

Topic:Authority Board Agenda Item 3-12018 May 07

Subject: **Proposition 1 WSIP application**

Requested Action:

Consider staff's recommendation to reduce the funding request from \$1,388. million as presented in the Authority's February 23, 2018 appeal letter to the Water Commission to a lesser amount as determined by the Authority Board.

Detailed Description/Background:

On May 3, 2018, the Water Commission voted to accept the following valuation of benefits (dollars in millions and in 2015 dollars) and agreed to allow applicants until the close of business on May 9, 2018 to elect to change their funding request.

Τh	is results in a Public Benefit Ratio (PBR) of:	0.73
Cu	rrent funding request:	\$ 1,388.0
То	tal value of eligible benefits	\$ 1,008.2
•	Water for Oroville coldwater pool benefits	\$ 0
•	Water to benefit Sacramento River anadromous fish	\$ 0
•	Water to benefit refuges by augmenting Level 4 water	\$ 432.9
•	Water to benefit Delta smelt in Cache Slough:	\$ 333.5
•	Flood reduction benefits	\$ 44.6
•	Recreational benefits	\$ 197.2

Prior Authority Board Action:

2017, July 31 Submit Application by the August 14, 2017 deadline

Fiscal Impact/Funding Source:

None.

Staff Contact:

Jim Watson

Attachments:

- 3-1A WSIP scoring process & timeline
- 3-1B 2018 April 20 Letter from Water Commission to Authority: Response to Appeal
- 3-1C 2018 April 30 Letter from Feinstein & Garamendi: Water Commission's process and level of eligible funding to benefit central valley salmon
- 3-1D 2018 May 02 Letter from Authority to Water Commission: Proposed solution to the PBR discussion regarding the Sites Project



Project	Applicant	Type of Project	Total Cost	Funding Requested	Staff Recommended Eligible Amount	Commission Approved Eligible Amount	Commission PBR
Centennial Water Supply Project	Nevada Irrigation District	Surface Storage	\$324 M	-	\$0	Deemed ineligible	-
Chino Basin Conjunctive Use Environmental Water Storage/Exchange Program	Inland Empire Utilities Agency	Conjunctive Use	\$480 M	\$300 M	\$153.7 M	\$206.9 M	1.23
Kern Fan Groundwater Storage Project	Irvine Ranch Water District/Rosedale-Rio Bravo Water Storage District	Groundwater Storage	\$171 M	\$85.7 M	\$72.5 M	\$85.7 M	1.05
Los Vaqueros Reservoir Expansion Project	Contra Costa Water District	Surface Storage	\$795 M	\$459 M	\$422.6 M	\$459 M	1.81
Pacheco Reservoir Expansion Project	Santa Clara Valley Water District	Surface Storage	\$969 M	\$484.5 M	\$484.5 M	\$484.5 M	2.02
Pure Water San Diego Program North City Phase 1	City of San Diego - Public Utilities Department	Surface Storage	\$1,210 M	\$219.3 M	\$0	Deemed ineligible	-
Sites Project	Sites Project Authority	Surface Storage	\$5,176 M	\$1,388 M	\$933.3 M	\$1,008.3 M	0.73
South Sacramento County Agriculture & Habitat Lands Recycled Water, Groundwater Storage, and Conjunctive Use Program (South County Ag Program)	Sacramento Regional County Sanitation District (Regional San)	Conjunctive Use	\$373 M	\$280.5 M	\$244.3 M	\$280.5 M	1.05
Temperance Flat Reservoir Project	San Joaquin Valley Water Infrastructure Authority	Surface Storage	\$2,661 M	\$1,055.3 M	\$171.3 M	\$171.3 M	0.47
The Tulare Lake Storage and Floodwater Protection Project	Semitropic Water Storage District	Conjunctive Use	\$603 M	\$452 M	\$0	Deemed ineligible	-
Willow Springs Water Bank Conjunctive Use Project	Southern California Water Bank Authority	Conjunctive Use	\$343 M	\$301.6 M	\$105.3 M	\$123.3 M	0.41
Total Requested Funding				\$5,097.9 M	\$2,587.5 M	\$2,819.5 M	

Total Cost – Total cost as provided in the original application.

Funding Requested – \$ amount requested by applicants.

Commission Approved Eligible Amount – \$ amount Commission approved based benefits and value, per Proposition 1 requirements. (May 3, 2018)

Staff Recommended Eligible Amount – Post-Appeal \$ amount staff estimated based on staff adjustments to benefits and value, per Proposition 1 requirements. (April 2018).

Staff Recommended PBR – Ratio of value of public benefits divided by funding requested (April 20, 2018) **Commission PBR** – Ratio of revised value of public benefits divided by funding requested (May 3, 2018). <u>Applicants</u> <u>can change their funding request by COB May 9.</u> PBRs will be finalized on May 10.

CALIFORNIA WATER COMMISSION 901 P STREET, P.O. BOX 942836 SACRAMENTO, CA. 94236-0001

SACRAMENTO, CA 94236-0001 (916) 651-7501

Armando Quintero Chair

Carol Baker Vice-Chair

Andrew Ball

Member

April 20, 2018

Jim Watson, General Manager Sites Project jwatson@sitesproject.org

Joseph Byrne Member Subject: Public

Daniel Curtin Member

Joe Del Bosque Member

Maria Herrera Member

Catherine Keig Member Subject: Public Benefit Ratio Appeal Response

Dear Mr. Watson,

As you know, the Water Storage Investment Program (WSIP) provided an appeal process allowing applicants to respond to staff adjustments made in our February initial Public Benefit Ratio (PBR) review. Many applicants used the opportunity to submit information that helped substantiate their project's anticipated physical benefits and their monetary value to help the Commission make an informed determination of each project's PBR at the upcoming May 1-3 meeting.

Thank you for your engagement, and the work your team put into the appeal process. The enclosed packet includes the WSIP technical review team's response to your appeal regarding the PBR for the Sites Project.

The response includes the recommendations of the Department of Water Resources, Department of Fish and Wildlife, and State Water Resources Control Board, as appropriate, as well as the Commission staff's updated recommendation for the project's PBR.

The staff recommendations will be presented to the Commission at the May 1-3 meeting. Please note, we are reserving May 4 as a hold-over day in the event extra discussion time is necessary. At the Commission meeting, applicants will have the opportunity to publicly address the Commission and answer questions about their projects. Public comment also will be heard.

Staff from the Commission, the Department of Water Resources, the Department of Fish and Wildlife, and the State Water Resources Control Board look forward to engaging with applicants at the scheduled meetings on April 24 and 25. These public meetings are designed to walk through the staff-response and help identify any remaining issues that may need clarification when the Commission meets in May. The meetings also will help applicants and the public prepare for the May 1-3 meeting.

The California Water Action Plan recognizes the importance of investing in both above- and below-ground storage. The Commission's May 1-3 meeting will mark another key step toward making key investments in new water storage. The Commission remains on track to make early funding and conditional funding awards in July.

Jim Watson, General Manager Sites Project April 20, 2018 Page 2

We look forward to your continued engagement in the Water Storage Investment Program.

Sincerely,

Joen

Joe Yun Executive Officer, California Water Commission



Public Benefit Ratio Appeal Response: Sites Reservoir Project

Applicant: Sites Project Authority

Introduction

On February 2, 2018, the California Water Commission (Commission) released staff-adjusted Public Benefit Ratios (PBRs) for Water Storage Investment Program (WSIP) applications received in August 2017. WSIP regulations section 6008 describes the appeal process for staff adjustments to a PBR. Applicants had three weeks to submit an appeal of the staff's adjustments to their PBRs. On February 23, 2018, the Commission received appeals from 10 applicants.

This PBR appeal response describes the following:

- Applicant's original PBR as submitted
- Staff adjustments to the PBR review
- Applicant's appeal
- Staff PBR recommendations

The Commission will decide final PBRs at its May 1-3, 2018 meeting.

This PBR response incorporates review of the applicant's appeal, which was conducted by the Commission's economics reviewers and water operations reviewers, the California Department of Fish and Wildlife (CDFW), and the California Department of Water Resources (DWR). The following reviews are attached to this PBR response:

- California Water Commission, Economics Review Appeal Response (Economics Response)
- California Water Commission, Water Operations Review Response to Applicant's Appeal of Public Benefits Ratio (Water Operations Response)
- California Department of Fish and Wildlife, Analysis of Water Storage Investment Program Project Appeals of Revised Public Benefit Ratios (CDFW Response)
- California Department of Water Resources, Water Storage Investment Program Public Benefits Ratio Recommendations Response to Applicant's Appeal (DWR Response)

Project Overview

The Sites Project Authority is proposing a surface storage project, the Sites Reservoir Project. The Sites Reservoir Project would be a 1.81 million acre-foot offstream surface storage reservoir located in the Sacramento Valley west of the town of Maxwell. The proposed reservoir's conveyance facilities would include the use of existing Tehama Colusa Canal and Glenn-Colusa Irrigation District Canal diversion and conveyance facilities, plus a proposed new diversion and discharge pipeline. Sources of water would be Funks Creek and Stone Coral Creek, which would be impounded by the proposed reservoir and the Sacramento River. Operation of the proposed reservoir would be in cooperation with the operations of existing Central Valley Project (CVP) and State Water Project (SWP) system facilities. Detailed operating agreements would need to be developed that define a framework and procedures for cooperative operations among the Sites Project Authority, the CVP, and the SWP.

The applicant describes Sites Reservoir Project public benefits as follows:

- Ecosystem Improvement—Increase coldwater pool conservation in Trinity Lake, Shasta Lake, Lake Oroville, and Folsom Lake
- Ecosystem Improvement—Help regulate Sacramento River summer flows for best use of cold water for control of temperature conditions adverse to anadromous fish
- Ecosystem Improvement—Stabilize Sacramento River fall flows for improving spawning and rearing success of anadromous fish
- Ecosystem Improvement—Provide water to the Yolo Bypass to support salmon migration and summer food production for delta smelt
- Ecosystem Improvement—Provide water for Incremental Level 4 refuge deliveries per the Central Valley Project Improvement Act (CVPIA)
- Flood Control—Reduce the frequency of local flooding, including portions of Maxwell, Williams, and Colusa, reduce river levels to avoid flood events, and relieve pressure on local levees
- Recreation—Provide recreation through two new recreation areas and a boat ramp on the shore of Sites Reservoir

Summary

Staff reviewed the information submitted in the appeal, considered the reasonableness of the documentation provided, and made recommendations (Table 1) for adjustment to the applicant's quantified public benefits, funding request or eligible amount, and PBR. Table 1 summarizes how these values changed during the PBR review process.

Through the PBR appeal process, applicants could rebut staff's adjustments to their public benefits, and provide an alternate PBR. If, during the appeal, and in response to a staff adjustment, the applicant chose to change their funding request from the amount in the original August 2017 application, it is also shown in Table 1.

Table 1. Summary of Adjustment	s to Public Benefi Original	t Ratio Staff PBR	Applicant	
	Application, August 2017	February 2, 2018	Appeal, February 23, 2018	April 20, 2018
Value of Public Benefits (\$ millions)	\$3,506.2	\$662.6	\$3,162.9	\$933.3
Applicant Funding Request (\$ millions)	\$1,661.7		\$1,388.0 ¹	
Public Benefit Ratio	2.11	0.40	2.28 ²	0.67

Notes:

All values are in 2015 dollars.

PBR value is based on the applicant's funding request.

Values are rounded to the nearest tenth of a million dollars for display purposes.

Underlying calculations reflect the precision provided by the applicant.

¹ This is the applicant's revised funding request as provided in the appeal.

² Applicant submitted a PBR of 1.9 based on the original funding request. The PBR has been recalculated using the revised funding request as provided in the appeal.

Table 2 summarizes the changes made during the PBR review process to the public physical benefits claimed in the application, and the monetary value of those benefits. The last column shows the staff recommendation for each claimed physical benefit.

Benefits	Physical/ Monetary	Staff PBR Review, February 2, 2018	Applicant Appeal, February 23, 2018	Staff Recommendation, April 20, 2018
Ecosystem— Anadromous Fish	Physical benefit	CDFW recommended removal	Appealed	Physical benefit removed. See CDFW Response Page 1.
	Monetary value	Value adjusted	Appealed	Monetary value removed. See Economics Response Page 4.
Ecosystem— Refuge Water Supply	Physical benefit	No adjustments	N/A	Physical benefit accepted
	Monetary value	Value reduced	Appealed	Monetary value accepted. See Economics Response Page 2.
Ecosystem— Oroville Coldwater Pool	Physical benefit	CDFW recommended removal	Appealed	Physical benefit removed. See CDFW Response Page 3.
	Monetary value	Value reduced	Appealed	Monetary value removed. See Economics Response Page 7.
Ecosystem— Yolo Bypass Flows	Physical benefit	CDFW recommended removal	Appealed	Physical benefit accepted. See CDFW Response Page 4.
	Monetary value	Method accepted	N/A	Monetary value accepted
Recreation	Physical benefit	No adjustments	N/A	Physical benefit accepted
	Monetary value	Value increased	Accepted	Monetary value accepted
Flood Control	Physical benefit	Adjusted by DWR	Accepted	Physical benefit accepted. See DWR Response Page 2.
	Monetary value	Value reduced	Accepted	Monetary value accepted

Table 3 summarizes the monetary value of the public benefits claimed by the applicants, as adjusted through the PBR review. It shows the staff recommendation, and how the total value of the claimed benefits changed through the PBR review. If a benefit was removed, the staff recommended monetary value is zero.

Table 3. Monetization of Public Benefits (\$ millions)						
Benefits	Original Application, August 2017	Staff PBR Review, February 2, 2018	Applicant Appeal, February 23, 2018	Staff Recommendation, April 20, 2018		
Ecosystem— Anadromous Fish	\$1,637.1	\$0.0	\$1,616.4	\$0.0		
Ecosystem— Refuge Water Supply	\$675.4	\$420.8	\$448.1	\$432.3		
Ecosystem— Oroville Coldwater Pool	\$595.3	\$0.0	\$597.4	\$0.0		
Ecosystem— Yolo Bypass Flows	\$268.5	\$0.0	\$259.2	\$259.2		
Recreation	\$191.6	\$197.2	\$197.2	\$197.2		
Flood Control	\$138.3	\$44.6	\$44.6	\$44.6		
Total Value of Public Benefits	\$3,506.2	\$662.6	\$3,162.9	\$933.3		
Notes:						

All values are in 2015 dollars.

Values are rounded to the nearest tenth of a million dollars for display purposes.

Numbers may not add up totals shown due to independent rounding and precision provided by applicant.

Underlying calculations reflect the precision provided by the applicant.

Table 4 shows staff recommendations for the total value of public benefits, ecosystem benefits, and the eligible amount. It also shows the proposed project's capital costs, and the funding request by the applicant, as provided in the appeal. Adjustments to the value of public benefits may have resulted in changes to the eligible amount, because Water Code section 79752 specifies that projects must have a measurable benefit to the Delta ecosystem or tributaries to the Delta. Water Code section 79756 also specifies that the WSIP can fund no more than one-half of total project costs, and that ecosystem benefits must be at least 50 percent of the eligible amount.

Table 4. Staff Recommendations for Value of Total Public and Ecosystem Benefits and Eligible Amount (\$
millions)

Benefit/Cost	Amount
Total Public Benefits	\$933.3
Ecosystem Benefits	\$691.5
Total Capital Costs	\$4,397.1
Total Funding Request as provided in appeal	\$1,388.0
Maximum Eligible Amount	\$933.3
Notes: All values are in 2015 dollars. Values are rounded to the nearest tenth of a million dollars for display purpose	es.

Underlying calculations reflect the precision provided by the applicant.



Economics Review Appeal Response: Sites Reservoir Project

Applicant: Sites Project Authority

This appeal response provides the Economic reviewers' (reviewers) recommendation for economics related public benefit ratio (PBR) review comments that were appealed by the applicant. The applicant appeal is summarized in this document and the reviewer responses are presented. Related comments are grouped by topic, in the order presented in the initial PBR review. For each PBR comment, a summary of the PBR comment is presented, followed by a synopsis of applicant's appeal, concluding with the reviewer response. Reviewers analyzed and considered the information contained in the appeal.

Summary of Economics Appeal Response

The applicant appeals the following benefit and cost adjustments made in the Economics Review for PBR:

- The applicant removed a cost of \$185 per acre-foot (AF), and added conveyance energy cost for refuge water deliveries, and provided refuge water supply physical benefits by water year type. Applicant's appeal states a quantified benefit of \$448.1 million for refuge water supply. Reviewers adjusted the present value (PV) of refuge water supply benefit to \$432.3 million because the applicant's PV calculations used to obtain the \$448.1 million were not provided.
- The anadromous fish physical benefit was not substantiated; therefore, the benefit is assigned a
 monetary value of \$0. Reviewers accepted the alternative cost of rice land retirement and included
 the additional management and mitigation costs identified by the applicant, with some adjustments.
 The applicant's appeal states a quantified benefit of \$1,476.3 million for anadromous fish. If the
 physical benefit were substantiated, reviewers calculated the monetary value of the benefit would
 be \$307.6 million.
- The Oroville coldwater pool physical benefit was not substantiated; therefore, the benefit is
 assigned a monetary value of \$0. The applicant's appeal states a quantified benefit of \$597.4 million.
 Reviewers removed the Oroville coldwater pool monetary benefit because the water quantities
 provided to estimate alternative cost are not documented and no other alternative cost was
 provided; the reviewer adjusted monetary value of the benefit is also \$0.
- The applicant substantiated Yolo Bypass Flow physical benefits. Reviewers accepted the applicant's quantified benefit of \$259.2 million for this benefit.
- The applicant accepted reviewers' adjustments to flood control monetization. The adjusted PV of flood control benefits is \$44.6 million.

- The applicant accepted reviewers' adjustments to recreation monetization. The adjusted PV of recreation benefits is \$197.2 million.
- The applicant provided municipal and industrial (M&I) and agricultural water supply benefits. The reviewers confirmed the applicant's PV of M&I water supply of \$3,120 million. The applicant accepted reviewer adjustment of agricultural water supply benefit. The PV of the agricultural water supply benefit is \$1,407.9 million.
- The applicant agreed with PBR adjustments related to monetized hydropower benefits. The reviewer- adjusted PV of hydropower is \$569.5 million.
- The applicant removed recaptured water supply from the estimation of monetized benefits.
- The applicant removed the anticipated savings resulting from reduced interest during construction from the project cost allocation and requested inclusion of \$350 million in future mitigation to eligible capital costs. Reviewers retained \$4,397.1 million as the project's capital costs, as shown in the original application.

After considering all applicant appeals and reviewer adjustments in response, total public benefits are \$933.3 million, and the recommended eligible amount is \$933.3 million.

1. Ecosystem Monetization—Refuge Water Supply

Applicant's appeal states quantified benefit of \$448.1 million. Reviewers adjusted the benefit to \$432.3 million.

1.1. Comment—Average Conveyance Energy Cost

Reviewers concluded that the applicant's "Average Conveyance Energy Cost" of \$185 per AF cannot be added to the TR unit values to obtain "Adjusted WSIP Unit Water Values" as provided in Table A5-7 in the file named "Sites_A5 Documentation.docx."

1.1.1 Applicant Appeal

The Authority removed the \$185 per AF added conveyance energy cost for refuge water deliveries that would be offset by an equivalent conveyance cost to deliver the water to the destination per the applicant's appeal letter, a file named "AppealLetter.pdf," on page 9.

1.1.1 Economics Review Response

Reviewers acknowledge applicant's acceptance of removal of the \$185 per AF added conveyance energy cost.

1.2. Comment—Reliability of Water Supplies

The applicant's valuation of refuge water supplies does not account for the reliability of these supplies. Based on information in Tables A5-17 in the file named "Sites_A5 Documentation.docx," the applicant calculates refuge water supply using the same unit values for each future development condition (i.e., 2030, 2045, and 2070) regardless of the different amount of water provided in different water year types.

1.2.1 Applicant Appeal

The refuge water valuation was revised to reflect specific water deliveries across water year types. Additional details regarding the revised analysis are provided in Attachment B per the file named AppealLetter.pdf," on page 9.

1.2.1 Economics Review Response

The water operations review concluded that "The revised Incremental Level 4 water supply deliveries included in Table 5 of the Appeal Letter and Table B-2 of AttachB match the results of analysis conducted by reviewers" (see Water Operations Response, page 9 of 12). Therefore, benefits were monetized based on these quantities, see Comment 1.4 below.

1.3. Comment—Conveyance Cost for Refuge Supplies

Reviewers used these adjusted quantities with water year type frequencies and TR unit values, plus the additional \$21 per AF conveyance cost, to adjust the benefits for refuge water supply.

1.3.1 Applicant Appeal

The Authority added a \$21 per AF cost for the conveyance energy cost to the unit water benefit values from the TR to obtain the willingness-to-pay at the point of use per the file named "AppealLetter.pdf," on page 9).

1.3.1 Economics Review Response

Reviewers accept this addition.

1.4. Comment—Present Value Calculation

The reviewer-adjusted PV of refuge water supply benefits is \$432.3 million.

1.4.1 Applicant Appeal

The applicant states that the "project's refuge water supply benefits will have a total present value of \$448.1 million with an equivalent annualized average value of \$15.8 million" per the file named "AttachB.pdf," on page B-5.

1.4.1 Economics Review Response

Reviewers are unable to replicate the PV calculation of \$448.1 million using the information provided. Using time series estimates of annual value in the appeal spreadsheet named "Final Sites WSIP Appeal Clean Model 2018.02.23.xls" on the "Annual Benefit by Purpose Rev" tab, the reviewers estimate the PV of benefits to be \$432.9 million. The reviewers' analysis using refuge water supply quantities by water year type provided by the applicant results in a revised refuge water supply benefit of \$432.3 million. Reviewers accepted the adjusted monetized benefit of \$432.3 million because the applicant's calculations are not provided and could not be verified.

2. Ecosystem Monetization—Anadromous Fish

Applicant's appeal states a quantified benefit of \$1,476.3 million. The physical benefit was not substantiated (see the California Department of Fish and Wildlife (CDFW) Response, page 3 of 5). Therefore, the monetary benefit for anadromous fish is zero. If the physical benefit were not removed, the monetary value of the benefit would be \$307.6 million.

2.1. Comment—Document Least-Cost Alternative

Reviewers found that the applicant did not provide sufficient documentation, as required by the regulations section 6004(a)(4), to support the conclusion that the 12.5-foot raise of Shasta Dam is the most cost-effective alternative.

2.1.1 Applicant Appeal

The applicant provides some additional documentation that the 12.5-foot raise of Shasta Dam is the most cost-effective alternative. Colusa Reservoir complex and Newville Reservoir are presented. However, the applicant states that "Other than constructing a new off-stream reservoir, the most effective way to achieve the anadromous fish benefits in the same location as Sites Reservoir (Sacramento River between Keswick Dam and Red Bluff) is to raise Shasta Dam," per the file named "AttachA.pdf," on page A-77.

2.1.1 Economics Review Response

Reviewers noted that the additional information and analysis are not used by the applicant or reviewers to monetize benefits.

2.2. Comment—Monetizing Anadromous Fish Benefit Based on Alternative Cost of Water

The applicant does provide alternative benefits measures based on the amount of water, but the applicant did not demonstrate that the Shasta Dam raise is more feasible than the additional amount of water transfers.

2.2.1 Applicant Appeal

The applicant states "The next section considers a long-term water transfer program as an alternative non-construction approach," per the file named "AttachA.pdf," on page A-78.

2.2.1 Economics Review Response

Reviewers noted that the additional information and analysis are used to develop an alternative cost to monetize the anadromous fish benefits.

2.3. Comment—Conditions for Use of TR Unit Values

To apply the TR water unit values, water quantities by water year type, as well as confirmation that these quantities would provide the same fishery improvement as the project, would both be required.

2.3.1 Applicant Appeal

The applicant states that "Table A.4-4 provides Anadromous Fish Benefit Water Supply Quantities by Water Year Type and monetization is provided based on Delta TR unit values plus additional costs of rice land retirement." The appeal first calculates the alternative cost of the Table A.4-4 water using Delta Export TR unit values to obtain a PV of benefits of \$1,337.5 million per the file named "AttachA.pdf," on page A-79.

2.3.1 Economics Review Response

Reviewers could not confirm that the Delta export amounts shown in Table A.4-4 provide the same benefits to anadromous fish as the proposed project. The applicant did not provide an explanation on how the Table A.4-4 volumes were derived and did not provide any analysis demonstrating that these Delta export amounts provide the same benefits to anadromous fish as the proposed project.

The applicant's appeal finds that north of Delta rice land would need to be used to provide water. Water transfers for Sacramento Valley uses have typically come from Sacramento Valley water users. Therefore, reviewers concluded that north-of-delta water amounts and monetization, not south-of-Delta, should be applied. Reviewers did not accept the monetization as presented in the appeal.

2.3.2 Applicant Appeal

The appeal also finds that rice land retirement would be required to achieve the project's physical benefits. The applicant states: "The Economics Review by the CWC recommended the use of WSIP unit values to monetize the benefits. This would require the establishment of a long-term transfer program to conserve water in Lake Shasta to mimic the coldwater pool benefits from Sites Reservoir operations" per the file named "AppealLetter.pdf," on page 9.

In their description of the analysis, the applicant states: "Unlike the short-term water sales contracts within the WSIP's transfer data, permanent land retirement will be required for the long-term water transfer agreements necessary to match the Sites Reservoir's water supply reliability. It is also expected that outright land purchases rather than easements would be necessary, given the typical land and operating conditions for region's rice production. The cropland would be expected to remain permanently fallow—even in wet years" per the file named "AttachA.pdf," on page A-82.

Section 1b on page A-82 to A-83 of the file named "AttachA.pdf" documents "Rice Cropland Retirement Acreage." Having calculated that 22,410 acres of rice land retirement would be required, Section 2c of AttachA.pdf states: "The estimated acquisition costs for the 22,410 acres are conservatively estimated to be between \$124.4 million (agricultural easement) and \$207.3 million (for full fee title)."

The applicant calculated additional costs associated with rice land retirement management and giant garter snake and wetland mitigation. Those costs were then added to the Delta Export alternative cost.

The applicant's appeal states: "Outright purchase of farmland represents an additional cost over temporary transfers or easements... As a result, a 1.67 factor (i.e. 1/0.6 or 67 percent increase in the transfer cost/value) may be applied to provide an approximate value adjustment for water transfers requiring full fee-title property acquisitions" per the file named "AttachA.pdf," on page A-82. The appeal then reduces benefits 1.4 percent for "downstream flow impacts" to obtain a proposed total benefit of \$1,476.3 million (in the same file on page A-92).

2.3.2 Economics Review Response

Reviewers accepted the concept that one alternative means of providing the project anadromous fish benefit would include rice land retirement. However, reviewers could not replicate the \$124.4 million to \$207.3 million cost estimate generated by the applicant. Reviewers calculated the total land acquisition high-end cost to equal \$224.1 million (i.e., \$10,000 per acre times 22,410 acres).

Reviewers accepted most of the additional costs associated with rice land retirement management and wetland and giant garter snake mitigation shown in Table A.4-9 since the TR unit values do not include management and mitigation costs that would likely be required to achieve the same physical benefit using rice land retirement.

Reviewers did not accept the applicant's "Acquisition (Net)" cost of \$22.50 per AF. The applicant provides reasoning for the "Acquisition (Net)" on page A-82, under section "a. Land Costs." The applicant also states that the cost of short-term easements is between 60 and 80 percent of the full fee title value of the land. They calculate a factor of 1.67 (1/0.6) and state that this represents the additional cost of permanent land retirement. For the same volume of water, the cost of temporary transfers is, generally, not less, when compared to land retirement. This is because land retirement allows growers to avoid more fixed farming costs than temporary transfers.

Reviewers accepted the alternative cost of land retirement and all additional costs identified by the applicant except the "Acquisition (Net)" cost of \$22.0/AF" discussed above. The additional management and mitigation cost for each of 22,410 retired acres is \$134.70. The PV of these costs is \$83.5 million. The total PV of the anadromous fish benefit then equals \$307.6 million based on the land retirement alternative (i.e., \$224.1 million plus \$83.5 million). Since the physical benefit is not accepted the assigned monetized benefit value is \$0.

2.3.3 Applicant Appeal

Table A.4-13 in the file named "AttachA.pdf," on page A-91 provides "Relative Change in Lower River Average Annual Survival" and in the same file on Table A.4-14, "the benefit values have been conservatively reduced by 1.4 percent to account for downstream flow impacts on anadromous fish populations."

2.3.3 Economics Review Response

It is not clear that this adjustment (i.e., 1.4 percent) can approximate an appropriate reduction in benefits due to downstream flow impacts. This might be appropriate if the values in Table A.4-13 are the reduction in survival as a share of the increase in survival of anadromous

fish provided by the project. Tables A.1-2 through A.1-5 in the file named "AttachA.pdf," on pages A-3 to A-5 show that this is not the case. The 1.4 percent is large relative to the increase in survival in Table A.1-5. Therefore, this potential adjustment was not accepted.

2.4. Comment—Monetizing Anadromous Fish Using Willingness to Pay

Reviewers noted the applicant has estimated anadromous fish numbers using SALMOD.

Regulation section 6004(a)(4)G requires that:

"The monetized benefit of the proposed project shall be calculated as the avoided cost (if any) plus, for any portion of the physical benefit not monetized as an avoided cost, the minimum of the feasible alternative cost value (if any) and the willingness to pay value (if any)."

If the applicant's fish numbers were accepted, a willingness-to-pay measure should be developed as required by the TR.

2.4.1 Applicant Appeal

In the applicant's file named "AttachA.pdf," on page A-2, Table A.1-1 provides "Total Number of Returning Adults Assumed in SALMOD for the Four Chinook Salmon Runs." Table A.1-5 in the same file provides "Annual Production Results from SALMOD Adjusted for Reduced Flows Downstream of Sites Reservoir Diversions." Additionally, Table A.17 in the same file provides "Long-term Average Escapement for Winter-Run Chinook Salmon (1971-2002)." This last table provides estimates of "Increment under With Sites Scenario with Flow-Survival Adjustment" showing increased winter-run Chinook salmon escapement of 58 and 228 adults under 2030 and 2070 conditions respectively.

2.4.1 Economics Review Response

CDFW did not substantiate the anadromous fish benefit (see CDFW Response, page 3 of 5). If the physical benefit of fish numbers could be accepted, then the willingness-to-pay benefit could be compared to alternative cost. Using unit fish values provided in the TR, reviewers found that the alternative cost measure based on rice land retirement was less than the value of fish produced. However, this monetization cannot be accepted as a potential monetization measure.

3. Ecosystem Monetization—Oroville Coldwater Pool

The applicant's appeal states a quantified benefit of \$597.4 million. The physical benefit was not substantiated (see CDFW Response, page 4 of 5). Therefore, the monetary benefit for the Oroville coldwater pool benefit is zero. If the physical benefit were not removed, the monetary value of the benefit would still be \$0.

3.1. Comment—Alternative Cost of Water Supplies Based on Annual Oroville Storage

Reviewers adjusted the monetization of the Lake Oroville coldwater pool physical benefit. Lake Oroville physical benefits are provided only as "projected future increase in annual water storage."

3.1.1 Applicant Appeal

The applicant provides coldwater pool supply physical benefits by water year type in the file named "AttachC.pdf" in Table C2-2.

3.1.1 Economics Review Response

Reviewers were unable to substantiate that these water quantities would provide the same coldwater pool improvement as the project. The applicant did not provide an explanation on how the Delta export quantities in Table C2-2 were derived and did not provide any analysis demonstrating that these Delta export amounts provide the same coldwater pool benefit as the proposed project. Therefore, monetization using the Table C2-2 water quantities was not accepted.

3.2. Comment—Use of TR Water Unit Values

Reviewers recommend adjusting the monetization applied to the Lake Oroville coldwater pool benefit based on the alternative cost of water supply using TR unit values.

3.2.1 Applicant Appeal

The applicant provided substantial new analysis for Oroville coldwater pool benefits. Alternative cost is based on the amount of reduced Delta export by water year required to achieve the same physical benefit. For monetization, the applicant states "The Authority recommends retaining the water unit values for Delta export because it would be more straightforward for State Water Project water users to reduce water use south of the Delta to conserve water in Oroville... Lake Oroville provides water almost exclusively for south of Delta water contractors" per the file named "AttachC.pdf," on page C-10.

3.2.1 Economics Review Response

Lake Oroville also releases water for Feather River water rights holders. The California Department of Resources' (DWR's) Bulletin 132-15, *Management of the State Water Project*,¹ documents that, from 2002 to 2014, Feather River diversions ranged from 0.84 to 1.19 million AF. These water users could participate in water transfers to provide the same coldwater pool benefit as the Sites project. Therefore, reviewers conclude that north-of-Delta water quantities and TR north of Delta unit values should be used.

¹ https://www.water.ca.gov/LegacyFiles/swpao/docs/bulletins/bulletin132/Bulletin132-15.pdf

4. Ecosystem Monetization—Yolo Bypass Flows

Reviewers accepted the applicant's monetization of Yolo Bypass flow physical benefits. This physical benefit has been substantiated by the applicant and accepted by CDFW (see CDFW Response, page 4 of 5). The PV of benefits is \$259.2 million.

5. Flood Control Monetization

The applicant accepts quantified benefit of \$44.6 million provided in the PBR review.

5.1. Comment—Monetization of Flood Control Physical Benefit

Reviewers adjusted monetization of the flood control physical benefit. In addition to the assumed 5-foot flood depths for all flood events, reviewers have concerns about the use of full structure replacement values, and misapplication of U.S. Army Corps of Engineers depth-damage functions.

5.1.1 Applicant Appeal

The applicant states "The Authority accepts the reviewer's comments related to both the physical benefits and the monetized benefits" in the file named "AppealLetter.pdf," on page 13.

5.1.1 Economics Review Response

Reviewers acknowledge the applicant's acceptance of flood control monetization adjustments.

6. Recreation Monetization

The applicant's appeal states a quantified benefit of \$197.2 million. Reviewers accept this benefit.

6.1. Comment—Monetization of Recreation Physical Benefits

Reviewers accepted monetization of recreation physical benefits. The small difference between the applicant's (\$191.6 million) and reviewer-adjusted (\$197.2 million) in PV of recreation benefits in Table 1 is caused by different phasing-in of benefits after the start of project operations.

6.1.1 Applicant Appeal

The applicant states that "The Authority accepts the reviewer's comments related to both the physical benefits and the monetized benefits" in the file named "AppealLetter.pdf," on page 13.

6.1.1 Economics Review Response

Reviewers acknowledge the applicant's acceptance of recreation monetization.

7. Non-Public Benefits Monetization—Municipal and Industrial and Agricultural Water Supply

The applicant's appeal states a quantified benefit of \$4,528 million. Reviewers accept this benefit.

7.1. Comment—Monetization of Supply

Reviewers accepted the monetization of the M&I water supply benefits and adjusted monetization of agricultural water supply benefits.

7.1.1 Applicant Appeal

The applicant states that "The agricultural water supply benefits were updated consistent with the reviewer's comments on conveyance costs" in the file named "AppealLetter.pdf," on page 19.

7.1.1 Economics Review Response

Reviewers accept the applicant's calculation of agricultural water supply benefits.

8. Non-Public Benefits Monetization—Recaptured Water Supply

8.1. Comment—Recaptured Water Supply Benefit

Water operations reviewers were not able to verify the recaptured water supply benefit (see Water Operations Review, attached). Therefore, reviewers recommend removing this physical benefit.

8.1.1 Applicant Appeal

The applicant states that "For the purposes of completing the evaluation of monetized PBR, the Authority has removed the recaptured water supply from the estimation of monetized benefits" in the file named "AppealLetter.pdf," on page 18.

8.1.1 Economics Review Response

Reviewers acknowledge the applicant's removal of recaptured water supply.

9. Non-Public Benefits Monetization—Hydropower

The applicant's appeal states a quantified benefit of \$570.4 million. Reviewers accept this benefit with adjustments to PV calculations. The reviewer-adjusted PV of this benefit based on the original PBR review is \$569.5 million.

9.1. Comment—Hydropower Benefit Monetization Method

Reviewers accepted the monetization method for hydropower benefits with some adjustment to the PV calculations.

9.1.1 Applicant Appeal

The applicant states that "The Authority accepts the reviewer's comments related to both the physical benefits and the monetized benefits," in the file named "AppealLetter.pdf," on page 19.

9.1.1 Economics Review Response

Reviewers acknowledge the applicant's acceptance of hydropower benefits.

10. Project Costs Monetization—Interest During Construction

10.1. Comment—Federal and State Contributions

The applicant reduces interest during construction (IDC) on the assumption that federal and State contributions before operations would reduce interest costs. Reviewers adjusted Sites costs by removing the applicant's IDC reduction.

10.1.1 Applicant Appeal

The applicant states that "The anticipated savings resulting from reduced interest during construction have been removed from the cost allocation," in the file named "AppealLetter.pdf," on page 19.

10.1.1 Economics Review Response

Reviewers acknowledge the applicant's acceptance of removal of IDC cost savings.

11. Project Costs Monetization—Mitigation Costs

11.1. Comment—Project Costs

Reviewers did not comment on the project's mitigation costs or adjust the project's capital costs in the PBR review.

11.1.1 Applicant Appeal

The applicant's appeal letter, page 2 states:

In Attachment F.2, Table 1 Economics Review, the mitigation costs were dropped from the eligible capital costs. Section 6001(a)(11)(C) explicitly allows "required environmental mitigation or compliance obligation expenses" as part of the capital cost. Also, per Page 8-1 of the Technical Reference document, environmental mitigation and compliance costs associated with providing public benefits can be included in the cost allocation. No explanation was provided to explain why these costs were excluded from the CWC cost allocation. In absence of any CWC comments indicating its basis for adjustment for the mitigation costs, the Authority contends that its full construction cost estimate of \$4,797 million should be recognized as the project's WSIP eligible capital amount (per the file named "AppealLetter.pdf," on page 2).

11.1.1 Economics Review Response

Reviewers note that the appeal comment draws attention to an inconsistency within the original application. Application listed \$4,397 million as the capital cost, which was used by the reviewers during the PBR evaluation; the mitigation or compliance obligations were, along with other costs, presented as separate costs, as shown in the applicant's Physical and Economic Benefits Summary Table, Part 3. Source for applicant estimates is the file named "Sites_A11 Physical and Economic Benefits Summary Tables". Part 3 of the Physical and Economic Benefits Table is reproduced below.

Part 3. Present Value of Project Costs, Cost-Effectiveness Measure, and Public Benefit Ratio, Million 2015 \$ Present Value					
Project Costs	Application Page Number	2015 \$ Million Present Value			
Capital costs as defined in Program regulations	A10-2	\$4,397			
Interest during construction	A10-2	\$429			
Replacement costs	A10-3	\$44			
Future environmental mitigation or compliance obligation costs	A10-2	\$350			
Operations, maintenance and repair (OM&R) costs	A10-3	\$711			
Other costs (describe)	NA	\$0			

Therefore, the mitigation costs were not "excluded" by the reviewers; rather, they were not explicitly included in the "Capital costs as defined in Program regulations" by the applicant.



Water Operations Review Response to Applicant's Appeal on Public Benefits Ratio: Sites Project

Applicant: Sites Project Authority

This response to appeal contains the Water Operations related Public Benefit Ratio review comments (released February 2, 2018), applicant appeal (received February 23) summarization, and Water Operations reviewer responses. The information is arranged as a comment group containing a specific reviewer comment, associated applicant appeal, and reviewer response. The comment groups are arranged by comment order as established in the February Public Benefit Ratio review. Through the information supplied with the appeal, the applicant has addressed Water Operations reviewer comments made in the Public Benefit Ratio review. This Water Operations response to Sites Project Authority's appeal is supplied to other review teams for their use in responding to applicant appeal items related to physical public benefits and economics.

Comment 1: CalSim II Model Review

Comment 1.1

Review of the Sites Project Authority's CalSim II model inputs shows that the water quality standards measured in milligrams per liter (mg/L) at Contra Costa Water District's (CCWD) intakes at Rock Slough, Old River, and Victoria Canal are different from the without-project models published by the Water Storage Investment Program (WSIP). It is unclear how the changes in the salinity standards affect the model results and the Sites Reservoir operations.

Applicant Appeal:

A new project can modify water quality in the Delta that can affect downstream conditions.

CalSim II contains a CCWD module that has water quality operational objectives for each of the CCWD intakes. The applicant explained that the CalSim II model inputs for the water quality conditions at the existing CCWD intakes were modified based on DSM2 simulations provided for the with project (Sites Reservoir) conditions.

"The CalSim II model inputs for SWRCB D-1641 water quality standards at Contra Costa Water District's (CCWD) intakes at Rock Slough were not modified from the withoutproject models published by the WSIP.... In order for the CalSim II simulation to reflect the potential changes to existing CCWD/LV operations and determine the net effect of the With Project condition on CCWD, SWP and CVP exports and related water quality conditions, it is imperative that CalSim II simulations (for any with project or alternative condition) use updated DSM2 simulated results for these inputs. ... " (Appeal Letter, p.13)

Water Operations Review Response:

The explanation provided by the applicant in the appeal adequately addresses the comment. Reviewers confirmed that the CalSim II model inputs for the water quality conditions at the existing CCWD intakes were modified based on DSM2 simulations for the with project conditions.

Comment 1.2

The applicant proposed a bypass flow standard at four locations along the Sacramento River, including Red Bluff Diversion Dam, Hamilton City, Wilkins Slough, and Freeport. However, the applicant does not provide information on the process used to develop the bypass flow standard. As a result, reviewers are unable to identify whether the proposed standard is adequate to "maintain and protect existing downstream water uses and environmental resources."

Applicant Appeal:

The applicant provided additional supporting documentation and explained that the proposed minimum bypass flow criteria were selected to protect existing beneficial uses, water rights, and existing environmental regulatory standards while developing the potential benefits of the Sites Project.

"The proposed minimum bypass flow criteria were selected to protect existing beneficial uses, water rights and existing environmental regulatory standards while developing the potential benefits of the Sites Project... CalSim II is instructed that diversions to fill Sites are lower priority than any other existing use of water including the use of water for upstream/downstream diverters, Delta exports and Delta outflow and salinity regulatory requirements. ... To address this concern, iterative analysis was done with the CalSim II and DSM2 to assess potential changes to Delta salinity and to develop protective bypass flow criteria. Over many iterative simulations, a variable schedule of bypass flow criteria for the Sacramento River at Freeport was developed to minimize the potential effects." (Appeal Letter, p. 4 and 5)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. Reviewers confirmed that diversion to Sites Reservoir has a lower priority than existing water deliveries and regulatory requirements and that Delta salinity is approximately the same between the with- and without-project conditions. The weight for diversion into the Sites Reservoir, represented by arc C17601, is set to negative 1500 which is same as the weight on the surplus and excess flows in the system and lower compared to the weights on water deliveries and regulatory requirements.

Comment 1.3

The applicant proposes a storm-induced pulse flow protection standard from October through May to "minimize entrainment and impingement of juvenile salmonids and other poor-

swimming aquatic species." Reviewers cannot verify whether the standard is applied for an adequate duration from the pre-processed number of no diversion days timeseries inputted in the CalSim II model.

Applicant Appeal

The applicant provided supplemental information regarding the basis for the proposed pulse flow protection operation to minimize entrainment and impingement of juvenile salmonids. The applicant described the iterative approach developed to estimate the number of no diversion days and restrict diversions in CalSim II during pulse flow periods for modeling purposes and provided the modeling approach justification of the number of days of no diversions to fill Sites Reservoir.

"Operations modeling of the Sites Project included restrictions on diversions to limit impacts on out-migrating juvenile fish as a "surrogate" for real time monitoring and adaptive management... The majority of diversions into Sites Reservoir occur during December through March. Of those months, 44% have no diversion days in recognition of potential pulse events over the 82-year simulation period. Approximately 200 potential pulse events are protected over the 82-year simulation period with durations with an average of 3.5 no diversion days with some months having as many as 14 no diversion days." (Appeal Letter, p. 5)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment regarding the basis for pulse flow protection standard. A review of the 2030 and 2070 conditions confirms that, on average, approximately 85 percent of the water diverted into Sites Reservoir occurs between December and March, which coincides with the months with the highest probability of no-diversion days. A review of the no diversion day timeseries confirms the data presented by the applicant in Table D.3-1 of the appeal documentation. The applicant acknowledged that this approach was adopted for modeling purposes and that "... project operations will be informed by real-time monitoring of fish presence and movement" (AttachD, p. D-5).

Comment 1.4

The applicant proposes to "augment flows in the Sacramento River between Keswick Dam and Red Bluff Diversion Dam to minimize dewatering of fall-run Chinook salmon redds... from October through March, particularly during fall months." Review of the applicant's CalSim II model results show that the range on long-term average change in Sacramento River flows for the months between October and March between Keswick Dam and Bend Bridge varies by 0 to 5 percent under 2030 conditions, and by -5 to 3 percent under 2070 conditions; between Bend Bridge and Red Bluff Diversion Dam varies by -3 to 1 percent under 2030 conditions, and by -5 to -2 percent under 2070 conditions. These results suggest minimal or no flow augmentation to help minimize dewatering of salmon redds.

Applicant Appeal:

The applicant pointed out that the Water Operations Review focused on the long-term average conditions between October and March without considering the intentional, primary benefits of providing additional water during the critical period for fall run Chinook salmon flow stability (December through February) when Shasta flows may be reduced.

"The use of a long-term monthly average flow during the longer October-March period obscures the challenges for flow stability for fall-run Chinook and the benefits of the Sites Project to this run... The Sites ecosystem enhancement storage account has been allocated to increase and stabilize flows in the Sacramento River below Keswick Dam to minimize dewatering of salmon redds." (Appeal Letter, p. 6)

"The Operations Plan defined a general window of opportunity between September and March in Above Normal, Below Normal, and Dry years for water to be released from Shasta Lake to stabilize flows in the Sacramento River when flows are between 3,250 to 5,500 cfs. This window of opportunity defined in the Operations Plan was based on current conditions. The quantification of benefits is based on modeling results under WSIP 2030 and 2070 climate conditions, and modeling analyses indicate that under future climate conditions the primary benefits of this action occur between December and February." (AttachD, p. D-10)

Water Operations Review Response:

Reviewers revised the analysis of the Sacramento River flows below Keswick Dam by reducing the time window for the flow augmentation benefits from October through March to December through February, and focusing on the Below Normal, Dry, and Critical water years instead of the long-term averages. Reviewers confirmed there is flow increase in the Sacramento River below Keswick Dam between December and February in Below Normal, Dry, and Critical water years. The results of the analysis show that flows in the Sacramento River below Keswick Dam between December and February exceed the without-project condition 40 to 50 percent of the time under 2030 conditions and 25 to 40 percent of the time under 2070 conditions, resulting in increase in average December through February flow by 16 TAF (7 percent) and 14 TAF (6 percent), respectively. Under 2030 conditions, the average December through February flow increases by 10 TAF (4 percent), 29 TAF (12 percent), and 9 TAF (4 percent) for Below Normal, Dry, and Critical water years, respectively. Under 2070 conditions, the average monthly flow between December and February increases by 13TAF (4 percent), 14 TAF (6 percent), and 16 TAF (8 percent) for Below Normal, Dry, and Critical water years, respectively.

Comment 1.5

The applicant proposes to improve the coldwater pool storage in Lake Oroville to improve water temperature suitability for anadromous fish in the lower Feather River from May through November during all water years. Review of the applicant's CalSim II model results show that

the range on long-term average change in the lower Feather River flow decreases by 1 to 7 percent from May through August, and increases by 1 to 3 percent from September through November under 2030 conditions; flow decreases by 1 to 11 percent from June through November with no change in September, and increases by 1 percent in May under 2070 conditions. These results suggest the flow augmentation objective in the lower Feather River is not fully met during May through November.

Applicant Appeal:

The applicant pointed out that the Water Operations review is based on long-term average changes in Feather River flow which does not allow examination of benefits when they are needed most by salmonids and in wet and above normal water years, flow and water temperature management are generally not an issue on the Feather River.

"The commission review is based on long-term average changes in Feather River flow which don't allow examination of benefits when they are needed most by salmonids. In wet and above normal water years flow and water temperature management are generally not an issue on the Feather River. Per the ... Operations Plan of the application, the most important water year types for stabilizing flows and river temperatures for salmonids are in dry and critical years with low Lake Oroville storage and a limited cold water pool. ... In general releases are reduced in June through August to preserve and maintain cold water pool, with flow augmentation releases in following months depending on storage conditions. Some periods may show decreases in average longterm river flows if more water is retained in reservoir storage." (AttachD, p. D-19)

Water Operations Review Response:

Reviewers revised the analysis of flows in the Feather River by reducing the time window for the flow augmentation benefits from May through November to May through September; focusing on the Dry and Critical water years instead of the longterm averages, and revising the definition of "lower Feather River" to be the stretch of the Feather River immediately below the Thermalito Complex instead of the Feather River just upstream of the confluence with the Sacramento River. Reviewers confirmed there is flow increase in the Feather River flows from May through September in Dry and Critical water years. Under 2030 conditions, the average May through September flow increases by 12 TAF (7 percent). The largest flow increases are observed during June and July where flows under the with-project conditions exceed the without-project conditions 60 to 80 percent of the time followed by May and September during which flows exceed the without-project conditions 40 to 50 percent of the time. No flow increases are observed in August; instead, 90 percent of the time flows are less than the without-project conditions. Under 2070 conditions, the average May through September flow increases by 5 TAF (3 percent). The largest flow increases are observed later in the summer during August and September where flows exceed the withoutproject conditions 50 to 60 percent of the time followed by May through July during which flows exceed the without-project conditions less than 40 percent of the time.

Comment 2: HEC-5Q and CE-QUAL-W2 Model Review

The applicant states that the project would "increase cold-water pool storage in Shasta Lake, Lake Oroville, and Folsom Lake and improve temperature in the Sacramento and American Rivers during certain months at specific compliance points..." A review of the applicant's HEC-5Q model results shows minimal water temperature reduction in the upper Sacramento River.

Applicant Appeal:

The applicant pointed out that the Water Operations Review focused on long-term average conditions while not addressing the intentional, primary water temperature benefits of the Sites Project in Dry and Critical year types.

"The review focused on long-term average conditions while not addressing the intentional, primary benefits of the Sites Project in dry and critical year types. Existing operations provide compliant conditions but have important challenges in dryer periods." (Appleal Letter, p. 15)

The applicant provided supplemental water temperature results for the average July to September water temperature for long-term, Dry, and Critical years at the four important Sacramento River temperature locations (Bonnyview, Balls Ferry, Jellys Ferry, and Bend Bridge) for the 2015, 2030, and 2070 conditions. (AttachD, p. 23-25)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. Reviewers reviewed the supplemental HEC-5Q model data focusing on Dry and Critical years for the 2030 and 2070 conditions provided by the applicant in the appeal (Attachment D, p.23-25). Reviewers confirmed the long-term Dry and Critical years monthly average (July to September) temperature for the four Sacramento River temperature locations (i.e., Bonnyville, Balls Ferry, Jellys Ferry, and Bend Bridge) for the Current (2015), 2030, and 2070 with- and without-project conditions match the HEC-5Q model output provided in the application. For current (2015) conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.6°F and in Critical years, average July to September temperatures are decreased by about 1.2°F to 1.4°F. For 2030 conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.2°F to 0.3°F and in Critical years, average July to September temperatures are decreased by about 0.6°F. For 2070 conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.5°F to 0.65°F and in Critical years, average July to September temperatures are decreased by about 1.44°F to 1.8°F.

Comment 3: DSM2 Model Review

The applicant states that upstream release actions improve water quality by augmenting Delta inflows and outflows. The Delta water quality could be improved for up to 6 months from July to December in Above Normal, Below Normal, and Dry water years. Review of DSM2 results shows

that the Sites Project improves water quality in October and November for all locations and deteriorates water quality in December for all locations; from July to September, the Sites Project improves water quality in the Western Delta and deteriorates in Jersey Point and South Delta locations.

Applicant Appeal:

The applicant stated that it could not verify the percent change in EC noted in the Water Operations Review but acknowledged small deterioration in water quality at few locations during some months between July and December in Above Normal, Below Normal, and Dry water years.

"We acknowledge the reviewer's analysis, but were unable to verify all their findings. We notice small deterioration in water quality at few locations during some months between July and December in Above Normal, Below Normal, and Dry water years. However, we find most increases in EC occur in relatively fresh conditions." (AttachD, p. D-26)

The applicant provided supplemental DSM2 model data of monthly EC at eleven Delta locations between with- and without-project conditions for the 2030 and 2070 conditions for long-term, Wet, Above Normal, Below Normal, Dry, and Critical years. The supplemental DSM2 model data shows the percent difference between with- and without-project long-term average December EC is less than 5 percent under 2030 and 2070 conditions for all locations. (AttachD, p. D-27-D-33)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. Reviewers confirmed the long-term monthly average EC for the 11 Delta locations for the 2030 and 2070 with- and without-project conditions match the DSM2 model output provided in the application. Reviewers also confirmed that the Wet, Above Normal, Below Normal, Dry, and Critical years' monthly average EC for January through September for the 11 Delta locations for the 2030 and 2070 with- and without-project conditions match the DSM2 model output processed by reviewers. However, for October through December, reviewers noted that the monthly average EC in Wet, Above Normal, Below Normal, Dry, and Critical years for the 11 Delta locations does not match the DSM2 model output processed by reviewers because the applicant quantified the monthly average EC by water year type using January through December of the same calendar year instead of using October of the preceding calendar year through September of the current calendar year as defined by the State Water Resources Control Board D-1641 Sacramento Valley 40-30-30 index. The applicant confirmed that there is small deterioration in water quality at a few locations during some months between July and December in Above Normal, Below Normal, and Dry water years. However, for October through December, the applicant's reported change in monthly average EC for Above Normal, Below Normal, and Dry years between withand without-project conditions are lower than the data processed by reviewers due to quantification of EC by water year type by the applicant using calendar year instead of water year. For December, when EC is quantified by water year type by reviewers using

water year, there is deterioration in EC at most of the Delta locations for Above Normal, Below Normal, and Dry years by up to 6 percent for the 2030 conditions and by up to 13 percent for 2070 conditions. Although there is deterioration in EC in December in Above Normal, Below Normal, and Dry years as compared to the without-project conditions, the Delta water quality standards are maintained and not exceeded in the with-project conditions.

Comment 4: Water Operations Review Conclusion Related to Benefits

There are discrepancies in the benefits quantified by water year type. The applicant summarized CalSim II model results using the five water year classifications included in the State Water Resources Control Board D-1641 Sacramento Valley 40-30-30 index. However, the applicant defined the water year as January through December of the same calendar year when post-processing the modeling results. The SWRCB D-1641 Sacramento Valley 40-30-30 index defines water year as "October 1 of the preceding calendar year through September 30 of the current calendar year."

Applicant Appeal:

The applicant changed the water year type reporting of public and non-public benefits using water year (October through September) rather than calendar year as provided in the application.

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. Reviewers confirmed the applicant's change in water year type reporting of benefits using water year instead of calendar year.

Comment 5: Refuge Water Supply

The applicant states that the project would provide Incremental Level 4 water supplies to Central Valley Project Improvement Act refuges north and south of the Delta to supplement refuge water supplies up to the Level 4 criteria. Review of the applicant's CalSim II model results confirm that the long-term averages for 2030 and 2070 conditions match the Incremental Level 4 deliveries claimed by the applicant. Refuge deliveries by water year type were updated to reflect the D-1641 Sacramento Valley 40-30-30 index water year definition.

Applicant Appeal:

The applicant changed the water year type reporting of Incremental Level 4 refuge water supply using water year (October through September) rather than calendar year and provided the revised refuge supply quantities by water year type in Table 5 (Appeal Letter, p. 14) and Table B-2 (AttachB, p. B-3).

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. The revised Incremental Level 4 water supply deliveries included in Table 5 of the Appeal Letter and Table B-2 of Attachment B match the results of analysis conducted by reviewers.

Comment 6: Oroville Coldwater Pool

The applicant defines the coldwater pool as an increase in the end of May storage at Lake Oroville for all storage levels. Review of the applicant's CalSim II model results confirm the applicant's stated long-term average increase in the May storage at Lake Oroville by 26 TAF under 2030 conditions and 31 TAF under 2070 conditions. However, the applicant does not provide a temperature model to assess the temperature improvements in the lower Feather River resulting from coldwater pool storage at Lake Oroville.

Applicant Appeal:

The applicant changed the water year type reporting of the end of May storage in Lake Oroville and provided the revised end of May storage in Lake Oroville by water year type (Appeal Letter, p. 14, Table 6).

The applicant also provided a new water temperature model analysis to assess the water temperature improvements in the lower Feather River and provided the water temperature model (Reclamation Temperature Model) and modeling results.

"Tables 1 and 2 summarize the flow and temperature results for the Feather River to show benefits achieved in dry and critical years for WSIP 2030 and WSIP 2070 conditions. The model results demonstrate greater water temperature benefits under projected WSIP 2070 conditions when warmer air temperatures and less snow pack will make water temperature management more challenging." (AttachD, p. D-19)

The applicant presented long-term and Critical year average change in average May to November and average October to November water temperature at several locations (low flow channel, above Thermalito, below Thermalito, and Gridley) on the Feather River for the 2015, 2030, and 2070 conditions. The water temperature results showed that larger temperature reductions in the Feather River generally occurred in critical years, ranging from 0.1 to 0.6°F for May to November to 0.2 to 1.1°F for October to November.

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment on coldwater storage at Lake Oroville. The revised coldwater pool storage at Lake Oroville – calculated as change in end of May storage – matches the analysis conducted by reviewers.

Reviewers reviewed the analysis of water temperature in the Feather River by using the temperature model results of the Reclamation Temperature Model provided by the applicant. Reviewers verified the temperature results at Feather River immediately below the Thermalito Complex to show benefits achieved in Wet, Above Normal, Below Normal, Dry, and Critical years for the 2030 and 2070 conditions. Reviewers noted that the applicant did not compare the model results at a location in the Feather River just upstream of the confluence with the Sacramento River. The applicant presented longterm and Critical year average change in average May to November water temperature at several locations (low flow channel, above Thermalito, below Thermalito, and Gridley) on the Feather River for the 2015, 2030, and 2070 conditions. Reviewers confirmed that the temperature reduction in the Feather River for long-term, Wet, Above Normal, Below Normal, Dry, and Critical water years matches the results of the Reclamation Temperature Model. The water temperature results showed that larger temperature reductions in the Feather River generally occurred in Critical years, ranging from 0.1 to 0.6°F for May to November and 0.2°F to 1.1°F for October to November. Reviewers also noticed that the applicant quantified the monthly average temperature by water year type using January through December of the same calendar year instead of using October of the preceding calendar year through September of the current calendar year.

Comment 7: Yolo Bypass Flows

The applicant states that the project will be operated to release two pulse flows of at least 400 cubic feet per second (cfs) each over a 2- to 3-week period between August and October in all years into Yolo Bypass near Knights Landing Ridge Cut to increase desirable food sources for Delta Smelt and other key fish species in the lower Cache Slough and lower Sacramento River areas.

Review of the applicant's CalSim II model results indicate that long-term average annual Yolo Bypass flow into the Delta decreases by 84 TAF per year under 2030 conditions, and by 116 TAF per year under 2070 conditions.

Applicant Appeal:

The applicant provided supplemental analysis that examined the frequency and duration of spills over the Fremont Weir as well as the total flows in the Yolo Bypass that would provide rearing habitat for salmonids and splittail. The applicant also provided new analysis through the application of the OBAN lifecycle model that incorporates the effects of Yolo Bypass flows on salmonids.

"The Authority has addressed these impacts in the revised analysis through the application of the OBAN lifecycle model that incorporates the Yolo Bypass effects on salmonids (see Attachments A.1, A.2, and A.3). This enables us to comprehensively evaluate benefits and impacts to salmonids and Delta smelt independently." (Appeal Letter, p. 12)

"The mean number of days with Yolo Bypass flooding (Fremont Weir flow >3,500 cfs) during January-June ranged from 0 in critically dry years with 2015 climate to 54-55 days in wet years with 2070 climate... The differences in mean duration of flooding between Without and With Project scenarios were small, 1-2 days..., and the frequency of flood duration over the 82-year simulation was not greatly different between Without and With Project scenarios... " (AttachA, p. A-68)

Water Operations Review Response:

The additional information provided by the applicant agrees with the reviewers' assessment that Yolo Bypass flows decrease during the winter. The applicant also conducted a new lifecycle analysis using the OBAN lifecycle model to assess the impacts on fish from decreased Yolo Bypass flows. The review of the OBAN lifecycle model is outside the purview of the Water Operations reviewers.

Comment 8: Water Supply Deliveries to Agricultural and M&I Users

The applicant does not explicitly define the south of Delta agricultural and municipal and industrial (M&I) water users receiving water deliveries from the project; reviewers cannot match the change in total water supply deliveries to the south of Delta agricultural and M&I water users as claimed by the applicant in the amount 130 TAF per year under 2030 conditions and 147 TAF per year under 2070 conditions.

The applicant does not explain how the 11 TAF south of Delta recaptured water was quantified. Therefore, reviewers are not able to verify this water supply benefit.

Applicant Appeal:

The applicant described how the total South of Delta water deliveries were computed.

"Average annual deliveries to South of Delta Sites Project Participants were calculated on an October-September SWRCB D-1641 water year basis by taking the difference between the with- and without-project scenario of total South of Delta project deliveries for each climate scenario. Total South of Delta project deliveries are the summation of the SWPTOTALDEL and CVPTOTALDEL summary outputs from CalSim II. These outputs summarize South of Delta SWP agricultural and municipal and industrial (M&I) deliveries and CVP agricultural, M&I, exchange contractor, and Level 2 refuge deliveries, respectively... Deliveries were divided among Sites Project participants according to their Sites Project participation." (AttachD, p. D-37)

The applicant removed the 11 TAF south of Delta recaptured water supply from the estimation of monetized benefits.

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. The revised south of Delta water supply deliveries included in Table D.9-1 (AttachD, p. 37) match the analysis conducted by reviewers. As noted by the applicant, the water supply deliveries are distributed among agricultural and M&I users based on their respective participation rates. These participation rates are not reflected in the CalSim II model and therefore, changes in water supply deliveries resulting from the Sites Project to individual contractors south of Delta cannot be tracked using the CalSim II model results. A review of Tables D.9-2 through D.9-4 (AttachD, p. D-38-D-40) confirms that the participation ratios are held relatively constant across 2015, 2030, and 2070 conditions.



State of California – Natural Resources Agency DEPARTMENT OF FISH AND WILDLIFE Director's Office Post Office Box 944209 Sacramento, CA 94244-2090 www.wildlife.ca.gov EDMUND G. BROWN JR., Governor CHARLTON H. BONHAM, Director



April 9, 2018

Joseph Yun Executive Officer California Water Commission P.O. Box 942836 Sacramento, CA 94236-0001

Dear Mr. Yun:

ANALYSIS OF WATER STORAGE INVESTMENT PROGRAM PROJECT APPEALS OF REVISED PUBLIC BENEFIT RATIOS

This letter and the attached appeal responses from the California Department of Fish and Wildlife (Department) represent an important step in the transparent, fair, and competitive process the California Water Commission (Commission) is undertaking to invest in water storage in the state. As you know, a broad range of stakeholders hold widely divergent perspectives about the Commission process. In my opinion, your process has worked. The project appeals of the revised public benefit ratios proves this point. After following the appeals process in the regulations, the Department's revised recommendations could result in restoring almost \$1.2 billion in ecosystem benefits and funding requests.

On January 29, 2018, the Department submitted a letter to you summarizing the Department's technical review of Water Storage Investment Program (WSIP) projects' monetized ecosystem benefits and our recommendations regarding the applicants' supporting information for the ecosystem benefits that factored into projects' public benefit ratio (PBR). In some cases, the Department found the information in the application did not substantiate the ecosystem benefit claimed and recommended the monetized ecosystem benefit not be included in the calculation of the project's PBR. California Code of Regulations, title 23, section 6008 allows an applicant to appeal a PBR that has been modified. The regulations limit the scope of the appeals to a "written rebuttal of specific Staff comments or reasons for Staff modifications," "new supporting information, if any, specific to the written rebuttal to support the value the applicant claims is correct," and "reference to existing application information to support the rebuttal." (Cal. Code Regs., tit. 23, § 6008, subd. (1)(C-E)).

On February 23, 2018, 10 WSIP project applicants submitted appeals of the recommended modifications to the PBRs for their projects. Using the standards established in the WSIP regulations, the Department conducted a technical review of the appeal material submitted by the project applicants. In accordance with the regulations, the Department only considered material specific to written Staff comments included in the comments on the application materials. In the majority of cases, the Department concluded that the information provided in the appeal material was sufficient to support the monetized ecosystem benefits that were removed based on the

Conserving California's Wildlife Since 1870

Mr. Joseph Yun, Executive Officer California Water Commission April 9, 2018 Page 2

Department's comments on the application material. Nine monetized ecosystem benefits fall into this category and the Department recommends including these benefits in the calculation of a project's PBR.

In a few cases, the Department concluded that the appeal material did not substantiate the ecosystem benefit and therefore the concerns raised by the Department in its comments on the application material remain unaddressed. This occurred for five monetized ecosystem benefits where the Department was not able to conclude that a net ecosystem improvement was established by the information submitted by the applicants in the appeal material.

Some applicants chose not to appeal the recommended removal of an ecosystem benefit from the PBR. This occurred for four monetized ecosystem benefits.

The Department recognizes the value and importance of additional surface water and groundwater storage in California. As called for in the California Water Action Plan, water storage is needed for environmental benefits as well as for water supply. The Department is encouraged by the number of applicants that submitted appeal information demonstrating that their projects will provide net ecosystem improvements. These projects represent a broad range of project types, including surface storage projects, conjunctive use projects, and groundwater storage projects. Additionally, these projects are distributed across the state from Southern California to north of the Delta, from the Central Valley to the coastal ranges.

The Department looks forward to continuing to work with the Commission in the evaluation of projects applying for funding under the WSIP.

Sincerely,

Charlton H. Bonham Director

Enclosures: Appeal Responses

ec: California Department of Fish and Wildlife

Nathan Voegeli, Acting Chief Deputy Director Nathan Voegeli@wildlife.ca.gov

Tina Bartlett, Acting Deputy Director Ecosystem Conservation Division Tina.Bartlett@wildlife.ca.gov

Scott Cantrell, Water Branch Chief Scott.Cantrell@wildlife.ca.gov

Appeal Response Sites Project

On February 1, 2018, the California Water Commission Executive Officer sent a letter to the Sites Project Authority (applicant) regarding the Public Benefit Ratio (PBR) Review conducted for the Sites Project (Project). Among other things, the February 1 letter included a modified PBR for the Project and a summary of the technical review conducted by the California Department of Fish and Wildlife (Department) related to the Project's monetized ecosystem benefits. The Department provided comments and recommendations regarding the support for the ecosystem benefits that factored into the Project's PBR.

On February 23, 2018, the applicant submitted an appeal of the modified PBR. The Department reviewed the appeal material pertaining to the monetized ecosystem benefits and concludes that the anadromous fish and Oroville coldwater pool monetized ecosystem benefits are insufficiently supported by the information provided. The Department maintains its original recommendation to remove the anadromous fish and Oroville coldwater pool monetized ecosystem benefits from the calculation of the Project's PBR. The Department concludes that the Yolo Bypass flows monetized ecosystem benefit is sufficiently supported by the information provided and, therefore, recommends inclusion of the Yolo Bypass flows monetized ecosystem benefit in the calculation of the Project's PBR.

The Department's responses to the Project's appeal are as follows:

Anadromous Fish Monetized Ecosystem Benefit

In its comments on the application material, the Department identified four main areas of concern. First, the use of SALMOD to calculate the number of fish that will benefit over the life of the Project did not accurately represent salmon population dynamics, nor did it account for annually changing population levels. Second, impacts to salmonids resulting from reduced river flows downstream of the proposed Project diversion points were not analyzed or disclosed in the quantification of net benefits. Third, SALMOD inputs and assumptions were not explained. Fourth, SALMOD inputs were higher than recent data indicate.

In the appeal material, the applicant provided revised SALMOD inputs that considered more recent starting populations, additional information on SALMOD assumptions, an OBAN analysis (a life cycle model for winter-run salmon), and a flow survival-effects analysis to generate a mechanism for calculating flow-related impacts associated with the Project's operations.

The results of the applicant's net benefits analysis are shown in Table A.1-5 in Attachment A to the appeal material.¹ The results indicate that there are net impacts to fall-run Chinook salmon under 2015 climate conditions and to spring-run Chinook salmon under 2030 climate conditions. Net impacts that could occur in the near future as a result of the Project could cause impacts that would not be offset by potentially beneficial conditions in the long-term.

The Department finds that the SALMOD assumptions and revised inputs provided in the appeal are reasonably explained and reflective of more recent and accurate data sets. However, the Department's concerns about the use of SALMOD to calculate the number of fish that will benefit over the life of the Project remain unresolved. As noted in the Department's comments on the application material, SALMOD treats production results separately for each year rather than compounding outcomes over

time. Each modeled year produces a change in production for each run of Chinook salmon at Red Bluff, and these yearly results are summed over the 82-year simulation period to produce a net change in salmon production levels. Because SALMOD is programmed to use the same starting numbers each year, the model is unable to account for variations in annual population levels. For example, SALMOD is unable to account for consecutive years in which a returning run contains a lower population than the preceding year. Because SALMOD does not account for annually changing population levels, there is high uncertainty in the resulting SALMOD outputs used to quantify net changes in salmon production.

In the appeal material, the applicant conducted a flow-survival effects analysis to account for the potential impacts associated with Project diversions on the Sacramento River that were identified in the Department's comments on the application. The net changes in salmon production numbers for each of the three climate scenarios were calculated by taking the salmon production numbers at Red Bluff, as calculated by SALMOD, and adjusting these outputs by the relative change in survival based on the flow-survival effects analysis. The relative change in survival was calculated using the change in flow below the Delevan intake. As fish migrate through the system, multiple factors in each section of the river can affect survival. The quantification of net benefits provided in the appeal analysis does not account for the cumulative reduction in survival in sections of the river upstream or downstream of the Delevan intake. Therefore, this flow-survival analysis does not evaluate the benefits to one life stage and impacts to other life stages. Thus, the Department is unable to make a determination regarding the claimed net benefit to all runs of Chinook salmon.

A lifecycle model could be used to evaluate these benefits and impacts. The applicant provided an analysis using the OBAN lifecycle model to simulate Sacramento River winter-run Chinook salmon population dynamics for the with- and without-project scenarios. The applicant notes that the withproject scenarios were also simulated considering an adjustment to survival downstream of Red Bluff Diversion Dam, recognizing potential effects related to reduced Sacramento River flows downstream of the Sites diversions. The applicant concluded that the results demonstrated an improvement in winterrun escapement. However, the applicant did not provide the modeling data for the OBAN analysis of winter-run Chinook salmon. Therefore, the Department cannot verify or evaluate the OBAN model outputs and conclusions presented in the appeal. Pursuant to the Technical Reference Document, reviewers must be able to verify all calculations, inputs and outputs, and information used by other models in the applicant's overall analysis. (Technical Reference, § 4.3.8.1 at p. 4-30.) Without this data, the Department cannot verify the OBAN results and is unable to substantiate the conclusion of net benefits to winter-run salmon. The appeal material did not include an analysis to link the benefits and impacts to each life stage of spring-run Chinook salmon, fall-run Chinook salmon, or late-fall-run Chinook salmon. As such, the Department is unable to verify the applicant's claimed net benefit to all runs of Chinook salmon.

The flow-survival effects analysis quantifies a change in survival at a single location downstream of the proposed Delevan intake. However, proposed Project operations would likely increase diversions at the Tehama-Colusa Canal and the Glenn-Colusa Irrigation District Main Canal, which are upstream of the Delevan intake. The appeal does not consider the potential cumulative effects that each of these diversions may have on migrating fish. Additionally, fish will likely experience decreased survival downstream of the single location below the Delevan intake due to reduced flows in the Lower Sacramento River and through the Sutter and Yolo Bypasses. These potential impacts were not considered in this analysis.

In the flow-survival effects analysis, the applicant evaluated several studies presenting flow-survival relationships. The applicant selected the relationship presented in the Iglesias² study for the purpose of

quantifying a change in survival from decreased flows. As illustrated by Figure A.2-6 in Attachment A to the appeal, ¹ the Iglesias study utilizes the flattest flow-survival curve when compared to survival curves of similar studies. The slope of the Iglesias derived curve illustrates that for a given increment of flow increase, the corresponding survival will have the lowest calculated increase. Each study presented in Figure A.2-6 has strengths and limitations, and there will be uncertainties in the results regardless of which flow-survival curve is used. To account for uncertainty, a sensitivity analysis using multiple flow-survival curves would demonstrate the potential range of variability in survival in light of reduced flows.

Additionally, the flow-survival effects analysis calculated annual survival estimates for each run using an average of survival values in primary migration months. Using the average may obscure potentially significant impacts in some months under some water year types. To determine a net change from flow impacts, the annual survival estimates were again averaged over the 82-year simulation period and the relative change in long-term average annual survival is presented. As with the survival estimates, using an average may obscure potentially significant impacts in some years.

The applicant proposes to provide a pulse flow mitigation measure to offset expected impacts to salmon from the Project's diversions. This measure would institute an operational rule that disallows diversion for several days after a rain induced pulse of a certain magnitude. The applicant assumes that 50% of migrating fish will move through the system after a pulse event, citing the Rosario study.³ Although a no diversion period after high rain pulses may reduce impacts, the extent to which this measure will reduce impacts is uncertain. The Rosario study looked at how large storm flow events affect migration by analyzing winter-run catch data near Knights Landing. However, the migration of other runs of salmon during rain pulses cannot be assumed from this study. Further, some runs tend to delay migration and rear much longer in the watershed, and the Sites diversions occur further upstream than the point examined by the study. Therefore, salmonids may respond differently than presented in the Rosario study; and the effectiveness of the mitigation measure may be less than the applicant proposes. Additionally, fish can migrate during a pulse event that would not trigger the mitigation measure. In this instance, this measure would not be protective of fish. The applicant anticipates that the pulse flow operations will be informed by real-time monitoring of fish movement. However, it is unclear how that information will be collected and provided in a timely manner so that it can influence real-time operations.

For the reasons described above, the Department finds the anadromous fish monetized ecosystem benefits are not substantiated by the information provided in the appeal.

Oroville Coldwater Pool Monetized Ecosystem Benefit

In its comments on the application material, the Department noted that it could not verify the Oroville coldwater pool monetized ecosystem benefit because the applicant did not provide a temperature model to assess temperature benefits, nor did the applicant quantify the resulting ecosystem improvement from a change in temperature. In response to these concerns, the appeal material contains a Reclamation Temperature Model (RecTemp) to assess temperature changes on the Feather River resulting from Project operations. In the appeal material, the applicant notes the RecTemp modeling indicates a net temperature improvement based on the long-term average under 2015, 2030, and 2070 climate conditions.

The modeled temperatures in the Feather River under with- and without-project conditions generally fall within the temperature criteria of the Oroville FERC Settlement Agreement⁴ for the low flow channel. The modeled operations for the applicant's project do not decrease temperatures to meet

established targets when exceedances occur. Modeled temperatures for above Thermalito Afterbay also fall within the existing protective temperature targets for anadromous fish.

The Oroville FERC Settlement Agreement currently does not have finalized temperature targets for the high flow channel (HFC). However, the water temperatures specified in the Settlement Agreement, Appendix A, Table 2 (56-64°F) for the HFC will serve as a starting point for development of future HFC temperature targets to support anadromous fish. In most cases, with-project modeled temperatures on the Feather River at the below Thermalito and Gridley locations do not provide temperature improvements to acceptable thresholds when temperatures fall outside the optimal range for Chinook salmon. In October under 2030 climate conditions, model results show that temperatures are lowered to meet targets in some water year types under with-project conditions. However, in summer months, across multiple year types and under all climate conditions, the Project raises temperatures above without-project conditions. Because the majority of temperature changes with-project do not lower temperatures to meet protective temperature targets, and because the Project raises temperatures in many cases, the Department is unable to conclude that a temperature improvement will occur as a result of Project operations.

For the reasons described above, the Department finds that the Oroville coldwater pool monetized ecosystem benefit is not substantiated by the information provided in the appeal.

Yolo Bypass Flows Monetized Benefit

In its comments on the application material, the Department expressed concerns about the net reductions in flows through the bypass, as identified by the Water Operations review. The Department noted that potential impacts resulting from the reduced Yolo Bypass flows were not analyzed or disclosed. The Department also noted that ecosystem benefits resulting from pulse flows through the Yolo Bypass are consistent with the Delta Smelt Resiliency Strategy.

In the appeal material, the applicant provided an analysis of flows, weir spills, and habitat inundation in the Yolo Bypass area. Based on these analyses, the applicant concluded that the mean duration of flooding events within the bypass was reduced by up to 2 days under with-project conditions. Therefore, the applicant concluded that the impacts to the Bypass would not likely limit salmonid population growth.

The appeal analysis indicates an average decrease of spill events by 0-2 days. Two days equals an average annual reduction of 15% and this reduction has the potential to be significant. When considering impacts (reduction in entrainment of juvenile salmon into Yolo Bypass), the amount of flow coming over Fremont Weir is important, because there is a positive relationship between flow and juvenile fish entrainment. Any reductions in Sacramento River flows at Fremont Weir may be at odds with the Salmon Resiliency Strategy and the planned salmonid habitat restoration projects in the Yolo Bypass.

The analysis provided in the appeal material allowed the Department to distinguish the aforementioned potential impacts to salmon from the benefits proposed to Delta smelt. Although the Department reserves its concerns regarding the impacts to salmon that could result from the operations of the Project, pulse flows through the Yolo Bypass are consistent with the Delta Smelt Resiliency Strategy. Evaluating the proposed benefits to Delta smelt separately from the potential impacts to salmon, the Department finds that the proposed flows to the Yolo Bypass are an ecosystem benefit and substantiated by the information provided.

¹Sites Project Authority. Attachment A Anadromous Fish (Sacramento River). 2018. <u>https://cwc.ca.gov/WISPDocs/AttachA.pdf</u>

4.1

²Iglesias, I. S., M. J. Henderson, C. J. Michel, A. J. Ammann, and D. D. Huff. 2017. Chinook Salmon Smolt Mortality Zones and the Influence of Environmental Factors on Out Migration Success in the Sacramento River Basin. Prepared for U.S. Fish and Wildlife Service, Pacific Southwest Region, Central Valley Project Improvement Act, Sacramento, CA. Agreement Number F15PG00146. April. National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, CA.

³del Rosario, R. B., Y. J. Redler, K. Newman, P. L. Brandes, T. Sommer, K. Reece, and R. Vincik. 2013. Migration patterns of juvenile winter-run-sized Chinook Salmon (*Oncorhynchus tshawytscha*) through the Sacramento–San Joaquin Delta. San Francisco Estuary and Watershed Science 11(1).

⁴State of California, Resources Agency, Department of Water Resources. 2006. Settlement Agreement for Licensing of the Oroville Facilities FERC Project No. 2100. <u>https://www.water.ca.gov/LegacyFiles/orovillerelicensing/docs/settlement_agreement/Settlement%20</u> <u>Agreement.pdf</u>.

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836 SACRAMENTO, CA 94236-0001 (916) 653-5791



April 12, 2018

Joseph Yun Executive Officer California Water Commission P.O. Box 942836 Sacramento, CA 95814-0001

RE: Proposition 1 Water Storage Investment Program

Dear Mr. Yun:

This is an exciting stage in the implementation of the Proposition 1 Water Storage Investment Program (WSIP) as the California Water Commission (Commission) is on the brink of investing \$2.7 billion toward new water storage projects. The Department of Water Resources (DWR) is committed to its ongoing role of providing the Commission expert technical review and support.

DWR is pleased that the additional conversations with applicants have resulted in an improved understanding of these projects. We look forward to the next phase when the Commission will make its determination and begin awarding funding. Investments in storage are critically needed across the state to ensure flood control protection, improve ecosystems and water quality, and to improve the resiliency of our water infrastructure and supplies.

We commend the Commission on its continued commitment to working with applicants and stakeholders in a transparent manner as it navigates the complexities of implementing this one-of-a-kind public investment program. The task before the Commission is not easy.

DWR looks forward to our continued partnership and appreciates the important work that will take place in the coming weeks before preliminary decisions are made in July.

Sincerely,

Karla & Newt

Karla A. Nemeth Director

DEPARTMENT OF WATER RESOURCES 1416 NINTH STREET, P.O. BOX 942836 SACRAMENTO, CA 94236-0001



April 12, 2018

Mr. Joseph Yun Executive Officer California Water Commission Post Office Box 942836 Sacramento, California 94236-0001

Project: Sites Project Applicant: Sites Project Authority

RE: Water Storage Investment Program —Public Benefits Ratio Recommendations – Response to Applicant's Appeal

Dear Mr. Yun:

With this letter, the Department of Water Resources (DWR) provides the California Water Commission the public benefits recommendation for acceptance, adjustment, or removal of the applicant's appealed physical benefits from the public benefits ratio (PBR) for the Water Storage Investment Program (WSIP) Proposition 1 application.

DWR maintains the original recommendation for the adjustment to the flood control physical benefit in the PBR calculation.

DWR staff evaluated each benefit addressed in the applicant's appeal. The information provided by the applicant in support of each claimed monetized benefit was reviewed in a consistent manner across all applications for the summary of recommendations listed below. DWR did not attempt to replicate or modify models and did not evaluate the project's claimed monetized benefits outside of the information provided in the application and appeal.

During the appeal reviews, DWR staff had the option to recommend adjustment of the physical benefit if the PBR physical benefit was not supported by the additional information provided in the applicant's appeal. If the methods used or values supplied in the appeal were not supported, and staff could not adjust the PBR, the monetized public benefit value was recommended for removal from the total PBR calculation.

Sites Project April 12, 2018 Page 2

Summary of Recommendations:

Flood Control:

DWR's original PBR recommendation:

DWR recommends the adjustment of this physical benefit to the PBR calculation. The Sites Project flood control physical benefit was adjusted for the reason listed below:

• DWR staff recommends the adjustment to the Sites Project's physical flood control benefit. The adjustment is to the without-project water surface elevation in the downstream floodplain from 5-feet of depth above first floor elevation to 3-feet of depth above adjacent grade for the 100-year flood event. The 3-feet of depth is consistent with the publicly available FEMA National Flood Insurance Rate Map used in the National Flood Insurance Program. The applicant's 5-feet without-project flood depth above the first flood elevation for the full range of flood events is not verifiable and has not been sufficiently documented. It is not clear if the applicant developed and ran additional models to support the 5-feet without-project flood depth.

The applicant accepted the recommended adjustment during their appeal. DWR maintains the original recommendation for the adjustment to the flood control physical benefit in the PBR calculation.

Sincerely,

Karla & Vent

Karla A. Nemeth Director

State's Proposition 1 (WSIP)



Congress of the United States

Washington, DC 20515

April 30, 2018

Armando Quintero Chair, California Water Commission P.O. Box 942836 Sacramento, California 94236-0001

Dear Chairman Quintero,

We appreciate the extraordinary dedication of the California Water Commission (Commission), its staff, and administering agencies to significantly advance the Water Storage Investment Program (WSIP) over the past year. We are concerned, however, that the Commission may be missing a once-in-a-generation opportunity to increase cold water reserves for Central Valley salmon through storage investments.

We are struck that only \$195 million, or 7% of the \$2.7 billion in available funding, could go to Central Valley salmon benefits based on the staff-recommended Public Benefit Ratios (see chart in attachment). We are further concerned that the full suite of salmon benefits from projects have not been analyzed in their entirety. We urge the Commission to complete these evaluations before awarding the voter-approved funding, in order to take advantage of this extraordinary opportunity to increase our salmon species' resiliency to drought and climate change.

In 2014, California voters overwhelmingly approved Proposition 1, which dedicated \$2.7 billion for water storage projects that provide public benefits. Over two-thirds of California voters supported the measure, not just to provide more water storage, but also to improve the health of ecosystems and fisheries throughout the state, including threatened Central Valley salmon.

Given that environmental benefits are the primary focus of the \$2.7 billion in voterapproved funding, we would have expected more than 7% of the benefits to go to Central Valley salmon. California's great salmon runs on the Sacramento and San Joaquin Rivers and their tributaries represent a vital economic and cultural resource for California, and existing public policy has made great efforts to preserve this population against environmental and manmade threats.

Moreover, our changing climate is likely to increase threats to salmon by bringing more extreme droughts further aggravated by increasing temperatures. Our limited cold-water storage was catastrophic for winter-run chinook salmon in 2014 and 2015. Well-placed storage projects that reserve large blocks of environmental water could be critical in helping salmon weather future droughts aggravated by climate change.

Our review of Commission staff responses to project appeals suggests that in a number of instances administering agencies did not fully evaluate projects' asserted salmon benefits. For example, the agencies would not accept projected benefits for one project from models such as SALMOD and OBAN that were listed in the Commission's technical reference documents as models that applicants could use.¹

Additionally, upon review of the applicants' appeal for this project, the Department of Water Resources (DWR) found a substantial flow benefit in the spring time² and a substantial temperature reduction benefit for salmon in the critical July to September months³, yet these were not recognized as ecosystem benefits. We would hope that administering agencies would thoroughly analyze the effects on the salmon of the spring flow benefit and the summer cold water temperature benefit that DWR identified.

As the Commission deliberates over the WSIP funding, we strongly urge you to fully evaluate the potential salmon benefits of the proposed projects before awarding the funding. We believe that the \$2.7 billion in voter-approved funding provides perhaps the last good opportunity to improve California's water infrastructure specifically to safeguard our threatened salmon runs against climate change and drought.

We greatly appreciate your consideration of our comments.

Sincerely,

Dianne Feinstein

United States Senator

John Garamendi United States Representative

Cc: California Water Commission Members

Attachments

¹ The administering agencies rejected Sites Reservoir's use of the OBAN results, because the applicant did not provide the modeling data for the OBAN analysis so the agencies could not verify the results (Page 2 of 5 of the attachment to the California Department of Fish and Wildlife letter to the Commission, attached). However, the attached excerpt from the Technical Reference Document shows that the Commission cited OBAN as a model that could be used, and OBAN is a proprietary model where the inputs are not available (See attached highlighted language on page 4-105 of the Technical Reference Document). So it appears that the Commission referred the applicants to use a model that the administering agencies then rejected based on its inherent proprietary nature.

² Water Operations Review Response to Applicant's Appeal on Public Benefits Ratio: Sites Project; Comment 1.4.

³ Water Operations Review Response to Applicant's Appeal on Public Benefits Ratio: Sites Project Comment 2.

Footnote #1

٦

Table 4-12. Summary of Models, Methods, and Approaches for Assessing Ecosystem Improvements.						
Resource Effects	Tools	Key Inputs and Assumpti ons	Outputs	Notes/Limitations/Links		
Reservoir Effect	S	I				
Effects on reservoir fish spawning success	DFW regression model	Requires CalSim II flow inputs to estimate monthly and daily changes in water surface elevation.	Estimates bass nesting success	Coarse output. The DFW regression models and an example application are documented in Appendix 9F of the Long-Term Operation (LTO) Environmental Impact Statement (EIS) (Reclamation, 2015).		
Surface water temperature in rivers and reservoirs	HEC-5Q and Reclamation Temperature Models Other temperature models listed in Deas & Lowney, 2000, including CE-QUAL- W2	Requires CalSim II inputs.	Estimates daily temperatures (HEC-5Q) and monthly temperatures (Reclamation Temperature Model) in riverine surface waters, and monthly temperatures in reservoirs (HEC5Q and Reclamation Temperature Model).	Only CVP and SWP reservoirs are modeled.		
Riverine Effects	••••••••••••••••••••••••••••••••••••••					
Impacts/change s to salmon early life stages	Reclamation Salmon Mortality Model. Also referred to as Egg Mortality Model	Requires temperatur e inputs from HEC- 5Q and Reclamatio n Temperatur e Model.	Estimates Chinook salmon egg and pre- emergent fry losses on Sacramento, Feather, American, Stanislaus rivers, annually.	May underestimate temperature related mortality and may not be sensitive enough to capture small differences in scenarios. DFW SOPs and OA/QC documents may be accessed here: https://www.wildlife.ca.gov/Conservati on/Watersheds/Instream-Flow/SOP		
In-river salmonid production	SALMOD	Requires temperatur e and flow inputs from HEC-5Q.	Estimates survival and mortality of Chinook salmon (all races, several life stages) in Sacramento River mainstem; specifically, from Keswick Dam to Red Bluff Pumping Plant.	Simulates annual growth, movement, mortality of various life stages based on an initial annual adult population that resets each biological year. Not a true life cycle model because it treats production results separately for each year rather than compounding outcomes over time. Without careful consideration of inputs this model may underestimate impacts and overestimate benefits.		
In-river physical habitat	PHABSIM	WUA. Requires flow inputs (e.g., CalSim II) and established	Estimates habitat area and suitability for salmonids (by life stage) and other target fish species based on stream flows.	Flow/WUA relationships have not been developed for many species, life stages, and drainages. Monthly CalSim II time step may be too broad. The PHABSIM modeling tool is available at		

F

Improvements.						
Resource Effects	Tools	Key Inputs and Assumpti ons	Outputs	Notes/Limitations/Links		
Geomorphic Function and Riparian Vegetation	Beomorphic Function and Riparian /egetationSRH Modeling PackageRequires input hydrology, channel geometry information , sediment information growth informationSRH-2D sediment information , sediment information , sedimentSRH-2D other outputs such as stage, velocity, bed shear stress, erosion and deposition.All m 		All models were developed by Reclamation's Technical Service Center. Contact the Technical Service Center (http://www.usbr.gov/research/about/i ndex.html) for further information about these modeling tools. See also Reclamation (2011, 2012).			
Juvenile fall-run and spring-run Chinook salmon abundance and growth by habitat area.	ESHE			Cramer Fish Sciences. 2011. Estimating Rearing Salmonid Habitat Area Requirements: A demonstration of the Emigrating Salmonid Habitat Estimation (ESHE) Model for California Fall-run Chinook salmon, <i>Oncorhynchus tshawytscha</i> . Prepared for the Nature Conservancy. 48 pages		
Potential of habitat to support salmonids.	EDT (Ecosystem Diagnosis and Treatment)	Water temperatur e and flow.	Spatially explicit estimates of density independent productivity, carrying capacity, and adult abundance.	Developed by ICF International. Available at: <u>https://edt.codeplex.com/</u>		
Delta Effects			L			
In-river, Delta, and ocean survival of winter-run Chinook salmon	OBAN	Requires CalSim II flow and Delta Cross Channel inputs and HEC-5Q temperatur e inputs.	Estimates winter-run Chinook salmon escapement and ocean survival.	Proprietary model of R2 Resource Consultants. Model is limited to winter-run and spring-run Chinook salmon.		
Delta smelt entrainment	USFWS regression model DSM2 PTM	Requires CalSim II OMR Flow inputs	Estimates proportional loss of both larval/juvenile Longfin and Delta smelt. Estimates adult Delta smelt entrainment losses.	The USFWS regression model and an example application are documented in Appendix 9G of LTO EIS. Relies only on OMR flows to explain loss/salvage, and does not incorporate adult distribution data.		

Table 4-12. Summary of Models, Methods, and Approaches for Assessing Ecosystem

Appeal Response Sites Project

On February 1, 2018, the California Water Commission Executive Officer sent a letter to the Sites Project Authority (applicant) regarding the Public Benefit Ratio (PBR) Review conducted for the Sites Project (Project). Among other things, the February 1 letter included a modified PBR for the Project and a summary of the technical review conducted by the California Department of Fish and Wildlife (Department) related to the Project's monetized ecosystem benefits. The Department provided comments and recommendations regarding the support for the ecosystem benefits that factored into the Project's PBR.

On February 23, 2018, the applicant submitted an appeal of the modified PBR. The Department reviewed the appeal material pertaining to the monetized ecosystem benefits and concludes that the anadromous fish and Oroville coldwater pool monetized ecosystem benefits are insufficiently supported by the information provided. The Department maintains its original recommendation to remove the anadromous fish and Oroville coldwater pool monetized ecosystem benefits from the calculation of the Project's PBR. The Department concludes that the Yolo Bypass flows monetized ecosystem benefit is sufficiently supported by the information provided and, therefore, recommends inclusion of the Yolo Bypass flows monetized ecosystem benefit in the calculation of the Project's PBR.

The Department's responses to the Project's appeal are as follows:

Anadromous Fish Monetized Ecosystem Benefit

In its comments on the application material, the Department identified four main areas of concern. First, the use of SALMOD to calculate the number of fish that will benefit over the life of the Project did not accurately represent salmon population dynamics, nor did it account for annually changing population levels. Second, impacts to salmonids resulting from reduced river flows downstream of the proposed Project diversion points were not analyzed or disclosed in the quantification of net benefits. Third, SALMOD inputs and assumptions were not explained. Fourth, SALMOD inputs were higher than recent data indicate.

In the appeal material, the applicant provided revised SALMOD inputs that considered more recent starting populations, additional information on SALMOD assumptions, an OBAN analysis (a life cycle model for winter-run salmon), and a flow survival-effects analysis to generate a mechanism for calculating flow-related impacts associated with the Project's operations.

The results of the applicant's net benefits analysis are shown in Table A.1-5 in Attachment A to the appeal material.¹ The results indicate that there are net impacts to fall-run Chinook salmon under 2015 climate conditions and to spring-run Chinook salmon under 2030 climate conditions. Net impacts that could occur in the near future as a result of the Project could cause impacts that would not be offset by potentially beneficial conditions in the long-term.

The Department finds that the SALMOD assumptions and revised inputs provided in the appeal are reasonably explained and reflective of more recent and accurate data sets. However, the Department's concerns about the use of SALMOD to calculate the number of fish that will benefit over the life of the Project remain unresolved. As noted in the Department's comments on the application material, SALMOD treats production results separately for each year rather than compounding outcomes over

time. Each modeled year produces a change in production for each run of Chinook salmon at Red Bluff, and these yearly results are summed over the 82-year simulation period to produce a net change in salmon production levels. Because SALMOD is programmed to use the same starting numbers each year, the model is unable to account for variations in annual population levels. For example, SALMOD is unable to account for consecutive years in which a returning run contains a lower population than the preceding year. Because SALMOD does not account for annually changing population levels, there is high uncertainty in the resulting SALMOD outputs used to quantify net changes in salmon production.

In the appeal material, the applicant conducted a flow-survival effects analysis to account for the potential impacts associated with Project diversions on the Sacramento River that were identified in the Department's comments on the application. The net changes in salmon production numbers for each of the three climate scenarios were calculated by taking the salmon production numbers at Red Bluff, as calculated by SALMOD, and adjusting these outputs by the relative change in survival based on the flow-survival effects analysis. The relative change in survival was calculated using the change in flow below the Delevan intake. As fish migrate through the system, multiple factors in each section of the river can affect survival. The quantification of net benefits provided in the appeal analysis does not account for the cumulative reduction in survival analysis does not evaluate the benefits to one life stage and impacts to other life stages. Thus, the Department is unable to make a determination regarding the claimed net benefit to all runs of Chinook salmon.

A lifecycle model could be used to evaluate these benefits and impacts. The applicant provided an analysis using the OBAN lifecycle model to simulate Sacramento River winter-run Chinook salmon population dynamics for the with- and without-project scenarios. The applicant notes that the withproject scenarios were also simulated considering an adjustment to survival downstream of Red Bluff Diversion Dam, recognizing potential effects related to reduced Sacramento River flows downstream of the Sites diversions. The applicant concluded that the results demonstrated an improvement in winterrun escapement. However, the applicant did not provide the modeling data for the OBAN analysis of winter-run Chinook salmon. Therefore, the Department cannot verify or evaluate the OBAN model outputs and conclusions presented in the appeal. Pursuant to the Technical Reference Document, reviewers must be able to verify all calculations, inputs and outputs, and information used by other models in the applicant's overall analysis. (Technical Reference, § 4.3.8.1 at p. 4-30.) Without this data, the Department cannot verify the OBAN results and is unable to substantiate the conclusion of net benefits to winter-run salmon. The appeal material did not include an analysis to link the benefits and impacts to each life stage of spring-run Chinook salmon, fall-run Chinook salmon, or late-fall-run Chinook salmon. As such, the Department is unable to verify the applicant's claimed net benefit to all runs of Chinook salmon.

The flow-survival effects analysis quantifies a change in survival at a single location downstream of the proposed Delevan intake. However, proposed Project operations would likely increase diversions at the Tehama-Colusa Canal and the Glenn-Colusa Irrigation District Main Canal, which are upstream of the Delevan intake. The appeal does not consider the potential cumulative effects that each of these diversions may have on migrating fish. Additionally, fish will likely experience decreased survival downstream of the single location below the Delevan intake due to reduced flows in the Lower Sacramento River and through the Sutter and Yolo Bypasses. These potential impacts were not considered in this analysis.

In the flow-survival effects analysis, the applicant evaluated several studies presenting flow-survival relationships. The applicant selected the relationship presented in the Iglesias² study for the purpose of

Footnote #2

swimming aquatic species." Reviewers cannot verify whether the standard is applied for an adequate duration from the pre-processed number of no diversion days timeseries inputted in the CalSim II model.

Applicant Appeal

The applicant provided supplemental information regarding the basis for the proposed pulse flow protection operation to minimize entrainment and impingement of juvenile salmonids. The applicant described the iterative approach developed to estimate the number of no diversion days and restrict diversions in CalSim II during pulse flow periods for modeling purposes and provided the modeling approach justification of the number of days of no diversions to fill Sites Reservoir.

"Operations modeling of the Sites Project included restrictions on diversions to limit impacts on out-migrating juvenile fish as a "surrogate" for real time monitoring and adaptive management... The majority of diversions into Sites Reservoir occur during December through March. Of those months, 44% have no diversion days in recognition of potential pulse events over the 82-year simulation period. Approximately 200 potential pulse events are protected over the 82-year simulation period with durations with an average of 3.5 no diversion days with some months having as many as 14 no diversion days." (Appeal Letter, p. 5)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment regarding the basis for pulse flow protection standard. A review of the 2030 and 2070 conditions confirms that, on average, approximately 85 percent of the water diverted into Sites Reservoir occurs between December and March, which coincides with the months with the highest probability of no-diversion days. A review of the no diversion day timeseries confirms the data presented by the applicant in Table D.3-1 of the appeal documentation. The applicant acknowledged that this approach was adopted for modeling purposes and that "... project operations will be informed by real-time monitoring of fish presence and movement" (AttachD, p. D-5).

Comment 1.4

The applicant proposes to "augment flows in the Sacramento River between Keswick Dam and Red Bluff Diversion Dam to minimize dewatering of fall-run Chinook salmon redds... from October through March, particularly during fall months." Review of the applicant's CalSim II model results show that the range on long-term average change in Sacramento River flows for the months between October and March between Keswick Dam and Bend Bridge varies by 0 to 5 percent under 2030 conditions, and by -5 to 3 percent under 2070 conditions, between Bend Bridge and Red Bluff Diversion Dam varies by -3 to 1 percent under 2030 conditions, and by -5 to -2 percent under 2070 conditions. These results suggest minimal or no flow augmentation to help minimize dewatering of salmon redds.

Applicant Appeal:

The applicant pointed out that the Water Operations Review focused on the long-term average conditions between October and March without considering the intentional, primary benefits of providing additional water during the critical period for fall run Chinook salmon flow stability (December through February) when Shasta flows may be reduced.

"The use of a long-term monthly average flow during the longer October-March period obscures the challenges for flow stability for fall-run Chinook and the benefits of the Sites Project to this run... The Sites ecosystem enhancement storage account has been allocated to increase and stabilize flows in the Sacramento River below Keswick Dam to minimize dewatering of salmon redds." (Appeal Letter, p. 6)

"The Operations Plan defined a general window of opportunity between September and March in Above Normal, Below Normal, and Dry years for water to be released from Shasta Lake to stabilize flows in the Sacramento River when flows are between 3,250 to 5,500 cfs. This window of opportunity defined in the Operations Plan was based on current conditions. The quantification of benefits is based on modeling results under WSIP 2030 and 2070 climate conditions, and modeling analyses indicate that under future climate conditions the primary benefits of this action occur between December and February." (AttachD, p. D-10)

Water Operations Review Response:

Reviewers revised the analysis of the Sacramento River flows below Keswick Dam by reducing the time window for the flow augmentation benefits from October through March to December through February, and focusing on the Below Normal, Dry, and Critical water years instead of the long-term averages. Reviewers confirmed there is flow increase in the Sacramento River below Keswick Dam between December and February in Below Normal, Dry, and Critical water years. The results of the analysis show that flows in the Sacramento River below Keswick Dam between December and February exceed the without-project condition 40 to 50 percent of the time under 2030 conditions and 25 to 40 percent of the time under 2070 conditions, resulting in increase in average December through February flow by 16 TAF (7 percent) and 14 TAF (6 percent), respectively. Under 2030 conditions, the average December through February flow increases by 10 TAF (4 percent), 29 TAF (12 percent), and 9 TAF (4 percent) for Below Normal, Dry, and Critical water years, respectively. Under 2070 conditions, the average monthly flow between December and February increases by 13TAF (4 percent), 14 TAF (6 percent), and 16 TAF (8 percent) for Below Normal, Dry, and Critical water years, respectively.

Comment 1.5

The applicant proposes to improve the coldwater pool storage in Lake Oroville to improve water temperature suitability for anadromous fish in the lower Feather River from May through November during all water years. Review of the applicant's CalSim II model results show that

Footnote #3

Comment 2: HEC-5Q and CE-QUAL-W2 Model Review

The applicant states that the project would "increase cold-water pool storage in Shasta Lake, Lake Oroville, and Folsom Lake and improve temperature in the Sacramento and American Rivers during certain months at specific compliance points..." A review of the applicant's HEC-5Q model results shows minimal water temperature reduction in the upper Sacramento River.

Applicant Appeal:

The applicant pointed out that the Water Operations Review focused on long-term average conditions while not addressing the intentional, primary water temperature benefits of the Sites Project in Dry and Critical year types.

"The review focused on long-term average conditions while not addressing the intentional, primary benefits of the Sites Project in dry and critical year types. Existing operations provide compliant conditions but have important challenges in dryer periods." (Appleal Letter, p. 15)

The applicant provided supplemental water temperature results for the average July to September water temperature for long-term, Dry, and Critical years at the four important Sacramento River temperature locations (Bonnyview, Balls Ferry, Jellys Ferry, and Bend Bridge) for the 2015, 2030, and 2070 conditions. (AttachD, p. 23-25)

Water Operations Review Response:

The additional information provided by the applicant in the appeal adequately addresses the comment. Reviewers reviewed the supplemental HEC-5Q model data focusing on Dry and Critical years for the 2030 and 2070 conditions provided by the applicant in the appeal (Attachment D, p.23-25). Reviewers confirmed the long-term Dry and Critical years monthly average (July to September) temperature for the four Sacramento River temperature locations (i.e., Bonnyville, Balls Ferry, Jellys Ferry, and Bend Bridge) for the Current (2015), 2030, and 2070 with- and without-project conditions match the HEC-5Q model output provided in the application. For current (2015) conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.6°F and in Critical years, average July to September temperatures are decreased by about 1.2°F to 1.4°F. For 2030 conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.2°F to 0.3°F and in Critical years, average July to September temperatures are decreased by about 0.6°F. For 2070 conditions, Dry years show a decrease in average July to September temperatures at all locations of about 0.5°F to 0.65°F and in Critical years, average July to September temperatures are decreased by about 1.44°F to 1.8°F.

Comment 3: DSM2 Model Review

The applicant states that upstream release actions improve water quality by augmenting Delta inflows and outflows. The Delta water quality could be improved for up to 6 months from July to December in Above Normal, Below Normal, and Dry water years. Review of DSM2 results shows



May 2, 2018

TO: California Water Commission Board Members

Subject: Proposed solution to the PBR discussion regarding the Sites Project

I appreciated the opportunity to discuss the Sites Project with the Commission at your meeting on May 1. The Commission was unable to reach a decision on the project's proposed anadromous fish benefits. I want to take this opportunity to offer you a solution to the quandary created by the lack of a collaborative process to resolve differing interpretations of the current science that were discussed on Monday.

Requested Commission Action:

- 1. The Commission should use its discretion to independently find that there is sufficient information to recognize the anadromous fish benefits along with sufficient protections in the permitting process to manage the impacts to levels that ensure a measurable net to anadromous fish benefit remains.
- 2. The economic value placed on that benefit should be between the CWC staff assumption based on taking large amounts of land out of production and that provided by the applicant based on the WSIP unit values in the Technical Reference. We propose a placeholder of \$560 Million be used in the PBR calculation to move the process forward. This equates to a 35% survival rate of salmon produced by the Sites Project which we valued at \$1,616 Million as presented in our February 23, 2018 appeal¹; which equates to a PBR of 1.07.

Supporting Facts:

1. There is no debate that the Sites Project provides flow stabilization and water temperature benefits on the upper Sacramento River.

These benefits were recognized and confirmed by DWR in its analysis of the CalSim and HEC-5Q modeling results provided by the Sites Project.

2. Benefits to juvenile salmon are dependent upon application of the current state of the science.

The SALMOD model results indicate increases in dry and critical years to all runs of salmon species in the upper river. To help address scientific uncertainty we

¹ 35% is lower than the most-conservative flow-survival curve as shown in Figure A.2-6 of Appendix A of our February 23, 2018 appeal letter. It is lower than the value discussed by CDFW at the May 1, 2018 meeting.



P.O. Box 517 Maxwell, CA 95955 530.438.2309



used the best available science to quantify these downstream impacts by adjusting the SALMOD results.

In addition, we also evaluated the Sites Project using an available life cycle model for winter-run Chinook salmon. We are very disappointed that this model was not reviewed simply because the CDFW technical reviewers were not able to see the inputs, <u>which the operations technical reviewers were able to evaluate</u>.

3. While there may be <u>uncertainty</u> regarding downstream impacts to salmon from filling Sites reservoir there is <u>certainty</u> that without Sites there will be further degradation of salmonid populations.

<u>The climate change forecasts show that if we do nothing, salmon species will</u> <u>continue to decline.</u> Our analysis indicate that the Sites Project is an important tool to aid salmon population stabilization and recovery. The evaluation of the available life-cycle model results should not be discarded.

4. A recognized public benefit for anadromous fish is a primary focus for the Sites Project's participating agencies.

Our project participants are motivated and committed to providing the state with a block of dedicated water for the environment, specifically the benefits the Sites Project can provide to salmon.

It would be a shame to have spent decades on this, the largest of the storage projects in front the Water Commission with the most water dedicated to public benefits, to lose the opportunity to secure a dedicated block of water for environmental uses and to address our water management challenges for generations to come.

I hope this is helpful in Thursday's deliberations. Please contact Jim Watson if you have any questions.

KITZ DURST

Fritz Durst Chair, Sites Project Authority



P.O. Box 517 Maxwell, CA 95955 530.438.2309