

**USACE responses to FRRRA Questions relating to the Water Control Revisions, April 9th 2024
(responses in red)**

**STAKEHOLDER QUESTIONS AND TOPICS OF CONCERN
FOR THE YUBA-FEATHER WATER CONTROL MANUAL UPDATE AND DEVELOPMENT**

(February 9th 2024)

(These questions and concerns are based on those submitted in August for the November 15th 2023 OCAC presentations by USACE & Scripts, which were not addressed)

Aside from general briefing at the Oroville Citizen Advisory Commission, stakeholders in the downstream basin have not been invited into the new Yuba-Feather WCM objective development process. Therefore, we submitted the following questions and topics for consideration. After receiving answers to these fundamental questions, a detailed set of downstream objectives will be developed, in preparation for a comprehensive stakeholders' meeting with the USACE. Such a public meeting needs to occur early enough in the process so that the objectives can still be negotiated with those who will be impacted by the revised Water Control Manual.

ER 1110-2-240 5.2

Water control plans will be developed in concert with all basin interests which are or could be impacted by or have an influence on project regulations.

Oroville Citizen Advisory Commission (OCAC) - Charter Paragraph F. 2.

The commission will act as a unified voice from the communities surrounding Oroville Dam to provide public feedback and advice on best practices to the dam operator.

QUESTIONS AND TOPICS OF CONCERN

1. Please clarify the congressionally authorized flood control purpose used for the 1970 Water Control Manual and the supplemental agreements that must be lawfully followed during the development of the new (FIRO) water control manual. How might those impose limitations during the development of revised objectives for the new WCM?

a. **Authorizations, Policy, and Procedures:**

a. **Section 7 of the Flood Control Act of 1944, Pub. L. No. 78-534, 58 Stat. 887, 890 (1944), authorizes the development of the rules and regulations contained in the Water Control Manual (WCM). The relevant portion of the Act reads as follows:**

"Hereafter it shall be the duty of the Secretary of War to prescribe regulations for use of storage allocated for flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project shall be in accordance with such regulations..."

- b. The Water Control Diagram and Emergency Spillway Release Diagram, which comprise the Water Control Plan, have been authorized per the policy and procedures contained in Title 33 of the Code of Federal Regulations, Section 208.11 (33 CFR 208.11).
 - c. The WCM content will be prepared in accordance with the instructions contained in the following USACE regulations and guidance:
 - i. ER 1110-2-240 *Engineering and Design – Water Control Management* 30 May 2016 – Provides guidance on water control management policy and procedures.
 - ii. EM 1110-2-3600 *Management of Water Control Systems* 10 October 2017 – Provides guidance on water control management fundamentals and objectives to be considered when formulating Water Control Plans.
 - iii. ER 1110-2-8156 *Preparation of Water Control Manuals* 11 December 2018 – Standardizes the format and content of WCMs.
 - d. Flood Control Act of 1958 for Oroville Dam (Public Law 85-500).
 - e. Flood Control Act of 27 October 1965 for New Bullards Bar Dam (Public Law 89-298).
 - f. Energy and Water Development Appropriations 12 September 2019 – Authorizes WCM Updates for New Bullards Bar Dam and Oroville Dam to include forecast informed reservoir operations.
- b. Objectives and considerations for the WCM Updates were developed taking these authorizations, policies, and procedures in account.
2. How will the new WCM account for the functional equivalent of the 240,000 acre-feet of flood storage space that Marysville Reservoir was to provide? (Oroville 750,000, New Bullards 170,000, Marysville 240,000, equals 1,160,000 acre feet of authorized flood storage space)
- a. The Yuba-Feather FIRO Pilot Program and the WCM Update process are two separate processes.
 - b. As part of the Yuba-Feather FIRO pilot program, one of the aspirational goals was to analyze if the use of forecasts can provide a “functional equivalent” of up to 260,000 ac-ft of flood storage space based on the proposed flood space in the non-built Marysville Reservoir (*Work Plan for Yuba-Feather Forecast Informed Reservoir Operations (FIRO)* https://cw3e.ucsd.edu/FIRO_docs/YF_workplan.pdf). As part of the Preliminary Viability Assessment for the Yuba-Feather FIRO Pilot Program (https://cw3e.ucsd.edu/FIRO_docs/Yuba-Feather_PVA.pdf), this analysis was not performed due to broad uncertainties associated with how Marysville Dam might operate with New Bullards Bar and Oroville Dams. A surrogate approach will be explored as part of the Final Viability Assessment.
 - c. Currently, a “functional equivalent” for Marysville Reservoir is not being considered for the WCM Update.

3. Will the hydrology of the existing Reservoir Design Flood (peak inflow of 440,000 cfs and a 72-hour volume of 1,520,000 acre-feet.) continue to be used, or are there plans to update the Reservoir Design Flood hydrology based on current data? What freeboard space should be required?
 - a. The Standard Project Flood (or “Reservoir Design Flood”) is no longer the metric used by U.S. Army Corps of Engineers to assess flood operations. In its place, historical floods, scaled to many different sizes both smaller and larger than the original design flood, will be used to assess the performance resulting from new operations at New Bullards Bar and Oroville dams.
 - b. USACE reached out to DWR for additional feedback on this question. DWR responded:
 - i. “DWR, as the owner of Oroville Dam, is subject to both [Federal Energy Regulatory Commission] FERC and [Division of Dam Safety] DSOD requirements for freeboard during the inflow design flood. As stated in FERC Engineering Guidelines Chapter 2 – *Selecting and Accommodating Inflow Design Floods for Dams*, FERC’s freeboard requirements are not prescriptive, but rather identify a number of considerations that should be taken into account such as embankment settlement, wave height, set-up, and run-up, possible malfunction of a spillway or outlet, landslides, and seismic settlement. DSOD’s re-evaluation guidelines state that a minimum residual freeboard of 1.5 feet is required. However, the residual freeboard must be sufficient to account for wind and wave runup that may occur under the design storm conditions. DWR is in the process of identifying the appropriate freeboard, based on the currently available information, for input into the WCM process.”
4. Under a recent congressional bill, the sizing of the Probable Maximum Flood (PMF) will be updated every 10 years. Should the Standard Project Flood (SPF) and deviations to the WCM’s rules of operation follow a similar schedule to keep pace with advance forecasting skills and increasing climate change?
 - a. Per the previous answer, the SPF is no longer a flood used for design purposes by USACE. However, by using several historical events, scaled to a wide range of magnitudes, the uncertainty in hydrology for the basin can be captured. These same historical events are used as the basis for assessing how forecasts could be incorporated into flood control operations. Climate change will be addressed more indirectly through an analysis of regional trends; however, the risk and uncertainty addressed by examining the performance of operations when faced with the wide range of historical events scaled up to sizes larger than the SPF should also provide robustness in the face of climate change within the foreseeable future.
 - b. UASCE reached out to DWR for additional feedback on this question. DWR responded:
 - i. “DWR last updated the PMF for Oroville Dam in 2017. Since that time, DWR has collaborated with USACE on the Paleoflood Investigation of the Feather River to better document the frequency and magnitude of floods at the location of Oroville Dam. DWR has also initiated work on a stochastic flood event modeling effort that will benefit future risk analyses on the

frequency and uncertainty associated with extreme floods. DWR does not plan to update the Probable Maximum Flood until the National Academies' report and applicable Probable Maximum Precipitation estimates are available. The National Academies are conducting this work under the project titled *Modernizing Probable Maximum Precipitation Estimation | National Academies*. The project includes incorporating the impacts of climate change on the estimates.”

- c. Deviations to WCM are an approved authorization to temporarily deviate from the operations prescribed in the project's approved Water Control Plan. Deviations are used to alleviate critical situations or to realize increased benefits during an operation season without affecting the fulfillment of the project's authorized purposes. Deviations are approved on an as needed basis and not subject to update every 10 years.
5. Should Englebright Lake hydrology be incorporated into the Yuba-Feather coordinated flood operations, not only for its uncontrolled outflows, but also for its uncontrolled down-ramping/ levee slouching risks.
 - a. The Yuba-Feather Forecast Coordinated Operations (F-CO) Program includes real-time reservoir operation and coordination consisting of daily communications between local reservoir operators, USACE, and the State-Federal Flood Operations Center. Flows along the Yuba River below Englebright are monitored in real-time, which would provide operators with the feedback they need for coordinated operations.
 6. Should not down ramping regulations be measured at river gauges below the confluence of the Yuba (Boyd's Pump) instead of by spillway releases that lack any consideration of uncontrolled down ramping from Englebright Lake and local tributaries?
 - a. Ramping up/down rates for both New Bullards Bar Dam and Oroville Dam are found within their respective WCMs. Downstream conditions are considered when determining ramping up/down rates of change for dams.
 7. The combined watershed's accumulated Snow Water Equivalent should be included into the soil wetness index calculations that regulates the size of the flood pool at both reservoirs.
 - a. The authorizations for both New Bullards Bar Dam and Oroville Dam are not changing; therefore, the size of the authorized flood space is also not changing. As part of the WCM Update process, it will be evaluated if soil wetness index calculations and/or snowpack forecasts will be used to determine flood pool requirements at Oroville Dam.
 8. The calculations and raw data for the Soil Index and Snow Water Equivalent should be made available on CA Data Exchange (CDE) for public verification of adherence to flood pool requirements.
 - a. Parameter data for used for the WCM calculation is available on the U.S. Army Corps of Engineers Water Management website under the Daily Flood Control Report: <https://www.spk-wc.usace.army.mil/fcgi-bin/midnight.py?days=0&report=FCR>. This data is listed as the "Flood Control Parameter" under the "Rain" column. The calculation to determine the Flood Control

Parameter is found within the WCM and can be requested via a Freedom of Information Act (FOIA) request from USACE (<https://www.spk.usace.army.mil/Contact/FOIA/>).

- b. Snow Water Equivalent forecast information is found on the California Data Exchange Center (CDEC) website: <https://cdec.water.ca.gov/snow/bulletin120/index2.html>.
9. The spring refill curve should account for the existing water equivalency of the snowpack.
 - a. As part of the WCM Update process, it will be evaluated if snowpack forecasts will be used for the spring refill curve.
10. Forecasting skills and their “Margin of Error” percentage should be established and used in determining the start and size of early releases ahead of flood events. The higher the margin of error the sooner the start of early releases. These margins of error and early release guidance should be available for public verification.
 - a. As part of the Yuba-Feather FIRO Pilot Program Preliminary Viability Assessment (PVA), forecast skill was assessed. Overall findings of the PVA demonstrated that the current forecast skill can support FIRO and that forecast of atmospheric river (AR) conditions are essential for FIRO operations in the Yuba-Feather watershed. Continued evaluation of improving AR forecast skill will continue to be evaluated in the Final Viability Assessment (FVA). Yuba-Feather FIRO Pilot Program PVA can be found here: https://cw3e.ucsd.edu/FIRO_docs/Yuba-Feather_PVA.pdf. Yuba-Feather FIRO Pilot Program FVA will also be available to the public once it is published.
 - b. Findings from the Yuba-Feather FIRO Pilot Program PVA and FVA will be considered when updating the WCMs for Oroville and New Bullards Bar dams.
11. The Preliminary FIRO Viability report made many recommendations but integrating them into the actual WCM process is of concern. The achievements and shortcomings within the Integration Team to protect downstream interest should be publicly shared.
 - a. Policies and procedures for updating WCMs provided in the first question will be followed when updating the WCMs. Yuba-Feather FIRO Pilot Program FVA will also be available to the public once it is published.
12. The language within the WCM should regulate most aspects of “situational decision-making” versus assumptions of “Good Faith” decision making by dam operators, who must deal with the competing objectives of public safety and water delivery, that often leads to only what's regulatorily required actions.
 - a. The WCMs are prepared by USACE in coordination with DWR, Yuba Water, and other agencies is for flood risk management and only includes flood control operations. Water delivery is not included in the WCM operations. Refer to DWR and Yuba Water for water delivery operations.
 - b. DWR coordinates with USACE to ensure public safety through appropriate flood risk reduction operations are prioritized over operations for water supply.

13. The effects that FIRO spillway releases have on the various life-cycle stages of the river fisheries must be understood and mitigated as much as possible. Objectives requested by DF&G and US Fish and Wildlife should be disclosed with stakeholders.

a. As part of the WCM Update process, life-cycle stages of river fisheries data will be collected and will be used as evaluation criteria for alternatives.

14. Real time river temperatures and river flow should be monitored and posted on (CDEC) for public review, along with the corresponding requirements for the fisheries.

a. Real time river temperatures and river flows are available on CDEC. Note: this is not an exhaustive list of gage locations near Oroville Dam/Feather River or New Bullards Bar Dam/Yuba River. Additional gage data can be found via the CDEC Station Locator Map: <https://cdec.water.ca.gov/webgis/?appid=cdecstation>

i. Oroville Dam/Feather River

1. ORO – Oroville Dam:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=ORO

2. FTO – Feather River at Oroville:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=FTO

3. ORF – Oroville Fish Hatchery:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=ORF

ii. New Bullards Bar Dam/Yuba River:

1. BUD – Bullards Bar:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=BUD

2. CPH – Colgate Power House:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=CPH

3. YRS – Yuba River Near Smartville:
https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=YRS

15. The effects that FIRO spillway releases have on both lake and river recreation should be understood and mitigated as much as possible. This understanding cannot be achieved without first engaging the public.

a. As part of the WCM Update process, recreation data will be collected and will be used as evaluation criteria for alternatives.

16. Required funding aside, what infrastructure enhancements at Oroville would help achieve the above WCM objectives well into the future? The cost-benefit analysis and funding request for such infrastructure investment should be weighed against the 50-year life of the SWC contract extensions.

- a. USACE reached out to DWR for additional feedback on this question. DWR responded:
 - i. “The existing spillway capacity of Oroville Dam allows for significant release capability far below the bottom of the current maximum flood reservation space requirements. The existing spillway can be used down to a lake elevation of 813.6 ft. This is 34.9 ft below the bottom of the flood reservation space which is at lake elevation 848.5 ft (for a wetness index of 11 or greater).”
 - ii. “To date, DWR’s *Oroville Dam Comprehensive Needs Assessment* and independent consultant reviews through the FERC Part 12D Safety Inspection/Level 2 Risk Analysis processes have not identified risks that require immediate treatment through an increase in release capacity via new infrastructure. DWR continues to study risks associated with extreme floods to the existing facilities, in particular the emergency spillway and embankments. Alternative measures under consideration by DWR to address extreme floods include potential raises (or parapet walls) to Oroville Dam, Parish Camp Saddle Dam, and Bidwell Bar Canyon Saddle Dam. These potential improvements, while they do not increase release capacity, may be more effective in addressing flood-related risks by reducing the likelihood of overtopping of the embankments. Such improvements will require more detailed “quantitative” risk analyses to better understand overtopping risks and justify the action (or no-action) to FERC, DSOD, and other interested parties.”
 - iii. “Beginning in 2018, DWR implemented the Enhanced Flood Control Operations which increases the flood pool at Oroville Dam to account for the absence of Marysville Dam. It also serves as an interim risk reduction measure (for extreme floods) to Oroville Dam infrastructure while DWR advances key studies that should reduce uncertainty and refine flood-related risks. In addition, DWR continues to participate in Forecast Informed Reservoir Operation studies and the USACE’s Water Control Manual update that may provide opportunities to further reduce risks to downstream levees and Oroville Dam infrastructure.”
17. The “wear and tear” on the Feather River levees system from the frequency, volume and duration of spillway releases conducted by a FIRO WCM should be understood and mitigated as much as possible.
 - a. As part of the WCM Update process, levee data will be collected and will be used as evaluation criteria for alternatives.
18. The frequency, volume and duration of spillway releases conducted by a FIRO WCM that exceed the natural river channel will have a negative effect on the farming practices within the downstream levee system. This needs to be understood through outreach efforts and mitigated where possible.
 - a. As part of the WCM Update process, levee data will be collected and will be used as evaluation criteria for alternatives.
19. When flows are projected to exceed the natural river channel, an adequate notification system should be developed to reach those affected.

- a. Public safety is our highest priority. Thus, continuous water release coordination with downstream agencies is an unwavering part of U.S. Army Corps of Engineers Sacramento District operations.
 - b. USACE reached out to DWR for additional feedback on this question. DWR responded:
 - i. “With respect to Oroville Dam, DWR makes advance notifications of High Flow Operations to downstream agencies when releases to the Feather River are planned to exceed 20,000 cfs.”
- 20.** How will the objectives for the Lower Yuba Accord and Sustainable Groundwater Management be incorporated into the joint Yuba-Feather WCM objectives? How will this help protect the local water district and basin groundwater.
- a. As part of the WCM Update process, understanding impacts to water supply will be analyzed.

Compiled by the Feather River Recovery Alliance - www.notjustaspillway.com