0	416
2017	7[3]	0	0	0	320	389	352	297	0	0	0	0	0	1,358
2018	-	0	0	0	0	0	-	-	-	-	-	-	-	-
Average		0	0	11	29	60	129	61	0	0	0	0	0	325

Note:

1. Water Years 2010-2013 and 2016 optimized to conform with 30-day rule, for 7 cfs equivalency
2. Complete Water Years only.
3. Water Year 2017 diversion rate was further optimized based on a monthly disaggregation.

Table 4-A
Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility - Conceptual Design
Engineer's Estimate of Probable Cost for Construction of
7 cfs Diversion Facility

Direct Construction Costs

Item No.	Description	`	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$49,700
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servic	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	2,000	CY	$21	$42,000
6	Backfill	2,000	CY	$37	$74,000
7	60" Dia. Concrete Manhole Structures	2	Job	Lump Sum	$15,000
8	Concrete Intake Structure	16	CY	$1,800	$28,800
9	24" Dia. Conveyance Pipes	40	LF	$100	$4,000
10	Concrete/CLSM Backfill	30	CY	$180	$10,400
11	12" Dia. Steel Discharge Piping	1	Job	Lump Sum	$11,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$11,000
13	Access Walkway to Structure	1	Job	Lump Sum	$8,000
14	8 oz. Geotextile Fabric	800	SF	$0.30	$240
15	18" Minus Riprap	190	Ton	$45	$8,550
16	3" PVC Conduit	100	LF	$20	$2,000
17	48" ISI Model C66-18 Brushed Cone Screen	2	Job	Lump Sum	$34,000
18	Hydraulic Power Unit	2	Job	Lump Sum	$26,000
19	Pumping System, 2-20 Hp Pumps	1	Job	Lump Sum	$299,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$30,000
	Subtotal Direct Construction				$670,690
	Contingency @ 25%				$168,000
Total Direct Construction					**$838,690**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 12%	$101,000
B	Geotechnical Investigation @ 6%	$50,000
C	Biological Review and Permitting @ 16%	$134,000
D	Construction Inspection @ 5%	$42,000
E	Contract Administration @ 2%	$17,000
	Subtotal Engineering and Admin.	$344,000
	Contingency @ 25%	$86,000
Total Engineering and Administration		**$430,000**
Total Estimated Construction Cost		**$1,268,690**
Total Estimated Construction Cost - Rounded		**$1,300,000**

Table 4-B
Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility - Conceptual Design
Engineer's Estimate of Probable Cost for Construction of
14 cfs Diversion Facility

Direct Construction Costs

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$61,600
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servic	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	2,000	CY	$21	$42,000
6	Backfill	2,000	CY	$37	$74,000
7	84" Dia. Concrete Manhole Structures	2	Job	Lump Sum	$27,000
8	Concrete Intake Structure	16	CY	$1,800	$28,800
9	36" Dia. Conveyance Pipes	40	LF	$150	$6,000
10	Concrete/CLSM Backfill	45	CY	$180	$13,100
11	24" Dia. Steel Discharge Piping	1	Job	Lump Sum	$22,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$22,000
13	Access Walkway to Structure	1	Job	Lump Sum	$8,000
14	8 oz. Geotextile Fabric	800	SF	$0.30	$240
15	18" Minus Riprap	190	Ton	$45	$8,550
16	3" PVC Conduit	100	LF	$20	$2,000
17	66" ISI Model C66-18 Brushed Cone Screen	2	Job	Lump Sum	$40,000
18	Hydraulic Power Unit	2	Job	Lump Sum	$26,000
19	Pumping System, 2-40 Hp Pumps	1	Job	Lump Sum	$398,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$35,000
	Subtotal Direct Construction				$831,290
	Contingency @ 25%				$208,000
Total Direct Construction					**$1,039,290**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 10%	$104,000
B	Geotechnical Investigation @ 5%	$52,000
C	Biological Review and Permitting @ 15%	$156,000
D	Construction Inspection @ 4%	$42,000
E	Contract Administration @ 1.5%	$16,000
	Subtotal Engineering and Admin.	$370,000
	Contingency @ 25%	$93,000
Total Engineering and Administration		**$463,000**
Total Estimated Construction Cost		**$1,502,290**
Total Estimated Construction Cost - Rounded		**$1,500,000**

Table 4-C
Suisun Creek at Putah South Canal Crossing
Suisun Creek Diversion Facility - Conceptual Design
Engineer's Estimate of Probable Cost for Construction of ~21 cfs Diversion Facility

Direct Construction Costs

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	Job	Lump Sum	$90,600
2	Preparation of SWPPP plan	1	Job	Lump Sum	$4,000
3	Implementation of SWPPP incl. QSD & QSP servic	1	Job	Lump Sum	$6,000
4	Stripping Project Site	1	Job	Lump Sum	$7,000
5	Excavation	3,100	CY	$21	$65,100
6	Backfill	3,100	CY	$37	$114,700
7	84" Dia. Concrete Manhole Structures	3	Job	Lump Sum	$40,500
8	Concrete Intake Structure	22	CY	$1,800	$39,600
9	36" Dia. Conveyance Pipes	60	LF	$150	$9,000
10	Concrete/CLSM Backfill	90	CY	$180	$21,200
11	24" Dia. Steel Discharge Piping	1	Job	Lump Sum	$33,000
12	Steel Discharge Piping Installation	1	Job	Lump Sum	$33,000
13	Access Walkway to Structure	1	Job	Lump Sum	$10,000
14	8 oz. Geotextile Fabric	1000	SF	$0.30	$300
15	18" Minus Riprap	230	Ton	$45	$10,350
16	3" PVC Conduit	150	LF	$20	$3,000
17	66" ISI Model C66-18 Brushed Cone Screen	3	Job	Lump Sum	$60,000
18	Hydraulic Power Unit	3	Job	Lump Sum	$39,000
19	Pumping System, 3-40 Hp Pumps	1	Job	Lump Sum	$597,000
20	Power Supply & Meter Panel	1	Job	Lump Sum	$40,000
	Subtotal Direct Construction				$1,223,350
	Contingency @ 25%				$306,000
Total Direct Construction					**$1,529,350**

Engineering and Administration Costs

Item No.	Description	Total
A	Engineering and Design @ 8%	$122,000
B	Geotechnical Investigation @ 4%	$61,000
C	Biological Review and Permitting @ 14%	$214,000
D	Construction Inspection @ 3%	$46,000
E	Contract Administration @ 1%	$15,000
	Subtotal Engineering and Admin.	$458,000
	Contingency @ 25%	$115,000
Total Engineering and Administration		**$573,000**
Total Estimated Construction Cost		**$2,102,350**
Total Estimated Construction Cost - Rounded		**$2,100,000**

Figures

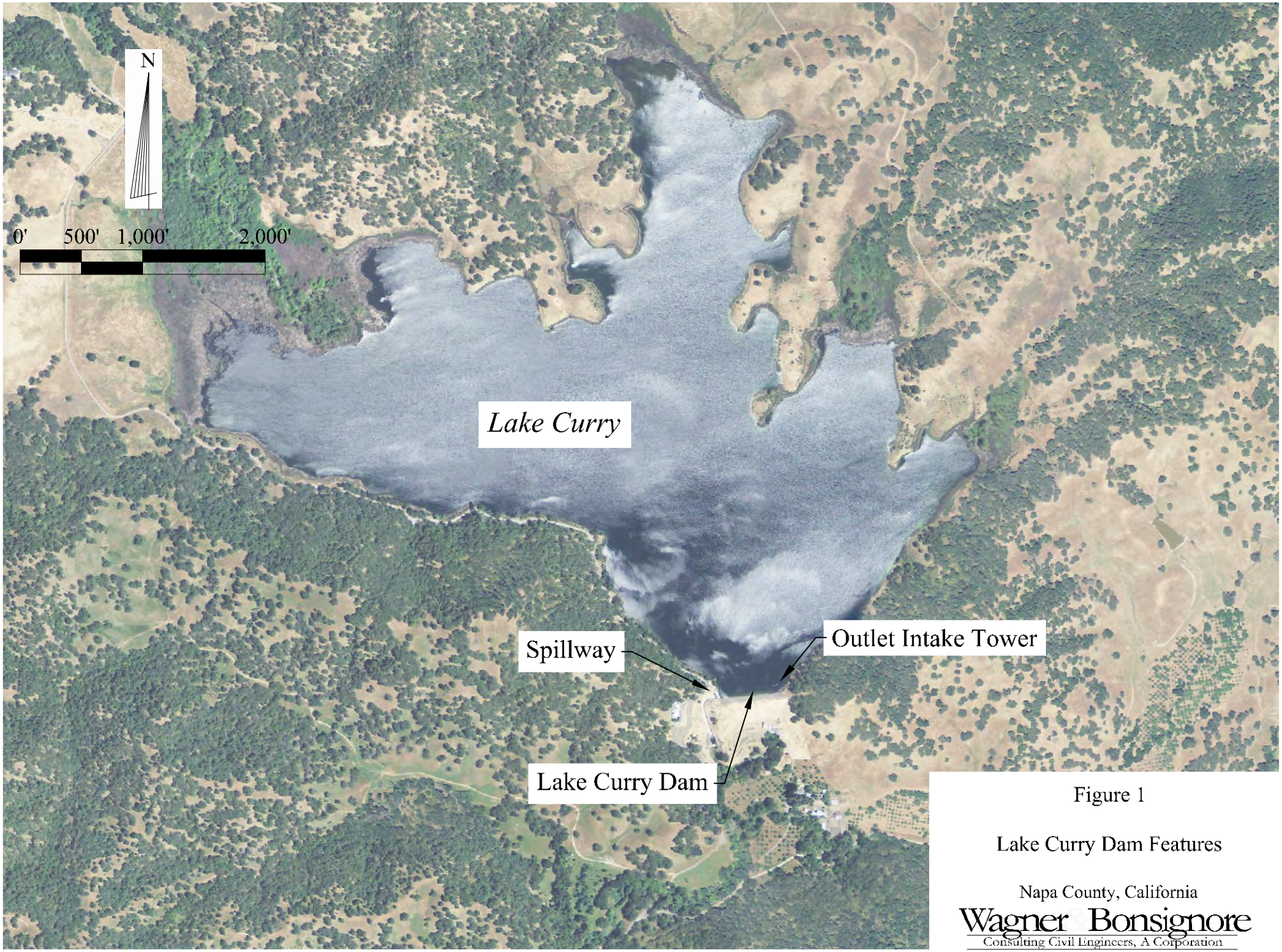


Figure 1

Lake Curry Dam Features

Napa County, California

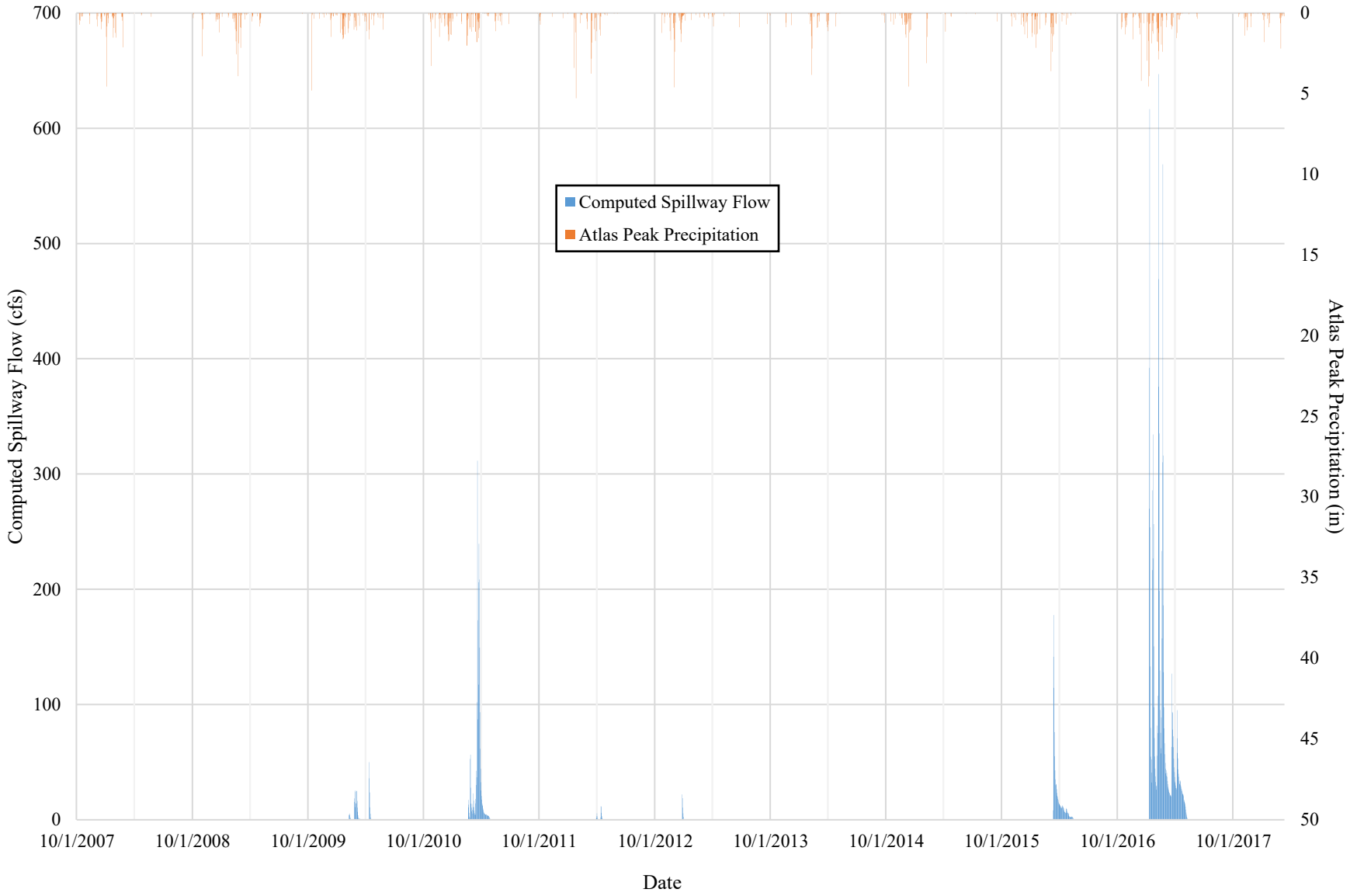
Wagner Bonsignore

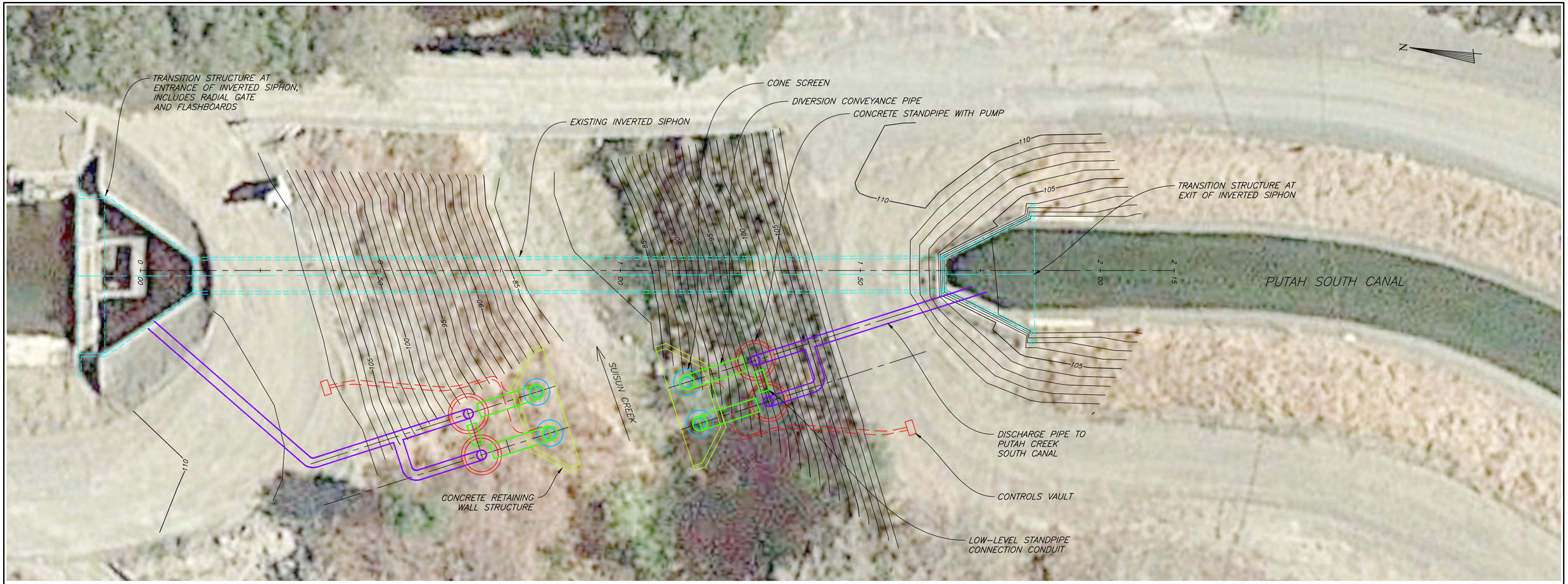
Consulting Civil Engineers, A Corporation

June 2021

Aerial Imagery per U.S. Department of Agriculture (USDA) - Aerial Photography Field Office, National Agricultural Inventory Project, flown May 20, 2012.
Q:\Drawings\California Land Stewardship Institute\Suisun Creek\CAD\Exhibit-Suisun Creek Watershed.dwg

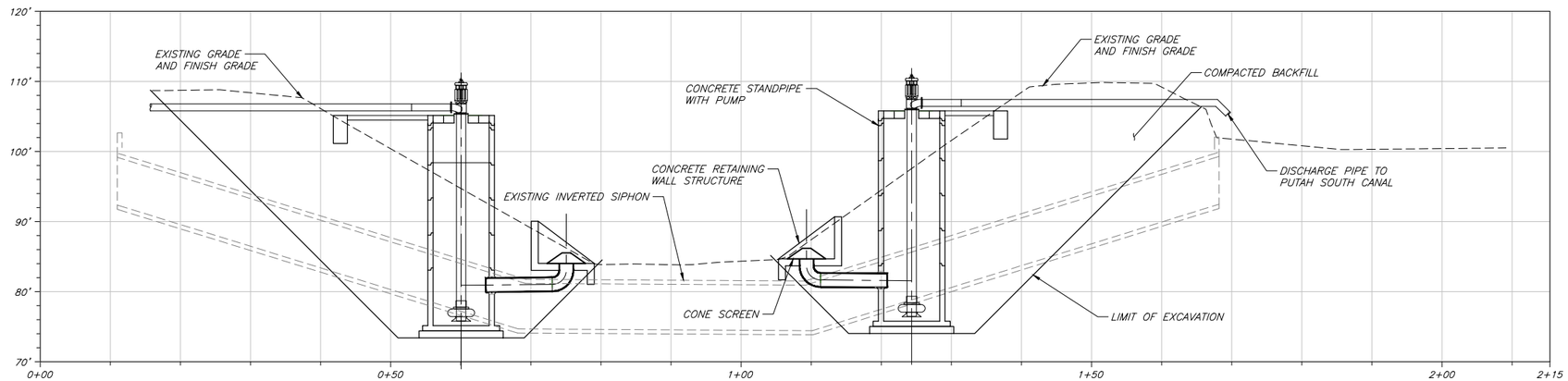
Figure 2
Daily Lake Curry Computed Spillway Flow and Atlas Peak Precipitation
Water Years 2008 to 2017





PLAN

0' 5' 10' 20'



PROFILE

0' 5' 10' 20'

NOTES:

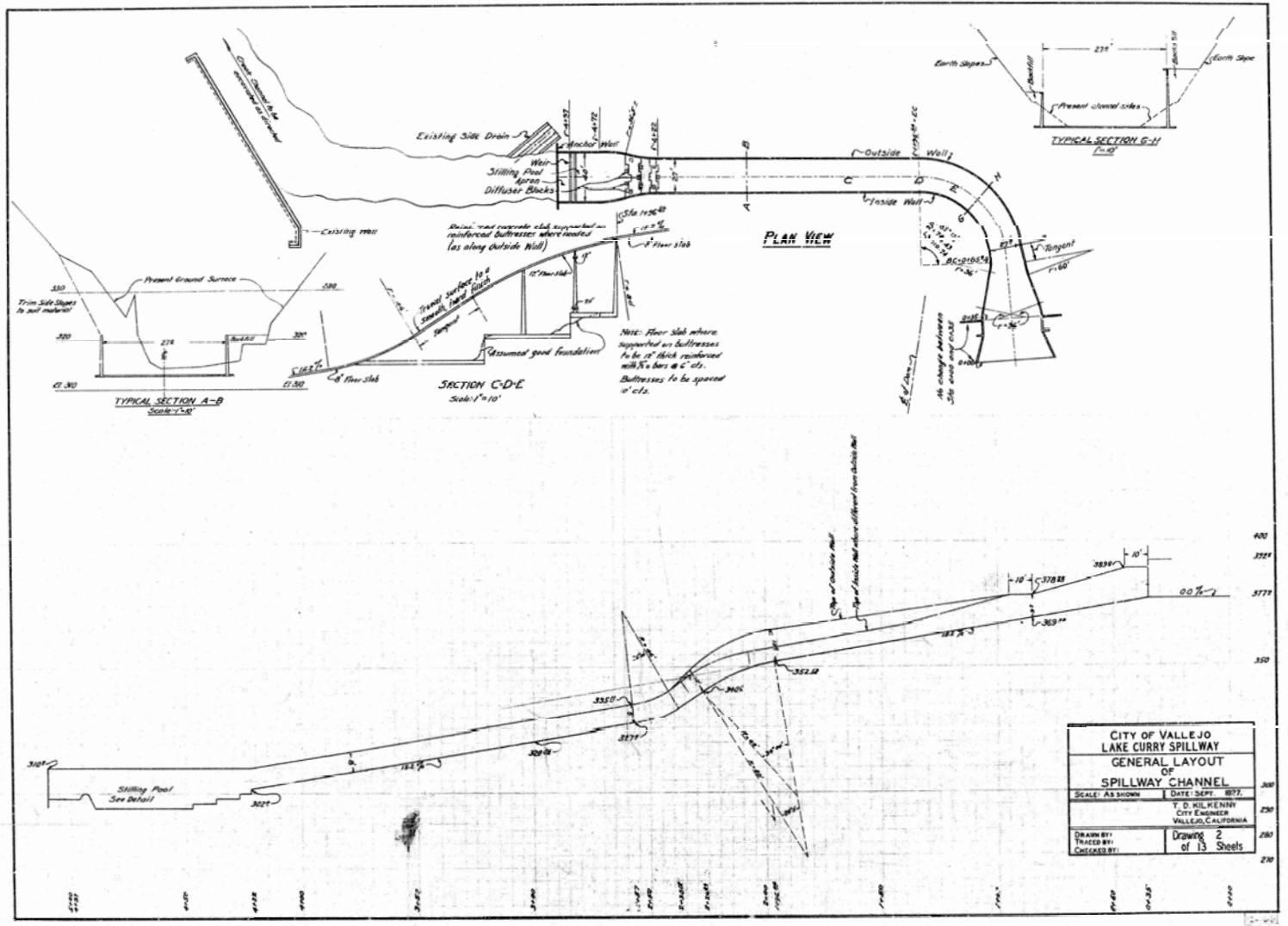
1. PLAN AND PROFILE VIEWS SHOW ALTERNATIVE PUMP STATION LOCATIONS ON THE LEFT AND RIGHT BANKS OF SUISUN CREEK. LOCATION TO BE DETERMINED DURING PRELIMINARY DESIGN.
2. DESIGN SHOWN IS FOR 14 CFS PUMP STATION CAPACITY ALTERNATIVE.
3. TOPOGRAPHY PER SURVEY BY WAGNER & BONSIGNORE, OCTOBER 24, 2019. CALIFORNIA COORDINATE SYSTEM, NAD83, ZONE 2 AND NAVD 88.
4. AERIAL PHOTO PER GOOGLE EARTH IMAGERY OCTOBER 2020.

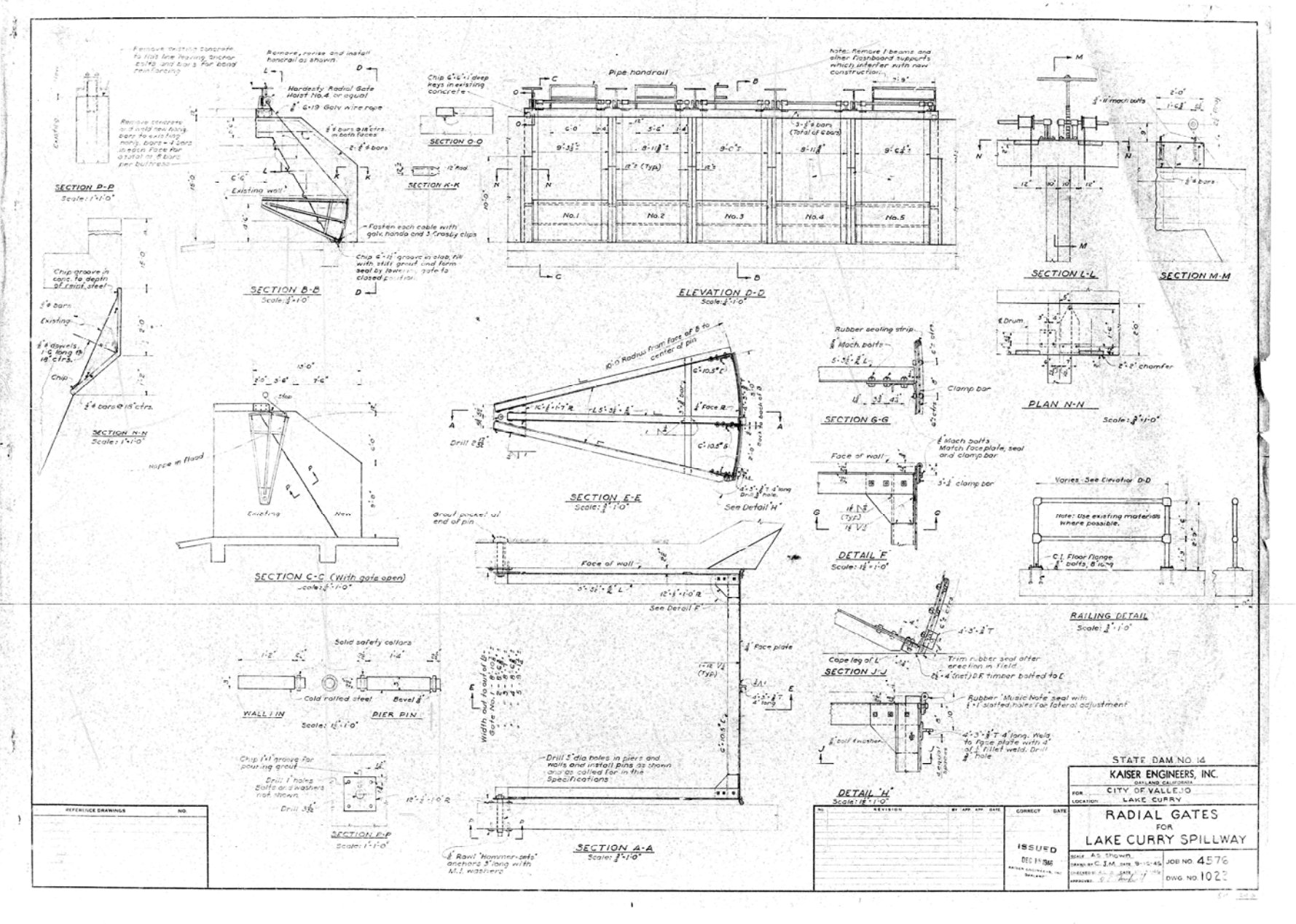
Figure 3

California Land Stewardship Institute
Task 3.4 Report
Conceptual Diversion Facility
and
Pump Station Design

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Appendix A – Lake Curry Spillway


Existing Side Drain
Anchor Wall
Weir
Stilling Pool Apron
Diffuser Blocks
Outside Wall
Inside Wall
Existing Wall
PLAN VIEW
1" = 40'
Present Ground Surface
Trim Side Slopes to suit material
Travel surface to a smooth, hard finish
Assumed good foundation
TYPICAL SECTION A-B
Scale: 1"=10'
SECTION C-D-E
Scale: 1"=10'
Note: Floor slab where supported on buttresses to be 12" thick reinforced with ½" bars @ 6" c/s.
Buttresses to be spaced 10' c/s.
TYPICAL SECTION G-H
Scale: 1"=10'
Earth Slopes
Backfill
Present channel sides
Stilling Pool See Detail
CITY OF VALLEJO
LAKE CURRY SPILLWAY
GENERAL LAYOUT OF SPILLWAY CHANNEL
SCALE: AS SHOWN
DATE: SEPT. 1937.
T. D. KILKENNY
CITY ENGINEER
VALLEJO, CALIFORNIA
DRAWN BY:
TRACED BY:
CHECKED BY:
Drawing 2 of 13 Sheets



REFERENCE DRAWINGS NO.

NO.	REVISION	BY	APP.	DATE

CORRECT DATE

ISSUED
DEC 19 1945

STATE DAM NO. 14

KAISER ENGINEERS, INC.
OAKLAND, CALIFORNIA

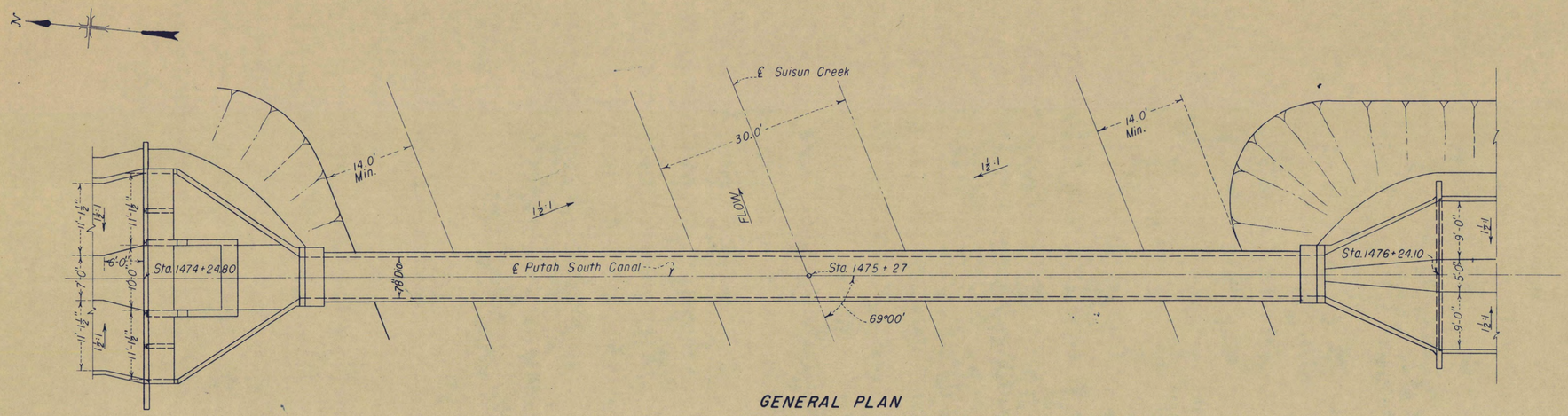
FOR CITY OF VALLEJO
LOCATION LAKE CURRY

RADIAL GATES FOR LAKE CURRY SPILLWAY

SCALE AS SHOWN
DRAWN BY C.J.M. DATE 9-10-45
CHECKED A.J. DATE
APPROVED

JOB NO. 4576
DWG. NO. 1022

Appendix B – PSC Suisun Creek Siphon



GENERAL PLAN

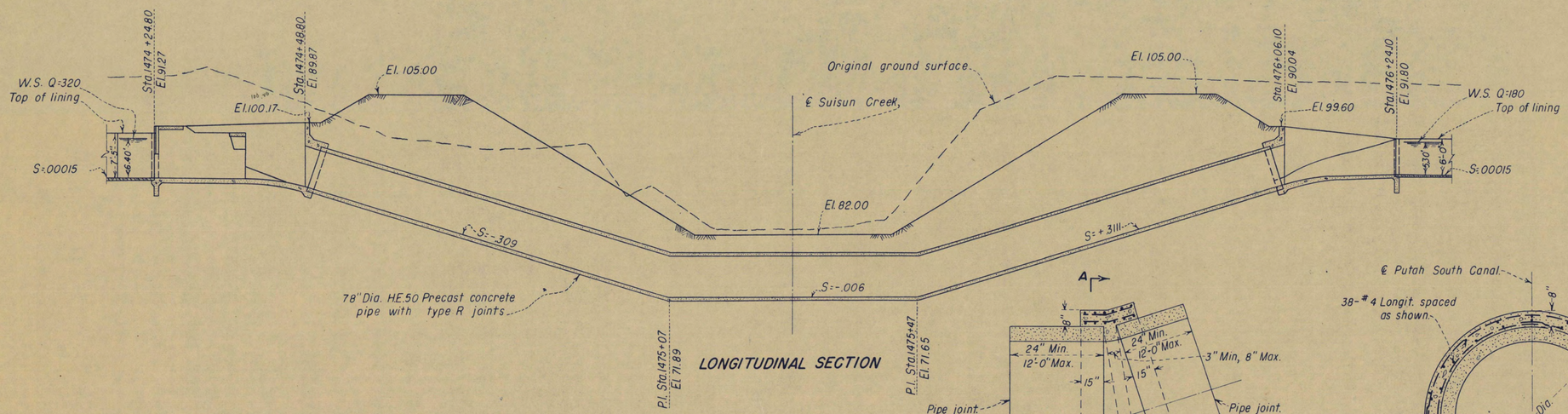
5 0 10 20
SCALE OF FEET

HYDRAULIC PROPERTIES

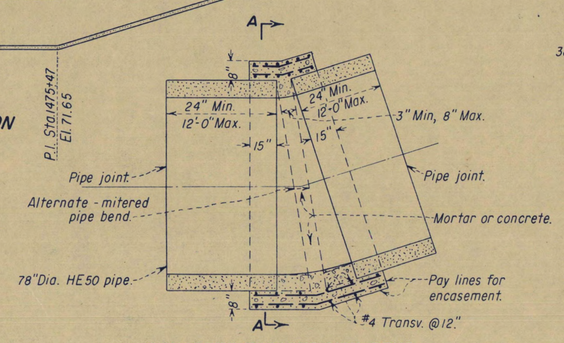
SECTION	A	V	Q	r	n or Cs	S
Lined Sec. No. 4	106.24	3.01	320	3.53	.014	.00015
Siphon	33.18	5.42	180	1.63	.370	.00093
Lined Sec. No. 5	68.64	2.62	180	2.85	.014	.00015

ESTIMATED QUANTITIES

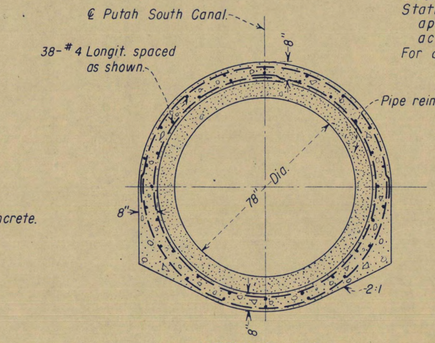
Concrete	69	Cu. Yds.
Reinforcement steel	7300	Lbs.
Miscellaneous metalwork	510	Lbs.
10'-0" x 7'-0" Radial gate and hoist	1	Unit
78" Dia. HE 50 Pipe	160	Lin. Ft.



LONGITUDINAL SECTION



CONCRETE ENCASED PIPE BEND



SECTION A-A

NOTES

Unless otherwise shown, place reinforcement so that the clear distance between face of concrete and nearest reinforcement is 1½"; except provide a clear distance from face of concrete placed against earth or rock of 2" where slab thickness is 9" or less, and 3" where slab thickness is greater than 9".

Lap all bars 24 diameters at splices, unless otherwise shown.

Monolithic concrete based on a compressive strength of 3,000 lbs. per sq.in.

Place base of structure on undisturbed earth or compacted fill.

Stations and elevations shown on longitudinal section refer to invert, unless otherwise shown.

Backfill above top of siphon as directed, 3.0' minimum.

Stations and elevations of P.I.s are to be considered approximate only, and may be adjusted according to actual laying length of pipe.

For details of transitions, see 413-D-534.

BUREAU OF RECLAMATION JUN

Feb. 2, 1959 As Built 222 ALL.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

SOLANO PROJECT-CALIFORNIA

PUTAH SOUTH CANAL STA. 1474+24.80

SUISUN CREEK SIPHON

GENERAL PLAN AND LONGITUDINAL SECTION

DRAWN A.W.B. SUBMITTED W. F. Schmidt
TRACED J.S.S. RECOMMENDED
CHECKED REC, CWS APPROVED Acting Chief Designing Engineer

DENVER, COLORADO DEC. 7, 1956
SHEET 1 OF 2

413-D-533

NOTE
For General Plan, Notes, and Estimated Quantities, see 413-D-533.

JUN 2? 1957
WINTERS, CALIFORNIA

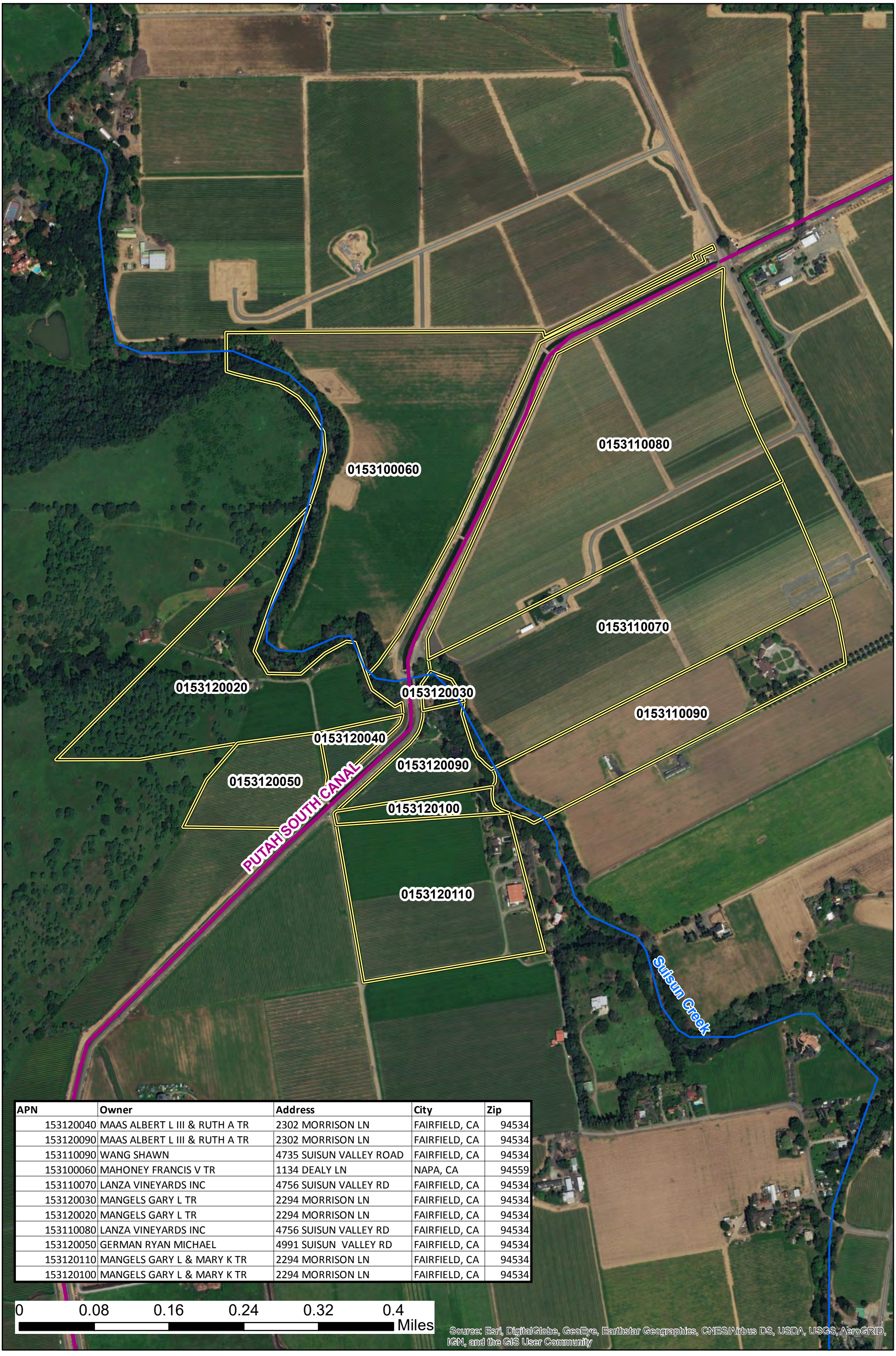
Feb. 2, 1959 As Built 222 A.L.L.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
SOLANO PROJECT - CALIFORNIA
PUTAH SOUTH CANAL - STA. 1474+24.80
SUISUN CREEK SIPHON
TRANSITIONS

DRAWN A.W.B. SUBMITTED W. F. Schmid
TRACED D.C.C. RECOMMENDED
CHECKED REC. APPROVED L. G. Puls
Acting Chief Designing Engineer
DENVER, COLORADO DEC. 7, 1956
SHEET 2 OF 2
413-D-534

Appendix C - Map of Land Ownership

Junction of Suisun Creek & Putah Creek South Canal Landowners



APN	Owner	Address	City	Zip
153120040	MAAS ALBERT L III & RUTH A TR	2302 MORRISON LN	FAIRFIELD, CA	94534
153120090	MAAS ALBERT L III & RUTH A TR	2302 MORRISON LN	FAIRFIELD, CA	94534
153110090	WANG SHAWN	4735 SUISUN VALLEY ROAD	FAIRFIELD, CA	94534
153100060	MAHONEY FRANCIS V TR	1134 DEALY LN	NAPA, CA	94559
153110070	LANZA VINEYARDS INC	4756 SUISUN VALLEY RD	FAIRFIELD, CA	94534
153120030	MANGELS GARY L TR	2294 MORRISON LN	FAIRFIELD, CA	94534
153120020	MANGELS GARY L TR	2294 MORRISON LN	FAIRFIELD, CA	94534
153110080	LANZA VINEYARDS INC	4756 SUISUN VALLEY RD	FAIRFIELD, CA	94534
153120050	GERMAN RYAN MICHAEL	4991 SUISUN VALLEY RD	FAIRFIELD, CA	94534
153120110	MANGELS GARY L & MARY K TR	2294 MORRISON LN	FAIRFIELD, CA	94534
153120100	MANGELS GARY L & MARY K TR	2294 MORRISON LN	FAIRFIELD, CA	94534

Appendix D – ISI Brushed Cone Screen

ISI Intake Screens, Inc.

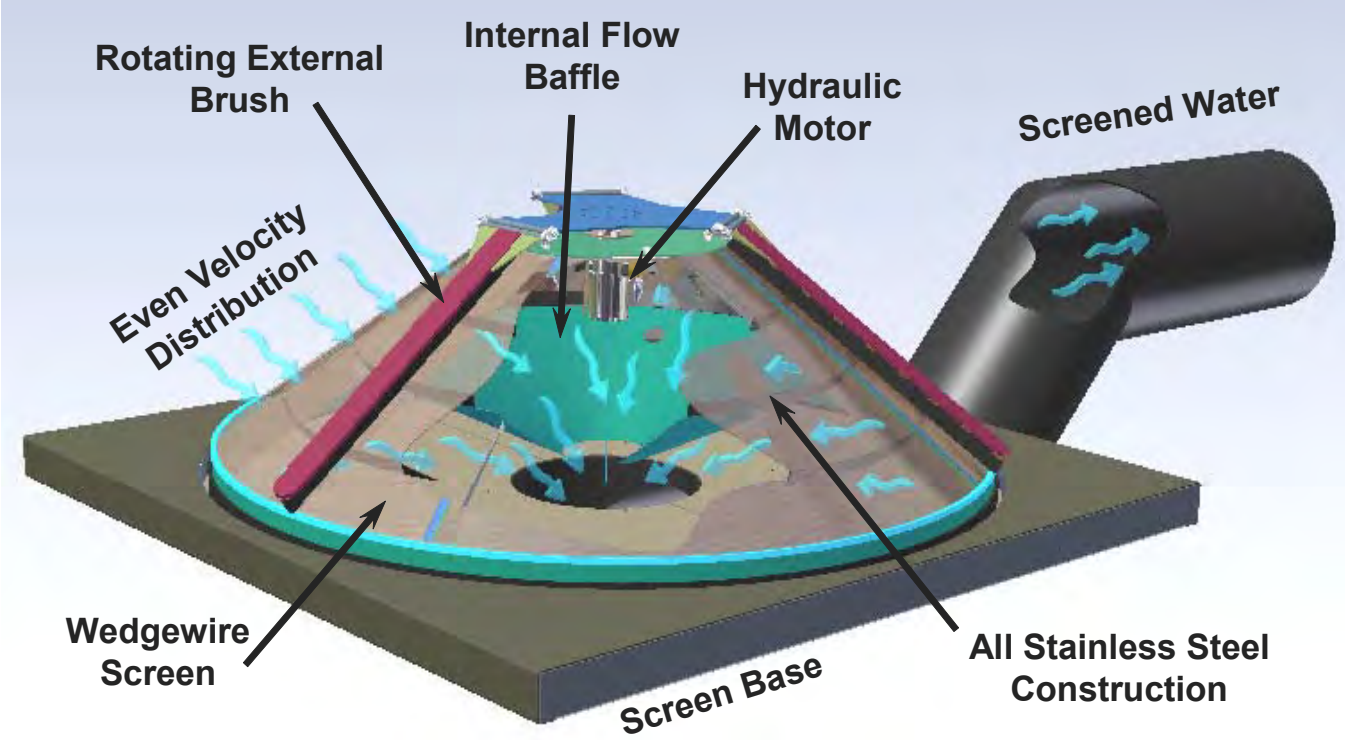
Since 1996

ISI Cone Screen

for Shallow Problematic Intakes

(Patent Nos. 5,851,087 and 6,089,790)

- **Rotating Brush Arms Keep Screen and Base Free of Silt and Debris Build-up**
- **External Brushing is a Durable and Proven Technology**
- **Minimizes Headloss and Clogging *Even* with Fine-Mesh Openings**
- **Complies with Regulatory Criteria**



FEATURES:

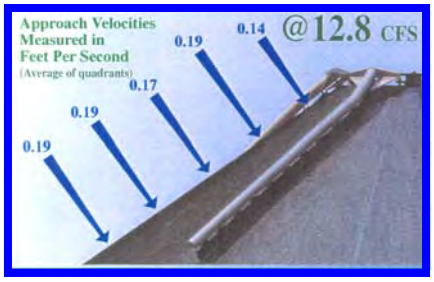
- **Powerful brushing action and brush rake prevents biofouling and debris plugging**
- **Wedgewire screen designed for fish protection, filtration, and hydraulic loads**
- **Cone provides large screen area in shallow water applications (small footprint)**
- **Internal baffle distributes flow evenly across the screen surface**
- **Easy installation and removal**
- **Marine-duty hydraulic motor rotates brushes in BOTH directions**
- **Hydraulic system requires minimal input power — brush system can operate on standard line voltage, solar power, or propeller-drive**
- **Base diameters from 5.5 to 12 feet — adaptable to concrete or steel base structure**
- **Remote monitoring and control system—SCADA interface**
- ***Design services and installation assistance available***

Applications for Shallow, Estuarine, Silty, and/or Backwater Areas with Heavy Debris Loads

Above: Screen can be adapted to fit on existing intakes in shallow areas or be made retrievable.

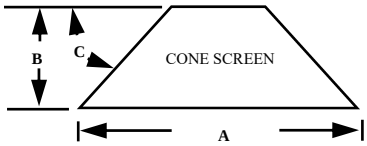
Above: Screen installed at shallow impoundment behind inflatable dam.

Above: Screens are built to operate in extreme conditions with heavy loads.



Left: Screens have been field tested by the National Marine Fisheries Service, California DWR, and UC Davis.

Right: Remote sites can be operated using solar power or by using a propeller-drive system as shown. Screen bases can be custom built to fit most any application.



Cone Screen Specifications

Model	Unit Dimensions A - B - C	Unit Weight	Screen Surface Area	Allowable Flow Rates *		
				Slot Velocity @ 0.5 ft/sec (0.08 m/s)	Approach Velocity @ 0.2 ft/sec (0.06 m/s)	Approach Velocity @ 0.33 ft/sec (0.10 m/s)
ISI C66-18	66” - 18” - 35°	430 lbs.	**26.8 ft²** (2.49 m²)	**6.7 cfs** (190 l/s)	**5.4 cfs** (153 l/s)	**8.8 cfs** (249 l/s)
ISI C78-21	78” - 21” - 35°	650 lbs.	**38.5 ft²** (3.58 m²)	**9.6 cfs** (272 l/s)	**7.7 cfs** (218 l/s)	**12.7 cfs** (360 l/s)
ISI C96-24	96” - 24” - 35°	980 lbs.	**54.8 ft²** (5.09 m²)	**13.7 cfs** (388 l/s)	**11.0 cfs** (311 l/s)	**18.1 cfs** (512 l/s)
ISI C120-32	120” - 32” - 35°	1,170 lbs.	**89.0 ft²** (8.26 m²)	**22.3 cfs** (631 l/s)	**17.1 cfs** (484 l/s)	**29.4 cfs** (833 l/s)
ISI C144-41	144” - 41” - 35°	1,500 lbs.	**131.9 ft²** (12.25 m²)	**32.7 cfs** (926 l/s)	**26.2 cfs** (742 l/s)	**43.2 cfs** (1223 l/s)

* 1) Allowable flows based on using wedgewire screens with 50% open area. Typical screen with 1.75mm wire is shown below;
2) If cone is not fully submerged, allowable flow rates will be reduced;
3) Maximum recommended slot velocity is 0.5 fps for most applications subject to heavy debris;
4) Many fisheries agencies use a maximum approach velocity criteria instead of slot velocity. Approach Velocity is the component of velocity perpendicular to the screen surface and measured 3 inches away. A minimum open area is generally specified;
5) Regulatory design criteria varies and typically depends on fish protection needs. Call for information on slot sizes below 1mm.

ISI Intake Screens, Inc.

For more information contact:

E-mail: **screens@intakescreensinc.com**
Website: **www.IntakeScreensInc.com**

Office: **8417 River Road, Sacramento, CA 95832**
Phone: **(916) 665-2727** ***Fax:*** **(916) 665-2729**

Plate I – Location Map

N

0' 1,500' 3,000' 6,000'

Atlas Peak Precipitation Gage

Watershed Boundary (Typ.)

Lake Curry Dam

Putah South Canal

Terminal Reservoir

Suisun Creek Watershed Flow Enhancement Project

Task 3.4 Report

PLATE I - LOCATION MAP

Napa & Solano Counties, California

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

Base map per USGS 7.5 Minute Quad maps for Capell Valley, Cordelia, Fairfield North, Fairfield South, Mt. George and Mt. Vaca.

Q:\Drawings\California Land Stewardship Institute\Suisun Creek\CAD\Exhibit-Suisun Creek Watershed.dwg

June 2021

Appendix D

Napa County Agricultural Watershed District Zoning

Chapter 18.20 AW AGRICULTURAL WATERSHED DISTRICT

18.20.010 Intent of classification.

The AW district classification is intended to be applied in those areas of the county where the predominant use is agriculturally oriented, where watershed areas, reservoirs and floodplain tributaries are located, where development would adversely impact on all such uses, and where the protection of agriculture, watersheds and floodplain tributaries from fire, pollution and erosion is essential to the general health, safety and welfare.

(Ord. 538 § 4, 1977: prior code § 12230)

18.20.020 Uses allowed without a use permit.

The following uses shall be allowed in all AW districts without use permits:

A. Agriculture;

B. One single-family dwelling unit per legal lot;

C. A second unit, either attached to or detached from an existing legal residential dwelling unit, providing that all of the conditions set forth in Section 18.104.180 are met;

D. Residential care facilities (small);

E. Family day care homes (small);

F. Family day care homes (large), subject to Section 18.104.070;

G. One guest cottage, provided that all of the conditions set forth in Section 18.104.080 are met;

H. Wineries and related accessory uses and structures which legally existed prior to July 31, 1974 without the requirement that a use permit be issued, and which have not been abandoned; provided, that the extent of such uses and structures have been determined in accordance with the procedure set forth in Section 18.132.050. No expansion beyond those which existed prior to July 31, 1974 may occur unless specifically authorized by use permit, issued in conformance with the applicable provisions of this title;

I. Small wineries which were issued a certificate of exemption prior to the date of adoption of the ordinance codified in this chapter, and used the certificate in the manner set forth in Section 18.124.080 before the effective date of the ordinance codified in this chapter, in conformance with the applicable certificate of exemption, Section 18.08.600, and any resolution adopted pursuant thereto;

J. Wineries and related accessory uses which have been authorized by use permit and used in a manner set forth in Section 18.124.080 or any predecessor section; provided, that no expansion of uses or structures beyond those which were authorized by a use permit or modification of a use permit issued prior to the effective date of the ordinance codified in this chapter shall be permitted except as may be authorized by a subsequent use permit issued pursuant to this title;

K. Minor antennas meeting the requirements of Sections 18.119.240 through 18.119.260;

L. Telecommunication facilities, other than satellite earth stations, that meet the performance standards specified in Section 18.119.200, provided that prior to issuance of any building permit, or the commencement of the use if no building permit is required, the director or his/her designee has issued a site plan approval pursuant to Chapter 18.140;

M. Hunting clubs (small) as defined in Chapter 18.08;

N. Overnight lodging in public parks or in structures, at the density and intensity of use (number of units) lawfully developed for such purpose prior to October 13, 1977, provided that such use has a currently-valid certificate of the extent of legal nonconformity pursuant to Section 18.132.050;

O. Any recreational vehicle park or campground and their accessory and related uses which have been authorized by use permit and used in a manner set forth in Section 18.124.080 or any predecessor section; provided that no expansion of uses or structures beyond those which were specifically authorized by a use permit or modification of a use permit issued prior to May 10, 1996, shall be permitted except as may be authorized by a subsequent permit issued pursuant to this title;

P. Floating dock which complies with all of the following:

1. Is accessory to a residential or agricultural use otherwise permitted by this chapter without a use permit,

2. Any portion located on a navigable waterway is determined by the Napa County Flood Control and Water Conservation District engineer to not obstruct seasonal flood flows, and

3. In operation is located adjacent and parallel to, and does not exceed in length the water frontage of the legal parcel or contiguous legal parcels owned by the owner of the floating dock;

Q. Maintenance and emergency repairs of legally-created levees, subject to compliance with Chapter 16.04 of this code;

R. Farmworker housing (i) providing accommodations for six or fewer employees, or (ii) consisting of no more than thirty six beds in group quarters or twelve units designed for use by a single household, and otherwise consistent with Health and Safety Code Sections 17021.5 and 17021.6, or successor provisions, subject to the conditions set forth in Sections 18.104.300 and 18.104.310, as applicable; and

S. Quasi-private recreation uses and facilities, as defined in Section 18.08.494, conforming to the standards in Section 18.104.350, and provided that they do not adversely impact adjacent agriculture.

T. Grading and paving contractors, including offices, equipment storage and repair, and materials storage, so long as the following conditions are met:

1. The grading and paving business has been conducted in the same location since July 1, 1968 or earlier;

2. The number of buildings used for the grading and paving business, and the total square footage of the building used for the grading and paving business, does not exceed that in existence as of January 1, 2015;

3. The days and hours of operation of the grading and paving business do not exceed the average of the years 2013 through 2015;

4. The grading and paving business is located within one mile of the city limits of an incorporated city;

5. The grading and paving business is located on a parcel no smaller than five acres and no larger than ten acres;

6. Uncovered storage areas shall be screened from pre-existing residences on adjacent parcels. Screening shall generally consist of evergreen landscape buffers and fences;

7. All exterior lighting, including landscape lighting, shall be shielded and directed downward, located as low to the ground as possible, and the minimum necessary for security, safety, or operations.

(Ord. No. 1326, § 6, 9-22-2009; Ord. No. 1323, § 7, 6-23-2009; Ord. 1144 § 2, 1998; Ord. 1105 § 4, 1996; Ord. 1097 § 14, 1996; Ord. 947 § 13, 1990: Ord. 900 § 2, 1988; Ord. 867 § 11, 1988; Ord. 816 § 7, 1986; Ord. 815 § 5, 1986; Ord. 784 § 1, 1984; Ord. 629 § 3, 1980: Ord. 538 § 4, 1977: prior code § 12231)

(Ord. No. 1427, § 5, 3-16-2018)

18.20.030 Uses permitted upon grant of a use permit.

The following uses may be permitted in all AW districts, but only upon grant of a use permit pursuant to Section 18.124.010:

A. Parks and rural recreation uses and facilities as defined in Chapter 18.08, conforming to the standards in Chapter 18.104;

B. Farmworker housing and seasonal farmworker centers conforming to Section 18.104.300 or 18.104.310, unless exempt from a use permit requirement under subsection (R) of Section 18.20.020;

C. Facilities, other than wineries, for the processing of agricultural products grown or raised on the same parcels or contiguous parcels under the same ownership;

D. Kennels, horse boarding and/or training stables, veterinary facilities, and wildlife rescue centers;

E. Feed lots;

F. Sanitary landfill sites;

G. Noncommercial wind energy and conversion systems;

H. Wineries, as defined in Section 18.08.640;

I. The following uses in connection with a winery:

1. Crushing of grapes outside or within a structure,

2. On-site, aboveground disposal of wastewater generated by the winery,

3. Aging, processing and storage of wine in bulk,

4. Bottling and storage of bottled wine; shipping and receiving of bulk and bottled wine, provided the wine bottled or received does not exceed the permitted production capacity,

5. Any or all of the following uses provided that, in the aggregate, such uses are clearly incidental, related and subordinate to the primary operation of the winery as a production facility:

a. Office and laboratory uses,

b. Marketing of wine as defined in Section 18.08.370,

c. Retail sale of (1) wine fermented or refermented and bottled at the winery, irrespective of the county of origin of the grapes from which the wine was made, providing nothing herein shall excuse the application of subsections (B) and (C) of Section 18.104.250 regulating the source of grapes; and (2) wine produced by or for the winery from grapes grown in Napa County;

J. The following uses, when accessory to a winery:

1. Tours and tastings, as defined in Section 18.08.620,
2. Display, but not sale, of art,
3. Display, but not sale, of items of historical, ecological or viticultural significance to the wine industry,
4. Sale of wine-related products,
5. Child day care centers limited to caring for children of employees of the winery;

K. Telecommunication facilities, other than satellite earth stations, that do not meet one or more of the performance standards specified in Section 18.119.200;

L. Satellite earth stations that cannot, for demonstrated technical reasons acceptable to the director, be located in an Industrial (I), Industrial Park (IP), or General Industrial (GI) zoning district;

M. Campgrounds on public lands conforming to the standards in Chapter 18.104;

N. Hunting clubs (large) as defined in Chapter 18.08 and subject to the standards in Chapter 18.104;

O. Facilities, other than wineries, for the processing of agricultural products where the products are grown or raised within the county, provided that the facility is located on a parcel of ten or more acres, does not exceed five thousand gross square feet, and is not industrial in character. Only those agricultural products raised or processed on-site may be sold at the facility; and

P. Farm management uses not meeting one or more of the standards contained in subsections (F)(2), (F)(3), and (F)(4) of Section 18.08.040.

(Ord. 1285 § 3, 2006: Ord. 1275 § 2, 2006: Ord. 1246 § 7, 2004: Ord. 1105 §§ 5, 6, 1996; Ord. 1101 § 6, 1996; Ord. 1097 § 15, 1996; Ord. 1040 § 6, 1993; Ord. 947 § 14, 1990: Ord. 757 § 4, 1983; Ord. 538 § 4, 1977: prior code § 12232)

(Ord. No. 1323, § 8, 6-23-2009; Ord. No. 1326, § 7, 9-22-2009; Ord. No. 1340, § 4, 5-11-2010; Ord. No. 1370, § 13, 3-20-2012; Ord. No. 1420, § 3, 5-9-2017)

18.20.040 Other regulations applicable.

The regulations shown for AW districts in the Schedule of Zoning District Regulations, Section 18.104.010 shall apply to each structure and to each use of land within the agricultural watershed district.

(Ord. 1194 § 11, 2002: Ord. 538 § 4, 1977: prior code § 12233)