



January 12, 2022

Via email to disb@deltacouncil.ca.gov

Steve Brandt, Chair, and members
Delta Independent Science Board
715 P Street, 15-300
Sacramento, CA 95814

Re: Current controversy over operations of the State Water Project and the Central Valley Project

Dear Chair Brandt and Delta Independent Science Board members,

This letter is to provide some background on the current scientific, technical, and legal controversy regarding operations of the State Water Project and the Central Valley Project, and the challenges of managing the system to meet ecosystem needs.

In 2021, the runoff forecasts by the Department of Water Resources were disastrously wrong, and the Department of Water Resources (“DWR”) and the US Bureau of Reclamation (“USBR”) filed a Temporary Urgency Change Petition requesting relaxation of environmental flow requirements in the Bay-Delta Water Quality Control Plan.

California Water Research filed a protest requesting “that the State Water Resources Control Board require a written report by DWR and USBR on the methodology used for the runoff forecast used in this year’s Drought Contingency Plans, together with an evaluation of the reasons for the errors in this year’s runoff forecast.”¹ The Board did not require such a report, and there was no independent review of the runoff forecasting methodology.

In November 2021, nine leading California water resources researchers published an opinion piece, entitled Managing Water Stored for the Environment During Drought.² The post stated in part:

¹ Deirdre Des Jardins, TUCP: California Water Research asks Water Board to require report on 2021 runoff forecast errors, California Water Research blog, June 5, 2021. <https://cah2oresearch.com/2021/06/05/tucp-california-water-research-asks-water-board-to-require-report-on-2021-runoff-forecast-errors/>

² S. Null, J. Mount, B. Gray, M. Dettinger, K. Dybala, G. Sencan, A. Sturrock, B. Thompson, H. B. Zeff, Managing Water Stored for the Environment During Drought, California WaterBlog, published by UC Davis Center for Watershed Sciences, Nov 7, 2021. <https://californiawaterblog.com/2021/11/07/managing-water-stored-for-the-environment-during-drought/>.

No Room for Error

Delivering as much water as practicable to urban and agricultural users leaves no room to adjust for errors in forecasting or unanticipated worsening of conditions. Yet, as 2021 and previous drought years show, forecasting, modeling, and operational errors are the norm – not the exception – during droughts. These errors inevitably lead to increased harm to the environment and the likelihood of errors is increasing with a changing climate.

For example, in 2021 the projects used optimistic runoff and climate forecasts that over-estimated their ability to meet downstream temperature standards. These forecasting errors were compounded by unanticipated high diversions and in-stream losses, both above and within the Delta. The higher downstream water uses required larger reservoir releases to maintain Delta water quality and made managing water temperatures even more difficult.

The problems of water year 2021 were not unique. Although different in detail, the same effort to deliver as much water as possible—coupled with modeling, forecasting, and operational errors—led to [similar environmental problems in water years 2014 and 2015](#), the height of the last drought. In that drought, which was also warmer than normal, the State Water Board issued TUC orders that relaxed environmental standards.

This is of major concern in the 2022-2023 water year because reservoirs were at record lows at the end of the last water year on September 30, 2021. Although reservoir levels are somewhat improved, California still in a drought. Delta ISB member Jay Lund wrote an insightful blog post Continued drought early in a possibly wet year, with the graph below.³

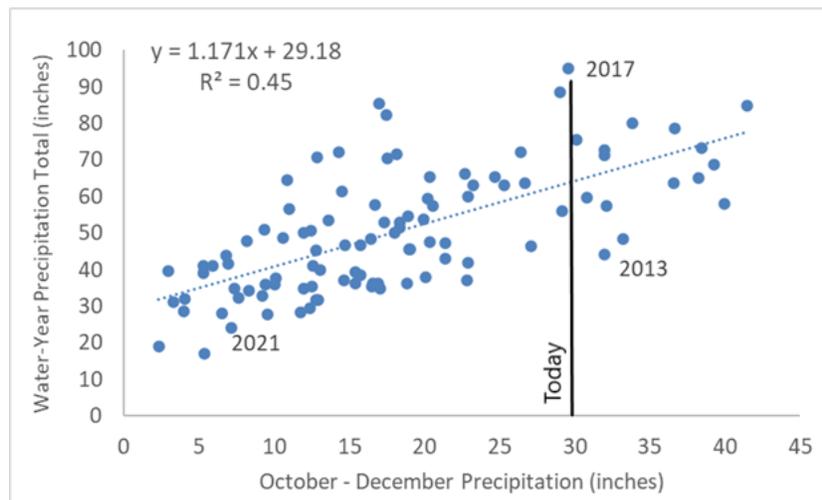
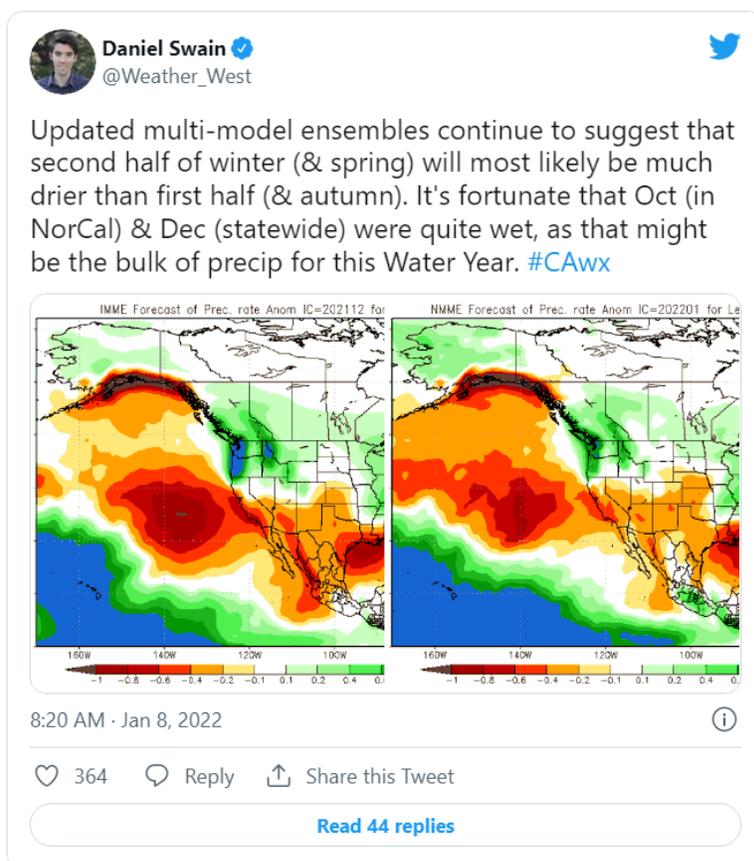


Figure 1. Historical Sacramento Valley 8-Station Index Water Year Precipitation vs. October-December Precipitation (inches) (Data from CDEC)

³ Jay Lund, Continued drought early in a possibly wet year, California WaterBlog, published by UC Davis Center for Watershed Sciences, January 9, 2022 <https://californiawaterblog.com/2022/01/09/the-current-drought-early-in-a-potentially-wet-year/>.

Climate scientist Daniel Swain looked at multi-model ensemble forecasts⁴:



On December 1, 2021, DWR and USBR again filed a Temporary Urgency Change Petition with the Water Board requesting relaxation of the Bay-Delta Water Quality Control Plan standards.⁵ The petition stated in part,

DWR and Reclamation rely upon sound science and methods to forecast and project hydrology and water supply needs. This scientific approach to water management is the most prudent course of action in such a complex and variable system.”

However, no evidence was submitted with the petition to support this assertion, and neither the system operational forecasts nor the associated modeling was provided for the January 5, 2022 Water Board workshop, although the Water Board did request it.

California Water Research filed a protest which stated in part,

⁴ Daniel Swain, As persistent West Coast ridge builds, California (mostly) warms up and dries out, Weather West blog, January 10, 2022. <https://weatherwest.com/archives/12616>.

⁵ Department of Water Resources and US Bureau of Reclamation, 2022 Petition for Temporary Urgency Change to modify the State Water Project and Central Valley Project Authorized Places of Use, Dec 1, 2021. https://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/tucp/docs/2022/20211203-tucp-notice.pdf.

We note that independent peer review is an essential part of sound science, but no evidence has been provided that the methods for operations forecasts used by DWR and Reclamation have had independent peer review. Furthermore, there is no evidence that the methods are suitable for public trust balancing by the State Water Resources Control Board.

The protest cited the opinion of Aris Georgakakos, an internationally known expert in multi-reservoir system operations who spent years developing a decision support system for State Water Project (“SWP”) and Central Valley Project (“CVP”) operations. In a 2011 peer-reviewed journal article⁶, Georgakakos stated that an

“unintended consequence of the way reservoir operation plans and policies have historically evolved is that it discourages the use of key science advances related to hydro-climatic forecasting, multi-reservoir optimization, uncertainty characterization, and integrated water resources management. True adaptive water resources management relies critically on such methods.”

Our protest concluded,

there are critically important scientific, technical, and legal issues that have not been addressed by the Petitioners. Furthermore, the history of climate change studies by the Department of Water Resources points to major, unresolved issues in adaptive management of the SWP and CVP reservoirs under climate change. The 2018 Addendum to the Coordinating Operations Agreement also indicates major unresolved water rights issues. The Board must ensure that these issues are fully considered within the TUCP process, and resolved to the extent possible. There must also be full transparency and notice to all Delta stakeholders and all potential protestants.

This petition may be dismissed if the Board delays approval of the TUCP and requests additional information from the Petitioners on forecasted operations, together with the associated modeling.

We’re also providing a copy of our January 12, 2022 protest – it has a lot more of the scientific and technical background. I hope the information is helpful.



Deirdre Des Jardins, Director
California Water Research

⁶ A.P. Georgakakos, H. Yao, M. Kistenmacher, K.P. Georgakakos, N.E. Graham, F.-Y. Cheng, C. Spencer, E. Shamir, Value of adaptive water resources management in Northern California under climatic variability and change: Reservoir management, *Journal of Hydrology*, Volumes 412–413, 2012, Pages 34-46, ISSN 0022-1694, <https://doi.org/10.1016/j.jhydrol.2011.04.038>.