

From: [Oliver, Mark/RDD](#)
To: [Black, Lyna/RDD](#); [Kane, Clare/SDO](#); [Chilmakuri, Chandra Sekhar/SAC](#); [Leaf, Rob/SAC](#); [Buchholz, Gwendolyn/SAC](#)
Cc: [Tull, Robert/SAC](#)
Subject: FW: NRDC et al comments on Sites DEIR/DEIS [EXTERNAL]
Date: Tuesday, January 16, 2018 8:11:40 AM
Attachments: [NRDC et al Sites DEIR comments 1-15-18.pdf](#)
[Exhibit A to NRDC et al comments.pdf](#)
[Exhibit B to NRDC et al comments.pdf](#)
[Exhibit C to NRDC et al comments.pdf](#)

Morning all – not sure if Rob Tull forwarded to the modeling team and Gwen. Haven't cracked this one open yet but will be in touch thanks!

Mark

From: Rob Thomson [mailto:rthomson@sitesproject.org]
Sent: Monday, January 15, 2018 8:31 PM
To: Oliver, Mark/RDD <Mark.Oliver@CH2M.com>; Black, Lyna/RDD <Lyna.Black@CH2M.com>
Cc: Tull, Robert/SAC <Robert.Tull@CH2M.com>
Subject: FW: NRDC et al comments on Sites DEIR/DEIS [EXTERNAL]

For our files.

RT2 – looks like a bunch of work to update our current analyses

From: Greg Reis [<mailto:reis@bay.org>]
Sent: Monday, January 15, 2018 5:36 PM
To: Rob Thomson <rthomson@sitesproject.org>
Cc: Jim Watson <jwatson@sitesproject.org>
Subject: FW: NRDC et al comments on Sites DEIR/DEIS

Hi Rob,

I just wanted to confirm that you received this. Please let me know as soon as possible.

Thanks,

Greg

Greg Reis

Scientist, Rivers and Estuary Program

The Bay Institute / bay.org

Mobile: [415-342-6390](tel:415-342-6390)

Our mission is to protect, restore and inspire the conservation of San Francisco Bay and its watershed, from the Sierra to the sea.

From: Greg Reis
Sent: Monday, January 15, 2018 10:32 AM
To: 'EIR-EIS-Comments@SitesProject.org' <EIR-EIS-Comments@SitesProject.org>
Subject: NRDC et al comments on Sites DEIR/DEIS

Dear Mr. Rob Thomson and Mr. Michael Dietl,

The comments of NRDC, DOW, TBI, PCFFA, IFR, CBD, and GGSA on the Sites Reservoir DEIR/DEIS are attached to this email, along with Exhibits A, B, and C. Please acknowledge receipt.

Thank you,

Greg Reis

Greg Reis

Scientist, Rivers and Estuary Program

The Bay Institute / bay.org

Mobile: [415-342-6390](tel:415-342-6390)

Our mission is to protect, restore and inspire the conservation of San Francisco Bay and its watershed, from the Sierra to the sea.



January 15, 2018

Jim Watson
Sites Project Authority
P.O. Box 517
Maxwell, CA 95955

Michael Dietl
U.S. Bureau of Reclamation
Mid-Pacific Region
2800 Cottage Way
Sacramento, CA 95825

Sent via email to: EIR-EIS-Comments@SitesProject.org

Re: Comments on Sites Reservoir Project Draft Environmental Impact Statement and Environmental Impact Report

Dear Mr. Watson and Mr. Dietl,

This letter is submitted as the comments of the Natural Resources Defense Council, Defenders of Wildlife, The Bay Institute, Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources, Center for Biological Diversity, and Golden Gate Salmon Association on the Draft Environmental Impact Statement and Draft Environmental Impact Report for the Sites Reservoir Project ("DEIS/DEIR"). Our organizations have worked for decades to improve the health of the San Francisco Bay-Delta and its watershed, and are dedicated to protecting and restoring fish and wildlife populations and habitats that the proposed Sites Reservoir Project would affect. Our organizations have not taken a formal position on the Sites Reservoir project, in large part because of the absence of reliable information regarding potential impacts on fish and wildlife beneficial uses in the estuary and watershed, including potential impacts to several species on the brink of extinction.

To evaluate the potential impacts and benefits of this project, it is essential that the DEIS/DEIR provides a meaningful and accurate assessment of the project's potential effects. After reviewing the DEIS/DEIR, however, we are concerned that the document suffers from several flaws that substantially undermine its informational value for decision makers and the public. Among other problems, the DEIS/DEIR fails to consider a reasonable range of alternatives, uses an inaccurate environmental baseline, and does not adequately assess climate change impacts. It also fails to adequately analyze impacts to aquatic species like Chinook salmon, Delta smelt, and longfin smelt, and terrestrial species like giant garter snakes and migratory birds, fails to disclose significant impacts of the project to these and other species, and inappropriately defers the formulation of mitigation measures. Because the modifications necessary to remedy these and other flaws are substantial and the revised document will include significant new information, the revised DEIS/DEIR should be recirculated in order to provide the public with a more meaningful opportunity to assess the project's impacts and submit comments.

I. The DEIS/DEIR Fails to Consider a Reasonable Range of Alternatives

The California Environmental Quality Act ("CEQA") and the National Environmental Policy Act ("NEPA") require that the DEIS/DEIR consider a reasonable range of alternatives. Cal. Pub. Res. Code §§ 21002, 21061, 21100; tit. 14, Cal. Code Regs. ("CEQA Guidelines") § 15126.6; 42 U.S.C. § 4332; 40 C.F.R. §§ 1502.1, 1502.14, 1508.25(b). However, the DEIS/DEIR fails to consider a reasonable range of alternatives because it only considers a single operational alternative, whereas other operational alternatives could reduce or avoid adverse environmental impacts.¹ The failure to include any operational alternatives that could reduce or avoid adverse environmental impacts violates NEPA and CEQA. *See, e.g., Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal.3d 553, 566 (1990) (EIR must consider a reasonable range of alternatives that offer substantial environmental benefits and may feasibly be accomplished); *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 813 (9th Cir. 1999) (NEPA analysis failed to consider reasonable range of alternatives where it "considered only a no action alternative along with two virtually identical alternatives"); *Natural Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005).

Alternatives that result in comparatively reduced water diversions from the Sacramento River (particularly during all but Wet water year types and during periods of moderate and low flows) are reasonable and feasible, would result in reduced adverse effects on native fish and wildlife in the Sacramento River and Bay-Delta estuary, and should have been evaluated in the DEIS/DEIR. The best available science shows that increased flows in the Sacramento River during the winter-

¹ In addition, the DEIS/DEIR improperly claims that it tiers off of the 2000 CALFED ROD. *See* DEIS/DEIR at 1-10. This is improper because the CALFED program was superseded by other entities nearly a decade ago, and the programmatic environmental review of CALFED is outdated and inconsistent with more recent scientific information. Reliance on the eighteen-year old CALFED ROD and programmatic EIS/EIR is inappropriate.

spring period and increased Delta outflows are necessary to protect and restore native fish and wildlife populations and their habitats and comply with state and federal law.²

Several commenters, including NRDC *et al* and the California Department of Fish and Wildlife (“CDFW”), submitted NEPA/CEQA scoping comments specifically stating that the DEIS/DEIR must analyze more than one operational alternative in order to identify alternatives that would minimize or avoid adverse environmental impacts of the project. NRDC *et al*’s scoping comments stated that the DEIS/DEIR should evaluate one or more operational scenarios that do not result in substantial reductions in Delta outflow during the winter and spring months, as well as one or more operational alternatives that result in increased Delta outflow during these months. CDFW’s scoping comments directed that several operational scenarios should be analyzed, including one that was consistent with the water operational requirements being proposed for the California WaterFix project³ and another that would fully minimize operational impacts. Moreover, in 2016 and 2017, CDFW submitted potential operational criteria to the project proponents that included Sacramento River bypass flows and Delta outflow requirements that were designed to reduce adverse environmental impacts of the project on salmon, sturgeon, longfin smelt, Delta smelt, and other native fish species. *See* Exhibit A.⁴

However, none of these proposed operational criteria were evaluated in the DEIS/DEIR. Instead, the DEIS/DEIR only analyzes a single operational scenario in the alternatives that are analyzed. *See, e.g.*, DEIS/DEIR at 3-102, 105-107. As discussed on the pages that follow, that operational scenario results in significant adverse environmental impacts and could not lawfully be permitted by state and federal agencies. As a result, the DEIS/DEIR violates NEPA and CEQA because it fails to consider a reasonable range of alternatives.

² As the DEIS/DEIR mentions, the State Water Resources Control Board (“SWRCB”) is updating the Bay-Delta Water Quality Control Plan, and the SWRCB’s 2016 draft scientific basis report recommends increasing Sacramento River flows and Delta outflow to protect native fish and wildlife. *See* DEIS/DEIR at 2-12. The SWRCB’s final scientific basis report was peer reviewed and released to the public in October 2017, and it also recommends increased Delta outflow to protect fish and wildlife. The DEIS/DEIR should evaluate one or more operational alternatives that are consistent with the flow recommendations in the final scientific basis report, such as an alternative that requires Sacramento River flows and Delta outflows that are 65 percent and 75 percent of unimpaired flow (while meeting existing summer/fall outflow requirements of D-1641, and the 2008 Delta Smelt biological opinion).

³ For instance, the final California Endangered Species Act (“CESA”) permit for the California WaterFix project prohibits diversions from the Delta when Delta outflows are less than 44,500 cfs during the months of March, April and May, and the CESA permit and NMFS biological opinion require cessation of diversions from the North Delta when salmon are migrating in the lower Sacramento River and flows in the lower Sacramento River are less than 35,000 cfs.

⁴ The documents provided by CDFW that are included as Exhibit A were obtained pursuant to a California Public Records Act request filed by NRDC in 2017.

In addition, NRDC *et al* and others submitted NEPA/CEQA scoping comments stating that the DEIS/DEIR must consider one or more alternatives that did not include a surface water reservoir and instead relied on groundwater storage, conjunctive use, and/or reoperation of reservoirs to improve water supplies and ecosystem protection. Such an alternative would likely cost dramatically less money to construct and operate, and could result in lower environmental impacts, making it a potentially feasible and reasonable alternative. However, the DEIS/DEIR failed to consider such an alternative, in violation of NEPA and CEQA.

II. The Bureau of Reclamation has Violated the Fish and Wildlife Coordination Act in Preparing the DEIS/DEIR

The Fish and Wildlife Coordination Act (“FWCA”) requires that the Bureau of Reclamation consult with and fully consider recommendations from the U.S. Fish and Wildlife Service (“FWS”), National Marine Fisheries Service (“NMFS”), and CDFW regarding potential project alternatives and mitigation measures that could reduce or mitigate adverse environmental impacts. 16 U.S.C. §§ 661 *et seq.* The FWCA also requires the Bureau of Reclamation to include the mandatory FWCA report as part of the DEIS/DEIR. *Id.* § 662. The FWCA report must estimate wildlife benefits and losses from the potential project, *id.* § 662(f), and must include proposed measures to reduce or avoid such impacts, *id.* § 662(a)-(b). The DEIS/DEIR acknowledges the duty to consult with state and federal fish and wildlife agencies pursuant to the FWCA. DEIS/DEIR at 4-11. However, the DEIS/DEIR does not include the mandatory FWCA report, fails to consider the recommendations of CDFW, *see* Exhibit A, and fails to demonstrate that the Bureau of Reclamation consulted with FWS and NMFS as required by the FWCA. Indeed, the DEIS/DEIR states that, “FWS will coordinate with CDFW and NMFS and solicit recommendations for the action agency to consider for the conservation or improvement of fish and wildlife habitat for any or all species during the life of the project.” DEIS/DEIR at 4-11. If the Bureau of Reclamation had consulted with NMFS as required by the Fish and Wildlife Coordination Act, the DEIS/DEIR could have evaluated the Sacramento River flow criteria that NMFS has prepared in order to reduce or avoid impacts to salmon. *See* Exhibit B.⁵

In preparing the DEIS/DEIR, the Bureau of Reclamation has violated the FWCA by failing to include the mandatory FWCA report, failing to demonstrate consultation with federal fish and wildlife agencies, and by failing to meaningfully consider the recommendations of CDFW. In order to comply with the FWCA, the DEIS/DEIR must be revised to meaningfully consider the recommendations of state and federal wildlife agencies and to include the mandatory FWCA report. Because the Bureau of Reclamation has deprived the public of the opportunity to review the FWCA report during the public comment period on the DEIS, Reclamation must reopen the public comment period upon release of the required report.

⁵ The presentation from NMFS that is included as Exhibit B was obtained pursuant to a Freedom of Information Act request filed by NRDC in 2017.

III. The DEIS/DEIR Fails to Use an Accurate Environmental Baseline to Evaluate Potential Environmental Impacts of the Proposed Project

Under both NEPA and CEQA, the DEIS/DEIR must evaluate the potential environmental impacts of the project as compared to the existing environmental conditions (the “environmental baseline”), so that the Project’s environmental impacts can be meaningfully analyzed and compared to alternatives. 40 C.F.R. § 1502.15; CEQA Guidelines § 15125(a); *see County of Amador v. El Dorado County Water Agency*, 76 Cal.App.4th 931, 952 (1999); *Neighbors for Smart Rail v. LA County Metropolitan Transit Authority*, 57 Cal. 4th 310, 315 (2013). In general, the environmental conditions at the time the Notice of Preparation (“NOP”) are issued constitute the environmental baseline. CEQA Guidelines § 15125(a). However, when an analysis based on existing conditions would be misleading to the public, CEQA requires use of a different baseline in order to give the public and decision makers the most accurate analysis of the project’s likely impacts. *Neighbors for Smart Rail*, 57 Cal. 4th at 449, 457. In particular, when environmental conditions will be improved in the near future as compared to existing conditions, the use of the existing conditions baseline would be misleading and contrary to CEQA. *Id.* at 453, fn. 5.

In this instance, substantial evidence demonstrates that the use of the existing baseline conditions, which excludes mandatory permit conditions imposed to protect the environment, misleads the public and decision makers as to the actual environmental impacts, and that in this case the environmental impacts should be assessed against an environmental baseline that includes these regulatory requirements. *See Communities for a Better Environment v. South Coast Air Management District*, 48 Cal.4th 310, 322-326, 328 (2010); *Neighbors for Smart Rail*, 57 Cal. 4th at 451-453. The environmental baseline used in the DEIS/DEIR fails to include several existing permit requirements that were imposed before issuance of the NOP, and which will be implemented before the proposed project could be constructed and operational in 2030.

Most importantly, the environmental baseline in the DEIS/DEIR fails to include the proposed amendment to Action Suite I.2 of the Reasonable and Prudent Alternative in the 2009 NMFS biological opinion (“Revised Shasta RPA”).⁶ The Revised Shasta RPA was adopted because the best available science showed that the existing RPA actions were failing to prevent Central Valley Project (“CVP”) operations from jeopardizing the continued existence of Endangered Species Act (“ESA”)-listed salmon and did not use the best available science. The Revised Shasta RPA makes significant changes in CVP operations at Shasta Dam, including requirements that the Bureau of Reclamation maintain higher storage in Shasta reservoir (imposing minimum water storage requirements for the end of April and end of September), as well as colder water temperature requirements in the Sacramento River necessary to protect winter run Chinook

⁶ The Revised Shasta RPA is available online at: http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/nmfs_draft_proposed_2017_rpa_amendment_-_january_19_2017.pdf and is incorporated by reference.

salmon. The Revised Shasta RPA was issued by NMFS on January 19, 2017, and the NOP for the Sites Reservoir project was issued on January 23, 2017. However, the DEIS/DEIR fails to include compliance with the Revised Shasta RPA in the environmental baseline. *See* DEIS/DEIR, Appendix 6A, at 6A-1. As compared to the modeling in the DEIS/DEIR, the Revised Shasta RPA would result in significantly higher reservoir storage in Shasta Reservoir, would maintain a greater volume of cold water for salmonids, and would result in colder water in the Sacramento River during the summer and fall months. *See, e.g.*, NMFS-Reclamation Stakeholder Workshop #3, Shasta RPA Draft Proposed Amendment, June 22, 2017, attached as Exhibit C. Modeling in the DEIS/DEIR shows that baseline conditions and alternatives would not achieve the minimum Shasta reservoir storage requirements under the Revised Shasta RPA. *See, e.g.*, DEIS/DEIR, Appendix 6B, at Table SW-07-3a. Implementation of the Revised Shasta RPA may also result in lower Sacramento River flows during some years, and the proposed project could cause environmental impacts by further reducing flows in the Sacramento River. Because the DEIS/DEIR fails to include these updated permit conditions in the environmental baseline, the DEIS/DEIR misleads the public and decision makers of the potential environmental impacts of the Sites Reservoir project.

Second, the environmental baseline in the DEIS/DEIR fails to include compliance with the Shasta RPA action in the NMFS 2009 biological opinion. *See* DEIS/DEIR, Appendix 6A, at 6A-8. The RPA action in the 2009 biological opinion is a mandatory permit condition that provides substantial environmental benefits for salmon, even if the RPA action (prior to the 2017 amendment) was insufficient to prevent CVP/State Water Project (“SWP”) operations from jeopardizing the continued existence of winter run Chinook salmon. As a result, modeling of Shasta Reservoir water storage levels and Sacramento River water temperatures in the DEIS/DEIR fail to comply with the requirements of the 2009 Shasta RPA action. *See, e.g.*, DEIS/DEIR, Appendix 6B, at Table SW-07-3a. By failing to ensure that the environmental baseline in the DEIS/DEIR includes existing permit terms and conditions, the DEIS/DEIR fails to adequately assess environmental impacts of the proposed project and fails to disclose potentially significant adverse impacts.

Third, the environmental baseline in the DEIS/DEIR appears to omit compliance with the permit obligation of the CVP and SWP to restore floodplain habitat in the Yolo Bypass, including modifications to the Fremont Weir to increase the frequency of inundation, pursuant to the 2009 NMFS biological opinion. The federal Notice of Intent for this project was published in the Federal Register on March 4, 2013, and in December 2017 the Bureau of Reclamation and California Department of Water Resources released a DEIS/DEIR for the Yolo Bypass Salmonid Habitat Restoration & Fish Passage project.⁷

⁷ That DEIS/DEIR is available online at: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=30484 and is incorporated by reference.

Appendix 12N of the DEIS/DEIR evaluates potential changes to the extent and frequency of inundating floodplain habitat in the Yolo Bypass. However, as the table below demonstrates, the data presented in Appendix 12N is inconsistent with data on the frequency and extent of inundation of the Yolo Bypass that the Bureau of Reclamation prepared as part of the California WaterFix project (the latter assumes completion of the Yolo Bypass restoration project as required by the 2009 NMFS biological opinion). Compare DEIS/DEIR, Appendix 12N, at Table SF-1a with California WaterFix draft biological assessment, June 2017, Appendix 5A, Attachment 4, at Table 5.A.A.4-5.⁸

	Fremont Weir spills greater than 3,000 cfs that last > 30 days under No Action Alternative
DEIS/DEIR, Appendix 12N, Table SF-1a	21 years
WaterFix Biological Assessment, June 2017, Appendix 5A, Attachment 4, at Table 5.A.A.4-5	70 years with notched weir

Because the DEIS/DEIR appears to exclude the notched weir, it fails to accurately assess the frequency, duration and extent of floodplain inundation in the Yolo Bypass under no action alternatives as well as under the proposed project and action alternatives. As discussed *supra*, reductions in floodplain inundation as a result of the project are likely to cause significant adverse effects on salmon. The DEIS/DEIR therefore fails to provide the public and decisionmakers with accurate information about the effect of the proposed project on floodplain inundation in the Yolo Bypass.

In addition, the DEIS/DEIR uses a flawed environmental baseline because it fails to accurately model compliance with the Fall X2 action in the 2008 Delta Smelt biological opinion. The Fall X2 action requires that the CVP and SWP “provide sufficient Delta outflow to maintain average X2 for September and October no greater (more eastward) than 74 km in the fall following wet years and 81km in the fall following above normal years.” 2008 FWS biological opinion at 369.⁹ The biological opinion requires that “[t]he monthly average X2 must be maintained at or seaward of these values for each individual month and not averaged over the two month period.” *Id.* However, the modeling of the environmental baseline and alternatives in the DEIS/DEIR

⁸ That biological assessment is available online at: http://cms.capitoltechsolutions.com/ClientData/CaliforniaWaterFix/uploads/App_5.A_CALSIM.pdf and is incorporated by reference.

⁹ In general, the monthly Delta outflow necessary to achieve these X2 requirements is approximately 11,400 cfs (wet) and 7,100 cfs (above normal), although the specific amounts of outflow necessary will depend on multiple factors including antecedent conditions (the location of X2 prior to imposition of the Fall X2 RPA action).

fails to achieve the Fall X2 requirements in the month of October. *See, e.g.*, DEIS/DEIR, Appendix 6B at Table SW-30-3a; DEIS/DEIR, Appendix 12G at 12G-2.

Finally, the DEIS/DEIR uses a flawed environmental baseline because it assumes full contract deliveries to Sacramento River Settlement Contractors, resulting in higher diversions from the Sacramento River. To our knowledge, the Sacramento River Settlement Contractors have never utilized their full contract amounts, and have diverted significantly less water than the full contract amounts. Data from the Bureau of Reclamation indicates that during 2009-2014, these contractors never diverted more than 75 percent of their full contract amounts. *See* Bureau of Reclamation, Water Delivered 2009-2014, available online at: <https://www.usbr.gov/mp/cvp-water/docs/cvp-water-deliveries.pdf>. Yet the DEIS/DEIR assumes full contract demands by these contractors, and it provides no explanation why it would make this assumption, which is inconsistent with the historical record. *See* DEIS/DEIR, Appendix 6A, at 6A-4.

By failing to utilize an accurate environmental baseline, the DEIS/DEIR fails to accurately assess the potential environmental impacts of the proposed project. The environmental baseline must be revised to incorporate the 2017 Revised Shasta RPA, to incorporate changes to the Yolo Bypass (including the notched Fremont Weir) required under the 2009 NMFS biological opinion, to accurately model compliance with the Fall X2 action in the 2008 FWS biological opinion, and to include reasonable assumptions regarding water demands by Sacramento River Settlement Contractors. Because of the significance of these changes, the DEIS/DEIR must be recirculated for comment after it is revised.

IV. The DEIS/DEIR Fails to Accurately Assess Environmental Impacts Because it Excludes Climate Change from the Environmental Baseline and Fails to Evaluate Long Term Impacts of the Project

CEQA and NEPA both require that the analysis of potential environmental impacts address the full duration of the project, not just the environmental impacts at the very beginning of the project. The CEQA Guidelines explicitly require the consideration of “both the short-term and long-term effects.” 14 Cal. Code Regs. § 15126.2(a). In *Neighbors for Smart Rail*, the California Supreme Court reiterated that an EIR must evaluate both the near term and long term environmental impacts of a proposed project. 57 Cal. 4th at 455. However, the DEIS/DEIR fails to evaluate the long term environmental impacts of the proposed project, because it only analyzes environmental impacts based on anticipated conditions in the year 2030. *See, e.g.*, DEIS/DEIR Appendix 6A at 6A-1, 6A-2. As a result, the DEIS/DEIR fails to consider the longer term environmental impacts in a future with climate change, violating NEPA and CEQA.

Climate change is anticipated to significantly increase air temperatures, increase the severity of droughts and frequency of floods, and alter precipitation patterns and amounts. *See, e.g.*, DEIS/DEIR at 25-30 to 25-31. The adverse effects of climate change are expected to be more severe in the coming decades than in the near future. *See, e.g.*, DEIS/DEIR at 25-30. This is anticipated to significantly alter hydrologic conditions and stress aquatic resources. However,

despite acknowledging these likely effects, *see, e.g.*, DEIS/DEIR Appendix 25B at 25B-1, 25B-2, the DEIS/DEIR only examines potential environmental impacts in the year 2030. *See, e.g.*, DEIS/DEIR Appendix 6A at 6A-1, 6A-2. If approved, the Sites Reservoir project is anticipated to be under construction until the year 2030, and would operate for many decades thereafter.

Moreover, the analysis of conditions in 2030 does not consider the likely effects of climate change. *See* DEIS/DEIR at 2-8 to 2-9. However, CALSIM modeling exists that incorporates the effects of climate change in the year 2030 and in the year 2070, and has been used for multiple analyses, including the CEQA/NEPA analysis of the California WaterFix project, the sensitivity analysis described in DEIS/DEIR Appendix 25A, and water storage project modeling and analysis for the California Water Commission summarized in DEIS/DEIR Appendix 25B. Appendix 25B's conclusion that incremental changes in stream flows and Delta outflows due to the project "could increase if the updated climate change assumptions were used in the CALSIM II model simulations presented in Appendix 25A" is correct, and highlights the importance of incorporating climate change impacts in the assessment of environmental impacts in the DEIS/DEIR (rather than relegating this analysis to an appendix). For instance, the assumption in Appendix 25A that the greatest adverse impacts would be under current climate conditions is false, particularly when compared to the LLT Q2 scenario results. *See* DEIS/DEIR Appendix 25A at 25A-1, 25A-4. Similarly, under the climate sensitivity analysis, the DEIS/DEIR predicts that the project would eliminate many of the purported ecosystem benefits, including providing no Delta outflow for Delta smelt habitat improvement or Sacramento River fall flow stabilization under ELT and LLT climate scenarios, and no Sacramento River flows for temperature control under LLT. *See* DEIS/DEIR Appendix 25A at 25A-19. These results demonstrate that climate change is likely to cause significant changes in the project and to the effects of the project, and that the DEIS/DEIR must be revised to incorporate the projected effects of climate change in the assessment of potential impacts. Appendix 25A inappropriately states that the sensitivity analysis should not be used for detailed evaluation, and provides a recommendation for a multiagency review. *See* DEIS/DEIR Appendix 25A at 25A-20. The failure to assess potential impacts over the duration of the project, deferring the analysis to a multiagency review at some unspecified date, significantly understates the likely environmental impacts of the proposed project over the longer-term period that it would be in operation and fails to accurately assess environmental impacts under NEPA and CEQA.

V. The DEIS/DEIR Fails to Accurately Assess Environmental Impacts Because it Uses the Outdated 2010 CALSIM Model Instead of the Current Version of the CALSIM Model

The DEIS/DEIR acknowledges that it uses an outdated version of the CALSIM model, despite the availability of a more recent model. Using the more recent model would likely address several of the flaws identified in this comment letter, including the failure to include certain regulatory requirements in the environmental baseline and the exclusion of the effects of climate change from the analysis. Moreover, on July 28, 2014, several members of the Sites JPA

submitted comments to the State of California regarding the use of the 2010 CALSIM model in DEIS/DEIR for the Bay Delta Conservation Plan, stating that,

the errors inherent in the use of the 2010 CalSim II model mean that the BDCP modeling analysis fails to satisfy the demands of CEQA Guidelines section 15151. In that regard, the use of the 2010 CalSim II model is like the use of outdated emissions information in *Berkeley Keep Jets Over the Bay*. (91 Cal.App.4th at p. 1367.) Consequently, it is improper for the DEIR/EIS to rely on the modeling contained in that document; instead, the modeling must be redone and the DEIR/EIS revised to reflect the correct methodology and results, and recirculated for public review.

North State Water Alliance (NSWA) comments on the Draft Bay Delta Conservation Plan, EIS/EIR, and Implementing Agreement, July 28, 2014, at 41; *see id.* at Exhibit A (list of Commenting Parties). The sensitivity analysis conducted comparing the 2010 and 2015 versions of the model in Appendix 6D shows major differences in the model output. Table 6D-1 shows average Delta outflow in Alternative D is 21,507 cfs in the 2010 model and 25,592 cfs in the 2015 model. *See* DEIS/DEIR Appendix 6D at 6D-6. This difference of over 4,000 cfs in average outflow—a 19% difference—far exceeds the 5 percent threshold for results to be considered “similar” and described as “model noise” in the comparative results within a model version. *See* DEIS/DEIR at 25-38. The DEIS/DEIR should be revised to use updated CALSIM modeling to ensure that the document accurately assesses environmental impacts.

VI. The DEIS/DEIR Fails to Accurately Assess Environmental Impacts to Aquatic Resources from Proposed Operations

A. Because it uses arbitrary thresholds of significance, the DEIS/DEIR fails to disclose the likely significant adverse impacts of the proposed project on aquatic resources

The DEIS/DEIR fails to accurately assess potential adverse impacts to aquatic resources because it assumes that flow changes of 5 percent or less are similar to existing conditions. *See, e.g.*, DEIS/DEIR at 5-14, 6-13. In other cases the DEIS/DEIR asserts that only flow changes greater than 10 percent constitute “a potentially meaningful difference.” DEIS/DEIR at 12-58. However, these 5 percent and 10 percent thresholds of significance are arbitrary, inconsistent with other NEPA/CEQA documents prepared by the Bureau of Reclamation, and not supported by substantial evidence. As a result, the DEIS/DEIR fails to disclose significant adverse effects on aquatic species of the proposed project and alternatives.

First, the DEIS/DEIR fails to justify using these thresholds. While the DEIS/DEIR provides some explanation for the 5 percent threshold, the document wholly fails to provide any justification why flow changes must be greater than 10 percent to constitute a meaningful difference. *See, e.g.*, DEIS/DEIR at 12-58. Moreover, the justification for the 5 percent threshold is arbitrary and capricious. The DEIS/DEIR claims to justify the 5 percent threshold

because CALSIM modeling uses a monthly time step. *Id.* However, even if this threshold were justified for flow or water storage results at the daily time step, it does not justify using this threshold for monthly or seasonal CALSIM modeling results, including changes in monthly or seasonal flows or storage levels and resulting analysis of effects on aquatic resources.

In addition, because CALSIM modeling is used in a comparative manner, and is used to model conditions under both the environmental baseline and action alternatives, there is no need for the 5 percent (or 10 percent) threshold(s). Importantly, there is no basis to conclude that Sacramento River flow reductions due to diversions to storage under the proposed project are an illusory modeling artifact; instead, reduced flow is an effect of the proposed project in the real world. While the CALSIM model does have significant flaws, failing to disclose changes in flow that are 5 percent or less as a significant impact misleads the public and decisionmakers.

Equally important, reductions in flow that are less than 5 percent can and will have significant adverse effects on aquatic resources. For instance, the modeling shows that Alternative A would reduce the abundance of longfin smelt, a species listed as threatened under CESA, by approximately 2.4 percent. *See* DEIS/DEIR, Appendix 12G, at Table AQ-12-3c.¹⁰ Yet CDFW determined that a reduction of longfin smelt abundance greater than 0 percent would be inconsistent with the requirements of CESA, in CDFW's CESA findings for the California WaterFix project.¹¹ By using the 5 percent threshold, the DEIS/DEIR claims that the project and alternatives would have no effect on longfin smelt, even though this same effect would violate CESA because it would further reduce the abundance of longfin smelt, which have experienced record or near-record low population levels under recent conditions. Indeed, any reduction in abundance of longfin smelt would cause the population of longfin smelt to drop further below self-sustaining levels, which constitutes a mandatory finding of significance under CEQA. *See* CEQA Guidelines § 15065(a)(1), (c).

Second, numerous other CEQA/NEPA documents that use CALSIM modeling do not use a 5 percent or 10 percent thresholds for determining whether changes in flow or storage constitute

¹⁰ In addition, Table AQ-12-3c of the DEIS/DEIR incorrectly states this is a 0.0% reduction in abundance. The actual reduction is 2.4%, based on comparing the abundance estimates in this table for the No Action Alternative and Alternative A. Similar errors occur on the Tables AQ-12-5c (reported as 0.0%, actual reduction in abundance is 2.8%), Table AQ-12-7c (reported as 0.0%, actual reduction in abundance is 3.2%), and Table AQ-12-9c (reported as 0.0%, actual reduction in abundance is 3.0%).

¹¹ *See* California Department of Fish and Wildlife, Findings of Fact of the California Department of Fish and Wildlife Under the California Endangered Species Act (Fish & G. Code § 2050 et seq.) for the project proposed by the California Department of Water Resources in reliance on and regarding the Construction and Operation of Dual Conveyance Facilities of the State Water Project (California WaterFix) and the Bay Delta Conservation Plan/California WaterFix Final Environmental Impact Report / Environmental Impact Statement, Incidental Take Permit No. 2081-2016-055-03, July 2017, at 327, available online at: <https://ftp.waterboards.ca.gov/NRDC/TBI/DOW/NRDC-20.pdf>. This document is incorporated by reference.

significant effects. For instance, the CEQA/NEPA documents for the California WaterFix project do not use these thresholds. It is unclear what would distinguish the DEIS/DEIR's use of CALSIM modeling results with these arbitrary thresholds from these other CEQA/NEPA documents that used CALSIM modeling without these arbitrary thresholds.

Further, the DEIS/DEIR inappropriately applies the 5 percent threshold of significance to averaged modeling results instead of operational criteria. This leaves exceedances of the 5 percent threshold unidentified in the DEIS/DEIR. For example, Funks to Sites exceedances imply that in January, at times 2,000-3,000 cfs could be diverted out of a total 15,000 cfs in the river, or 15 to 20 percent of the river's flow. This far exceeds the arbitrary 5 percent threshold of significance.

The recirculated DEIS/DEIR should not use these 5 percent and 10 percent thresholds of significance.¹² By using the 5 percent and 10 percent thresholds of significance, the DEIS/DEIR fails to disclose significant adverse effects on aquatic resources. The DEIS/DEIR must be revised to eliminate the use of these thresholds in determining what constitutes significant adverse effects on aquatic resources as a result of changes in river flows or reservoir storage levels.

B. The DEIS/DEIR fails to accurately assess environmental impacts to salmon and steelhead

As discussed above, the DEIS/DEIR fails to adequately assess potential impacts to salmon because it uses an improper environmental baseline that excludes existing regulatory requirements that protect salmon, because it uses arbitrary and inappropriate thresholds of significance, and because it excludes the anticipated effects of climate change in assessing whether the Project would result in significant environmental impacts. As discussed in more detail below, the DEIS/DEIR also fails to adequately assess potential impacts to salmon because it (i) ignores adverse impacts to salmon that will result from reduced flows in the Sacramento River; (ii) arbitrarily assumes no impacts from increased predation or impingement at fish screens; and, (iii) fails to accurately assess the adverse effects on salmon from reduced floodplain inundation. In addition, the DEIS/DEIR relies on ineffective mitigation measures (single pulse flow) that are inadequate to reduce or avoid these impacts. Finally, the DEIS/DEIR also fails to use existing life cycle models that would more accurately assessment impacts to

¹² However, to the extent that the DEIS/DEIR assumes that flow changes less than 5 percent are not significant, this should be applied to the actual river flows whenever flows are less than unimpaired. For example, a diversion of 5,000 cfs would only be allowed when Delta outflow exceeds 100,000 cfs (<5 percent impact), a 1,000 cfs diversion could be allowed when flows exceed 20,000 cfs, and 500 cfs could be allowed when flows exceed 10,000 cfs, assuming no other thresholds were impacted. The 5 percent limit would almost never apply to July-September diversions, because flow in the Sacramento River during that time typically exceeds 100 percent of unimpaired flow, however October through June diversions usually would have to comply with the limitation.

salmon, and instead relies on flawed and outdated modeling approaches. As a result, the DEIS/DEIR must be revised and recirculated.

1. *The DEIS/DEIR fails to accurately assess impacts to salmon because it ignores the effects of reduced Sacramento River flows on salmon survival*

The DEIS/DEIR fails to accurately assess impacts to migrating salmon because it fails to quantitatively analyze the effect of reduced Sacramento River flows on survival of migrating salmon. Numerous scientific studies have documented that reduced flow in the upper Sacramento River results in reduced survival of salmon. *See, e.g.,* Michel et al 2015; Klimley et al 2017; Notch 2017. The DEIS/DEIR wholly ignores these studies, and fails to use these models and analyses in the DEIS/DEIR to evaluate impacts on salmon from Sites Reservoir diversions that reduce flow in the Sacramento River. *See, e.g.,* DEIS/DEIR, Appendix 12B, at 12B-7 (no analysis of the effects of reduced flows on survival).

In recent years NMFS and CDFW have demonstrated that the survival of acoustically tagged salmon is strongly correlated with Sacramento River flows, and that survival of migrating salmon is lower when flows are less than 20,000 cfs, with a more significant reduction in survival when flows are less than 12,000 cfs. As a result, NMFS has recommended minimum base Sacramento River flows during the winter months (4,500 to 8,000 cfs, depending on water year type) and spring months (10,000 cfs to 14,000 cfs, depending on water year type) to protect salmon, as well as additional functional flows during these months. *See* Exhibit 2. More specifically with respect to potential operations of Sites Reservoir, CDFW has identified potential flow thresholds in the upper Sacramento River necessary to reduce or minimize impacts to migrating salmon, including minimum bypass flows of approximately 12,000 - 15,000 cfs at Wilkins Slough, before diversions to Sites could occur. *See* Exhibit 1. However, the DEIS/DEIR entirely fails to consider these studies and analyses, and fails to analyze the effects of reduced flows on salmon survival in the upper Sacramento River. While the document makes qualitative statements about the effects of potential increases in flow during low flow conditions, the DEIS/DEIR ignores the effects on salmon from water diversions to Sites reducing flows in the Sacramento River during higher flow conditions.

Similarly, studies have shown that reduced flow in the lower Sacramento River results in the reduced survival of migrating salmon. For instance, NMFS' biological opinion for the California WaterFix project demonstrates that in the lower Sacramento River, salmon survival is reduced when flows are less than approximately 35,000 cfs. NMFS 2017; *see* Perry et al 2017. As with the effect of reduced flow upstream, the DEIS/DEIR wholly fails to analyze the effects of reduced flows on salmon survival in the lower Sacramento River, caused by water diversions to Sites Reservoir.

The DEIS/DEIR must be revised to include the likely adverse effects of Sacramento River diversions to Sites Reservoir when flows are less than 22,000 cfs (upper Sacramento River) or less than 35,000 cfs (lower Sacramento River). Reductions in Sacramento River flows below

these thresholds have been demonstrated to reduce salmon survival, yet the DEIS/DEIR wholly ignores these adverse impacts, fails to acknowledge that proposed operations likely will cause significant impacts, and fails to consider feasible mitigation measures to address these impacts. To avoid and/or mitigate significant impacts to imperiled salmon, the recirculated DEIS/DEIR should evaluate mitigations measures that provide for minimum flows of 22,000 cfs (upper Sacramento River) and 35,000 cfs (lower Sacramento River) from November to May.

2. *The DEIS/DEIR fails to accurately assess impacts to salmon because it ignores increased predation and impingement as a result of the new Sacramento River water diversion facility*

The DEIS/DEIR improperly concludes that there will be no adverse impacts from increased predation at the new diversion facilities (or from reduced flow) or as a result of impingement on fish screens as a result of the proposed project, as long as the fish screen meets sweeping and approach velocity requirements. *See* DEIS/DEIR, Chapter 12, at 12-71. However, the 2017 NMFS biological opinion for the WaterFix Project concludes that even when fish screens are operated to meet sweeping and approach velocity requirements, 3-5 percent of migrating salmon would suffer adverse impacts from injury or mortality on a single fish screen. NMFS 2017 at 588. The biological opinion also estimates that increased predation at the fish screens could result in a range of impacts from 0.3 percent to 5 percent mortality, with the latter estimate based on predation mortality studies at the GCID fish screen. *Id.* at 593. The DEIS/DEIR must be revised to consider the likely reductions in survival from increased predation and impingement on fish screens for the new Sacramento River intake.

3. *The DEIS/DEIR fails to accurately assess impacts to salmon because it inaccurately assesses reduced floodplain inundation and ignores the effects of reduced floodplain inundation on salmon survival*

The DEIS/DEIR fails to adequately assess the adverse effects of reduced floodplain inundation on salmon. The DEIS/DEIR appropriately acknowledges that salmon that rear on floodplains are larger and are assumed to have improved survival. However, the DEIS/DEIR's analysis of the extent to which proposed operations reduce inundation of floodplains is flawed, and the DEIS/DEIR improperly concludes that these reductions in inundation would be less than significant. The analysis in the DEIS/DEIR appropriately looks at a range of inundation periods, but it only looks at the effects on inundation at flows less than 10,000 cfs, despite acknowledging that floodplain inundation increases rapidly at flows up to 40,000 cfs. *See* DEIS/DEIR at 12-63.¹³ Even at the flow levels that are analyzed, the DEIS/DEIR demonstrates that proposed

¹³ The DEIS/DEIR also does not appear to quantitatively analyze potential effects of operations on the frequency and magnitude of Tisdale Weir spills that result in floodplain inundation. In contrast, CDFW recommended specific bypass criteria to ensure that proposed operations would not reduce Tisdale Weir spills up to 5,000 cfs. *See* Exhibit 1. The DEIS/DEIR should be revised

operations will reduce the frequency of Fremont Weir spills; for instance, Table SF-1a shows that Alternative A would reduce Fremont Weir spills of 10,000 cfs that last more than 10 days by more than 10 percent, and would reduce Fremont Weir spills of 10,000 cfs that last more than 20 days by approximately 10 percent. DEIS/DEIR, Appendix 12N, at Table SF-1a. Alternative A also results in reductions in the frequency of Fremont Weir spills at lower flow levels as well. *Id.* Alternative A also results in a reduction in Sutter Bypass Flows, which would also harm salmon. DEIS/DEIR, Appendix 12N, at Table SF-1e. However, the DEIS/DEIR fails to acknowledge that the reduction in the frequency and magnitude of Fremont Weir spills that inundate floodplain habitat would cause a significant adverse impact on salmon. The DEIS/DEIR should be revised to acknowledge this significant impact and to consider feasible mitigation measures that would ensure that the proposed project and alternatives would not reduce the frequency and magnitude of floodplain inundation as a result of Fremont Weir spills.

4. *The proposed mitigation measure in the DEIS/DEIR (Pulse Flows) are inadequate to mitigate impacts on salmon from proposed operations*

The proposed mitigation measure (pulse flows) are inadequate to mitigate these impacts to a less than significant level. Pulse flows can improve survival of those salmon that migrate during the pulse flow event, assuming the pulse flow is of sufficient duration and magnitude. However, salmon that migrate during non-pulse flow events would suffer reduced survival as a result of flow reductions due to diversions to Sites Reservoir storage. NMFS demonstrated that the first storm event of approximately 15,000-20,000 cfs at Wilkins Slough triggers the migration of approximately 50 percent of the population of winter run Chinook salmon. *See* Del Rosario 2013. However, the remaining proportion of this endangered salmon run would not be protected by the proposed pulse flows, *id.*; *see also* SWRCB 2017, and reduced Sacramento River flow as a result of diversions to Sites reservoir would reduce salmon survival as shown above. Equally important, because only those fish expressing the life history trait of migrating on the first storm pulse, this proposed mitigation measure would cause a reduction in life history diversity of salmon, which is one of the critical factors in ensuring viable salmonid populations.

5. *The DEIS/DEIR fails to accurately assess impacts to salmon because it uses flawed temperature thresholds and flawed models*

Finally, the DEIS/DEIR generally relies on outdated, inaccurate models to assess impacts to salmon, and fails to utilize more accurate and updated models, particularly with respect to the adverse effects of water temperature on salmon. For instance, the DEIS/DEIR relies on flawed temperature thresholds and models analyzing potential effects of water temperature on egg and juvenile salmon survival, which have been shown to be highly inaccurate. While the DEIS/DEIR uses Reclamation models to assess temperature impacts on salmon, *see* DEIS/DEIR at 12B-10, NMFS' 2017 WaterFix Biological Opinion states that the Reclamation Egg Mortality

to analyze Tisdale Weir flows and floodplain inundation frequency and extent, as part of its analysis of effects on salmon.

Model “is based on a relationship between temperature and Chinook salmon egg mortality that likely substantially underestimates actual mortality in the field.” NMFS 2017 at 450. The biological opinion rejects use of that model to assess potential temperature impacts to winter run Chinook salmon, spring run Chinook salmon, or fall run Chinook salmon, and only uses it to assess potential impacts to late fall run Chinook salmon because results from more accurate models (the Southwest Fishery Science Center’s temperature-dependent egg mortality model) were not available. *Id.*; see NMFS 2017 (Revised Shasta RPA, documenting significant flaws with Reclamation temperature mortality models and showing estimated temperature dependent mortality by year, which is significantly higher than that estimated in the DEIS/DEIR using the Reclamation models). The DEIS/DEIR should be revised to use the Southwest Fishery Science Center’s temperature-dependent egg mortality model to assess temperature effects on salmon.

Equally important, the DEIS/DEIR relies on flawed temperature thresholds to assess impacts to salmon. *Compare* DEIS/DEIR, Appendix 12D, at 12D-5 (using 56, 58, 60 and 62 degree temperature thresholds for impacts on salmon spawning and egg incubation) *with* NMFS 2017 (Revised Shasta RPA, using Martin et al 2017 temperature threshold of 53.7 degrees). The DEIS/DEIR must be revised to use accurate temperature thresholds and models in order to accurately assess potential impacts to salmon.

6. *The DEIS/DEIR must be revised to consider feasible mitigation measures to address the significant adverse impacts from proposed operations*

Taken together, proposed operations analyzed in the DEIS/DEIR will have significant, adverse effects on fall run Chinook salmon, spring run Chinook salmon, winter run Chinook salmon, and other salmonids. The proposed operations will reduce Sacramento River flows in ways that will reduce survival of salmon, will reduce inundation of floodplains that will harm salmon, and will increase predation and impingement mortality that harms salmon. Even if each of these effects individually only reduces survival by a few percentage points, cumulatively they result in a significant reduction in survival, which could be fatal for several salmon runs that are at high risk of extinction.

The DEIS/DEIR must consider alternative operational scenarios that include the base flows and bypass flows recommended by CDFW and NMFS, including minimum bypass flows of 14,000 cfs at Wilkins Slough during the months of November to May. Because proposed operations would reduce survival of salmon, causing a significant adverse impact to species listed under CESA, the DEIS/DEIR must consider feasible mitigation measures, including these minimum bypass flows.

C. The DEIS/DEIR fails to accurately assess environmental impacts to longfin smelt

The DEIS/DEIR improperly concludes that proposed operations will not cause a significant adverse effect to longfin smelt because it assumes that changes less than 5 percent are not significant. However, as discussed above, this arbitrary threshold results in the DEIS/DEIR

failing to identify an impact that constitutes a mandatory finding of significance under CEQA, because the modeling used in the DEIS/DEIR demonstrates that proposed operations will reduce the abundance of this CESA-listed species below self-sustaining levels.

In addition, the analysis of impacts to longfin smelt in the DEIS/DEIR is flawed because: (1) it fails to consider existing life cycle models that more accurately assess impacts, and which consider the effects of prior stock abundance in assessing the effects of flow; and (2) it fails to consider the effects of reduced outflow on meeting flow thresholds necessary to achieve a 50 percent chance of positive population growth. The DEIS/DEIR also fails to consider feasible mitigation measures that would avoid or reduce these significant impacts.

First, reliance on the Kimmerer 2009 equation to analyze impacts to longfin smelt from reduced flow underestimates adverse impacts to longfin smelt from reduced Delta outflow during the winter and spring months. Because it does not consider the effects of prior stock abundance, the Kimmerer et al. (2009) regression relationships will show that years with the same winter-spring X2 produce the same estimate of longfin smelt abundance, regardless of the abundance in previous years. However, more recent published scientific studies demonstrate that prior stock abundance has a significant effect on abundance in subsequent years (stock-recruit effect). *See* Nobriga and Rosenfield 2016. Because longfin smelt population size in any given year is affected by both Delta outflow and abundance of the previous generation, the sequence of annual winter-spring Delta outflow conditions has a large impact on population abundance – for example, several dry years in a row can produce abundance declines that cannot be reversed by occasional wet years. The Kimmerer 2009 regression therefore leads to overestimation of longfin smelt abundance when wet years follow dry years and underestimates environmental impacts of the alternatives on longfin smelt. As a result, the DEIS/DEIR significantly underestimates the adverse effects on abundance from reduced Delta outflow caused by proposed operations. Given that longfin smelt abundance has already declined by 99 percent over the past several decades, further declines in the abundance of the species would cause a mandatory finding of significance and are inconsistent with the requirements of CESA. As a result, CDFW recently concluded that WaterFix must not result in any reduction in abundance of this species, and prohibited that project from reducing Delta outflow during the months of March to May, unless Delta outflows exceeds 44,500 cfs. *See supra* note 11.¹⁴ CDFW recommended a similar mitigation measure for Sites Reservoir operation. *See* Exhibit 1.

Similarly, the SWRCB's final scientific basis report for the Phase 2 update of the Bay-Delta Water Quality Control Plan concluded that average Delta outflow of 42,800 cfs during the January to June time period is necessary to achieve a 50 percent chance of positive population

¹⁴ Unfortunately, CDFW's CESA findings demonstrate that WaterFix will reduce the abundance of longfin smelt, in large part because WaterFix will reduce Delta outflow during the winter months. Separately, CDFW has submitted written comments to the SWRCB confirming that Delta outflow during the January to June period is the appropriate time period to analyze impacts to longfin smelt and to ensure adequate Delta outflows to protect the species.

growth, and determined that such flows would be protective of longfin smelt. SWRCB 2017 at 3-56, 3-60. The DEIS/DEIR should be revised to analyze whether proposed operations would reduce the frequency of achieving this flow threshold.

Because the proposed operations would result in significant adverse impacts on longfin smelt, the DEIS/DEIR must consider feasible mitigation measures. The DEIS/DEIR should be revised to consider a mitigation measure that would only allow diversions to storage when Delta outflows are in excess of 42,800 cfs during the months of January, February and June, and in excess of 44,500 cfs during the March through May time period. This proposed mitigation measure would also provide significant benefits to other species, including salmon and sturgeon, whose survival and abundance is dependent on Sacramento River flows and/or Delta outflows.

D. The DEIS/DEIR fails to accurately assess environmental impacts to Delta smelt

The DEIS/DEIR fails to accurately assess potential impacts of operations on Delta smelt because it fails to consider the effects of reduced Delta outflow during the winter and spring months on the survival and abundance of Delta smelt. The DEIS/DEIR appropriately acknowledges that increases in outflow during the summer and fall months benefit Delta Smelt,¹⁵ as recent scientific information from CDFW, FWS, and the Interagency Ecological Program have shown. However, the DEIS/DEIR does not analyze how reductions in Delta outflow during the spring, summer or fall, as a result of proposed operations, would reduce the survival and abundance of Delta Smelt, despite recent scientific information from FWS and other agencies documenting this effect.¹⁶ The DEIS/DEIR should be revised to consider these studies and evaluate whether the proposed operations would reduce spring Delta outflow, thereby harming delta smelt.

VII. The DEIS/DEIR Fails to Accurately Assess Environmental Impacts to Terrestrial Biological Resources

A. The DEIS/DEIR inappropriately defers formulation of mitigation measures and fails to adequately describe mitigation for potentially significant impacts to terrestrial species

¹⁵ However, while the DEIS/DEIR claims that shifting X2 0.5 or 1 km east during the winter or spring would not have an effect on longfin smelt, due to the arbitrary 5 percent and 10 percent thresholds, the DEIS/DEIR concludes that shifts in X2 of 0.5 or 1 km west could have a beneficial effect on Delta Smelt.

¹⁶ See, e.g., Interagency Ecological Program, Management, Analysis, and Synthesis Team: An Updated Conceptual Model of Delta Smelt Biology 2015, available online at: http://www.water.ca.gov/iep/docs/Delta_Smelt_MAST_Synthesis_Report_January%202015.pdf; email from Leo Polansky to Doug Obegi dated September 29, 2017, available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterf/x/exhibits/docs/NRDC_TBI_DOW/NRDC-37.pdf. These documents are incorporated by reference.

The DEIS/DEIR makes clear that proposed project is likely to have significant, negative impacts on a substantial number of terrestrial species, including golden eagles, bald eagles, Western pond turtles, and giant garter snakes, among many others. Because the impacts to these species are potentially significant, the EIS/EIR must describe feasible mitigation measures that could minimize the significant adverse impacts. CEQA Guidelines § 15126.4(a)(1). Generally, the formulation of mitigation measures may not be deferred until a later time. *Id.* § 15126.4(a)(1)(B). If an agency chooses to defer formulation of specific measures in a CEQA document, it must “commit itself to specific performance criteria for evaluating the efficacy of the measures implemented.” *POET, LLC v. California Air Res. Bd.*, 217 Cal. App. 4th 1214, 737-38 (2013). As explained further below, the DEIS/DEIR fails to meet these standards because it provides vague descriptions of mitigation measures with a promise of future formulation, but fails to include any performance criteria for the ultimate evaluation of those measures.

The general mitigation measure (“Mitigation Measure Wild-1b”) suffers from precisely this flaw. Instead of providing a specific mitigation plan, it merely promises future consultation with specific state and federal agencies, and indicates that compensation ratios will follow “appropriate protocols”:

For unavoidable Project footprint impacts, suitable habitat shall be identified in coordination and consultation with USFWS, CDFW, and the USACE and appropriate actions/agreements developed ranging from on-site restoration, enhancement, acquisition of conservation easements, land purchases, or mitigation bank credit acquisition. Compensation of such habitat lands shall occur per all appropriate protocols (including replacement ratios) for each such species.

DEIS/DEIR at 14-128 to 129. This vague promise of future formulation is insufficient to provide the public with any reasonable assurance that the proposed project’s significant wildlife impacts will be properly mitigated because it lacks specific performance criteria or other measures that could be used to evaluate the mitigation measures’ efficacy. While the DEIS/DEIR proposes additional mitigation measures for some species, several animals, like the western pond turtle, are entirely dependent on Mitigation Measure Wild-1b. *See* DEIS/DEIR at 14-138 (describing avoidance measures and stating “[l]oss of western pond turtle habitat would be compensated for with through the implementation of Mitigation Measure Wild-1b identified above”); *see also, e.g.*, DEIS/DEIR at 14-138 (mitigation for western yellow-billed cuckoo provided exclusively under Mitigation Measure Wild-1b); DEIS/DEIR at 14-137 (mitigation for loss of grassland habitat for western burrowing owls provided exclusively under Mitigation Measure Wild-1b). Further, while USFWS and CDFW may have clearly-defined mitigation protocols for some species, we do not believe such protocols exist for all species that the project will impact. If agencies have multiple, potentially conflicting guidelines, it is unclear which protocols they would follow. Because Mitigation Measure Wild-1b defers formulation of specific mitigation measures for admittedly significant impacts and lacks meaningful

performance criteria, it is unlawful and must be substantially modified in the revised and recirculated DEIS/DEIR.

Several of the species-specific mitigation measures also unlawfully defer formulation of mitigation measures, creating concern that the project's significant wildlife impacts will not be adequately mitigated. For example, for giant garter snakes, the DEIS/DEIR states that “[p]ermanent loss of GGS habitat will be compensated at a ratio and at a manner agreed upon in consultation with the USFWS. Compensation may include preservation and enhancement of existing populations, restoration or creation of suitable habitat, or purchase of credits at a regulatory agency approved mitigation bank in a sufficient quantity to compensate for the effect.” DEIS/DEIR at 14-134. The mitigation measure fails to define what “a sufficient quantity to compensate” for the impacts means, and does not provide any performance standards. Further, formulating mitigation based on consultation with only USFWS is inadequate because giant garter snakes are also listed under CESA, and the state law includes a more stringent standard—i.e., minimize and fully mitigate—than the federal ESA.

The DEIS/DEIR similarly defers mitigation for golden eagle habitat loss, fails to provide any performance standards, and fails to include a requirement for consultation with CDFW. DEIS/DEIR at 14-135 (“The specific methods for mitigating the loss of the annual grassland habitat shall be determined in consultation with USFWS.”). This is legally inadequate and must be remedied in the revised DEIS/DEIR. Similar problems exist for other species-specific mitigation measures. *See, e.g.*, DEIS/DEIR at 14-137 (burrowing owl mitigation “will include the creation of artificial burrows in adjacent suitable habitat as determined appropriate by a qualified biologist in consultation and coordination with CDFW and USFWS”).

The DEIS/DEIR also inappropriately defers formulation of mitigation for impacts to giant garter snakes caused by modifications to the GCID main canal. The giant garter snake mitigation measure—Mitigation Measure Wild-2d—states that “[c]onstruction activity within giant garter snake habitat shall be conducted between May 1 and October 1. If work outside of this time period is necessary, USFWS’s Sacramento Fish and Wildlife Office shall be contacted to determine if additional protection measures are necessary.” DEIS/DEIR at 14-133. Conducting work between May 1 and October 1 is important because giant garter snakes are active during that period, and therefore more likely to move away from construction equipment. However, the DEIS/DEIR states that “[t]he GCID Main Canal is typically out of service each year between early January 7 and late February for maintenance. Construction activities would be scheduled during this maintenance period whenever possible.” DEIS/DEIR at 3-64. The project description thus indicates that, in contrast to the time period specified in Mitigation Measure Wild-2d, modifications to the GCID main canal would occur during the giant garter snake’s inactive season. This is particularly problematic because the proposed modifications include lining the earthen canal, and the earthen canal is likely to include burrows used by giant garter snakes during their winter inactive period. All modifications to the GCID canal should occur during the time period prescribed in the giant garter snake mitigation measure—between May 1 and October 1. If that is not possible, it is not appropriate to defer formulation of mitigation

measures related to construction during the inactive season because construction during that time is foreseeable based on the project description. Rather, Mitigation Measure Wild-2d should be modified to specify avoidance, minimization, and mitigation measures appropriate for significant impacts to giant garter snakes caused by construction during the snakes' inactive period.

Proposed mitigation measures for temporary impacts to giant garter snake habitat are also inadequate. According to the DEIS/DEIR, giant garter snakes are known to use rice fields within the construction disturbance area, and construction of the Delevan Pipeline will cause temporary impacts to 1,358.9 acres of rice habitat. DEIS/DEIR at 14-96, 14-99. The DEIS/DEIR acknowledges that “[f]allowing of rice fields would not only temporarily remove giant garter snake habitat, but could also have adverse effects on the reproduction, recruitment, and survival of the species that could continue beyond the 2-year construction schedule.” DEIS/DEIR at 14-99. The document concludes that loss of fresh emergent wetland habitat along with “the extensive temporary loss of rice habitat” will have a potentially significant impact on giant garter snakes. DEIS/DEIR at 14-99.

In spite of these admittedly significant impacts, the DEIS/DEIR fails to include adequate mitigation measures. First, the document relies on inappropriate mitigation guidelines. It states that “[p]rotective actions and mitigation measures shall comply with the USFWS’s Programmatic Biological Opinion (USFWS, 1997), or USFWS mitigation guidelines current at the time of the surveys.” DEIS/DEIR at 14-132. However, the referenced biological opinion states that it is intended to be used for projects “with relatively small effects on the giant garter snake and its habitat,” including “permanent impacts of less than 3.00 acres (1.21 hectares) and temporary impacts of less than 20.00 acres (8.09 hectares) of giant garter snake habitat.”¹⁷ Here, in contrast, construction of the Delevan Pipeline is expected to cause temporary impacts to more than 1,358 acres of giant garter snake habitat and permanent impacts to additional habitat acreage. Reliance on the 1997 Programmatic Biological Opinion is clearly improper, and the DEIS/DEIR’s reference to other “USFWS mitigation guidelines current at the time of the surveys” does not cure the problem because it fails to allow for any assessment of the appropriateness of whatever mitigation guidelines may be used in the future. Further, because giant garter snakes are listed under both CESA and the federal ESA, an exclusive focus on USFWS mitigation guidelines is inappropriate and CDFW should also play a role in formulating appropriate mitigation.

Second, the DEIS/DEIR does not clearly indicate how temporary loss of rice habitat will be compensated.¹⁸ In light of the extent of temporary habitat loss (more than 1,358 acres), the

¹⁷ U.S. Fish and Wildlife Service, 1997 Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, at p. 1, available at http://www.water.ca.gov/fishpassage/docs/butte/butte_app_K.pdf

¹⁸ Though this discussion focuses on mitigation for impacts to giant garter snakes, the DEIS/DEIR indicates that up to 196 species may be found within rice habitat in the Extended

substantial duration of the loss (at least two years), and the seriousness of the impacts (adverse effects on reproduction, recruitment, and survival), the temporary impacts must be fully mitigated. However, Mitigation Measure Wild-2d only explicitly discusses compensation with respect to permanent impacts. *See* DEIS/DEIR at 14-133 (“Permanent loss of GGS habitat will be compensated at a ratio and at a manner agreed upon in consultation with the USFWS.”). The DEIS/DEIR’s one statement regarding compensation for lost rice habitat is inadequate and confusing. It states that “[m]itigation for rice habitat would already be partially compensated for by implementation of the mitigation measures for loss of wildlife habitat types described above.” DEIS/DEIR at 14-133. To the extent this statement means that loss of rice habitat will be compensated for by implementation of the avoidance and minimization measures discussed in the bullet points that precede the statement, it is incorrect because those measures do not include any compensation for the lost habitat. To the extent it means that loss of rice habitat will be compensated by mitigation already being provided for the loss of other habitat types, the statement improperly suggests that mitigation acres will be double counted. The final EIS/EIR must clearly explain how impacts to giant garter snakes from a two-year loss of rice habitat will be fully mitigated, including appropriate compensation.¹⁹

B. The DEIS/DEIR’s reliance on old information renders its assessment of impacts to terrestrial species unreliable

Field surveys are critical for understanding the presence and distribution of wildlife within the project area, and for determining whether the proposed project is likely to impact terrestrial species. Yet the DEIS/DEIR relies upon extremely dated survey information. The document explains that “[i]nitial field surveys were conducted within the Primary Study Area from 1998 to 2004 at all Project facility locations, then again in 2010 to 2011 at newly proposed Project facility locations.” DEIS/DEIR at 14-16. This means that for the inundation area and other large swaths of land, field surveys that the impacts analysis relies upon are between 14 and 20 years old. Particularly in light of climate change, there is a substantial risk that the information regarding species’ presence and distribution derived from the survey data is no longer accurate.²⁰

Study Area. DEIS/DEIR at 14-3. Many of these species will be impacted by fallowing and construction associated with the Delevan Pipeline, and significant impacts to all of these species must be mitigated.

¹⁹ As a point of reference, the inappropriately relied upon 1997 Programmatic Biological Opinion indicates that temporary impacts to giant garter snake habitat lasting two seasons should be compensated by restoration plus 1:1 replacement. For temporary impacts lasting more than two seasons, compensation must be restoration plus 2:1 replacement. *See* http://www.water.ca.gov/fishpassage/docs/butte/butte_app_K.pdf at p. 7.

²⁰ Field survey information regarding the presence of wetlands and other waters within the Primary Study Area is similarly outdated. According to the DEIS/DEIR, wetlands and other waters within the inundation area were surveyed during 1998 and 1999. DEIS/DEIR at 15-5. Because of changing hydrology and land use, there is a substantial risk that this old survey data no longer provides accurate information regarding the distribution of wetlands and other waters within the project area.

The DEIS/DEIR's discussion of bald eagles illustrates the problem. According to the document, "[d]uring initial field surveys, no nests, adult pairs, or nesting behavior were observed at any Project facility location. However, during subsequent visit to the Primary Study Area a nesting pair of bald eagles was observed at the proposed Golden Gate Dam site." DEIS/DEIR at 14-26. While the species was absent during the initial surveys, it was later found to be present within the project area. As this example suggests, the old survey data is not reliable. Particularly for smaller, more elusive species like California red-legged frogs, California tiger salamanders, giant garter snakes, vernal pool fairy shrimp, vernal pool tadpole shrimp, and ringtails, reliance on decades old survey data likely creates an unrealistic picture of their presence and distribution, and an inaccurate assessment of the project's impacts.²¹

The DEIS/DEIR recognizes that the survey data may not accurately represent species presence and distribution, but fails to remedy the problem. According to the document, "[i]t is recognized that [t]he distribution of special-status species or important habitat features (e.g., nest sites) may change during the period prior to construction, which could influence the location and extent of mitigation. Accordingly prior to construction, additional special-status species surveys will be conducted as necessary in consultation with USFWS and CDFW." DEIS/DEIR at 14-17; *see also* Mitigation Measure Wild-1a (requiring preconstruction surveys). While it is helpful that the DEIS/DEIR recognizes the need to update information regarding species presence and distribution prior to construction, deferring additional survey work until after the EIS/EIR is finalized significantly undermines the accuracy and informational value of the environmental document, and makes it difficult for the public to assess and compare the environmental impacts of the proposed alternatives.

Accordingly, to ensure the EIS/EIR's analysis of impacts to terrestrial species is accurate and meaningful, we recommend that the lead agencies conduct additional field surveys and make the information from the additional field surveys available in the revised and recirculated DEIS/DEIR. Additional field surveys are particularly important for species like California red-legged frogs and California tiger salamanders, which have potentially suitable habitat within the Primary Study Area, but which were not found during the initial field surveys. Without additional field surveys for these and other species, conclusions regarding the absence of significant impacts are unsubstantiated and unreliable.

²¹ In addition to relying on old field survey data, the DEIS/DEIR makes unsubstantiated assertions about the quality of some habitat types within the Primary Study Area. For example, with respect to habitat for conservancy fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp, the DEIS/DEIR states that "[t]he quality of potential habitat found within the proposed reservoir footprint is marginal. Many of the pools do not remain ponded for entire seasons, and some potential habitats do not pond at all." DEIS/EIR at 14-24. The revised and recirculated DEIS/DEIR should include source information for this and similar assertions, and to the extent the conclusions regarding habitat quality are based on old field survey information, the lead agencies should conduct additional follow-up field studies.

C. The DEIS/DEIR's assessment of impacts to wildlife refuges is inadequate

Wildlife refuges in the Central Valley provide some of the region's last-remaining wetland habitats, and are essential for the health of Pacific Flyway birds, ESA-listed species like giant garter snakes, and many other creatures. We are concerned about several flaws in the DEIS/DEIR's analysis of impacts to Central Valley refuges.

First, the DEIS/DEIR states that “[t]he project would replace at least some volume of Level 4 water supplies with a more reliable water supply than interim water transfers, but would not change the volume of water delivered to the refuges under either Level 2 or Level 4.” DEIS/DEIR at 14-52. However, the Water Storage Investment Project (“WSIP”) application for the Sites Reservoir project indicates that the project will provide 19,000 acre feet of Level 4 refuge water in drier years, and 33,000 acre feet of Level 4 refuge water in average years.²² This is a major inconsistency that raises questions about both the accuracy of the water supply related information in the DEIS/DEIR, and the project's ability to provide the Level 4 water supplies proposed in the project's WSIP application.

Second, the DEIS/DEIR fails to adequately assess the risks to wildlife from siting overhead power lines along the northern edge of Delevan National Wildlife Refuge (“Delevan NWR”). For its assessment of Alternative A, which proposes to site the power lines adjacent to Delevan NWR, the DEIS/DEIR merely states that “[t]he eastern end of the Sites/Delevan Overhead Power Line would be located adjacent to the Delevan NWR, and could, therefore, disrupt a migratory corridor by causing collisions.” DEIS/DEIR at 14-103. This cursory analysis fails to answer many critical questions. For example, how many birds utilize Delevan NWR each year and how many could be impacted by the proposed power lines? What species are likely to be impacted? Are collisions likely to cause mortality? Are there particular risks for birds traveling between Delevan NWR and Sacramento NWR, and how frequent is such travel? Are there risks to birds that make daily trips between Delevan NWR and other wildlife refuges in the Sacramento Valley and nearby rice fields? Without answers to these and other questions, it is impossible for the public to understand the impacts that Alternative A could have to migratory and resident birds that utilize Delevan NWR and other nearby refuges. This shortcoming is particularly problematic because other alternatives propose different configurations for overhead power lines that could reduce the likelihood of bird strikes, but without an adequate assessment of the potential impacts from Alternative A, the public and decision makers will be unable to assess the comparative benefits of the other proposed alternatives. We believe an adequate assessment of potential impacts to birds from the Sites/Delevan Overhead Power Line will reveal that siting the power lines away from Delevan NWR and along existing power line corridors, as

²² See Sites WSIP Application Executive Summary at p. 4, available at https://cms.capitoltechsolutions.com/ClientData/SitesProject/Uploads/SitesExecutiveSummary_Final_August2017.pdf

appears to be proposed in Alternative D, will substantially reduce wildlife impacts, and we urge the lead agencies to include such an assessment in the revised DEIS/DEIR.

Third, the DEIS/DEIR contains almost no information regarding the possibility of construction-related impacts to wildlife that reside within and migrate to and from Delevan NWR. This omission is surprising and problematic given that construction of the Delevan Pipeline is expected to take two years and will occur along the entire northern edge of the refuge. The DEIS/DEIR acknowledges, for example, that there is suitable nesting habitat for tricolored blackbirds within Delevan NWR along the proposed Delevan Pipeline route, but fails to discuss the impacts that noise and other aspects of pipeline construction could have on tricolored blackbirds within the refuge. *See* DEIS/DEIR at 14-28 and 14-95 to 100. The revised DEIS/DEIR should provide substantially more information regarding potential impacts to Delevan NWR from construction of the Delevan Pipeline, the Sites/Delevan Overhead Power Line, and associated project facilities. Among other information, the expanded discussion should address potential impacts to the area in the northern part of Delevan NWR that serves as a sanctuary from hunting. It should also address how construction will be timed to minimize disturbance at the refuge, particularly with respect to the hunting season when sanctuary areas in the northern part of the refuge are critical for Pacific Flyway birds.

Fourth, the DEIS/DEIR fails to discuss potential impacts to private lands surrounding Sacramento Valley wildlife refuges that are enrolled in USFWS and NRCS easement programs. According to the final recovery plan for the giant garter snake, “about 2,226 hectares (5,500 acres) of private lands are enrolled in our wetland easement program in the area north and south of Delevan NWR.”²³ Several important NRCS wetland easements also exist within the project area. Impacts to these lands could cause significant impacts to sensitive wildlife, and must be disclosed and analyzed in the revised and recirculated DEIS/DEIR. Among other things, the final EIS/EIR must identify wetland easements in the Primary Study Area, describe any construction-related impacts to those properties, and analyze potential impacts to birds that must cross new power lines to move to and from refuges and easement properties.

Fifth, the list of wildlife refuges on page 15-2 of the DEIS/DEIR is incomplete. Among other omissions, the list fails to include Sutter NWR and Colusa NWR, both of which are located near the proposed new reservoir in the Sacramento Valley. Including a meaningful discussion of potential water supply impacts to Sutter NWR is particularly important because this Sacramento Valley refuge continues to struggle from inadequate water supplies, particularly during dry years.

²³ FWS Recovery Plan for the Giant Garter Snake (2017) at II-5, available at https://ecos.fws.gov/docs/recovery_plan/20170928_Signed%20Final_GGS_Recovery_Plan.pdf.

D. The DEIS/DEIR's analysis of impacts to giant garter snakes is inadequate

On September 28, 2017, USFWS finalized a recovery plan for the threatened giant garter snake. The DEIS/DEIR includes information from the 1999 draft recovery plan and must be updated to reflect information included in the final recovery plan. *See* DEIS/DEIR at 14-13. Importantly, the Primary Study Area lies within the Colusa Basin Recovery Unit, and the recovery plan describes specific recovery criteria for that unit. *See* Final GGS Recovery Plan at II-15 to 16. The revised DEIS/DEIR should describe how the proposed project could impede recovery efforts, and also explain how mitigation for giant garter snake impacts will advance the goals that the final recovery plan establishes.

There are several additional problems with the DEIS/DEIR's analysis of impacts to giant garter snakes that need to be remedied. First, the DEIS/DEIR indicates that the proposed modifications to the GCID Main Canal Facilities would temporarily disturb 3.1 acres within the existing canal. DEIS/DEIR at 14-91. However, the proposed modification includes lining 200 feet of earthen canal that currently provides habitat for giant garter snakes, which will permanently eliminate burrows and other habitat that is suitable for use during the snake's dormant period. Accordingly, this impact must be considered permanent and must be mitigated accordingly.

Second, there appear to be impacts to giant garter snake habitat that are not accounted for in Chapter 14. In particular, Chapter 15 describes the possibility of significant impacts to agricultural ditches and canals:

A total of approximately 42 acres (24 miles) of waters could be permanently lost or adversely affected through construction of the buried pipelines and other activities associated with construction of the Delevan and TRR pipelines, TRR Pipeline Road, and Delevan Pipeline Electrical Switchyard. All affected waters consist of agricultural ditches and canals between 3 and 30 feet in width. If the water was not redirected back into the farmers' irrigation systems so that the water would still be available for surrounding fields, temporary or permanent disruption of most of these canal waters by the pipelines would represent a hydrological interruption and would be a potentially significant impact

DEIS/DEIR at 15-36 to 37. To the extent these agricultural ditches and canal are associated with rice fields, they are likely to provide habitat for giant garter snakes, and we were unable to identify a discussion of these potential impacts in Chapter 14. If these impacts are already addressed within Chapter 14, we request that you identify the relevant discussion. If the impacts are not discussed in Chapter 14, we request that you address these potentially significant impacts to giant garter snakes in Chapter 14, including a discussion of appropriate mitigation.

Third, the DEIS/DEIR fails to discuss potentially significant impacts to giant garter snakes from possible construction of a temporary bypass channel for the GCID main canal. As a part of the project description, the DEIS/DEIR explains that:

If construction activities are required outside of the maintenance period, a temporary bypass channel would be built around the construction site to allow diversion water to flow past and maintain regular canal operation. The temporary bypass channel would be constructed within the existing GCID right-of-way using a combination of excavation, earth embankment, and sheetpile walls to isolate the construction site from the canal. After completion of construction, the temporary bypass would be filled in, earthen embankments and sheetpile walls would be removed, and the area would be restored to preconstruction conditions.

DEIS/DEIR at 3-64. As discussed above, it is likely that construction on the GCID main canal will have to occur outside of the winter maintenance period because of increased likelihood of giant garter snake impacts during this time. It therefore seems likely that the briefly referenced temporary bypass channel may be constructed, and the channel's potentially significant impacts to giant garter snakes and other species must be identified and fully mitigated.

Fourth, the DEIS/DEIR inappropriately concludes that there will be no impacts to special status species from construction of the proposed Terminal Regulating Reservoir ("TRR") and related facilities. The document explains that construction of the TRR and associated facilities would result in permanent loss of 120.9 acres of rice habitat and temporary disturbance of 13.6 acres of rice habitat. DEIS/DEIR at 14-93. Yet it concludes that there will not be significant impacts to special status wildlife because "[n]o special status species were observed within the vicinity of the proposed construction footprint of the TRR or associated facilities." DEIS/DEIR at 14-94. Giant garter snakes, however, are known to inhabit rice fields throughout the project area, and the lack of observation of this elusive species does not indicate its absence. The DEIS/DEIR must discuss impacts to giant garter snakes from the permanent loss and temporary disturbance of rice habitat within in the footprint of the TRR and related facilities, and must propose appropriate mitigation for this significant impact.

VIII. The DEIS/DEIR Fails to Adequately Analyze Cumulative Impacts, and it Fails to Disclose that the Project is Likely to Result in Cumulatively Significant Adverse Impacts to Aquatic Resources

Finally, Chapter 35 of the DEIS/DEIR fails to adequately analyze cumulative impacts because it fails to consider the cumulative reductions in Sacramento River flows and Delta outflows that would result from the proposed project, California WaterFix, and several other water storage and diversion projects that the Bureau of Reclamation is currently evaluating. It completely ignores the fact that the Bureau of Reclamation has finalized NEPA analysis, including CALSIM modeling, for the California WaterFix project and Shasta Lake Water Resources Investigation, and has prepared draft NEPA analysis including CALSIM modeling for other proposed water storage projects. The failure to quantitatively consider the cumulative effect of these projects, using the existing CALSIM modeling, is inappropriate and violates NEPA and CEQA. These projects cumulatively would significantly reduce flows in the Sacramento River and significantly

reduce Delta outflow, harming longfin smelt, Delta smelt, spring run Chinook salmon, winter run Chinook salmon, fall run Chinook salmon, and other species. Moreover, MBK engineers has prepared CALSIM modeling of a suite of water storage projects and the California WaterFix project, which also shows these projects have the potential to significantly reduce Delta outflow and significantly reduce Sacramento river flows.²⁴ However, the DEIS/DEIR ignores all of this modeling and instead assumes that certain other planning processes will result in increased flows that offset or mitigate these impacts. See DEIS/DEIR at 35-22 to 35-23. This is improper. At a minimum, Chapter 35 of the DEIS/DEIR should be revised to include modeling of the cumulative effects of the action alternatives with the California WaterFix project and Shasta Lake Water Resources Investigation on Sacramento River flows and Delta outflows.

IX. The DEIS/DEIR's Presentation of Information is Flawed and Obscures Potentially Significant Environmental Impacts

A. The DEIS/DEIR labels results for "existing conditions" in a confusing, inconsistent and misleading manner

Chapter 2 reveals no differences between NAA and baseline, and defines them as equal to each other. It is therefore confusing when differences appear elsewhere in the DEIS/DEIR. Appendix 12F is one section of the DEIS/DEIR where this change between Existing Conditions/Baseline and NAA is evident, but poorly labeled. The methodology in this section is inadequately described, since there is no description of what the alternatives are being compared to in the first table for each reservoir (Tables 12F-1a, 12F-2a, 12F-3a, 12F-4a, 12F-5a), or what the assumptions for the baseline are. The first tables for each reservoir in Appendix 12F show changes in the NAA, but nowhere does it describe changes from what.

For example, the NAA itself causes reservoirs to be 6 feet lower (than baseline) in many years, usually in May and June. For June, the percentage of time that the reservoirs are six or more feet lower (than baseline): Trinity 25%, Shasta 83%, Oroville 55%, Folsom 21%. San Luis is more than six feet lower almost all the time (96-99% of time) April-June. Big April-June drawdowns appear to be planned for San Luis under NAA, and the proposed Sites Reservoir project doesn't appear to change that.

Similarly, Appendix 6A tables showing "existing condition" in comparison to the NAA are confusing, since no explanation of "Existing Conditions" is given. Each table caption reminds the reader that the NAA represents "Existing Conditions/No Project/No Action Condition" in the DEIS/DEIR, but fails to describe the existing condition shown by the tables. If the term "existing condition," when not referring to the NAA, is describing the Existing Conditions under

²⁴ This study is available online at: <https://www.acwa.com/wp-content/uploads/2017/06/2017-06-05-ACWA-Integrated-Storage-Final-Report.pdf> and is incorporated by reference. Figure 6 estimates that these projects would reduce Sacramento River flows by 0.9 million acre feet per year on average, including reduced flows in dry (0.5 MAF) and critical years (0.1 MAF).

the administrative draft EIR, or under CALSIM II modeling, then the text should be modified to read “Existing Condition-NODOS” or “Existing Condition-CALSIM 2010” or in some similar way identify that these tables refer to modeling assumptions from a former Administrative Draft EIR. Appendix 6D is another location where Existing Conditions are described for model results. Since results for existing conditions exist, that condition should be compared to all the alternatives so as not to hide cumulative impacts, and to avoid confusion.

B. The DEIS/DEIR includes misleading and inaccurate descriptions of model results

The DEIS/DEIR provides misleading and inaccurate descriptions of model results, as the following examples demonstrate:

- Page 6-50: States September-June Delta outflow would be similar to NAA, and increase in July-August. This is misleading because it implies an overall increase in Delta outflow would occur, yet this is not the case. The only decrease described is January-March in Dry and Critical years, however this text contradicts the SW-33-7 tables/figures with modeling results that show December-March reductions in median years, reductions in some months of all year types, and reductions in all months at times outside of June-August. In addition to these averages, the exceedance tables show reductions in Delta outflow in all months at certain times.
- Pages 6-50 and 6-51: State that OMR Reverse flows would be larger September-November of all years and November, January, August-September of Dry and Critical years with Sites, but compliant with regulatory criteria. This is inaccurate and should be revised to reflect the modeling results in tables/figures SW-35-7, which show more negative OMR in July-November of most years. Also, as we state elsewhere, regulatory criteria are changing, and compliance with current inadequate regulations does not necessarily indicate a lack of impact.
- Table 7-4: Should say “< 56” and “< 68” (less than), instead of > (greater than).
- Page 7-44: Salinity at Rock Slough in AN years November-December would increase up to 16.5 percent, however this impact is not identified as significant. This fails to use the DEIS/DEIR’s own criteria of >10 percent changes being significant.
- Chapter 7: Under the action alternatives, X2 is described as similar to NAA, however model results in the exceedance tables in Appendix 6B show increases up to 5 km. In the driest February, X2 increasing from 83 km to 87 km would result in a significant impact on estuarine habitat that must be mitigated.
- Appendix 6B: Monthly results sorted by exceedance probability showing differences between the NAA and the alternatives may be mixing years and hiding larger variation in year to year results. While the display of total amounts is helpful, the proper way to display the absolute difference would be to subtract the results sorted by year prior to ordering by exceedance. In this way, the differences in each year can be evaluated.

C. Unexplained model results and confusing sentences require further explanation

Below are examples of model results and text that require additional explanation in order for the public and decisionmakers to understand:

- Page 6-38: The last paragraph is difficult to understand. Why would the delivery of water from Sites Reservoir to SOD users cause San Luis Reservoir storage to decrease June-December?
- Page 6-44: Why are there Clear Creek flow increases in July?
- Page 6-46: The short phrases explaining increases/decreases in flow are generally inadequate. For example, downstream of Delevan Pipeline, “[i]n July through November under Alternatives A, B, C, and D flows would increase as compared to the Existing Conditions/No Project/No Action Condition due to increased Shasta Lake releases to stabilize flows.” The location where flows need stabilizing and the reason flow stabilization would result in flow increases from Shasta is never explained.
- Appendix 6B: Results labeled “Funks” should be changed to “Holthouse” to avoid confusion.
- Appendix 6C-1: Mentions the concept of “excess flow.” This term should be defined in terms of flow that is in excess of that needed to maintain downstream ecosystems, and not in terms of current regulations, as existing regulations result in instream flows that demonstrably fail to adequately protect fish and wildlife.
- Page 25-41: Cites a 12-41 inch sea level rise, but doesn’t say what period the sea level rise is projected over.

D. The modeling results make clear that proposed operations would result in ecosystem degradation and omits consideration of opportunities to improve environmental conditions

Sites Reservoir is touted as a project that would provide public benefits, however the priority operations on 6A-15 are water supply-focused and would cause significant impacts to fish, wildlife and aquatic ecosystems. The operations criteria on page 6A-23 only show releases to the river in summer given one-way operation of the pipeline. This is a missed opportunity. For instance, the reservoir could be used to improve the Sacramento River hydrograph if releases in other months were considered.

Table 3-24 as well as model results in Appendix 6B indicate an operation with limited ecosystem benefits and a missed opportunity. Decreases in Sacramento River flows in the winter/spring, and increased flows from June-October, are generally inconsistent with reducing the impairment of the Sacramento River hydrograph, which would generally require reducing summer flows and increasing winter/spring flows. Improving the spring-summer hydrograph to be more reflective of unimpaired runoff patterns (high flows in early spring declining through early summer) could deliver significant benefits to the riparian systems of the Sacramento River. Currently, the

spring-summer hydrograph in the Sacramento River is reversed, with April-May flows rising instead of falling; combined with Army Corps and private riprap projects, this has prevented riparian growth and regeneration since about 1974. For instance, a 2002 study by The Nature Conservancy showed that providing adequate flows to restore riparian growth and regeneration near Hamilton City would take little or no additional water in wet years, 6 percent on average, and would mainly require reshaping the hydrograph to fix these problems.²⁵

June-September Delevan pipeline flows would augment an already augmented summer period in the Sacramento River, potentially worsening ecological conditions in a river ecosystem adapted to lower flows during these months.²⁶

At the TCC Intake at Red Bluff, diversions exceeding 1,000 cfs in up to 60 percent of Januaries and Februaries in Alternative A (and 2000 cfs in January-March for Alternative B) would cause a significant impact in Below Normal year types, reducing Sacramento River flows when higher flows are needed to help outmigrating salmon and higher Delta outflows are needed for maintaining the health of the estuary. At the GCC Intake at Hamilton City, large diversions April-May also miss the opportunity to lessen the impairment of the hydrograph in the spring months. While the diversions in the driest years are reduced compared to the NAA (although not in April in Alternative B), the operation of Sites Reservoir could be used to improve this further by focusing diversions on the augmented flows of the July-September period, when upstream reservoir releases almost always cause flows to be well above what the natural flows would be.

Sites Reservoir end of month storage for Alternative A shows October-March increases in storage to over 1 MAF almost independent of year type in Above Critical water years. For Alternatives A and B the greatest increases in storage are in Dry years. November to March diversions on the Sacramento River are already at an ecological tipping point, with river flows at Ord Ferry currently averaging near 75 percent of unimpaired flow. Below 75 percent of unimpaired flow, ecosystem impacts generally increase.²⁷ Increasing diversions in drier water year types runs counter to the goal of benefitting the ecosystem.

²⁵ A Pilot Investigation of Cottonwood Recruitment On The Sacramento River M. D. Roberts, D. R. Peterson, D. E. Jukkola, V. L. Snowden, The Nature Conservancy, Sacramento River Project, May 2002, available at http://www.sacramentoriver.org/forum/scripts/library/file.php?file_id=36.

²⁶ While increased Delta outflow during the summer would benefit Delta smelt, increased flows in the Sacramento River appear unlikely to provide benefits for native fish species in the riverine environment.

²⁷ Richter, B. D., M. M. Davis, C. Apse, and C. Konrad. 2011. A presumptive standard for environmental flow protection. *River Research and Applications* 28:1312-1321. *See also* State Water Resources Control Board. 2010. Development of Flow Criteria for the Sacramento- San Joaquin Delta Ecosystem. Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009, available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf.

Increased diversions from the already-reduced December-March period are very problematic except under very high flow conditions, both in the Sacramento River and in terms of reduced Delta outflows December-March. These will result in significant impacts that could be addressed with more beneficial operations.

X. Conclusion

As explained above, the DEIS/DEIR contains substantial flaws and inaccuracies, fails to disclose significant impacts, and fails to consider reasonable mitigation measures. The DEIS/DEIR should be revised to address these issues and recirculated for public comment.

Thank you for considering these comments. Please feel free to contact us with any questions, or to further discuss the proposed project.

Sincerely,



Doug Obegi
Natural Resources Defense Council



Rachel Zwillinger
Defenders of Wildlife



Gary Bobker
The Bay Institute



Noah Oppenheim
Pacific Coast Federation of Fishermen's Associations
Institute for Fisheries Resources



John Rose
Center for Biological Diversity



John McManus
Golden Gate Salmon Association

**SITES JPA – CDFW
Coordination Meeting #3**

Wednesday, June 13, 2017
12:00-1:30 PM
Somach Simmons and Dunn Conference Room
500 Capitol Mall, Sacramento
(LUNCH PROVIDED)

AGENDA

1. Introductions
2. Brief Summary/Discussion of May 30 meeting
3. Preliminary Results of Requested Diversion Modeling Scenarios
4. Prop 1 Application Discussion - Water Commission's process - (regulations operative March 7, 2017)
 - a. Benefits based on:
 - Unique climate change scenario
 - Regulatory baseline is existing conditions (as of Nov 21, 2016)
 - DFW's Evaluation of Relative Environmental Values
 - Economic value of environmental benefits to calculate benefit-cost ratio
 - b. Schedules: (Applications due Aug 14, 2017)
 - Commission's decision-making & funding
 - Authority's schedule for completion of EIR/S and acquire permits
5. Identify process to reconcile Water Commission's process with DFW's processes.
6. Concepts of how Sites fits into Settlement Discussions
7. Schedule Next Meeting

**Working Draft - Preliminary Assessment of
CDFW's Proposed Bypass Flow Criteria for the Sites Reservoir Project**

June 13, 2017

This preliminary assessment provides average annual Sites Project diversion results for a range of CDFW suggested bypass flow criteria. Results are preliminary and subject to change.

These criteria specify the amount of storm event flow that must be present at a given location in the system before Sites diversions can occur upstream. These criteria are **not** minimum flow criteria that that must be met or supplemented by the Sites Project.

The analysis included evaluation of eight sensitivity runs under current conditions using the DWR Delivery Capability Report (DCR 2015) CalSim II model with the WSIP implementation of the Sites Project (Alternative D) as the base case. The sensitivity runs include interpretations of three flow criteria proposed by CDFW:

- Diversion restrictions to maintain Tisdale Weir spills up to 5,000 cfs
- Increasing Wilkins Slough bypass flows requirements from 8,000 cfs to 14,000 cfs in November through May
- Delta Outflow criteria of 44,500 cfs in March, April, and May.

In addition, a sensitivity run with no monthly pulse bypass flow requirement was conducted to assess the impact the current monthly pulse bypass flow criteria has on average annual diversions to Sites Reservoir.

Results of the analyses are summarized and presented in the table and figures below.

Summary

The base case DCR2015 current conditions model run with Alternative D shows an average annual diversion to sites Reservoir of 514 TAF/year, as show in the table below. Alternative D includes a bypass flow criteria of 5,000 cfs at Wilkens Slough consistent with the project description in the EIS/R. There is no Tisdale Weir or Delta Outflow criteria above D-1641 specified in Alternative D.

Adding the Tisdale Weir spill criteria reduces the annual average diversion to Sites Reservoir by about 12 TAF/year, the smallest impact on Sites fills of all of the sensitivity runs.

Increasing the Wilkins Slough bypass flow criteria from 5,000 cfs to 8,000 cfs reduces average annual diversions by 45.7 TAF/year, a reduction of about 9%. Increasing the Wilkins Slough bypass flow criteria in 2,000 cfs increments from 8,000 cfs to 14,000 cfs reduces average annual Sites fills by additional increments of approximately 9%.

The addition of the Delta Outflow criteria of 44,500 cfs in March through May reduces average annual diversions by 72.6 TAF/year.

The combination of the Tisdale, Wilkins Slough (8,000 cfs), and Delta Outflow criteria reduce annual average Sites diversions by 24% or 124 TAF/year.

The elimination of the monthly pulse bypass flow requirement included in Alternative D resulted in an increase in average annual diversions to Sites Reservoir of about 10 TAF/Year.

Sensitivity Analysis

The runs are defined as follows:

1. **DCR2015** = Base Case (DCR2015 With Alternative D Project)

2. **No Pulse Bypass Flow** = "DCR2015" + No Monthly Pulse Bypass Flow Criteria
3. **Tisdale** = "DCR2015" + Tisdale Weir Spill Criteria
4. **Wilkins8k** = "DCR2015" + Wilkins Slough winter Bypass Flow of 8,000 cfs
5. **Wilkins10k** = "DCR2015" + Wilkins Slough winter Bypass Flow of 10,000 cfs
6. **Wilkins12k** = "DCR2015" + Wilkins Slough winter Bypass Flow of 12,000 cfs
7. **Wilkins14k** = "DCR2015" + Wilkins Slough winter Bypass Flow of 14,000 cfs
8. **DO Criteria** = "DCR2015" + Delta Outflow flow of 44,500 cfs in March, April, and May
9. **DO+T+W8k** = Combination of Delta Outflow 44,500 cfs + Tisdale + "Wilkins Slough 8,000 cfs"

The summary table, bar chart, and exceedance figures below present the preliminary results of the analysis.

October-September			
Total Average Annual Diversion to Sites Reservoir			
Volume (TAF)		Difference from Previous	Difference from DCR2015 with Alternative D
DCR2015 with Alternative D	514.0		
Eliminate Monthly Bypass Pulse Flow	523.4	9.5	9.5
Tisdale Weir	502.0	-21.4	-11.9
Wilkins8k	468.3	-33.7	-45.7
Wilkins10k	426.4	-41.9	-87.5
Wilkins12k	388.5	-37.9	-125.5
Wilkins14k	355.3	-33.2	-158.7
Delta Outflow Criteria 44,500 cfs March – May	441.3	86.1	-72.6
Delta Outflow +Tisdale +Wilkins Slough 8,000 cfs	390.0	-51.3	-123.9

Modeling Assumptions for Sites Reservoir Intakes (Oct-Jun)

The following assumptions were developed by CDFW for a modeling exercise to evaluate the ability of Sites Reservoir to operate while ensuring species specific habitat needs and protection are met in the Sacramento River and Delta. It is assumed that these Sacramento River and Net Delta Outflow Index criteria will be met during the specified timeframes prior to and during Sites Reservoir operations. Results from this modeling exercise are intended to support the evaluation of project alternatives and their ability to contribute to ecosystem benefits.

Sacramento River Assumptions

- No pumping at TCCA facility until January
- No pumping until after first initial pulse flow greater than or equal to 15,000 cfs at Wilkins Slough for five consecutive days
- Wilkins Slough bypass flow requirement of 15,000 cfs
- Colusa bypass flow requirement of 29,500 cfs

Habitat and Species Protection

- No pumping at TCCA facility until January
 - The majority of winter-run pass this facility as very small fry.
 - 99% of downstream juvenile winter-run passage is typically completed by the end of December each year (Poytress et al. 2014).
- No pumping until after first initial pulse flow greater than or equal to 15,000 cfs at Wilkins Slough for five consecutive days.
 - The first major pulse flow past Wilkins Slough has been correlated with peak winter-run passage at the Knights Landing rotary screw traps.
 - Substantial increases in cumulative catch of winter-run at Knights Landing have been observed and correspond to a flow threshold of approximately 14,000 cfs at Wilkins Slough (del Rosario et al. 2013).
- 15,000 cfs Wilkins Slough bypass flow requirement.
 - Based on flow survival relationships of juvenile salmonids in the Sacramento River.
 - Increased emigration has also been observed at Knights Landing when flows increase.
- 29,500 cfs Colusa bypass flow requirement.
 - There is substantial benefit to providing floodplain rearing habitat in the Sutter Bypass.
 - This flow rate should provide at 5,000 cfs spill at Tisdale Weir (CDEC data and linear regression analysis of COL and TIS) to provide floodplain rearing habitat in the Sutter Bypass.
 - Based on flow survival relationships of juvenile salmonids in the Sacramento River.

Net Delta Outflow Index Assumptions

Month	W	AN	BN	D	C		
Oct	12,400 (74km)	7,100 (81km)	D-1641	D-1641	D-1641		
Nov	12,400 (74km)	7,100 (81km)	D-1641	D-1641	D-1641		
Dec	11,400	5,000	D-1641	D-1641	D-1641		
Jan	25,000						
Feb							
Mar	44,500		25,000		11,400		
Apr						11,400	
May						11,400	
Jun	D-1641 or 11,400 (74km) ¹	D-1641 or 11,400 (74km) ¹	D-1641 or 11,400 (74km) ¹	D-1641	D-1641		
Habitat and Species Protection							
D-1641		Existing SWRCB D-1641 requirements					
BiOp RPA		Existing Fall X2 requirements (Delta Smelt) FWS BiOp					
Delta Smelt		Holds LSZ around suitable abiotic habitat for spawning and rearing					
Longfin Smelt		Protects flows for LFS abundance					
Sturgeon		Protects attraction flows					

¹ Whichever flow value is higher



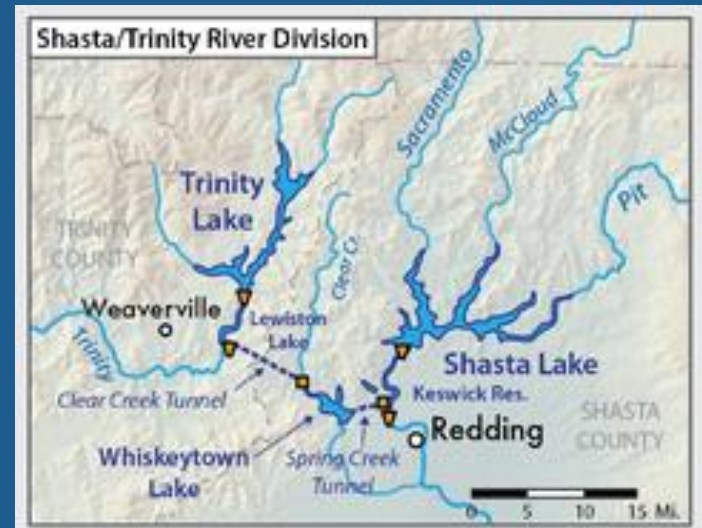
**NOAA
FISHERIES**

**West Coast
Region**

Sacramento River Ecological Flow Thresholds for Salmonids Workshop

Brycen Swart
September 29, 2016

Shasta Division Central Valley Project



Regulatory Context

- 2009
 - Biological Opinion on the CVP/SWP Long-term Water Operations (OCAP)
 - Jeopardy Determination
 - Shasta Division RPA actions address storage requirements, temperature compliance, drought contingencies, and re-introduction but not flows
- 2016
 - Shasta Division RPA Adjustment – RPA actions are not avoiding jeopardy
 - CVP/SWP Long-term Operations Re-initiation
- SWRCB – Bay-Delta Water Quality Control Plan

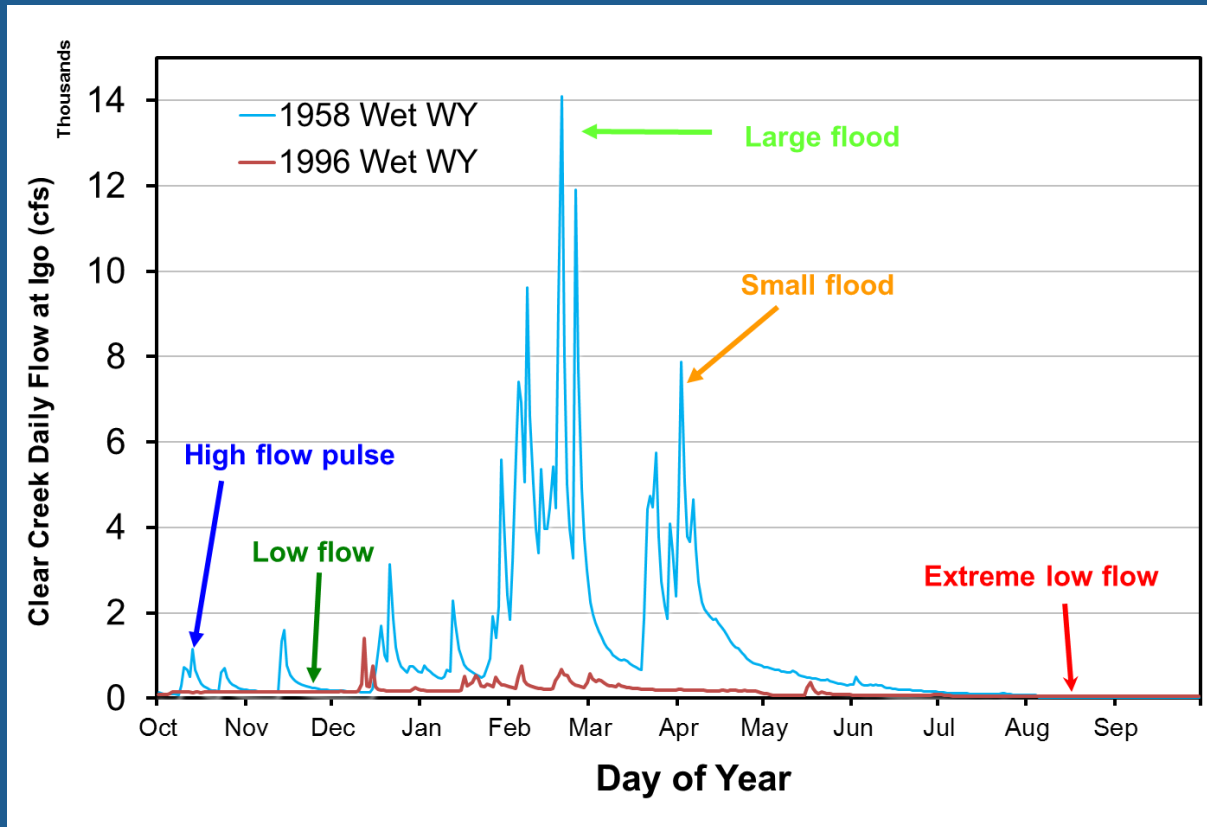
Current Flow Management

Minimum Flow Requirements

Period	Reclamation-CDFW MOA (1960)		Water Rights 90-5 (1990)	NMFS BiOp (1993)
	Normal	Critically Dry		
Water Year Type			Normal	All
January 1–February 28(29)	2,600	2,000	3,250	3,250
March 1–March 31	2,300	2,300	2,300	3,250
April 1–April 30	2,300	2,300	2,300	No Requirement
May 1–August 31	2,300	2,300	2,300	No Requirement
September 1–September 30	3,900	2,800	3,250	No Requirement
October 1–November 30	3,900	2,800	3,250	3,250
December 1–December 31	2,600	2,000	3,250	3,250

Flow Regime Approach

Mimic “natural”, climatically-driven variability of flows from year to year and from season to season



- Magnitude
- Timing
- Duration
- Frequency
- Rate of change

Principles for Flow Regime Approach

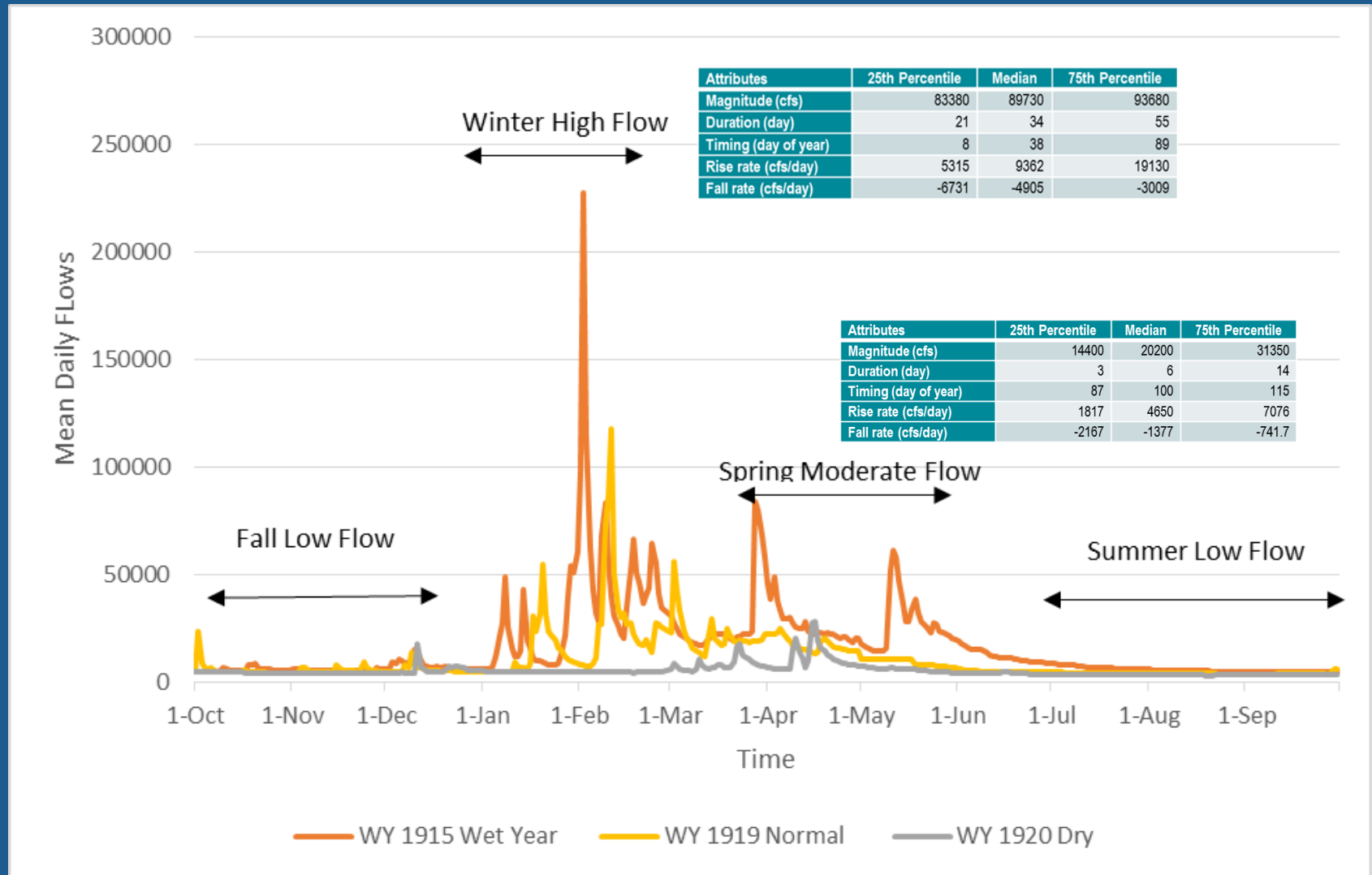
- Flow determines the extent and type of physical habitat, which in turn determines the types of living organisms in that habitat.
- Aquatic species have evolved in such a way as to be well adapted to the natural flow regime to which they have been historically exposed.
- Maintenance of natural patterns of high flows, low flows and flow variation is essential to the viability of native riverine species.
- The alteration of flow regimes contributes to the invasion and success of exotic (non-native) species in rivers.

(Bunn and Arthington, 2002)

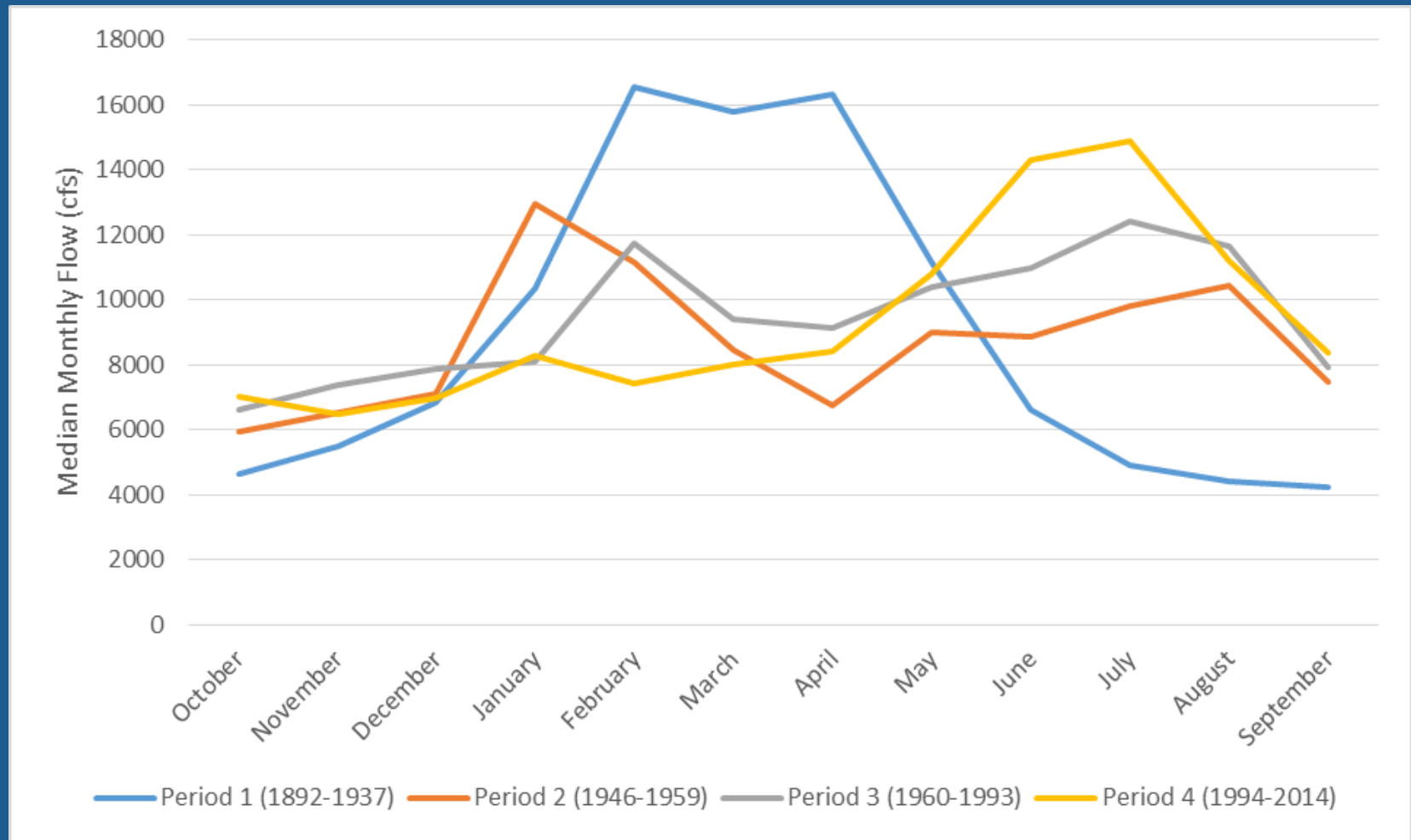
Implementing Flow Regime Approach

- Collect flow data and analyze them
- If there is a period of time when flows were measured before major human modifications occurred, that time period is used to set the baseline or natural, unmanaged flow conditions.
- If no such data exists, use other data (e.g., similar unimpacted rivers or unimpaired flow) to establish historic conditions.
- Set recommended flows throughout the year, providing flow recommendations for each hydrologic season (e.g. low flow, snowmelt, rainy season).

Pre-Dam Natural Flow



Median Monthly Flows



Changes in Flood Flows

Period	1.5-Year Flood	2-Year Flood	5-Year Flood	10-Year Flood
Period 1 (1892-1937)	89730	130000	153000	206000
Period 2 (1946-1959)	54600	85700	97400	125000
Period 3 (1960-1993)	50500	77500	101000	123000
Period 4 (1994-2014)	41400	73200	88800	105000
% Reduction (P1 and P2)	39%	34%	36%	39%
% Reduction (P1 and P3)	44%	40%	34%	40%
% Reduction (P1 and P4)	54%	44%	42%	49%

Changes in Spring Pulse Flows

Attributes	Period 1 (1892-1937)	Period 2 (1946-1959)	Period 3 (1960-1993)	Period 4 (1994-2014)
Magnitude (cfs)	20200	14800		
Duration (day)	6	2		
Timing (day of year)	100	112		
Frequency (per year)	1.5	1	0	0
Rise rate (cfs/day)	4650	2715		
Fall rate (cfs/day)	-1377	-2788		

Environmental Thresholds and Requirements

	Magnitude	Duration	Timing	Frequency	Source
Bed Mobilization	24,000 - 120,000	12 hour peak flow	Between Feb 20 - March 20	3 to 4 years	Cain 2008, DWR 2001, Kondolf 2000, Stillwater 2006
Bank Erosion and Channel Migration	15,000 - 60,000	?	Prior to late March	2 to 4 years	Stillwater 2007, Larsen 2007
Floodplain Inundation and Rearing Habitat Flows	>25,000	30 - 60 days	Feb 15 to April 30	Dry to Wet Water Year Types	Harrell 2008, DWR 2008
Riparian Flows	23,000 - 30,000	72 day recession period	April to May	Above Normal and Wet Years	Roberts 2003, Kondolf 2007, Cain 2008

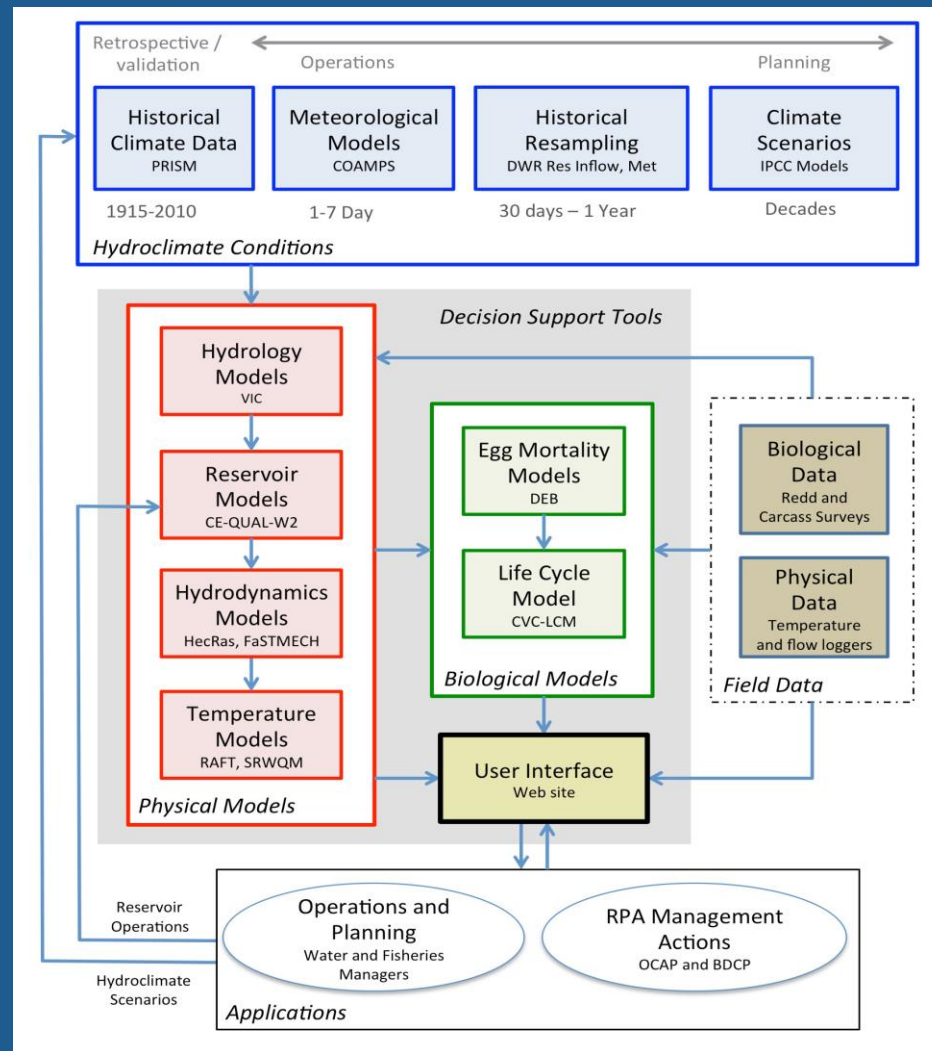
Potential Flow Recommendations

	Timing	Water Year Type				
		Critical	Dry	Below Normal	Above Normal	Wet
Bed Mobilization	Mid Feb – Mid Mar		35,000	65,000	85,000	105,000
Floodplain Inundation	Feb - Apr (45 days)			25,000	35,000	45,000
Riparian Establishment Flow	Apr				23,000	37,000
Fall Base Flow	Sep - Nov	5,250	5,250	5,250	5,250	5,250
Winter Base Flow	Dec - Feb	4,500	6,000	6,500	7,000	8,000
Spring Base Flow	Mar - May	10,000	12,000	12,500	14,000	14,000
Summer Base Flow	Jun - Aug	8,000	8,000	8,000	8,000	8,000

Next Steps

- Incorporate regression analysis of salmonid abundance with instream flow
- Refine flow recommendations
- CALSIM, SRWQM, and RAFT modeling

Validation



Thanks! Any Questions?

RECLAMATION

Managing Water in the West

NMFS – Reclamation Stakeholder Workshop #3 Shasta RPA Draft Proposed Amendment June 22, 2017



U.S. Department of the Interior
Bureau of Reclamation

Introductions

RECLAMATION

Workshop Objectives

Provide status updates, discuss, and receive input on:

- 1. Temperature management for the 2017 Sacramento River temperature management season**
- 2. System-wide analyses of draft proposed amendment (issued January 19, 2017) to the Reasonable and Prudent Alternative of the 2009 NMFS Biological Opinion for the long-term operation of the Central Valley and State Water Projects related to Shasta Reservoir operations**

Workshop Agenda

- **Introductions**
- **Meeting Purpose**
- **Update/Discussion on 2017 Temperature Management**
- **Update/Discussion on System-Wide Evaluations of Draft Proposed Shasta RPA**
- **Next Steps in System-Wide Evaluations of Draft Proposed Shasta RPA**
- **Discussion Q&A**



Proposed Ground Rules

- **Participate!**
- **Be respectful**
- **Help us stay on track**
- **Speak into microphone**
- **Take comments in batches – in room then on phone**
- **Cell phones off/silent**
- **For those on phone – please mute phones and don't place the call on hold (sometimes creates background music)**

2017 Sacramento River Temperature Management

RECLAMATION

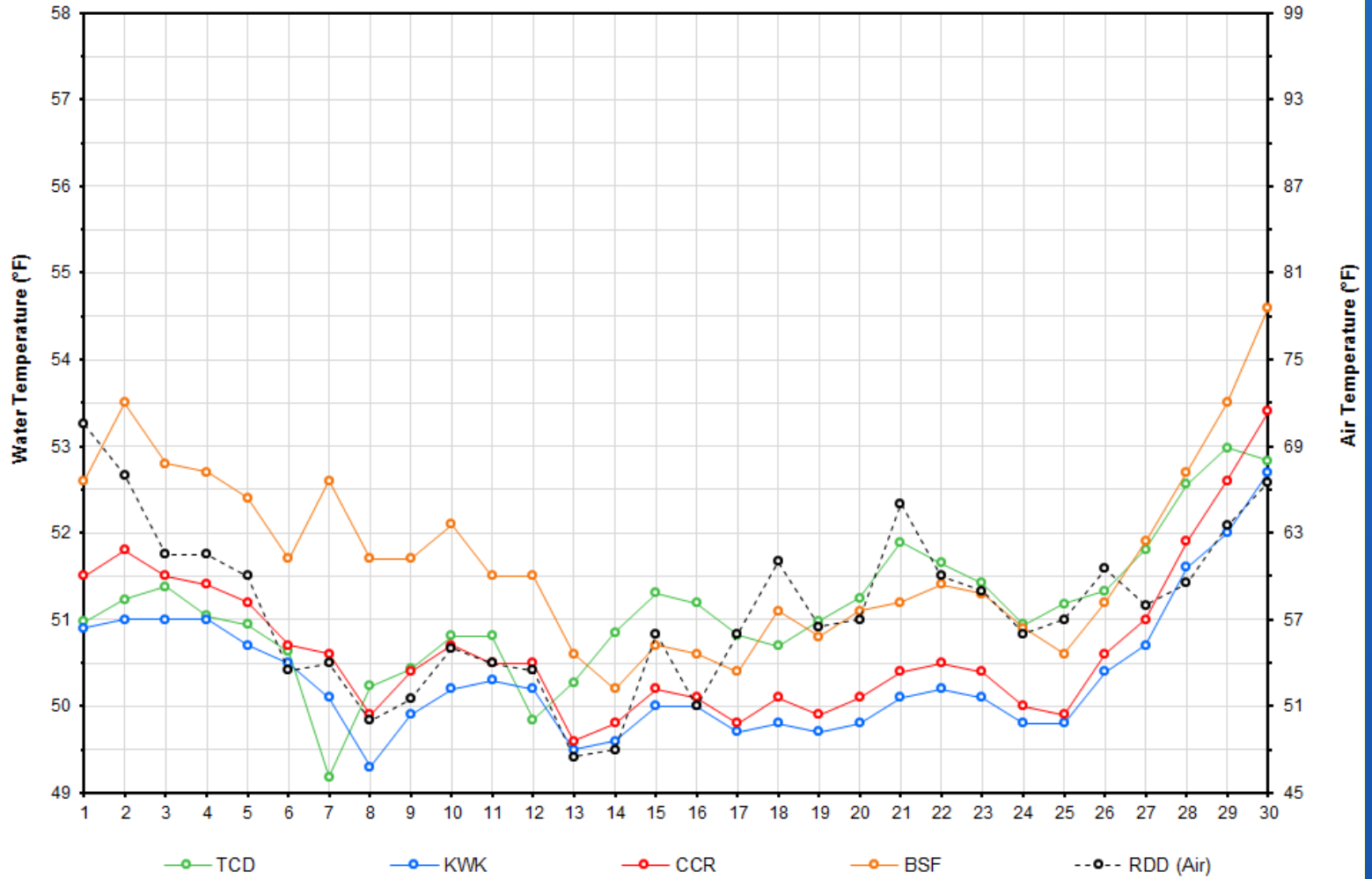
Sacramento River Temperature Management Planning

- **Sacramento River Temperature Management required under:**
 - **SWRCB Order 90-5**
 - **Meet temperatures of 56° F DAT at compliance location**
 - **NMFS 2009/2011 BiOp, Action I.2.4**
 - **Development of annual plan**
 - **56° F DAT at compliance location between Balls Ferry and Bend Bridge May 15 – Oct 31**

2017 Plan

- **Compliance**
 - 56° F DAT; Balls Ferry
 - May 15 – Oct 31
- **Target (Operational Study)**
 - 53° F DAT as surrogate to 55° F 7DADM
 - CCR Gage as surrogate to most downstream redd
 - Subject to further discussion and analysis if most downstream redd ends up significantly farther downstream
 - May 15/onset of spawning through emergence
 - Subject to further discussion and analysis if late emergence has potential to cause impacts to future cold water pool and/or significant fall run dewatering risk
 - Offramp if significant impacts

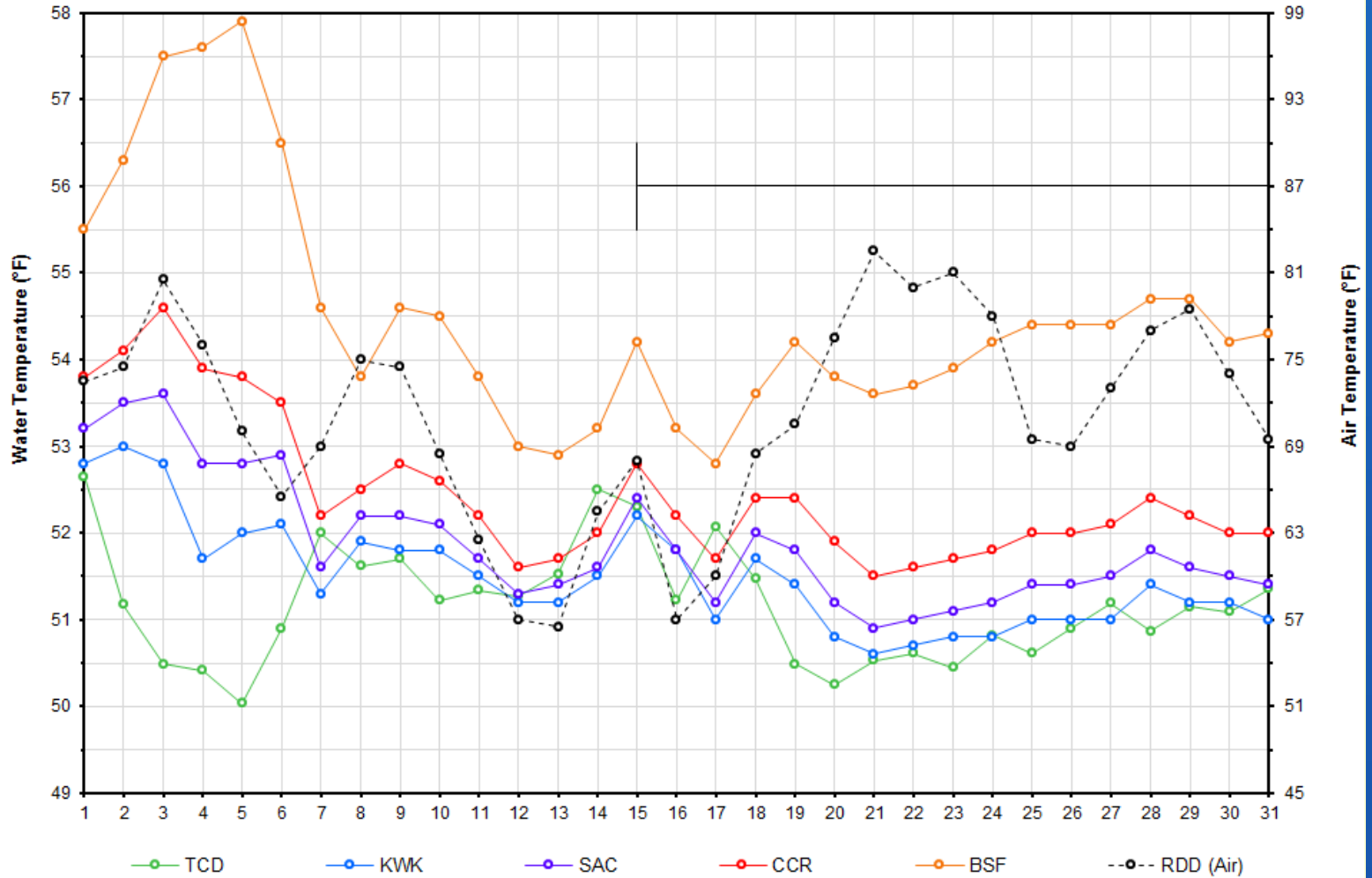
April Mean Daily Temperatures



Station Details		
Code	Body of Water	Location
TCD	N/A	Shasta Power Plant
KWK	Sacramento River	0.8 miles downstream of Keswick Dam
CCR	Sacramento River	9.7 miles downstream of Keswick Dam
BSF	Sacramento River	25 miles downstream of Keswick Dam

Temperature Control Point		
Point	Temp. (°F)	Date Range
BSF	56.0	06/17/16 - Current

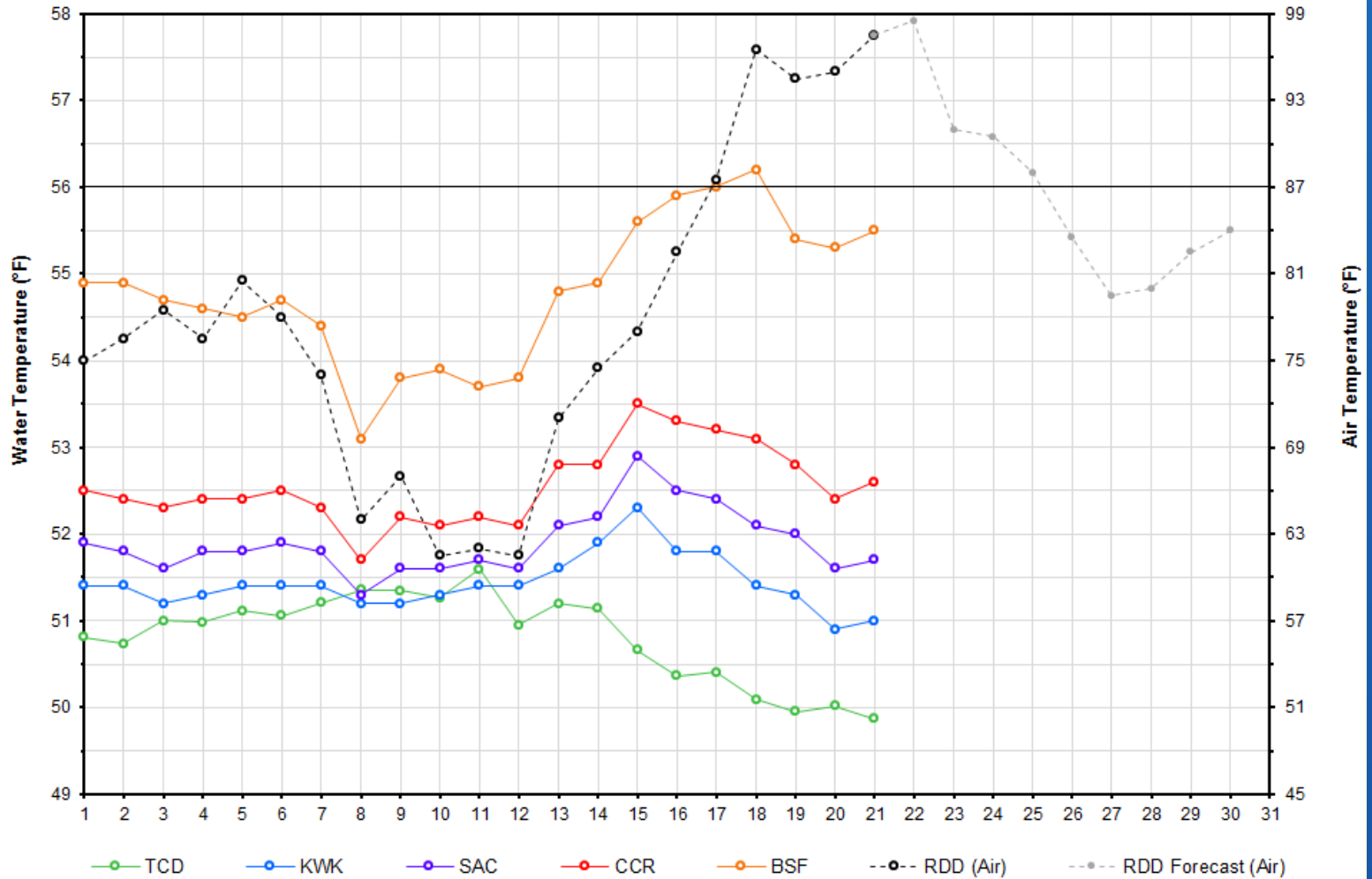
May Mean Daily Temperatures



Station Details		
Code	Body of Water	Location
TCD	N/A	Shasta Power Plant
KWK	Sacramento River	0.8 miles downstream of Keswick Dam
CCR	Sacramento River	9.7 miles downstream of Keswick Dam
BSF	Sacramento River	25 miles downstream of Keswick Dam

Temperature Control Point		
Point	Temp. (°F)	Date Range
BSF	56.0	06/17/16 - Current

June Mean Daily Temperatures



Station Details		
Code	Body of Water	Location
TCD	N/A	Shasta Power Plant
KWK	Sacramento River	0.8 miles downstream of Keswick Dam
CCR	Sacramento River	9.7 miles downstream of Keswick Dam
BSF	Sacramento River	25 miles downstream of Keswick Dam

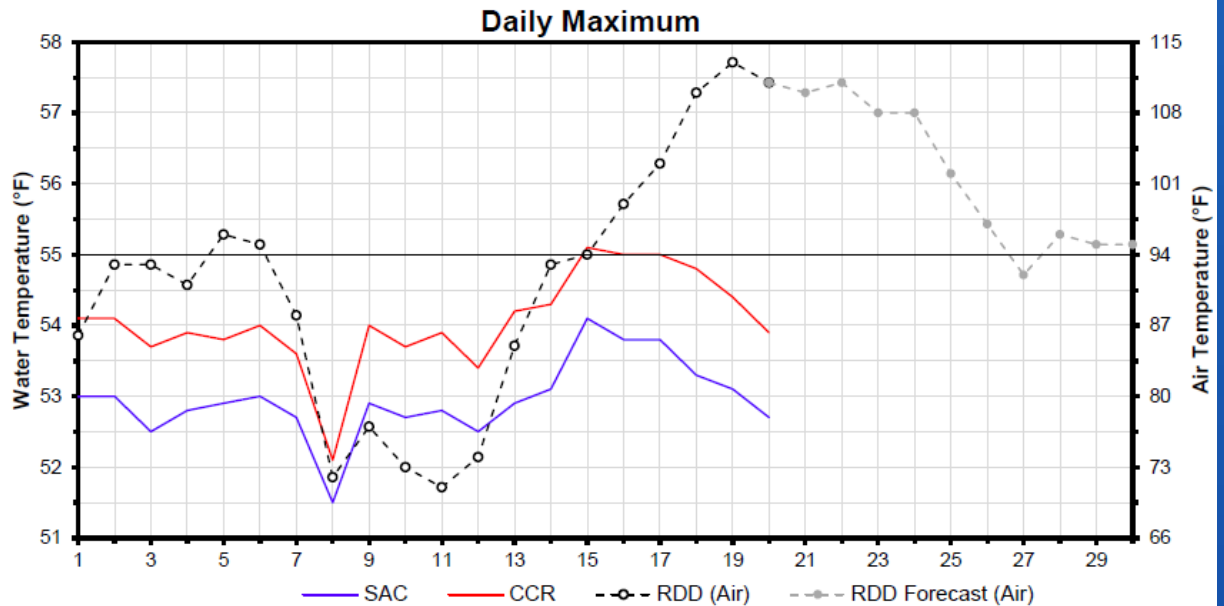
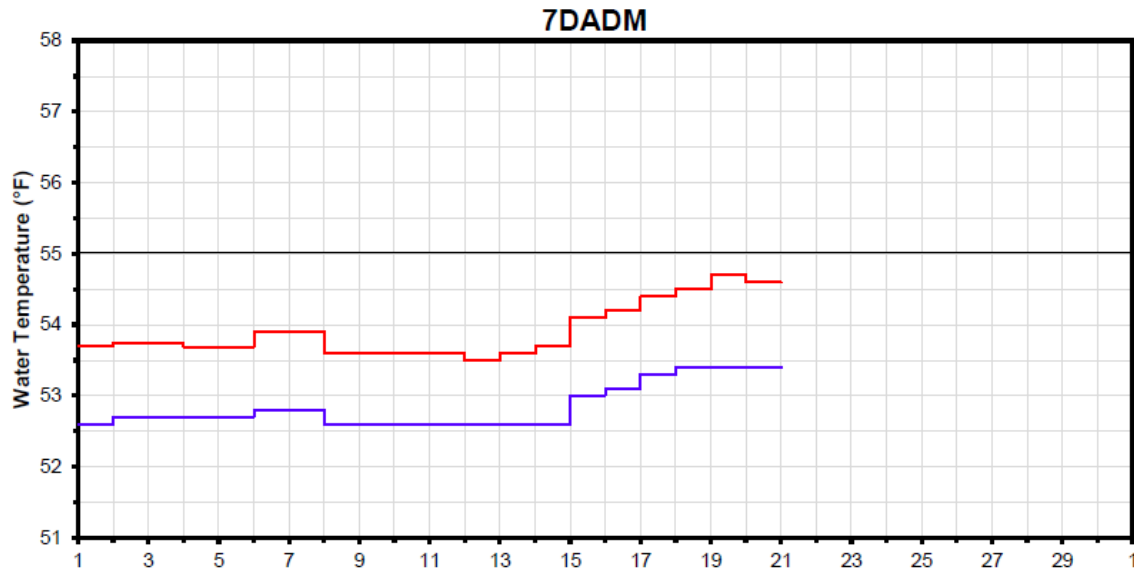
Temperature Control Point		
Point	Temp. (°F)	Date Range
BSF	56.0	06/01/17 - Current

DATE	Daily Max		7DADM ¹		DAT ²
	SAC	CCR	SAC	CCR	BSF
06/01	53.0	54.1	52.6	53.7	54.9
06/02	53.0	54.1	52.7	53.7	54.9
06/03	52.5	53.7	52.7	53.7	54.7
06/04	52.8	53.9	52.7	53.7	54.6
06/05	52.9	53.8	52.7	53.7	54.5
06/06	53.0	54.0	52.8	53.9	54.7
06/07	52.7	53.6	52.8	53.9	54.4
06/08	51.5	52.1	52.6	53.6	53.1
06/09	52.9	54.0	52.6	53.6	53.8
06/10	52.7	53.7	52.6	53.6	53.9
06/11	52.8	53.9	52.6	53.6	53.7
06/12	52.5	53.4	52.6	53.5	53.8
06/13	52.9	54.2	52.6	53.6	54.8
06/14	53.1	54.3	52.6	53.7	54.9
06/15	54.1	55.1	53.0	54.1	55.6
06/16	53.8	55.0	53.1	54.2	55.9
06/17	53.8	55.0	53.3	54.4	56.0
06/18	53.3	54.8	53.4	54.5	56.2
06/19	53.1	54.4	53.4	54.7	55.4
06/20	52.7	53.9	53.4	54.6	55.3
06/21					
06/22					
06/23					
06/24					
06/25					
06/26					
06/27					
06/28					
06/29					
06/30					
-					

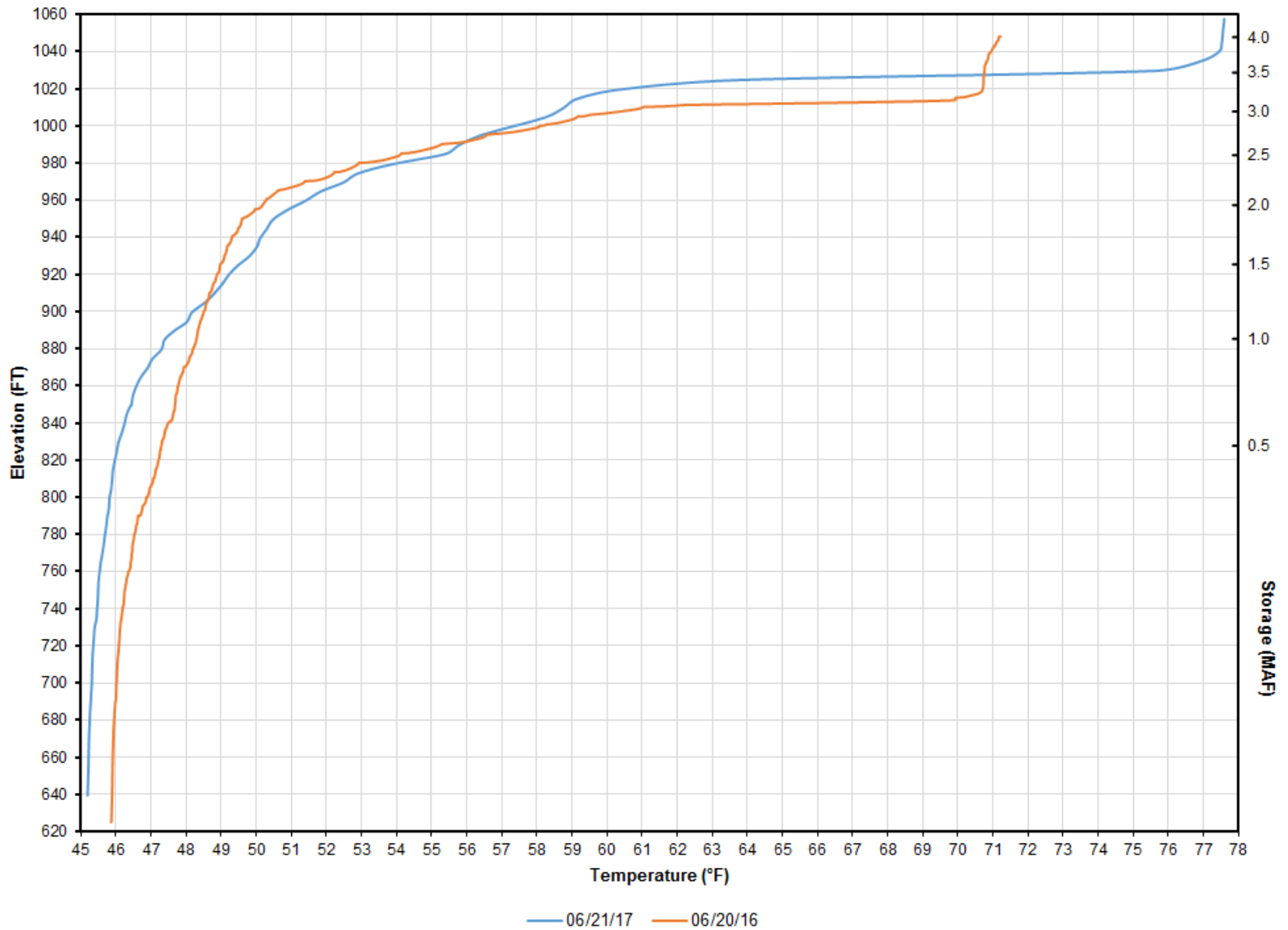
Notes

¹ 7DADM = 7-Day Average Daily Maximum

² DAT = Daily Average Temperature



Shasta Reservoir Vertical Temperature Profile 2016 vs 2017



2017 Temperature Management

- **Next Steps**
 - Continue operational study
 - Continue to gather, analyze, and assess data
 - 2017
 - 2016
 - Previous Years

Discussion

RECLAMATION

**System-Wide
Evaluations of Draft
Proposed Amendment**

RECLAMATION

Storage and Flow Targets/Restrictions

- **Spring/Fall Storage Targets**
 - Vary by water year type
 - Spring storage: ranges between 3.5 to 4.2 MAF
 - Fall storage: ranges between 1.9 to 3.2 MAF
- **Spring Flow Restrictions**
 - Vary by water year type
 - April flow: ranges between 4,000 to 8,000 cfs
 - May flow: ranges between 7,500 to 12,000 cfs
 - (June through October forecast flow run scenario)
- **Action I.2.1**
- **Action I.2.3**
 - Actions I.2.3.A-C

Analyses – Storage and Flow Targets/Restrictions

- **CalSim analysis**
 - Feasibility of targets/restrictions
 - Impacts/changes to other parts of the CVP/SWP system required to meet targets/restrictions

Analyses – Storage and Flow Targets/Restrictions

- Initial CalSim sensitivity analysis
 - Two scenarios – both use ELT Climate Change (Q5):
 - “Current Ops”
 - “NMFS Amendment”

Analyses – Two Scenarios

- **“Current Ops”**
 - Attempts to replicate some reduced deliveries to help protect storage
 - Does not implement reductions to D-1641 requirements in extreme drought conditions (potential refinement for ongoing studies)
- **“NMFS Amendment”**
 - No specific logic that guarantees Shasta storage levels
 - Allows for any shortage allocation necessary in attempt to meet proposed operational objectives
 - Not a policy or necessarily realistic strategy, but used to test ability to reach targets under essentially any supply condition
 - Shasta-Folsom balance adjusted to target “Current Ops” range of conditions

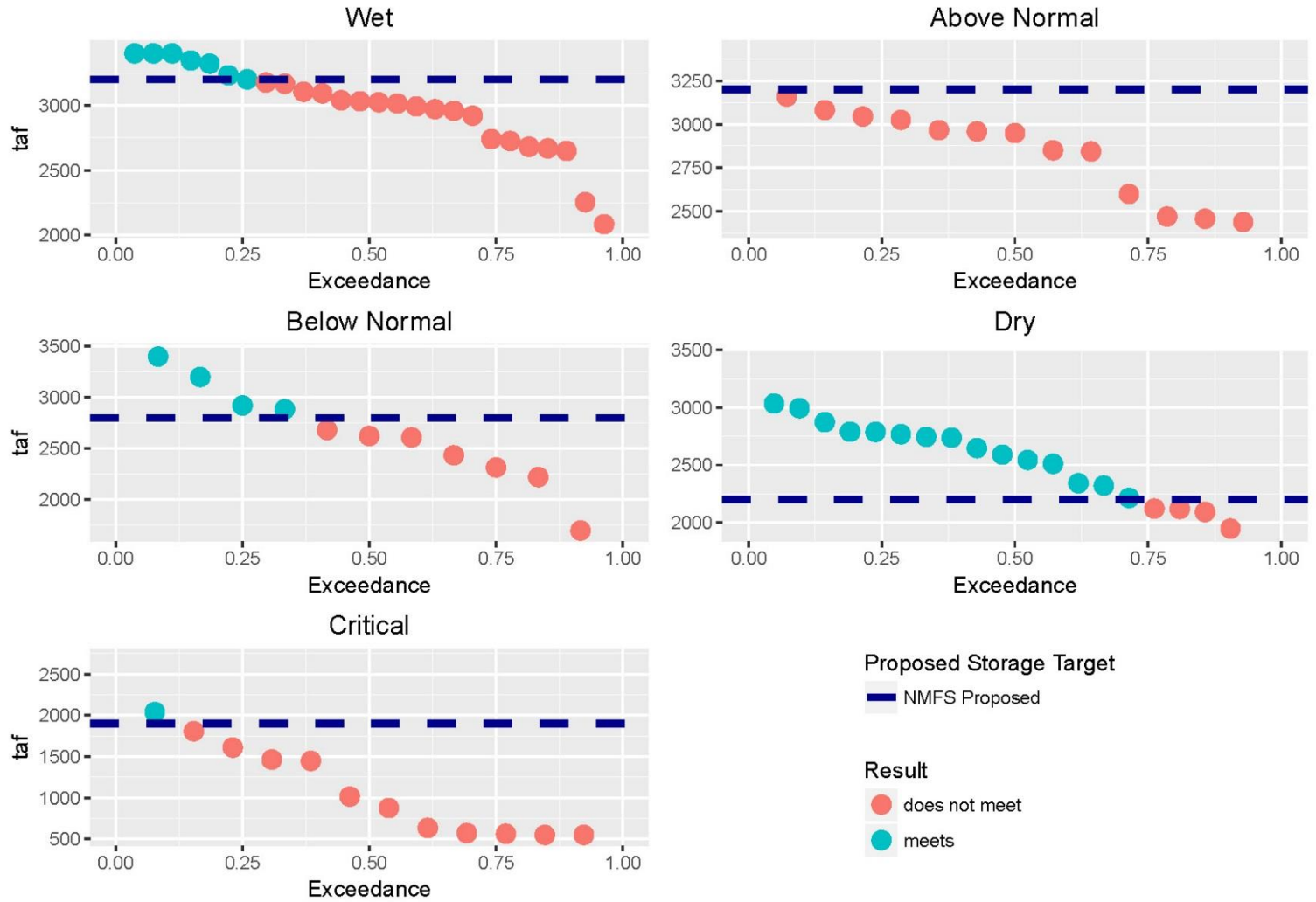
Analyses – Fall Storage Targets

- **Draft Proposed September Storage Targets**
 - **Critically dry: 1.9 MAF**
 - **Dry: 2.2 MAF**
 - **Below Normal: 2.8 MAF**
 - **Above Normal: 3.2 MAF**
 - **Wet: 3.2 MAF**

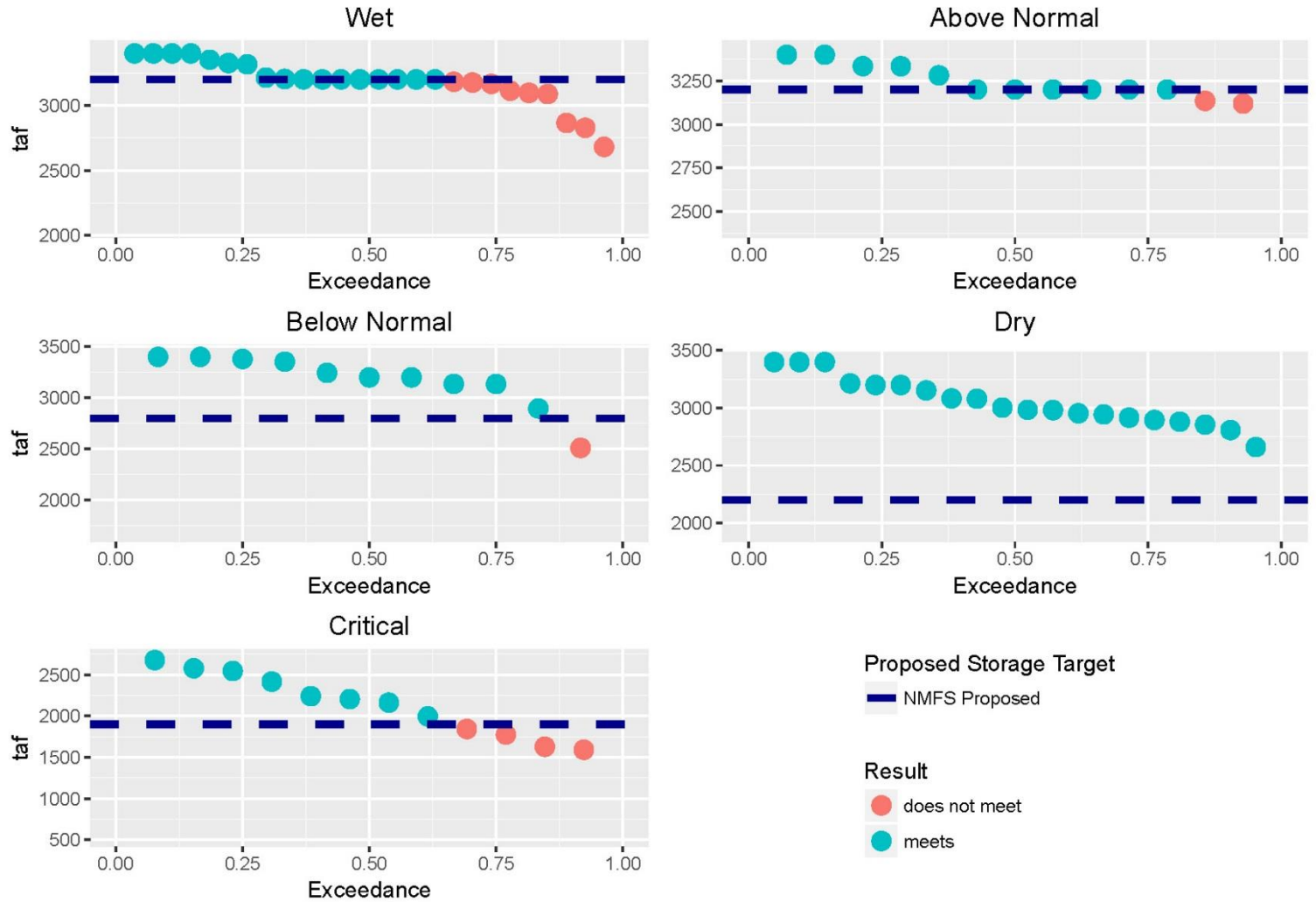
Analyses – Fall Storage Targets

- **Compliance under “Current Ops”**
- **Compliance with modified CVP delivery allocation**
 - **Allocations consider fall storage target in computing CVP delivery capability**

Shasta Carryover Targets, Sept – Current Ops



Shasta Carryover Targets, Sept – NMFS Amendment



June-Sept Sacramento Controls for years not meeting September target

version: NMFS Amendment

Year	WY Type	May Target	Met May Target?	Sept Target Diff	Month Fell Below Sept Target	June		July		August		Sept		Max Fill	Max Fill Month
1924	Crit	3500	-654	-272	8	NDO	WS	NDO	WQ	NDO	WQ	NDO	RV	3429	3
1931	Crit	3500	-775	-124	8	NDO		NDO		NDO	WQ	NDO	WS RV	3171	3
1934	Crit	3500	-584	-309	8	X2		NDO		NDO	WQ	NDO	RV	3123	3
1977	Crit	3500	-913	-57	8	NDO		NDO		NDO	WQ	NDO	K RV	2838	10
1939	BN	4200	-587	-288	7	NDO	WQ	NDO	WQ		WQ	NDO		3900	3
1928	AN	4200	Yes	-80	9	X2	WQ	NDO	WQ	NDO	WS		X2	4510	4
1940	AN	4200	Yes	-65	8	X2	WS	NDO	WQ	NDO	WS		X2	4251	5
1938	Wet	4200	Yes	-103	9		WS	NDO	WS	NDO	WS		X2	4552	5
1953	Wet	4200	Yes	-24	9		FC	NDO		NDO	WQ		X2	4552	5
1956	Wet	4200	Yes	-34	9		WS	NDO	WS	NDO	FC		X2	4552	5
1958	Wet	4200	Yes	-18	9		FC	NDO	FC	NDO	FC		X2	4552	2
1963	Wet	4200	Yes	-335	9	X2	WS	NDO	WQ	NDO	WS		X2	4552	5
1970	Wet	4200	-98	-520	8	X2	WQ	NDO	WQ	NDO	WS		X2	4109	4
1984	Wet	4200	Yes	-87	9	X2		NDO	WQ	NDO	FC		X2	4552	5
1986	Wet	4200	-324	-112	8	EI	WS	NDO	WQ	NDO	WS		X2	3876	5
1997	Wet	4200	-274	-373	9	X2	WS	NDO	WQ	NDO	WS		X2	4038	4

WS	Wilkins Slough
RV	Rio Vista
FC	Flood Control
X2	Fall X2

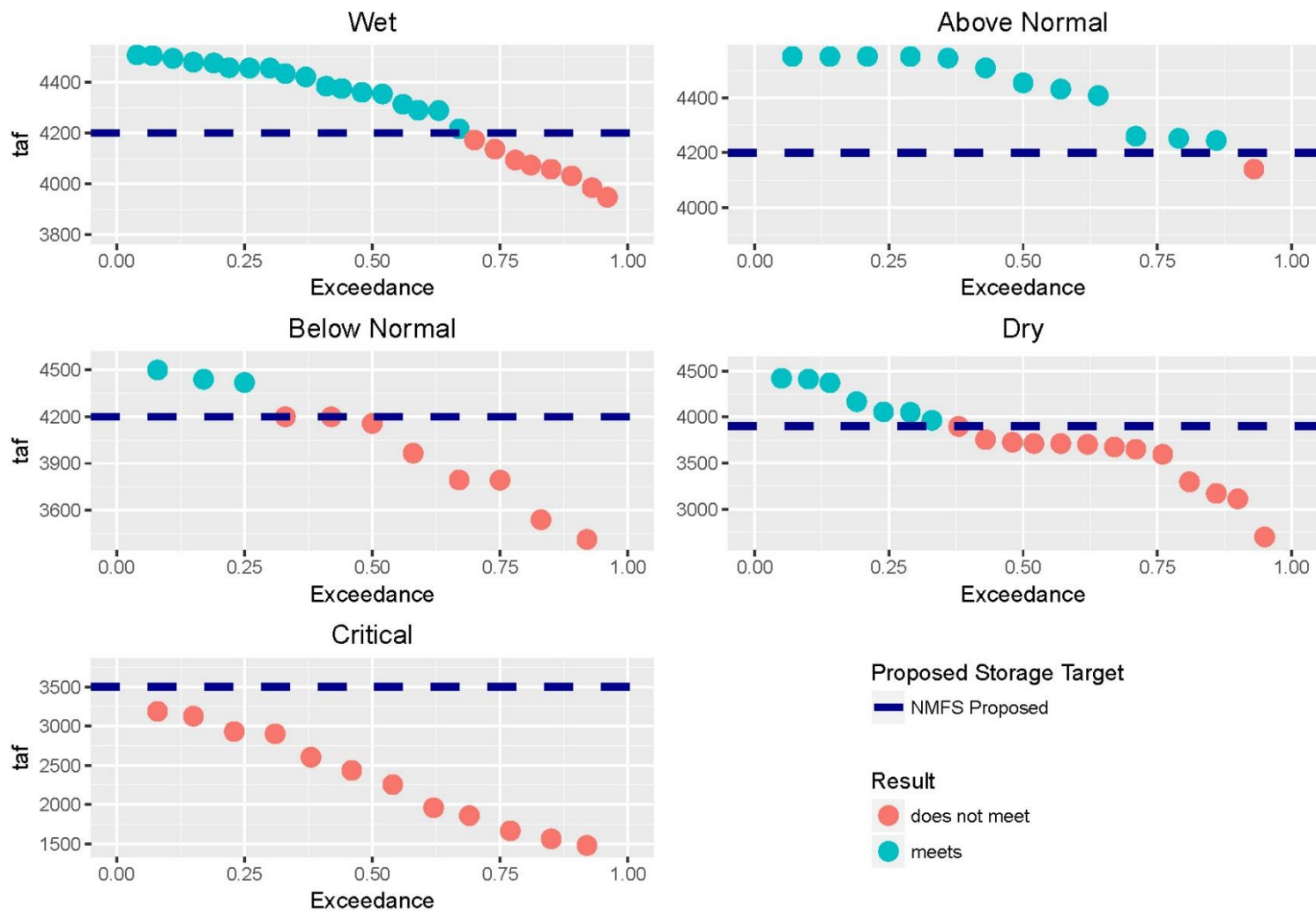
Analyses – Spring Storage Targets

- **Draft Proposed Spring Storage Targets**
 - Critically dry: 3.5 MAF
 - Dry: 3.9 MAF
 - Below Normal: 4.2 MAF
 - Above Normal: 4.2 MAF
 - Wet: 4.2 MAF

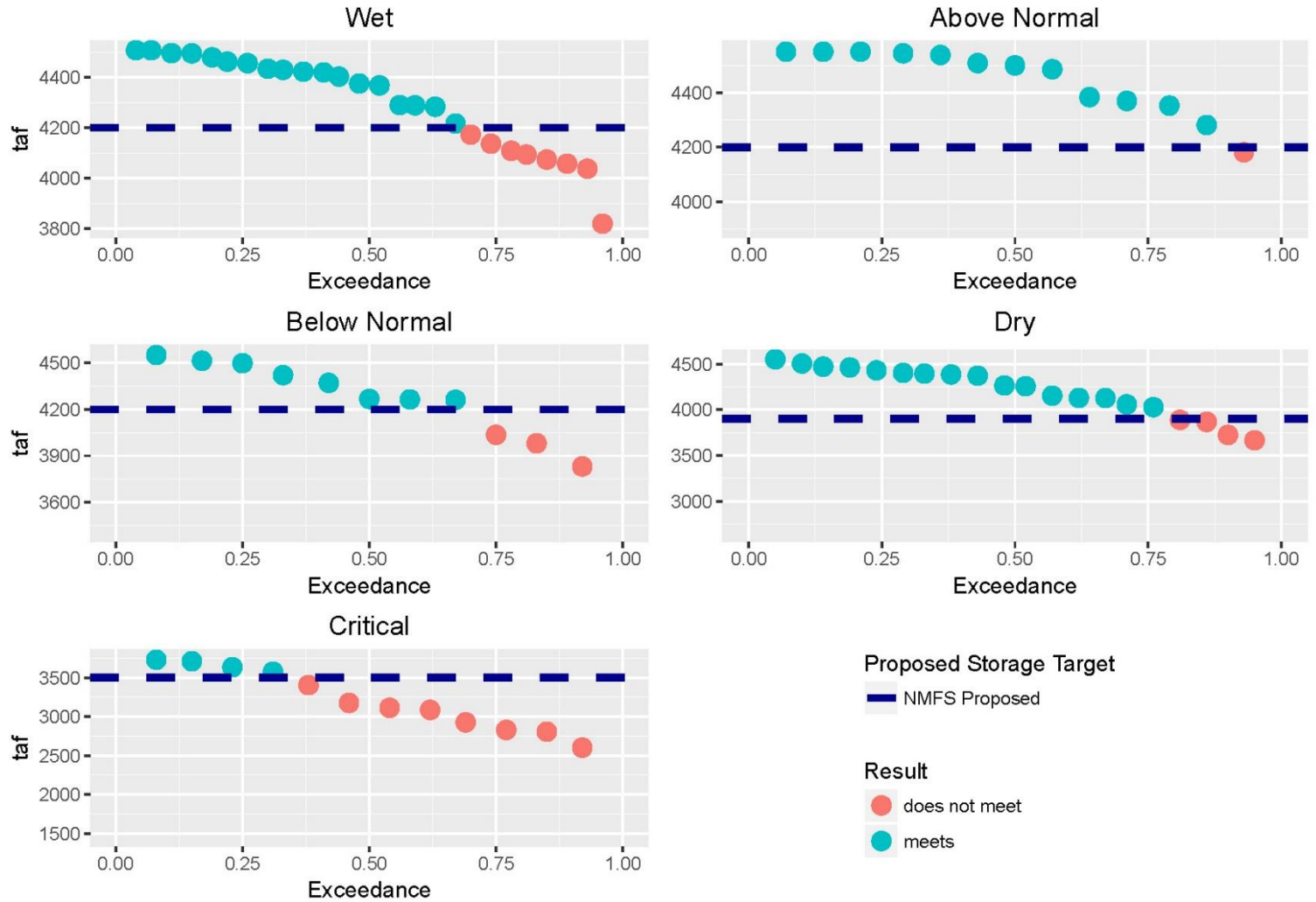
Analyses – Spring Storage Targets

- **Compliance under “Current Ops”**
- **Compliance with modified CVP delivery allocation**
 - **No specific effort to modify October-March operations**
 - **Demonstrates ability to fill given September target**

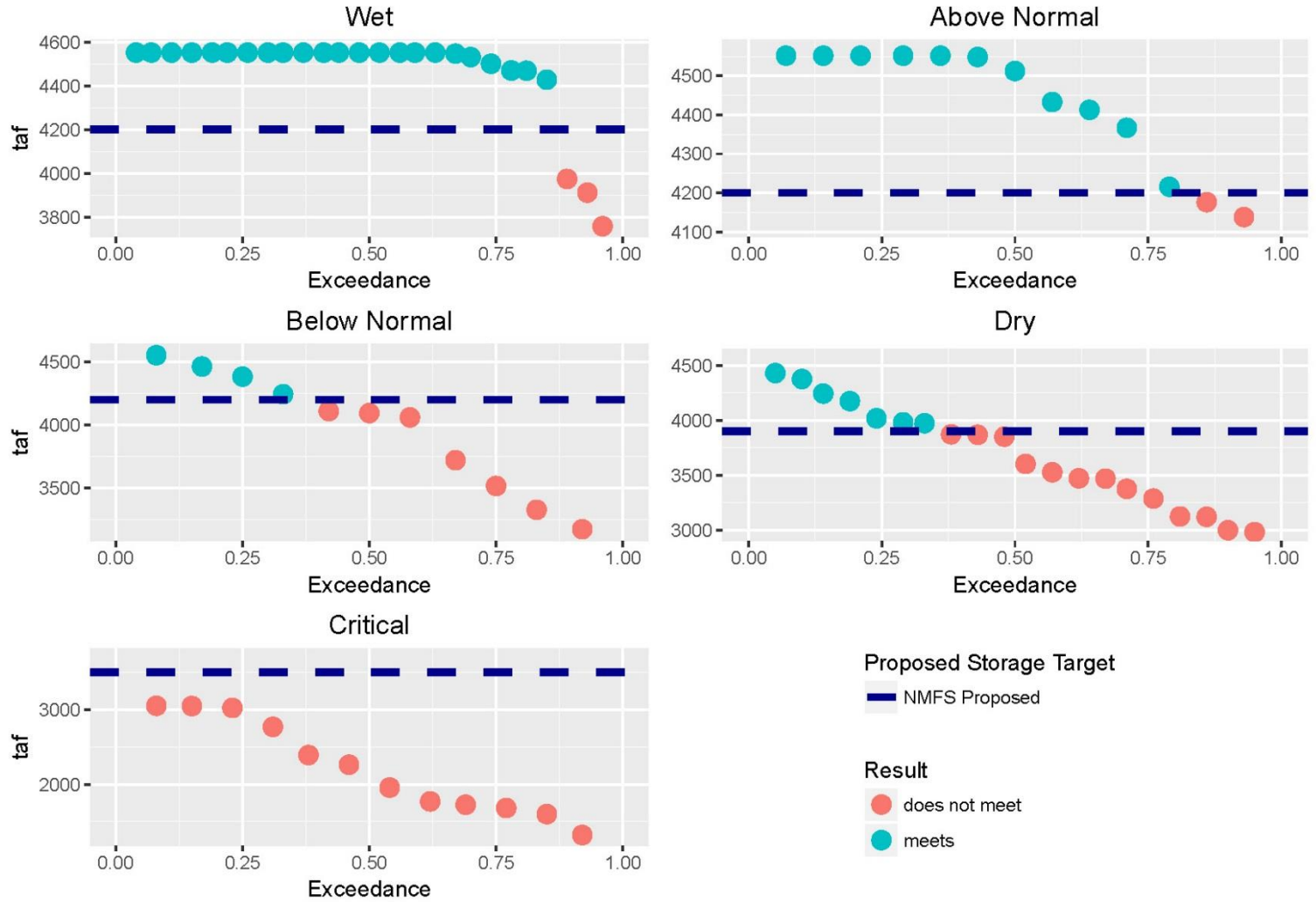
Shasta Fill Targets, April – Current Ops



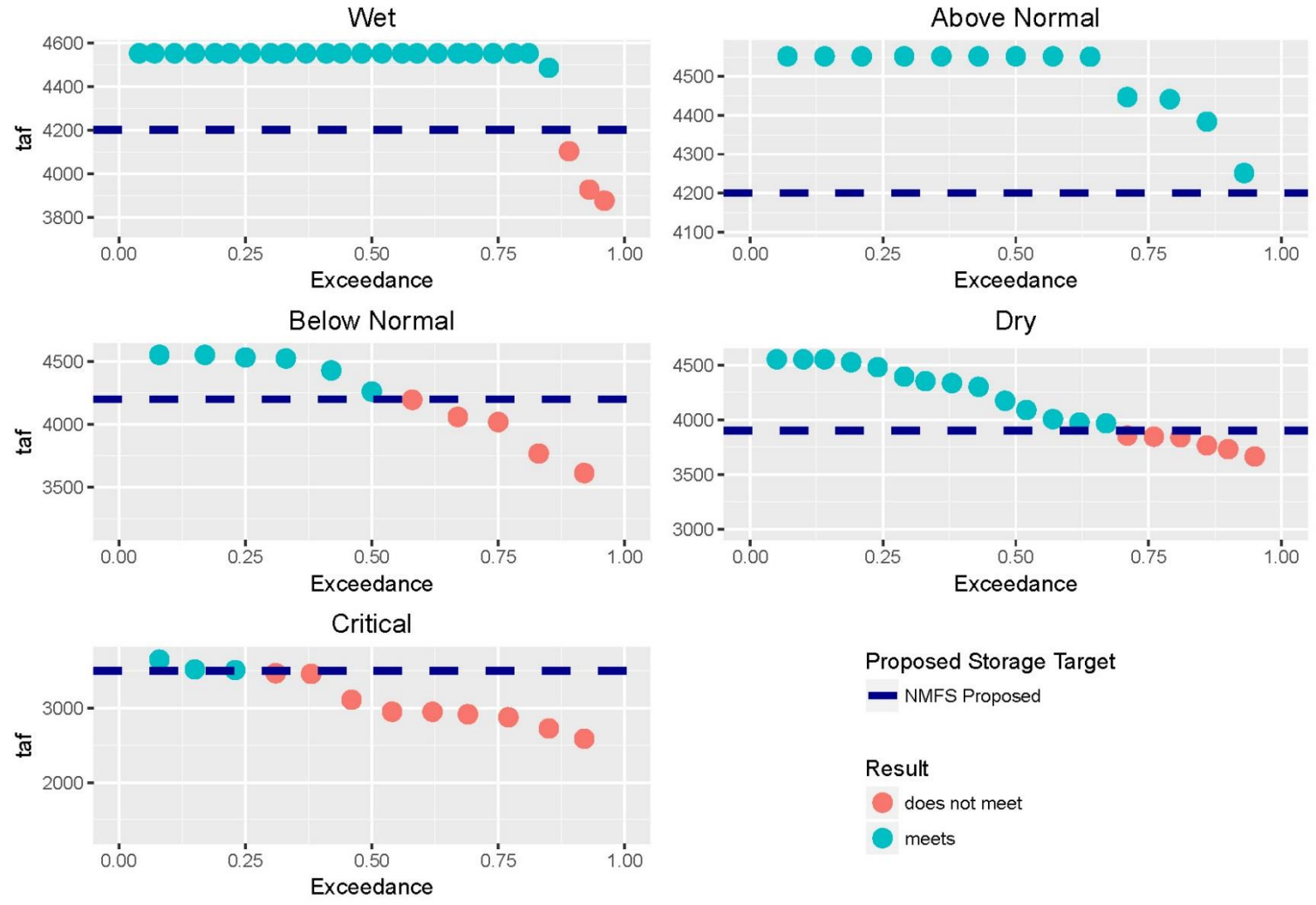
Shasta Fill Targets, April – NMFS Amendment



Shasta Fill Targets, May – Current Ops



Shasta Fill Targets, May – NMFS Amendment



Oct-May Sacramento Controls for years not meeting May target

version: NMFS Amendment

Year	WY Type	Prev. WY Type	Met Prev Sept Target?	May Fill Target	May Target Diff	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Max Fill	Max Fill Month		
1924	Crit	BN	Yes	3500	-624	NDO			NDO	WS	NDO	K	WQ	K		K	X2	K	X2	WS	NDO	WS	3429	3	
1931	Crit	Dry	Yes	3500	-775	NDO	WS	RV	NDO		NDO	K	WQ	K		K		K	X2		NDO	WS	3171	3	
1932	Crit	Crit	No	3500	-551	NDO	WS	RV	NDO	K	WQ	K		K		K		K		WS		WS	2949	5	
1933	Crit	Crit	Yes	3500	-550	NDO	WS	RV	NDO	WS	WQ/NDO	K		K		K		K	X2	K	X2	WS	2950	5	
1934	Crit	Crit	Yes	3500	-584	NDO	WS	RV	NDO	K		K		K		K	X2	K	X2	WS	X2	WS	3123	3	
1977	Crit	BN	Yes	3500	-913	NDO			NDO		NDO	K	WQ/NDO	K	X2	K	X2		X2		NDO	WS	2838	10	
1991	Crit	Crit	Yes	3500	-388	NDO		RV	NDO	RV	WQ/NDO	K	NDO	K	WQ/X2			K			K		WS	3114	4
1992	Crit	Crit	Yes	3500	-31	NDO	WS	RV	NDO	RV	WQ/NDO	K	WQ	K	WQ		WQ	K		K	X2	WS	3712	4	
1994	Crit	AN	Yes	3500	-41	X2			X2		EI/NDO	K	WQ	K		K		K		WS		WS	3752	3	
1944	Dry	Wet	Yes	3900	-169	X2			X2		EI/NDO	K		K		K		K		WS	WQ	WS	3731	5	
1947	Dry	AN	Yes	3900	-55	X2	WS		X2			K		K		K		K		WS	WQ/X2		4154	4	
1964	Dry	Wet	No	3900	-134	X2		K	X2		EI	K		K	EI	K	EI	K	WQ/X2	WS	WQ/X2	WS	3990	3	
1976	Dry	Wet	Yes	3900	-235	X2			X2		EI	K		K		K		K	WQ	WS	WQ/NDO		3889	4	
1987	Dry	Wet	No	3900	-45	X2		K	X2		NDO	K		K		K		K	X2	WS	WQ/X2		4149	3	
2001	Dry	AN	Yes	3900	-60	X2			X2		NDO			K		K		K		WS	WQ/X2		4059	4	
1923	BN	Wet	Yes	4200	-141	X2						K		K		K		K		K		WS	4265	4	
1936	BN	Dry	Yes	4200	-182	NDO			NDO	K	NDO	K	WQ	K		FC		K		K		WS	4036	4	
1939	BN	Wet	No	4200	-587	X2	WS		X2		EI/NDO	K		K		K		K	X2		WQ/NDO		3900	3	
1959	BN	Wet	No	4200	-5	X2			X2		EI/NDO	K		FC		FC	EI	K	X2	WS	WQ/X2		4262	4	
1985	BN	Wet	No	4200	-433	X2		K		FC		FC		K		K		K		WS	X2		3981	4	
1970	Wet	Wet	Yes	4200	-98	X2			X2			FC		FC		FC		K		WS	WQ/X2		4109	4	
1986	Wet	BN	Yes	4200	-324	NDO			NDO	K	WQ	K		FC		FC		FC		K		WS	3876	5	
1997	Wet	Wet	Yes	4200	-274	X2		WS	X2	FC		FC		FC		K		K		WS	WQ	WS	4038	4	

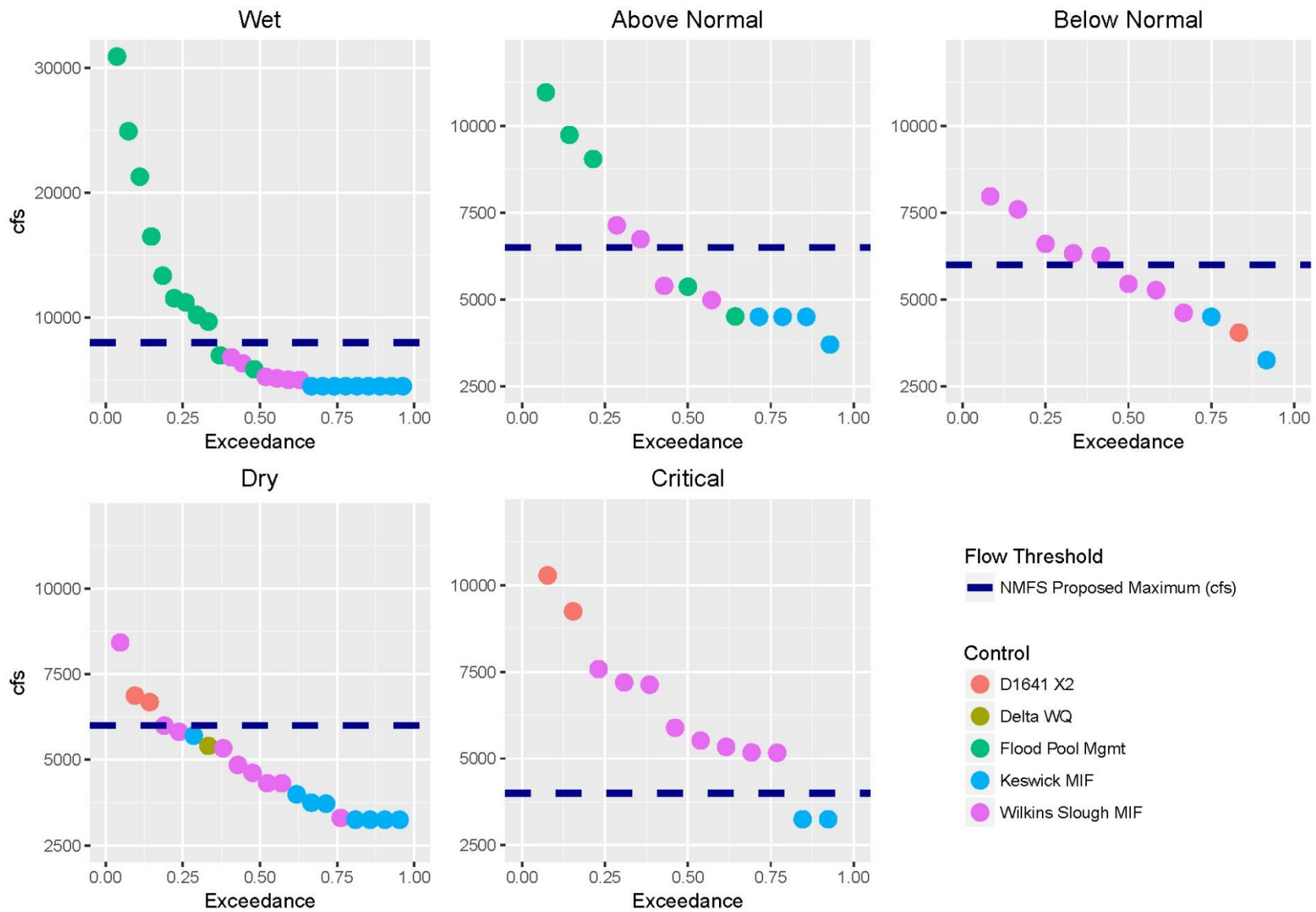
Analyses – Spring Release Limits

- **Draft Proposed Spring Release Limits**
 - **April:**
 - **Critically Dry: 4,000 cfs**
 - **Dry: 6,000 cfs**
 - **Below Normal: 6,000 cfs**
 - **Above Normal: 6,500 cfs**
 - **Wet: 8,000 cfs**
 - **May:**
 - **Critically Dry: 7,500 cfs**
 - **Dry: 8,000 cfs**
 - **Below Normal: 9,000 cfs**
 - **Above Normal: 11,000 cfs**
 - **Wet: 12,000 cfs**

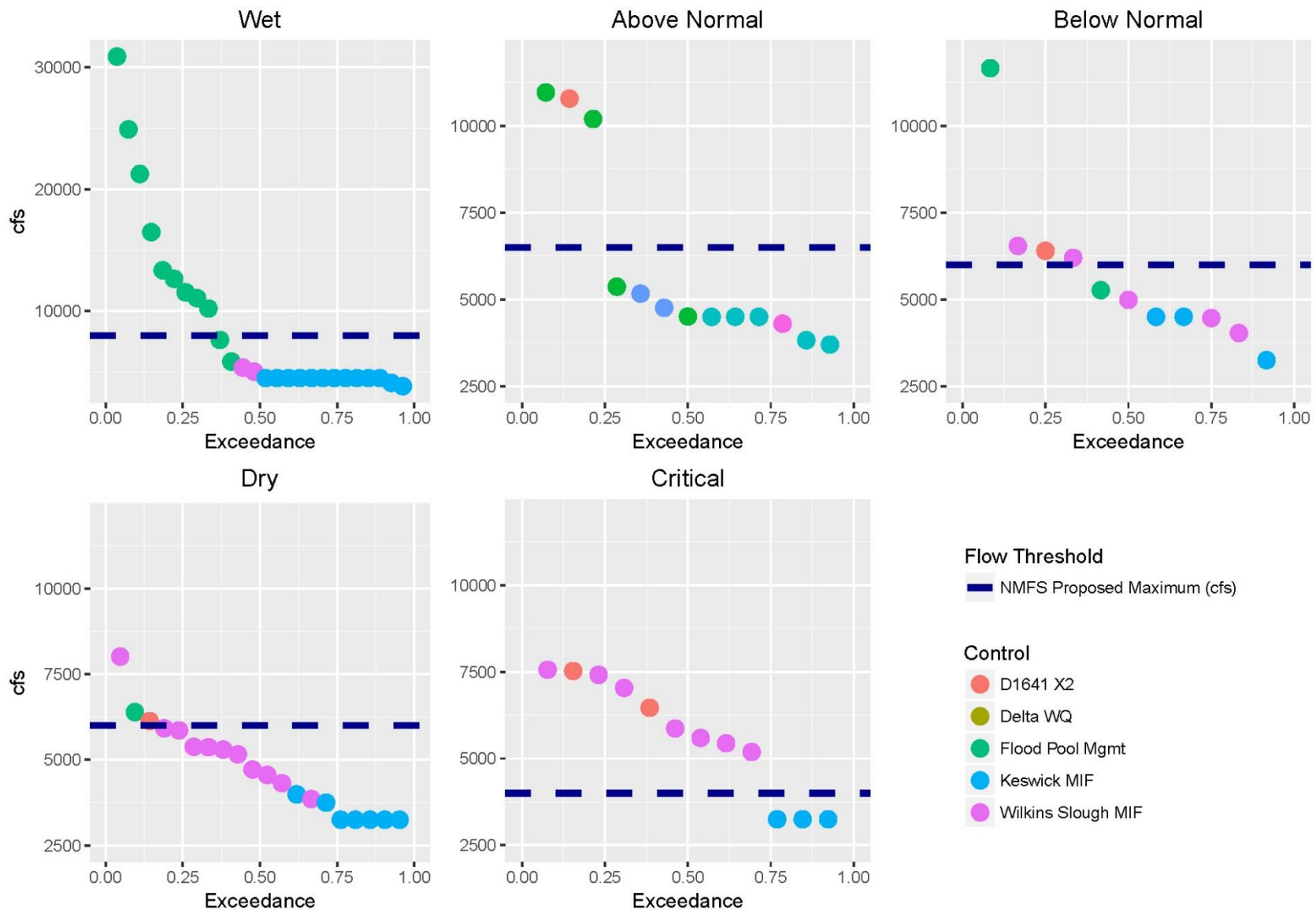
Analyses – Spring Release Limits

- **Compliance under “Current Ops”**
- **Compliance with modified CVP delivery allocation**
 - **No specific limits set on releases**
 - **Operation affected solely by allocation and storage conditions**

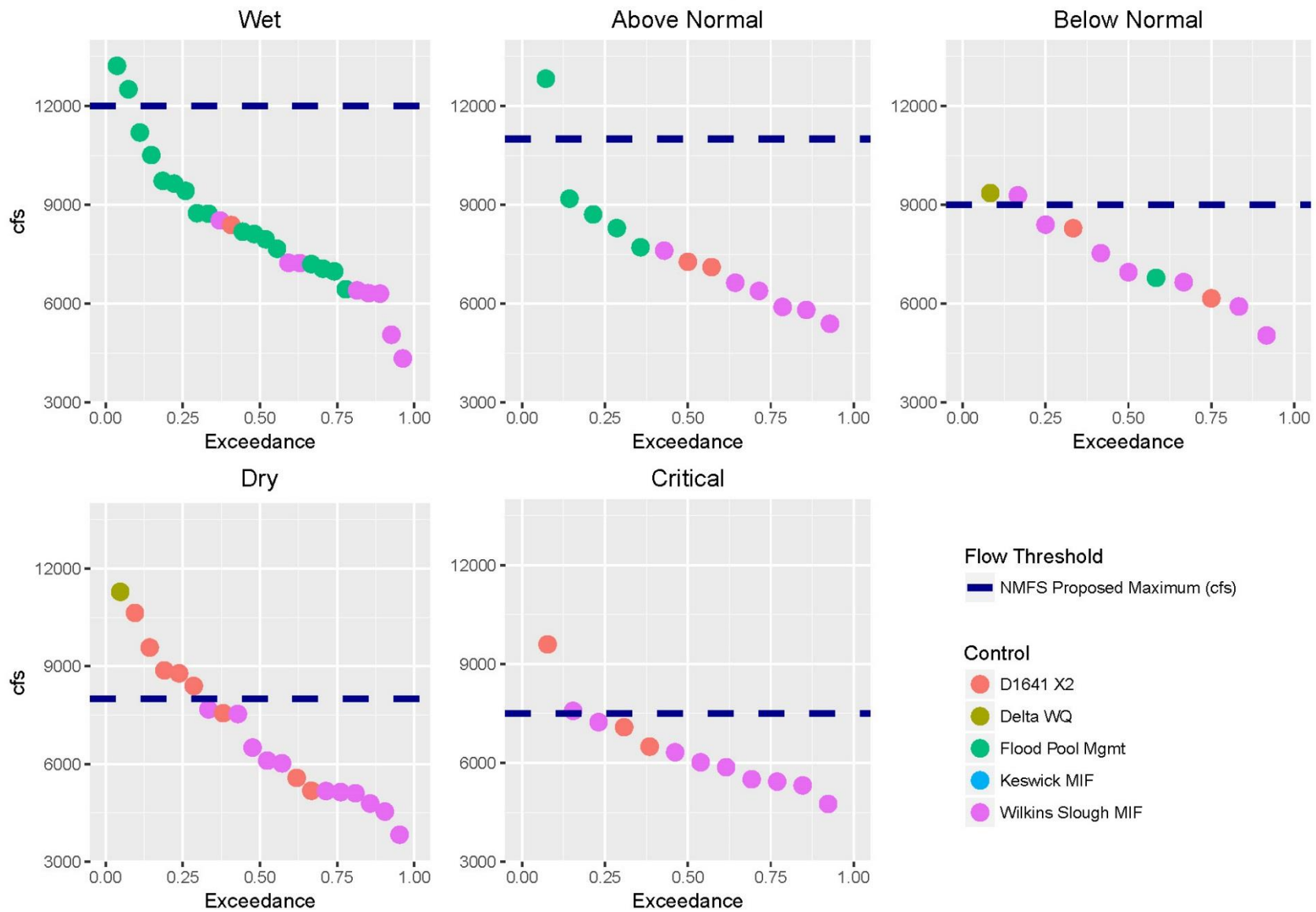
Keswick release limits, April – Current Ops



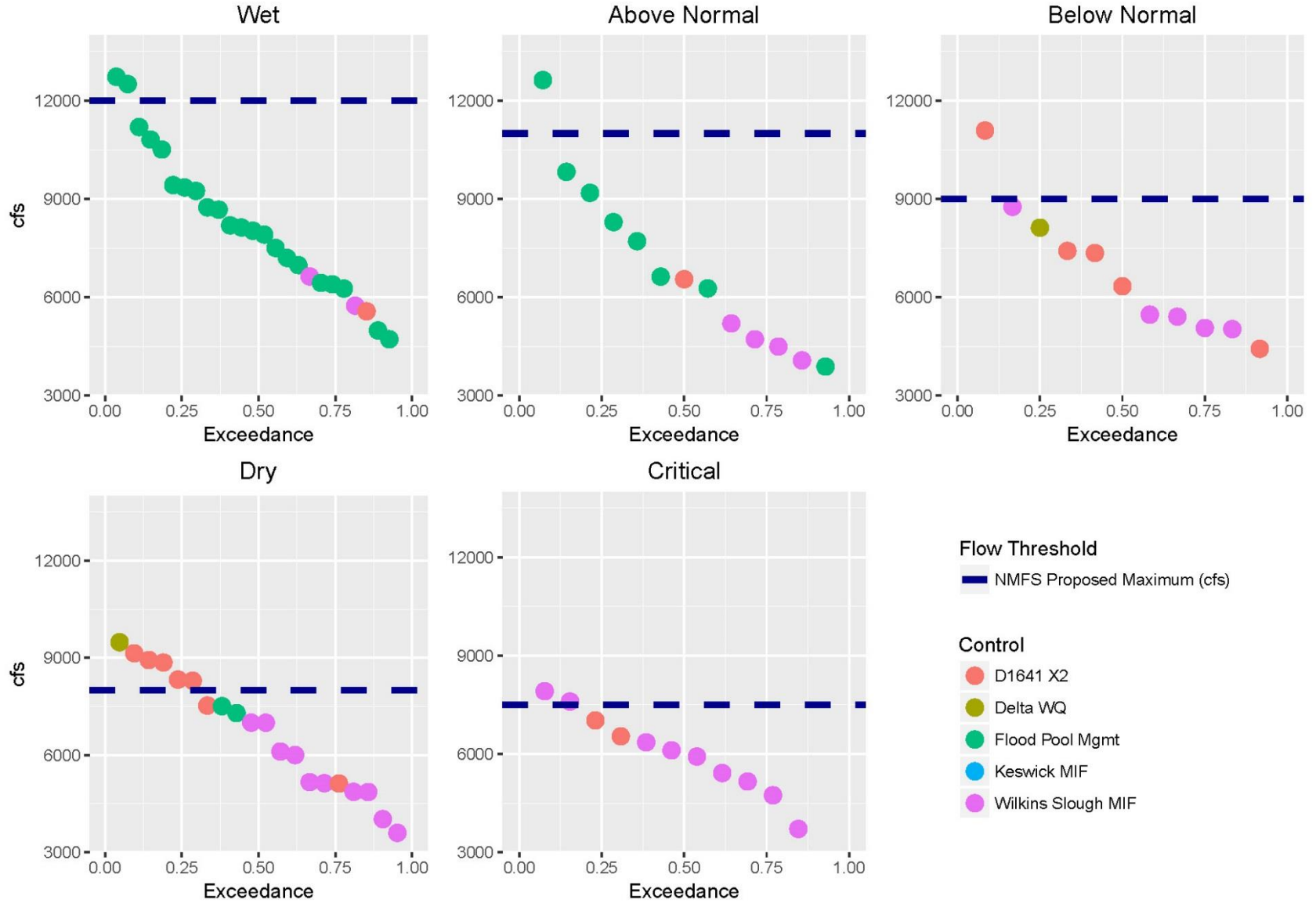
Keswick release limits, April – NMFS Proposed RPA Amendment scenario



Keswick release limits, May – Current Ops



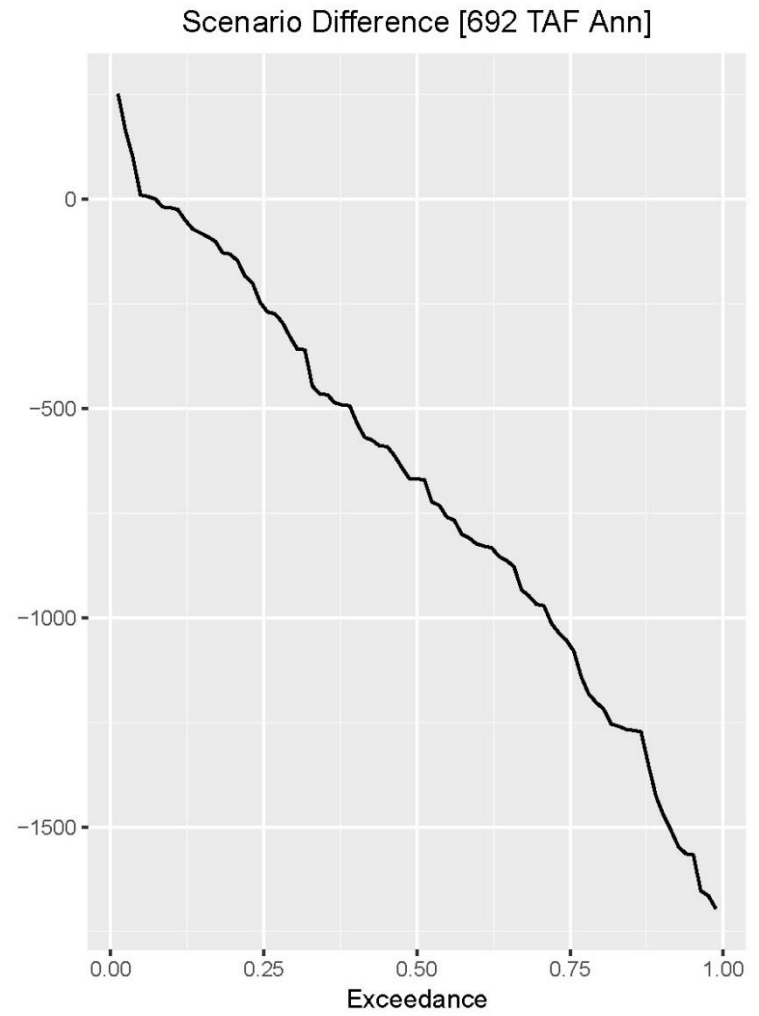
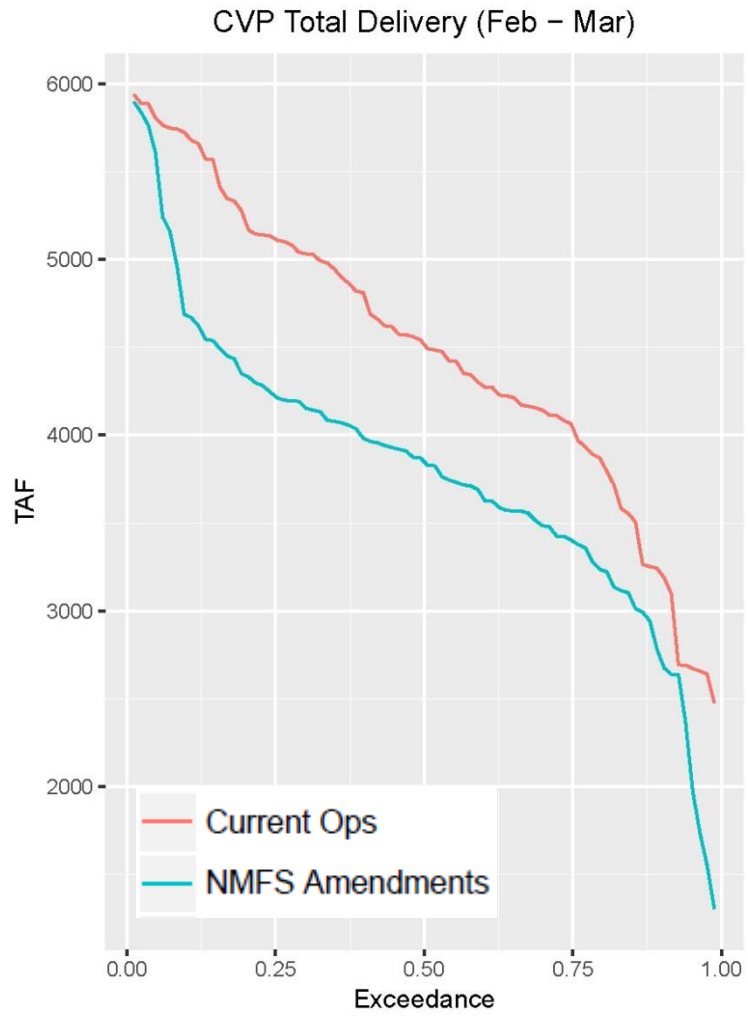
Keswick release limits, May – NMFS Proposed RPA Amendment scenario



Analyses – Effects on Other System Operations

- Folsom Storage
- Delta Outflow
- SWP Operations
- CVP Delivery

Overall change in CVP Delivery



Discussion

RECLAMATION

Next Steps

**System-Wide Evaluations
of Draft Proposed
Amendment**

RECLAMATION

Analyses – Storage and Flow Targets/Restrictions

- **Further refinements to CalSim analysis**
 - Refinements to storage target accomplishment
 - Refinements to impact distribution
 - Additional QA/QC

Temperature Compliance (location/value/metric)

- 55° F 7DADM and/or 53° F DAT at CCR (May 15->)
 - Action I.2.3.A-C
 - Action I.2.4
- 61° F 7DADM and/or 58° F DAT at Jellys Ferry (March 1 – May 15)
 - Action I.2.3

Analyses – Temperature Compliance (location/value/metric)

- **HEC-5Q analysis**
 - **Feasibility/frequency**
 - Existing
 - In conjunction with storage/flow targets/restrictions
 - **Potential impacts of meeting the requirements (requires additional formulation)**
- **Data from 2016/2017/Previous Years**

Analyses – Biological Impacts

- **SacPas, SAIL, MAST**
 - Potential biological impacts on other species residing in other components of system
 - Sacramento/American salmon, steelhead, Delta smelt, others

Biological Objectives

- **Temperature-dependent mortality objectives**
 - **Varies by water year type**
 - **3% to 30%**
 - **Action I.2.1**

Analyses – Biological Objectives

- Analyses into feasibility based on outputs of CalSim/HEC-5Q model runs

Analyses – Others

- **Wilkins Slough Operations**
 - Action I.4
 - Discussions with SRSC/North-of-Delta water users
- **Others?**

Discussion

RECLAMATION

Next Steps

- **Previous Meeting Notes**
- **Future Workshops**
 - **September 21 – Status/Updates**