

Response to NGO Request to Model Additional Operational Criteria



To: File
Date: November 15, 2023
From: Alicia Forsythe, Environmental Planning and Permitting Manger
Subject: NGO Modeling Request and Results

A handwritten signature in black ink that reads 'Alicia Forsythe'.

This memorandum supplements the information in the Final Environmental Impact Report/Environmental Impact Statement for the Sites Reservoir Project (“Project”) and the responses to comments received on the November 2021 Revised Draft Environmental Impact Report/Environmental Impact Statement in addressing the Sites Reservoir Authority (the “Authority”) response to a request received on October 28, 2020 from the Natural Resources Defense Council (“NRDC”) and other non-government organizations (“NGOs”) to model operational criteria proposed as part of an “environmentally responsible project.”

Background

On September 16, 2020, NRDC sent an email to Authority staff regarding the Authority Board of Director’s proposed selection of a preferred alternative for the purposes of CEQA. In particular, this email stated that it “appears from the memo to the Board of Directors that the CEQA document will only consider 2 alternatives, with identical operational parameters for those alternatives (meaning that there are no operational alternatives being considered).” The email further states that “considering only a single operational scenario would violate CEQA’s mandate to consider a reasonable range of alternatives...In addition, that approach is inconsistent with our last email exchange in June, where you stated that:

We will have Jacobs conduct an analysis of at least one set of operational criteria that are similar to (or the same as) what you have proposed.”

Subsequently, the Authority coordinated with NRDC and others to discuss and confirm the operational criteria that should be modeled (see Attachment A). On October 28, 2020, NRDC sent an email to the Authority (Attachment B) that included attachments describing proposed operational criteria for modeling including specific Sacramento River bypass flow criteria as well as specifics regarding floodplain inundation and Delta outflow:

1. Floodplain inundation: Model operations to ensure no changes to the frequency and duration of flood flows into the Yolo Bypass and Sutter Bypass (per our criteria on page 1); and;

2. Delta outflow: use the criteria from pages 2 and 3 (including both the minimum Delta outflow requirements on page 3 and the maximum diversion rate as a percentage of NDOI on page 2).

They proposed the following overall criteria for what was identified as an “Environmentally Responsible Project”:

- Upper Sacramento River bypass flows: Flows of at least 15,000 [cubic feet per second] cfs past all Sacramento River points of diversion for Sites Reservoir are required prior to the diversion of water into the reservoir during the months of October to June to protect out-migrating juvenile salmonids. (See Table A)
- Lower Sacramento River flows: Diversions of water into the reservoir should not occur from October to June unless flows at Freeport are greater than 35,000 cfs. Lower Sacramento River bypass flows in October and June shall be based on real time monitoring for salmonids. (See Table A)
- Flows for the San Francisco Bay-Delta Estuary: Per Table B, diversions of water into the reservoir should occur only when sufficient Delta inflows and outflows are available to meet the needs of Delta smelt, longfin smelt, migrating Chinook salmon, and other flow-dependent species.
- Floodplain inundation: Diversions must not reduce the frequency or duration of inundation of the Yolo Bypass and the Sutter Bypass, as floodplain inundation is beneficial for rearing salmon, migratory birds, and other wildlife.
- Overhead powerlines: Any new overhead powerlines associated with the project should be sited along exiting transmission corridors and not run along the Delevan National Wildlife Refuge. The power lines should also conform to current Avian Power Line Interaction Committee guidelines.
- Refuge water supplies: Water supply availability for federal, state, and private wildlife refuges must not be negatively affected, and a detailed description of conveyance methods should be provided for any publicly funded Level 4 refuges water supplies.
- Mitigation for construction impacts: Detailed plans must be developed showing how all temporary and permanent impacts of the project on golden eagles, giant garter snakes, vernal pools, and other species and habitats will be mitigated according to law, including appropriate assurances and performance standards.
- Releases of water from Sites Reservoir to the Sacramento River: Additional analysis of the water quality impacts of reservoir releases is necessary, given concerns regarding water temperature, algal blooms, and other water quality parameters.

Authority Response

During the preparation of the Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement, the Authority and Reclamation (as the federal lead agency) took into consideration all the concerns raised in the criteria listed above. To address the more restrictive operational criteria proposed by NRDC, the Authority conducted a sensitivity analysis that included a model run using the NRDC criteria (see Attachment C and tables for the output for ALT A1 092220 rev03 NRDC1). As shown in Attachment C, this analysis indicated that under these criteria, the release from Sites Reservoir would be, on average, 131 thousand acre-feet (“TAF”) per year, including 14 TAF for refuge water supply and 21 TAF for Yolo Bypass habitat.

The results of this modeling were then used by the Authority’s financial experts (Montague DeRose and Associates) to calculate a cost per acre foot (AF) for this alternative operational scenario. The calculations were as follows:

From: Brian Grubbs <grubbs@montaguederose.com>
Sent: Friday, October 30, 2020 2:14 PM
To: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Cc: JP Robinette <JRobinette@brwnald.com>; Doug Montague <montague@montaguederose.com>
Subject: RE: Cost per Acre-Foot under NRDC Criteria

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

Erin,

Since the cost hasn’t changed and the funding hasn’t changed the breakout by state and local should be the same. So for 131TAF, 109.5 TAF for participants, and 21.5 TAF for the state. I provided the comparison with the last VP7 case so you can verify I’m providing the right value. This is all-in total cost (debt service + O&M&R – revenue)

VP 7: \$3.037B, 1,000cfs, 1.5 MAF			
release amount	243 TAF	131 TAF	difference
w/o WIFIA			
\$/AF (2020\$)	661	1,185	524
with WIFIA			
\$/AF (2020\$)	611	1,093	482

1

As noted in the Final EIR/EIS, in both Appendix 2B, *Additional Alternatives Screening and Evaluation*, and Master Response 9, *Alternatives Development*:

- In the 2019 and 2020 timeframe and in response to discussions with NGOs, the Authority also conducted a sensitivity analysis to determine if the Project would be viable with the following operating criteria met prior to the Project being able to divert:
- (1) bypass flows of at least 15,000 cfs past all diversion locations October through June;
 - (2) bypass flows of at least 35,000 cfs at Freeport October through June; and
 - (3) Delta

outflow ranging from 42,800 cfs to 44,500 cfs in January through June. Based on these criteria, Project deliveries were reduced to a long-term average annual delivery of 131,000 AF. This resulted in Project per AF costs increasing by \$480 to \$525/AF above the costs estimated in the Value Planning Report. This scenario also resulted in a long-term average of 35,000 AF for Proposition 1 benefits, reducing the overall Project environmental benefits substantially and increasing the cost of the environmental benefits to a point that they would likely no longer result in a cost/benefit ratio sufficient to qualify for Proposition 1 funding. Due to the substantial increase in costs and the virtual elimination of the environmental benefits of the Project, this scenario was not considered for further analysis.

The results of the EIR/EIS analysis were shared with the NGOs in subsequent discussions and in a series of small group meetings prior to the release of the RDEIR/SDEIS.

Attachment A

Alicia Forsythe

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 30, 2020 1:23 PM
To: Alicia Forsythe
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Thanks Ali. I think it'd be great to include them in the meeting (both of them were involved in developing the attachment to your email this am).

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 30, 2020 1:21 PM
To: Obegi, Doug <dobegi@nrdc.org>
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Rachel Zwillinger asked if it would be okay to add in Gary Bobker and Grey Reis from TBI to the doodle poll and meeting. They were not on the email trail and thus, I haven't sent them the doodle poll. Let me know your preference. I am comfortable either way -- just wanted to check with you first.

Ali

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

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 30, 2020 9:27 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com) <john.spranza@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Thanks Ali. I'll fill out the Doodle poll.

Best,
Doug

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, September 30, 2020 8:57 AM
To: Obegi, Doug <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>; Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>;

jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com)

<john.spranza@hdrinc.com>; Heydinger, Erin <Erin.Heydinger@hdrinc.com>

Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug and all – I'd like to schedule some time to discuss and confirm the operational criteria that you all would like to see modelled. Please complete the doodle poll below so I can get a meeting for us on the calendar.

<https://www.doodle.com/poll/cpnk5pqs82d48vga>

Also, I believe the attached document is the most recent / up to date that we have in our files on the groups thoughts. I was thinking we can start our discussion with this document and go from there. Please let me know if there is something more recent we should be reviewing.

Ali

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aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe

Sent: Monday, September 21, 2020 6:32 PM

To: 'Obegi, Doug' <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>

Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org

Subject: RE: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Doug – Thanks for your email and for watching our agendas / keeping up to date with the project.

I want to assure you that we have not changed our position from my June email. We will have Jacobs evaluate at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. Jacobs is working on a number of revisions to the Sites Calsim model, including modifications to the baseline, which we expect to be completed in the coming weeks. We will reach out to you soon for a meeting in October to discuss where we are on operational criteria along with confirming the criteria that you would like to see modelled.

Once we have the modifications to the Calsim model completed, we will run a series of analyses using the results of Calsim to test the operational criteria and resulting effects to juvenile salmon. These include follow on modeling (that uses the output of the Calsim modeling), such as DSM2 and OBAN, along with spreadsheet analyses based on recent scientific papers – many of which you cite below.

We truly appreciate your input and I will be reaching out in a few weeks to schedule some time to chat in October.

Ali

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From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, September 16, 2020 9:28 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org
Subject: CEQA range of alternatives for Sites Project being considered at Authority BOD meeting tomorrow

Dear Ali and Jerry,

I hope you're both hanging in there these days, and that you and your families are all safe and sound between fires, hazardous air quality, COVID, and everything else that is making 2020 suck.

I'm writing about the proposal to select a preferred alternative for the Sites Project at tomorrow's meeting of the Authority's Board of Directors (https://3hm5en24txyp2e4cxyxaklbs-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/02-03-EIR_EIS-Selection-of-Preferred-Project-for-Purposes-of-CEQA.pdf). It appears from the memo to the Board of Directors that the CEQA document will only consider 2 alternatives, with identical operational parameters for those alternatives (meaning that there are no operational alternatives being considered). The memo further states that the preferred alternative will be the basis for the application for a biological opinion and a CESA incidental take permit. I strongly urge the Board and staff at the Authority to take a different approach.

First, considering only a single operational scenario would violate CEQA's mandate to consider a reasonable range of alternatives, a point that state agencies have also made previously with respect to the environmental review for this project. So I hope that I'm misunderstanding the memo to the Board in concluding that this is the only operational alternative that is being considered. In addition, that approach is inconsistent with our last email exchange in June, where you stated that:

"We will have Jacobs conduct an analysis of at least one set of operational criteria that are similar to (or the same as) what you have proposed. We will work with you, TBI, and others to confirm these criteria before we model them. This analysis will be in the Revised Draft EIR/EIS. However, based on analyses we completed last summer / fall, we expect these criteria to result in a project that's not affordable and provides very little water to accomplish the project objectives. Thus, we don't anticipate that this will result in an alternative that we would carry forward for detailed analysis in the Revised EIR as we don't anticipate it to result in a feasible project."

I'm unaware of any such discussions to refine one or more operational alternatives since our email exchange in June. Has the Authority decided not to model any such alternatives? In addition, is the Authority not planning to model an alternative that is consistent with the SWRCB's 55% of unimpaired flow proposal from the July 2018 Framework (https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/sed/sac_delta_framework_070618%20.pdf)? In addition to violating CEQA, the failure to include analysis of these or similar alternatives should preclude state agencies from relying on the CEQA document for a water rights proceedings and for CESA permitting.

Second, as we have previously emphasized, the proposed operations being considered would significantly harm juvenile salmon migrating down the Sacramento River in the winter and spring months, as the best available science

demonstrates a very strong flow: survival relationship for juvenile fall-run, spring-run, and winter-run Chinook salmon in the upper, middle, and lower Sacramento River and in the Delta (see citations below), and it would harm Longfin Smelt and other species downstream as a result of reducing Delta outflow during these months.

I strongly urge the Board to consider a reasonable range of alternatives that includes more protective operational parameters, including an alternative that is consistent with the SWRCB's 55% of unimpaired flow framework for the Sacramento River and an alternative similar to the operations that we have previously proposed. We remain willing to work with you to refine such an alternative.

Thank you for consideration of our views.

Sincerely,
Doug

Citations:

- Stuart Munch et al 2020. *Science for integrative management of a diadromous fish stock: interdependencies of fisheries, flow and habitat restoration*, Can. J. Fish. Aquat. Sci. 77: 1487–1504 (2020) [dx.doi.org/10.1139/cjfas-2020-0075](https://doi.org/10.1139/cjfas-2020-0075);
- Michel, Cyril 2019. *Decoupling outmigration from marine survival indicates outsized influence of streamflow on cohort success for California's Chinook salmon populations*, Can. J. Fish. Aquat. Sci. 76: 1398–1410 (2019) [dx.doi.org/10.1139/cjfas-2018-0140](https://doi.org/10.1139/cjfas-2018-0140);
- Friedman, W. R. et al. 2019. *Modeling composite effects of marine and freshwater processes on migratory species*. Ecosphere 10(7):e02743. 10.1002/ecs2.2743;
- Mark Henderson et al, 2018. *Estimating spatial-temporal differences in Chinook salmon outmigration survival with habitat and predation related covariates*. Can. J. Fish. Aquat. Sci. 76(9): 1549-1561, <https://doi.org/10.1139/cjfas-2018-0212>;
- Notch, Jeremy et al 2020. *Outmigration survival of wild Chinook salmon smolts through the Sacramento River during historic drought and high water conditions*. Environ Biol Fish, <https://doi.org/10.1007/s10641-020-00952-1>
- Russell Perry et al 2018. *Flow-mediated effects on travel time, routing, and survival of juvenile Chinook salmon in a spatially complex, tidally forced river delta*. Can. J. Fish. Aquat. Sci. 75(11): 1886-1901, <https://doi.org/10.1139/cjfas-2017-0310>.

DOUG OBEGI

Senior Attorney*
Water Program

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Please save paper.
Think before printing.

* *Admitted to practice in California*

Alicia Forsythe

From: Obegi, Doug <dobegi@nrdc.org>
Sent: Wednesday, October 28, 2020 8:42 AM
To: Alicia Forsythe; Jerry Brown; Ron Stork (RStork@friendsoftheriver.org); Zwillinger, Rachel (Mail Contact); Barry Nelson (barry@westernwaterstrategies.com); Glen Spain; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com); Heydinger, Erin; bobker@bay.org; Greg Reis
Subject: RE: Sites - Operational Criteria for Modeling Efforts
Attachments: Sites_Environmental minimums_8.6.18.pdf

Hi Ali,

Sorry for the delay in responding, and thank you for following up. Given your answers about the modeling capabilities w/r/t floodplain inundation and Delta outflow, it appears that the Sites team can model the operational criteria in the attached document. It didn't sound like you had any questions about the Sacramento River bypass flow criteria (Freeport and at points of diversion) in the attachment, which should be pretty straightforward to model. And with respect to floodplain inundation and Delta outflow specifically:

- 1) Floodplain inundation: Model operations to ensure no changes to the frequency and duration of flood flows into the Yolo Bypass and Sutter Bypass (per our criteria on page 1). We recognize this will be an approximation, which I assume involves some post-processing analysis of the CALSIM results; and,
- 2) Delta outflow: use the criteria from pages 2 and 3 (including both the minimum Delta outflow requirements on page 3 and the maximum diversion rate as a percentage of NDOI on page 2).

Does that make sense? Please let us know if you have questions. And we appreciate you following up on the other questions as well.

Thanks,
Doug

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, October 20, 2020 12:02 PM
To: Obegi, Doug <dobegi@nrdc.org>; Jerry Brown <jbrown@sitesproject.org>; Ron Stork (RStork@friendsoftheriver.org) <RStork@friendsoftheriver.org>; Zwillinger, Rachel (Mail Contact) <rzwillinger@defenders.org>; Barry Nelson (barry@westernwaterstrategies.com) <barry@westernwaterstrategies.com>; Glen Spain <fish1ifr@aol.com>; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com) <john.spranza@hdrinc.com>; Heydinger, Erin <erin.heydinger@hdrinc.com>; bobker@bay.org; Greg Reis <greg@bayecotarium.org>
Subject: RE: Sites - Operational Criteria for Modeling Efforts

All – Thanks for the good discussion on the status of the Sites modeling effort and operational criteria that you would like to see modeled. Below are the responses to the two questions that I had as near-term action items for the Sites team.

1. Is there a way to tie Sites diversion criteria to changes in frequency and duration of flows into the bypass system? What “knobs” do we have to turn with regard to flows into the bypass system in the model? – Yes, but this is an approximation using the Calsim model. Calsim can tell us the months and amounts of flows in the bypasses and we can assess those changes. But as Calsim is a monthly timestep, it will spread these changes over the month.

2. Can Sites diversion be ramped based on Delta outflow? Meaning, can we have a “diversion table” ramping that is tied to Delta outflow? Yes, we can do this with the Sites Calsim model.

We are ready to run your proposed criteria through the Sites Calsim model. Please let us know what you would like to see modeled. If we could have your criteria by October 27, that would be helpful.

Also, I had the additional following action items, that we will continue to follow up on:

1. What is Sites’ FERC exemption approach?
2. What would be the changes / effects on temperatures as a result of Sites releases into the Sacramento River and Yolo Bypass?
3. The group would like a better sense of the ecosystem benefits and how those benefits would be realized.
4. Will Sites be running an operational scenario assuming the State Board’s proposed 55% unimpaired outflow?
5. Schedule a future meeting focused on terrestrial species impacts and mitigation measures.

We continue to follow up on these items and will circle back on them. Let me know if there are any other action items I missed.

Ali

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

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-----Original Appointment-----

From: Alicia Forsythe

Sent: Friday, October 2, 2020 10:57 AM

To: Alicia Forsythe; Obegi, Doug; Jerry Brown; Ron Stork (RStork@friendsoftheriver.org); Zwillinger, Rachel (Mail Contact); Barry Nelson (barry@westernwaterstrategies.com); Glen Spain; jon@baykeeper.org; brandon.dawson@sierraclub.org; John Spranza (john.spranza@hdrinc.com); Heydinger, Erin; bobker@bay.org; Greg Reis

Subject: Sites - Operational Criteria for Modeling Efforts

When: Thursday, October 8, 2020 1:00 PM-2:30 PM (UTC-08:00) Pacific Time (US & Canada).

Where: Microsoft Teams Meeting

Update on 10/8 – Added Agenda

Discuss and confirm the operational criteria that you all would like to see modelled. We can use the attached as a basis for our discussion if that works for the group.

[Join Microsoft Teams Meeting](#)

+1 916-538-7066 United States, Sacramento (Toll)

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SITES RESERVOIR: CRITERIA FOR AN ENVIRONMENTALLY RESPONSIBLE PROJECT

- Upper Sacramento River bypass flows: Flows of at least 15,000 cfs past all Sacramento River points of diversion for Sites Reservoir are required prior to the diversion of water into the reservoir during the months of October to June to protect out-migrating juvenile salmonids. (See Table A)
- Lower Sacramento River flows: Diversions of water into the reservoir should not occur from October to June unless flows at Freeport are greater than 35,000 cfs. Lower Sacramento River bypass flows in October and June shall be based on real time monitoring for salmonids. (See Table A)
- Flows for the San Francisco Bay-Delta Estuary: Per Table B, diversions of water into the reservoir should occur only when sufficient Delta inflows and outflows are available to meet the needs of Delta smelt, longfin smelt, migrating Chinook salmon, and other flow-dependent species.
- Floodplain inundation: Diversions must not reduce the frequency or duration of inundation of the Yolo Bypass and the Sutter Bypass, as floodplain inundation is beneficial for rearing salmon, migratory birds, and other wildlife.
- Overhead powerlines: Any new overhead powerlines associated with the project should be sited along exiting transmission corridors and not run along the Delevan National Wildlife Refuge. The power lines should also conform to current Avian Power Line Interaction Committee guidelines.
- Refuge water supplies: Water supply availability for federal, state, and private wildlife refuges must not be negatively affected, and a detailed description of conveyance methods should be provided for any publicly funded Level 4 refuges water supplies.
- Mitigation for construction impacts: Detailed plans must be developed showing how all temporary and permanent impacts of the project on golden eagles, giant garter snakes, vernal pools, and other species and habitats will be mitigated according to law, including appropriate assurances and performance standards.
- Releases of water from Sites Reservoir to the Sacramento River: Additional analysis of the water quality impacts of reservoir releases is necessary, given concerns regarding water temperature, algal blooms, and other water quality parameters.

Table A: Sites Reservoir bypass flows triggered by Sacramento River fish and wildlife protections

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Notes
Sacramento River at Freeport	real time	35,000 cfs	35,000 cfs	35,000 cfs	35,000 cfs	35,000 cfs	35,000 cfs	35,000 cfs	real time				Based on NGO proposed WaterFix minimum bypass flow of 35,000 cfs at Freeport Nov-May. The 35,000 cfs bypass flow is also in effect in Oct and Jun if real time observations show salmon are present.
Sacramento River at all Points of Diversion for	15000 cfs	15000 cfs	15000 cfs	15000 cfs	15000 cfs	15000 cfs	15000 cfs	15000 cfs	15000 cfs				Minimum bypass flow. Based on CDFW 2016 recommendation.
Max diversion rate	2% / 5%	2% / 5%	2% / 5%	2% / 5%	2% / 5%	2% / 5%	2% / 5%	2% / 5%	2% / 5%				When Net Delta Outflow Index (NDOI) is above minimum flows identified in Table A and Table B but below 60,000 cfs, diversions to Sites limited to a maximum of 2% of the river flow. When NDOI exceeds 60,000 cfs, diversions to Sites limited to 5% of Sacramento River flow.

Table B: Sites Reservoir bypass flows triggered by downstream water quality protections

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Notes
Delta Outflow				42,800 cfs		44,500 cfs			42,800 cfs				Bypass flow, based on longfin smelt flow need but will benefit salmon and other species as well (SWRCB 2017)
	11,400 cfs in W and AN years, 7,400 cfs all other yr types	11,400 cfs in W and AN years, 7,400 cfs all other yr types								7,100 cfs	7,100 cfs	11,400 cfs in W and AN years, 7,400 cfs all other yr types	Bypass flow, consistent with proposed NGO terms and conditions for California Water Fix regarding Delta Smelt
X2	74 km (W) or 81 km (AN)	No diversions in AN or W years	No diversions of X2-related releases in AN or W years									74 km (W) or 81 km (AN)	No diversions when diversions would result in noncompliance with current Delta smelt RPA requirements to maintain Fall X2 position in Sept-Dec period following a W or AN year
OMR, E:I, etc.	Water supply releases, water transfers, and refuge releases for SOD delivery are subject to all water quality and endangered species protections in the Delta.												

PRELIMINARY - NOT FOR DISTRIBUTION

Deliveries Table

Deliveries (TAF/year) (above No Project Alternative conditions) ^a	ALT A1 092220 rev03 NRDC1		ALT A1 092220 rev03 Scn B		ALT A1 092220 rev03 PEA	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
Alternative Facilities	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)	
Authority Deliveries in SWP Service Area	76	171	84	201	95	234
SOD Ag	0	0	0	0	0	0
SOD M&I	10	20	4	12	2	12
SOD WTS	65	151	80	188	93	222
Authority Deliveries in CVP Service Area	17	35	21	43	24	48
NOD Ag	17	35	21	43	24	48
Reclamation Deliveries from CVP Operational Flexibility	-9	-6	-3	2	-3	-4
NOD Ag	-3	-3	-3	-2	-4	-4
NOD M&I	-1	0	0	0	0	0
SOD Ag	-5	-4	1	4	1	1
SOD M&I	0	0	0	0	0	0
Sub-Total Supplemental Deliveries for Water Supply	84	199	102	246	115	278
Refuge Water Supply	12	21	18	32	22	39
NOD	3	4	4	6	5	7
SOD	9	18	14	26	17	32
Yolo Bypass Habitat Water Supply	18	5	30	9	36	16
Total Deliveries	114	226	150	287	173	333

Storage Increases (TAF) (above No Project Alternative conditions) ^a	ALT A1 092220 rev03 NRDC1		ALT A1 092220 rev03 Scn B		ALT A1 092220 rev03 Scn B	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
Additional end-of-September storage	34	41	60	79	68	91
Trinity	1	2	1	2	1	2
Shasta	-15	-17	-8	-9	-10	-17
Oroville	47	57	70	93	81	115
Folsom	1	-1	-2	-7	-4	-10

Authority Deliveries in SWP Service Area	66%	76%	56%	70%	55%	70%
Authority Deliveries in CVP Service Area	15%	15%	14%	15%	14%	14%
Reclamation Deliveries from CVP Operational Flexibility	-8%	-3%	-2%	1%	-2%	-1%
Refuge Water Supply	11%	9%	12%	11%	13%	12%
Yolo Bypass Habitat Water Supply	16%	2%	20%	3%	21%	5%
	100%	100%	100%	100%	100%	100%

Portion of total additional end-of-September storage						
Trinity	2%	5%	1%	3%	1%	2%
Shasta	-42%	-40%	-13%	-12%	-15%	-18%
Oroville	137%	137%	116%	118%	120%	127%
Folsom	4%	-3%	-4%	-9%	-6%	-11%
	100%	100%	100%	100%	100%	100%

Notes:

^a Values shown are the net change between the Project Alternative and No Project Alternative

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

PRELIMINARY - NOT FOR DISTRIBUTION

Sites Fills Table

Fills (TAF/year)	ALT A1 092220 rev03 NRDC1		ALT A1 092220 rev03 Scn B		ALT A1 092220 rev03 PEA	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
Alternative Facilities	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)	
Fills to Authority Deliveries in SWP Service Area	94	7	117	35	130	57
Fills to Authority Deliveries in CVP Service Area	22	4	26	8	31	13
Fills to Reclamation Deliveries from CVP Operational Flexibility	0	0	0	0	0	0
Fills to Refuge Water Supply	15	1	22	6	26	11
Fills to Yolo Bypass Habitat Water Supply	21	1	35	7	44	17
Total Fill	152	12	200	56	230	99

Fills to Authority Deliveries in SWP Service Area	62%	55%	59%	62%	57%	58%
Fills to Authority Deliveries in CVP Service Area	15%	31%	13%	13%	13%	13%
Fills to Reclamation Deliveries from CVP Operational Flexibility	0%	0%	0%	0%	0%	0%
Fills to Refuge Water Supply	10%	8%	11%	11%	11%	11%
Fills to Yolo Bypass Habitat Water Supply	14%	6%	18%	13%	19%	17%
	100%	100%	100%	100%	100%	100%

Notes:

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

PRELIMINARY - NOT FOR DISTRIBUTION

Sites Releases Table

Releases (TAF/year)	ALT A1 092220 rev03 NRDC1		ALT A1 092220 rev03 Scn B		ALT A1 092220 rev03 PEA	
	Average	Dry and Critical	Average	Dry and Critical	Average	Dry and Critical
Alternative Facilities	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)		1.5-MAF Reservoir Dunnigan Pipeline (outlet only)	
Releases for Authority Deliveries in SWP Service Area	0	0	0	0	0	0
Releases for Authority Deliveries in SWP Service Areas through WTS	79	155	97	193	110	226
Releases for Authority Deliveries in CVP Service Area	17	35	21	43	24	48
Releases for Reclamation Deliveries from CVP Operational Flexibility	0	0	0	1	0	0
Releases for Refuge Water Supply	14	23	20	32	24	40
Releases for Yolo Bypass Habitat Water Supply	21	6	34	11	42	18
Total Releases	131	219	172	279	200	331

Releases for Authority Deliveries in SWP Service Area	0%	0%	0%	0%	0%	0%
Releases for Authority Deliveries in SWP Service Areas through WTS	60%	71%	56%	69%	55%	68%
Releases for Authority Deliveries in CVP Service Area	13%	16%	12%	15%	12%	14%
Releases for Reclamation Deliveries from CVP Operational Flexibility	0%	0%	0%	0%	0%	0%
Releases for Refuge Water Supply	11%	10%	12%	11%	12%	12%
Releases for Yolo Bypass Habitat Water Supply	16%	3%	20%	4%	21%	6%
	100%	100%			100%	100%

Notes:

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

PRELIMINARY - NOT FOR DISTRIBUTION

Sites Storage Allocation Table

Storage Volumes (TAF)	ALT A1 092220 rev03 NRDC1	ALT A1 092220 rev03 Scn B	ALT A1 092220 rev03 PEA
Alternative Facilities	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)	1.5-MAF Reservoir Dunnigan Pipeline (outlet only)
Authority Deliveries in SWP Service Area	946	946	946
Authority Deliveries in CVP Service Area	190	190	190
Reclamation Deliveries from CVP Operational Flexibility	0	0	0
Refuge Water Supply	124	124	124
Yolo Bypass Habitat Water Supply	120	120	120
Dead Pool Storage	120	120	120
Total Storage	1500	1500	1500

Authority Deliveries in SWP Service Area	63%	63%	63%
Authority Deliveries in CVP Service Area	13%	13%	13%
Reclamation Deliveries from CVP Operational Flexibility	0%	0%	0%
Refuge Water Supply	8%	8%	8%
Yolo Bypass Habitat Water Supply	8%	8%	8%
Dead Pool Storage	8%	8%	8%

Notes:

Results are dependent on storage allocations