california water impact network

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

California Water Research

October 15, 2021 Via email

Steve Brandt, Chair, and members
Delta Independent Science Board
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Re: Comments on *Draft Water Supply Reliability Review*

Dear Dr. Brandt and Delta ISB members,

Please accept these comments on the Delta Independent Science Board's *Draft Water Supply Reliability Review* ("Review").

Overall, the Review is a substantive and important review, and we commend the Delta Independent Science Board for completing the draft in the difficult circumstances of the past year. The discussion of Water Supply Reliability Estimation methods and use of these methods is comprehensive and the many references to the research literature create an extremely useful reference for stakeholders and practitioners.

We offer the following suggestions to strengthen the Review.

Executive Summary

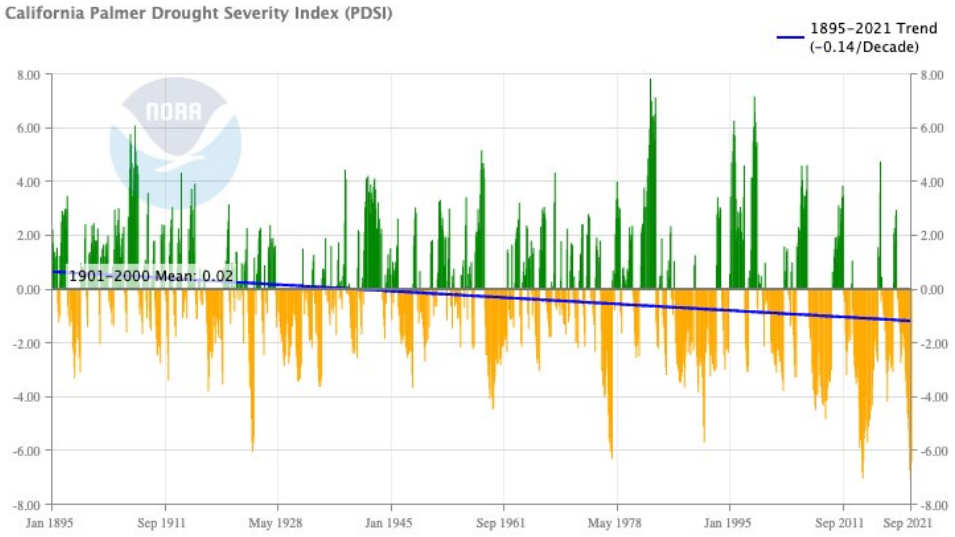
The Executive Summary is probably the most important part of the report, since it is what will be read managers and decision makers. The Executive Summary needs to be more concise.

The Executive Summary needs to be more compelling. There is no reference to the fact that California is currently experiencing the most severe drought in the observational record, as measured by the Palmer Drought Severity Index ("PDSI"). There is also no mention of the record low storage in California's reservoirs, or the imminent extinction of Delta smelt.

We urge the authors to follow the recommendation of Bradshaw et.al.,[1] who stated:

> "It is therefore incumbent on experts in any discipline that deals with the future of the biosphere and human well-being to eschew reticence, avoid sugar-coating the overwhelming challenges ahead and 'tell it like it is.'"

In general, the readability and understandability of the Review would be strengthened by a few more graphs relating concepts discussed in the report to the current drought. One example would be a graph from NOAA showing the overall trend in PDSI.[2]



The Executive Summary states,

> Environmental concerns, particularly the desire to maintain aquatic habitat, adds a new type of reliability assessment relative to past efforts. Both water quantity and quality (e.g., salinity and temperature) will determine the ability of species to survive and reproduce. Technical and management issues include increasing the breadth and realism of aspects of water management portfolios (multiple water sources, operations, and demand management) in water supply reliability modeling.

Environmental concerns are more than just concerns, or a "desire." The discussion needs to explicitly consider the Delta Reform Act mandate that "[t]he longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta." (Wat. Code § 85023.)

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[1] Bradshaw C., Ehrlich P. R., Beattie A., Ceballos G., Crist E., Diamond J, Dirzo R., Ehrlich A., Harte J., Harte M. E., Pyke G., Raven P. H., Ripple W. J., Saltré F., Turnbull C., Wackernagel M., Blumstein D. T.: Underestimating the Challenges of Avoiding a Ghastly Future, Frontiers in Conservation Science. Vol. 1, 2021. https://www.frontiersin.org/article/10.3389/fcosc.2020.615419.

[2] Swain D., October 13, 2021. https://twitter.com/Weather_West/status/1448393544993951744?s=20.

The final sentence in the Executive summary states, "methods currently in use can make reliability results hard to employ in public and agency deliberations and may be insufficient for managing increasing uncertainty of climate." We believe this recommendation can and should be strengthened.

Black Swan Events

The discussion of the challenges of high-impact, low probability (black swan) events on p. 16 needs to reference the recent paper by Robinson et. al., Increasing heat and rainfall extremes now far outside the historical climate.[3]

The commentary that "Decision makers need to be prepared to consider a wide range of expected and novel extreme events using both probabilistic and robust sensitivity analyses" should be strengthened. Such analyses are critically important, given recent extreme events.

Water Supply Reliability Analysis

The discussion of challenges for water management on p. 18 mentions the Central Valley Project Improvement Act, but in fact, the Central Valley Project Improvement Act has had little impact on the yield of the Central Valley Project. See Appendix A to these comments. The discussion of challenges for water management is also incomplete without a mention of upstream water supply issues. In particular, the State Water Resources Control Board assumed in Decision 1275 that flows on the Sacramento River would be augmented by 900,000 acre-feet per year. The assumption of this water supply in State Water Project contracts had a major impact on reliability of State Water Project deliveries. See Appendix B to these comments. Maturity of water rights in the areas of origin is also affecting the yield of the State Water Project and Central Valley Project. See Appendix B.

Climate Change

The discussion of sea level rise on p. 34 mentions a projection of 50 cm of sea level rise by 2050 (~ 20 in.) It would be appropriate to include a range of future projections to convey current uncertainty, as well as providing a source reference. The discussion might also mention that not one of the 165 simulations of the ensemble of projections for mass loss from the Greenland Ice Sheet reproduces mass loss as severe as observed for the last two decades An important preprint by scientists studying ice sheet dynamics states that "analysis of a recent effort to project Greenland's contribution to future sea-level suggests that few models reproduce historical mass loss accurately, and that they appear much too confident in the spread of predicted outcomes." See Aschwanden, A. et. al., 2021 and graph on the following page.[4]

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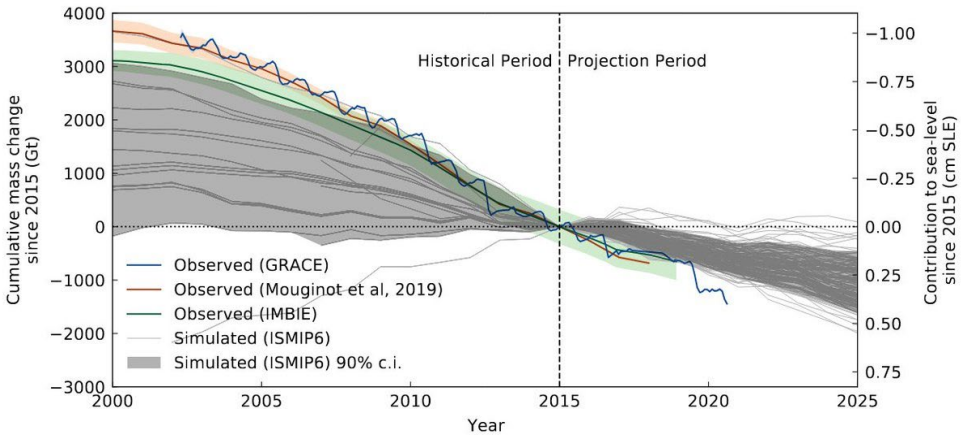
[3] Robinson, A., Lehmann, J., Barriopedro, D., Rahmstorf, S., Coumou, D. (2021): Increasing heat and rainfall extremes now far outside the historical climate. npj climate and atmospheric science [doi: 10.1038/s41612-021-00202-w] https://www.nature.com/articles/s41612-021-00202-w.

[4] Aschwanden, A., Bartholomaus, T. C., Brinkerhoff, D. J., and Truffer, M.: Brief communication: A roadmap towards credible projections of ice sheet contribution to sea-level, The Cryosphere Discuss. [preprint], https://doi.org/10.5194/tc-2021-175, in review, 2021. https://tc.copernicus.org/preprints/tc-2021-175/



Ecological and Environmental Water Supply

The discussion of Ecological and Environmental Water Supply on p. 36 omits any discussion of the dire situation with the state's aquatic ecosystems. In the 2012-2016 drought. The Water Board temporarily suspended at least 35 minimum instream flow standards. By August 2015, the Department of Fish and Wildlife reported that there had been 783 fish rescues in 52 different watersheds, comprising 51 species, and more than 264,000 fish.[5] This was crisis management.

Water rights is *the* major process for management of ecological and environmental water supply needs, and the discussion is incomplete without a consideration of water right requirements. For example, the discussion mentions the coequal goals in the Delta Reform Act but does not consider the Delta Reform Act mandate that "[t]he longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta." (Wat. Code § 85023.)

The discussion mentions multiple-objective optimization methods, which are an important tool for adaptive management, but fails to consider the general failure, over the past 4 decades, to adopt adequate instream flow criteria. See Appendix C to these comments.

While the development of new multi-objective optimization methods is important research, the Review should not imply that protection of the public trust should wait for such tools to be developed. The landmark decision in *National Audubon Society v. Superior Court (1983) 33 Cal.3d 319, 446* requires that the state take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible.

Water Quality

Flaws in computer modeling have affected water quality in the Delta. The discussion of water quality on p. 37 would benefit from mention of the fact that in 2017, Richard Woodley sent a letter to the State Water Resources Control Board, stating that the Bureau of Reclamation would refuse to comply with the minimum instream flows required at Vernalis under Decision 1641.

[5] Lehr, S. Chief, Fisheries Branch, California Department of Fish and Wildlife, *2014-2015 Drought Response*. Briefing to PSFMC, 8-21-2015. http://www.psmfc.org/wp-content/uploads/2015/09/8-PSMFC-Drought-Briefing-8-21-2015_compressed.pdf

The basis of Woodley's refusal was flaws in the modeling for Decision 1641. See Appendix D to these comments.

Thank you for your consideration of our comments.

Sincerely,

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Appendix A

The Fate of Central Valley Project Improvement Act Section 3406(b)(2) water

Section 3406(b)(2) of the Central Valley Project Improvement Act (Pub. L. No. 102-575, tit. 34, 106 Stat. 4600 (1992) dedicated 800 TAF of CVP yield to fish, wildlife, and habitat restoration, stating:

> "dedicate and manage annually 800,000 acre-feet of Central Valley Project yield for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help meet such obligations as may be legally imposed upon the Central Valley Project under state or federal law following the date of enactment of this title, including but not limited to additional obligations under the federal Endangered Species Act."

In the 2005 report, *Finding the Water: New Water Supply Opportunities To Revive The San Francisco Bay-Delta Ecosystem* (*Finding the Water*),[6] the Environmental Defense Fund described how accounting changes for the water dedicated to fish and wildlife in CVPIA section 3406(b)(2) largely negated benefits of the 800 TAF federal water budget for the environment. *Finding the Water* states in part:

> Though it was incorporated as a cornerstone of the CALFED Plan, the Interior Department's 1999 Decision for administering CVPIA Sections B1 and B2 jointly was in force for only two years— 2000 and 2001—after it was signed.
>
> […] In 1997, CVP contractors initiated litigation against the United States challenging the Interior Department's initial interpretation of Section 3406(b)(2). Various environmental groups, including Environmental Defense, and fishing groups joined the suit soon thereafter. The U.S. District Court eventually ruled on a complex series of issues involving various Department of Interior decisions over a five-year period. In January 2002, the court issued key rulings that forced Interior to revise its policies for "offset" and "reset." As a result, virtually all operational changes implemented to improve fisheries would be charged to the B2 account, even if the changes had no effect on contractors.
>
> The ruling did not address how Interior should apply the fishery provisions in Section 3406(b)(1) which authorize the Secretary "to provide flows of suitable quality, quantity, and timing to protect all life stages of anadromous fish" as long as they "do not conflict with fulfillment of the Secretary's remaining contractual obligations to provide Central Valley Project water for other authorized purposes". In addition, the court ruled that the Interior Department had no discretion to limit how much of the B2 account could be used

[6] Rosekrans, S., Hayden, H. *Finding the Water: New Water Supply Opportunities to Revive the San Francisco Bay-Delta Ecosystem, Environmental Defense Fund*, 2005. Available at: https://www.edf.org/sites/default/files/4853_FindingtheWater_0.pdf.

> in meeting its share of WQCP obligations. The effect of these rulings meant that, in many years, the entire B2 account might be applied to meet the WQCP obligations within the Delta, leaving no water to enhance spawning and outmigration of anadromous fish. (p. 10, footnotes omitted.)

An independent peer review of the CVPIA Anadromous Fish Restoration Program was conducted in 2008. It was highly critical of Reclamation's implementation of the 3406(b)(2) water budget. The report of the independent peer review was titled *Listen to the River: An Independent Review of the CVPIA*.[7] The report stated that the reviewers were "flabbergasted" to learn that none of the 800 TAF of water dedicated to fish and wildlife in CVPIA section 3406(b)(2) was reaching San Francisco Bay:

> When viewed in combination with the broad directive in Section 3406(b)(1)(B) to "modify Central Valley Project operations to provide flows of suitable quality, quantity, and timing to protect all life stages of anadromous fish," for which the 800 kaf is one explicit tool, the panel expected to find that implementation of 3406(b)(2) had occurred in this way: The agencies identify 800 kaf of dedicated storage in the system – essentially, a water volume budget – and then consistent with an identified system-wide flow regime to improve conditions for anadromous fish, Reclamation would release this stored water in requested amounts at the call of the fish managers and then protect that amount of altered flow through the rivers, through the Delta, and into the bay. <u>We were flabbergasted to learn this is not how the agencies implement this provision.</u> The agencies have not identified a system-wide flow regime and set of system flow objectives. Worse, Reclamation does not dedicate and manage 800 kaf of water from headwaters storage through the Delta. Instead, Reclamation releases approximately *400* kaf from CVP storage each year, aimed at supporting the needs of particular life stages at particular locations. These augmented amounts are then *diverted out of the system* at a later point. The 800 kaf accounting then includes approximately 400 kaf realized in pump restrictions in the Delta. This approach seems fundamentally at odds with the intent and language of the legislation.

The summary above basically describes how water has been managed by the Bureau of Reclamation under CVPIA section 3406(b)(2.) But with Reclamation's Long Term Operations adopted in December 2019, even water released from storage for supporting "particular life stages" was discretionary. Reclamation's *Final Environmental Impact Statement for Coordinated Long Term Operation of the Central Valley Project and State Water Project*[8] states on p. 3-3:

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[7] Cummins, K, Furey, J.D.: Giorgi, A., Lindley, S., Nestler, J., Shurts, J., *Listen to the River: An Independent Review of the CVPIA Fisheries Program* Prepared under contract with Circlepoint for the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service, December 2008. Available at: https://www.usbr.gov/mp/cvpia/docs_reports/indep_review/FisheriesReport12_12_08.pdf.

[8] US Bureau of Reclamation, *Final Environmental Impact Statement for Coordinated Long Term Operation of the Central Valley Project and State Water Project*, December 2019. Available at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=41664.

Reclamation would operate in accordance with its obligations under the CVPIA. This includes exercising discretion to take actions under CVPIA 3406 (b)(2).

The Secretary of Interior may make water available for other purposes if the Secretary determines that the 800,000 AF identified in 3406(b)(2) is not needed to fulfill the purposes of Section 3406.

Appendix B

State Water Project Water Supply and Reliable Yield

In 1967, the State Water Board held a hearing to consider issuing diversion permits for the State Water Project. A joint water rights investigation by the Bureau of Reclamation and the Department of Water Resources showed that there was likely not enough water in the Delta for the proposed State Water Project diversions. The Department of Water Resources produced studies showing that with an extra 900,000 af/year of water from the Dos Rios Reservoir, that there would be adequate supply. The State Water Board granted the diversion permits in the Delta based on these studies.[9]

At the time the Department of Water Resources presented its yield studies to the State Water Resources Control Board in 1967, the construction of the proposed dam on the Eel River had become hugely controversial because it was going to flood 18,000 acres in Round Valley, displacing 1,050 people in the community of Covelo and 350 residents of the Round Valley Indian Reservation.[10] The initial North Coast study proposed two dams, one above and one below Round Valley, but this option would only have yielded 660,000 acre feet per year. The Department of Water Resources decided to go with the plan to inundate Round Valley.

Unfortunately for the Department's plans, one of the ranchers in Round Valley had powerful political connections and got Governor Reagan to intervene in 1968 to mandate the development of alternatives. In 1972, the state legislature designated the Eel River as a Wild and Scenic River, as well as portions of the Klamath, Smith, and Trinity rivers.[11] The Eel and undeveloped portions of the Trinity Rivers were designated federal Wild and Scenic Rivers in 1981. In the intervening 40 years, hydrologic studies by the Department of Water Resources have continued to show that the "dependable annual supply of [State Water] project water" is about half the contracted Table A amounts.

Estimates of the dependable yield of the State Water Project have decreased as understanding of the needs for flows to maintain fish and wildlife in the Delta have improved, and with attempts to resolve conflicts with prior permits for diversions by the Bureau of Reclamation, and with area of origin rights in the Sacramento River and Delta.

The initial study for the Feather River Project estimated that releases from Oroville Dam and diversions from the Delta would provide a dependable supply of about 2,845,000 acre feet per year.[12] However, this estimate was in conflict with yield studies used by the State Water Board

[9] State Water Resources Control Board, Decision 1275.
[10] California Department of Water Resources, California Water Plan, 1970.
[11] California Department of Water Resources, Bulletin 200, California State Water Project v 1. History, Planning, and Early Progress, p. 79.
[12] California State Water Resources Board, Report on Feasibility of the Feather River Project and Sacramento-San Joaquin Delta Diversion Projects Proposed as Features of the California Water Plan, May 1951, as quoted in DWR Bulletin 200, v. 1, p. 53.

in granting permits for diversions by the Bureau of Reclamation in the Sacramento River and Delta, which included the unimpaired flow of the Feather River, totaling more than 3 million acre feet per year.[13]

In 1981, the Department of Water Resources estimated that the dependable annual yield of the State Water Project was 2.3 million acre feet per year, and projected to go down to 1.6 to 1.8 million acre feet per year by 2000, "as a result of increased use in areas of origin, maturity of contractual obligations of the Central Valley Project, and other prior rights."[14]

The average deliveries for the State Water Project between 1990 and 2000 were in line with the 1981 projections -- about 1.86 million acre feet per year. In 1987, the Department of Water Resources estimated the state needed to acquire 250,000 to 500,000 af/year of CVP water to firm up State Water Project supplies, as well as develop the Kern Water Bank to store wet year flows and provide another 140,000 af/year towards meeting Table A allocations.[15] The additional water supply was not acquired and the Kern Fan Element was transferred to the Kern Water Bank Authority.

[13] State of California, State Water Rights Board, Opinion by Board Member W. P. Rowe Concurring In Part With, And Dissenting In Part From Decision D 990, p. 58. http://www.swrcb.ca.gov/waterrights/board_decisions/adopted_orders/orders/1961/wro61_wrd990.pdf

[14] California Department of Water Resources, State Water Project – Status of Water Conservation and Water Supply Augmentation Plans, November 1981.

[15] California Department of Water Resources, Bulletin 160-87, California Water: Looking to the Future, p.48.

Appendix C

History of instream flow standards

During the 1976-77 drought, Governor Brown created a Commission to Review California Water Rights Law. The blue-ribbon panel was charged with reviewing the Water Code in light of the drought and Article X, Section 2 of the California Constitution on "Reasonable Use" of water. The Commission's 1978 Final Report[16] recommended increased protection for instream flows and providing for better management of groundwater. The groundwater recommendations were ahead of their time and were not implemented for decades.

For instream flows, the Commission proposed "[t]hat comprehensive instream flow standards be set on a stream-by-stream basis by the State Water Resources Control Board and that the Board comply with these standards in its administrative and adjudicatory decision making; that instream flow standards be expressed in terms of certain quantities or flows of water which are required to be present at certain points along the stream at certain times of the year to protect fishery, wildlife, recreational, aesthetic, scenic and other beneficial instream uses;"

Although legislation has mandated the determination of instream flows, doing so has been delayed for decades. In 1982, the legislature passed a law requiring the Department of Fish and Wildlife to "identify and list those streams and watercourses throughout the State for which minimum flow levels needed to be established in order to assure the continued viability" of fish and stream-dependent wildlife. DFW was then required to prepare proposed "streamflow requirements" for each identified stream not later than July 1,1989 (Pub. Res. Code §§ 10001-2.) The "streamflow requirements" were required to be considered by the Water Board when acting on applications to appropriate water. (Wat. Code § 1257.5.)

But DFW did not even transmit the identification list to the Water Board until 2008. The transmittal identified 20 priority streams and was accompanied by obsolete and incomplete streamflow studies done over the previous 20 years.[17] DFW has since proposed only two actual "streamflow requirements" for the identified streams, for the Big Sur River and Butte Creek.[18]

In 2014, Action 4 of Governor Brown's California Water Action Plan mandated that the State Water Resources Control Board and the Department of Fish and Wildlife develop "defensible, cost-effective, and time-sensitive approaches to establish instream flows using sound science and

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[16] Governor's Commission to Review California Water Rights Law, *Final Report,* December 1978. https://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1425&context=caldocs_agencies.

[17] California Department of Fish and Wildlife, "Flow Recommendations to the State Water Resources Control Board." https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_recommendations/docs/dfw_ifr.pdf.

[18] Department of Fish and Wildlife (CDFW) Instream Flow Recommendations: CDFW Instream Flow Program. https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_recommendations/index.html.

a transparent public process."[19] However, the action was not even begun until after the drought ended, likely due to agency resource limitations.

The chosen streams include:[20]

Shasta River, tributary to the Klamath River
South Fork Eel River, tributary to the Eel River
Mark West Creek, tributary to the Russian River
Mill Creek, tributary to the Sacramento River
Ventura River

'In 2010, pursuant to the 2009 Delta Reform Act (Wat. Code § 85087), the Water Board sent a report to the legislature estimating that comprehensively determining instream flows for 100 priority streams outside the Delta and its watersheds would cost $107 million.[21] The Water Board has been collaboratively developing analytical tools for assessing instream flow needs that may reduce the costs.[22]

[19] California Water Action Plan, p. 12. https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/docs/cwap_final.pdf.

[20] California Water Action Plan – Enhance Water Flows in Stream Systems Statewide. https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_flows/cwap_enhancing/#heading.

[21] State Water Resources Control Board, *Instream Flow Studies for the Protection of Public Trust Resources: A Prioritized Schedule and Estimate of Costs*, December 2010. https://www.waterboards.ca.gov/waterrights/water_issues/programs/instream_recommendations/docs/draftreport110210.pdf

[22] California Water Quality Monitoring Council, California Environmental Flows Workgroup webpage. https://mywaterquality.ca.gov/monitoring_council/environmental_flows_workgroup/index.html.

Appendix D.

Refusal of Bureau of Reclamation to comply with D-1641 minimum instream flow requirements at Vernalis.

On February 15, 2017, Richard Woodley, Reclamation's Resources Manager, sent a letter to the California State Water Resources Control Board stating that Reclamation would not comply with the Bay-Delta Water Quality Control Plan's 2006 Table 3 requirements for minimum instream flows at Vernalis, but only those in Appendix 2E of the National Marine Fisheries Services Biological Opinion.[23] The basis of the objection was flaws in the modeling used for Decision 1641. Woodley's letter stated in part:

> Reclamation believes that the 1999 modeling is flawed and underestimates the true impact of operating New Melones to these flow requirements. Such operations have not been vetted through a due process hearing, and threaten the ability of New Melones to store and deliver water to its federal contractors in all but the wettest years.

Following Woodley's objection, the Central Valley Project was not operated to meet the Bay-Delta Water Quality Control Plan's minimum instream flows at Vernalis.

As described by Delta Watermaster Michael George in a 2018 presentation to the Delta Protection Commission, [24] the south Delta had serious deterioration of water quality, including reduced net flow in channels, reduced dissolved oxygen, and impeded navigation, as well as increased water temperature, increased harmful algal blooms, and build-up of salinity hot spots. While Mr. George cites buildup of sediment, the failure of Reclamation to provide adequate flows at Vernalis was likely a major contributing factor.

[23] Woodley, R. February 15, 2017, letter to Tom Howard, Executive Director of the State Water Resources Control Board. https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/woodley_ltr02152017.pdf.

[24] George, M., Delta Water Master. Update of Activities, July 18, 2019. Presentation to the Delta Protection Commission, pdf p. 13-16. https://cah2oresearch.com/wp-content/uploads/2020/01/2019-07-18-Item-8a-Delta-Watermaster.pdf.