

## **USACE Oroville WCM Update - Social Economic Concerns** (dated 3-2-26)

### **Destructive floods have created social economic hardship on the communities**

The 1955 flood caused 40 deaths and \$572 million in damages (2023 dollars).

The 1964 flood caused \$49 million in damage

The 1986 flood caused \$263 million in damage

The 1997 flood caused \$567 million in damage

The 2017 ORO spillway event had over \$1 Billion in repair cost from releases of only 50,000cfs  
180,000 downstream citizens were evacuated with the indirect costs estimated at \$50-75 million

### **Oroville's 1970 Water Control Manual Agreement (1/500 yr Flood Space)**

By agreement between the State of California and the Corps, flood control space was based on flood protection up to standard project flood (1/500 yr), with releases limited to 150,000 cfs. Independent of Marysville Dam, holding Oroville's outflow to 150,000cfs limit was only achieved for a 154 - 268yr storm event, only half the flood protection as was in the 1970 WCM agreement.

### **Concern 1) No FIRO objective to maintain 1/500 yr protection and 150kcfs outflow limit**

FIRO's objective was for NBB-ORO WCM to account for the 260TAF Marysville was to provide so Oroville's WCM requirement to surcharge the Auxiliary Spillway by 10' could be removed. Formalizing NBB-ORO joint requirements for river levels below Marysville was another priority.

### **FIRO Alternative Plans Prioritized Water Storage with Restrictions to Sizing the Flood Space**

The FIRO Viability Analysis lists the 1986 storm scaled by 140% as a 1/346 yr event, (SPF x 70%) Auxiliary Spillway surcharged by 5 ft for 48 hrs and the Yuba City levees overtopped for 4 days. The only constraint that was met was to not drop the FIRO Space below the current 835 ft. elev.

The FIRO Analysis developed safeguards to prioritize the recovery of the conservation pool Risk Tolerance Curve and 75% tile deterministic forecast ignore the largest forecasted inflows Conservation pool recovery could be a flexible priority within Plan ID4 iterative's Rule Stack. turn it off to increase drawdown ahead of extreme events, turn it back on to refill afterwards.

### **Concern 2) Remove the Elev. 835' Hard Bottom / Replace with Conservation Pool Recovery**

If risk to conservation pool recovery is minimized, using a Hard Bottom constraint is irrelevant.

Period of record water benefit during droughts will far exceed a potential loss in extreme years.

**Concern 3) Period of Record Water Benefit should be used to capture the healthy gains during drought years.** The focus should not be solely on the complete recovery after an extreme event.

### **The Proposed Soil Wetness Index Further reduces Flood Space for Water Storage Benefit**

USACE authorized flood pool is 750TAF, to avoid surcharging the spillway 150TAF was added The department wants to reduce the 750TAF flood pool to 350TAF during dry conditions, yet they will not enlarge the flood space by the same 400TAF during a 1/150 year or greater event.

### **Concern 4) Need Equal Sizing of the Flood Pool between Flood and Water Benefits**

**Current Soil Wetness Index Calculation ignores critical factors when sizing flood pool.**

The current calculation only factors daily rainfall multiplied by .97 to size the flood pool. In recent years much of the Feather River watershed has been fire scared and lost absorption. During the 2017 spillway incident the snowpack on top of the soil added 35% more runoff than was forecasted and caused the Auxiliary Spillway to surcharge which threatened the Hyatt P.P.

**Concern 5) Any use of a Soil Wetness Index should incorporate any such available data**

**Oroville's Authorized Flood Pool insufficient for the peak inflows during extreme events**

A CVHS report referenced at the September Ad Hoc meeting stated that with a starting elev. at 860' and early releases to 813' (FCO gates) it can pass a 1/500yr event with 150kcfs. releases. While other dams in the watershed, Folsom, and New Bullards Bar, needed to construct secondary spillways to achieve a similar level of flood protection, Oroville already has the capacity. What will be required of Oroville dam owners is the willingness to save downstream communities from another destructive flood, while answering to the SWCs on water storage.

**Concern 6) Further drawdown into the conservation pool would be voluntary by the dam owner.**

**Dam Owners and operators need real-time decision making tools to balance competing risks.**

Although the WCM can not mandate drawdowns into the conservation pool, it can help make that voluntary decision easier. There are two different FIRO Alternative Plans that FIRO Analysis recommended, but are strikingly different in the Real-Time Situational Awareness they provide.

**Concern 7) Without Real-Time Situational Awareness built in, Voluntary Drawdown is Unlikely**

**Alternative plan ID3 Prescriptive**

This Plan creates a draw down curve based on the size of the forecasted storm. Generally speaking, if the storm is a 1/10 year event then release 60,000cfs, or 150,000cfs for a 1/100 year storm. It simply uses Inflow forecasts to estimate the return frequency of the event and reference that to a drawdown curve.

**FIRO Alternative plan ID4 Iterative**

The FIRO ID4 plan demonstrated the best results and provides greater flexibility for meeting various objectives. It relies heavily on the USACE Reservoir Simulation system (HEC Res-Sim) that runs dozens of forecasts in an attempt to satisfy a stack of rules/objectives. If the tolerable risk of a given objective is exceeded considering the full ensemble, a new reservoir release is created and evaluated. This process is repeated until the tolerable risks for each objective is not exceeded.

It provides awareness to the various risks associated with the suggested reservoir release. That awareness will help confirm or adjust the reservoir release to balance the risks. When balancing risk it can add, delete, or reprioritize the objectives within the rule stack. The Decision Support Tools are available and easy to use once dam operators are trained. It can also adapt to future climate change without need for another WCM update authorization

### **Concern 8) Plan ID3 Prescriptive lacks the Situational Awareness and Flexibility needed**

If the Dam Owner is willing to exercise good moral judgement, and conduct deep voluntary releases into the conservation pool to prevent another destructive flood, then Alternative ID4 Iterative is a better plan. It provides all the situational awareness needed to balance competing risks and make adjustments throughout the extreme as conditions change daily. It is currently used at Lake Mendocino and was greatly improved during the Yuba Feather- FIRO Analysis.

### **Social Economics Concerns recap**

Oroville's 1970 Water Control Manual Agreement (1/500 yr Flood Space)

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Oroville's "Authorized" flood pool is insufficient for the peak inflows during extreme events

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Oroville dam owners will need the confidence in their decision to save downstream communities from another destructive flood, while answering to the SWCs on water storage.

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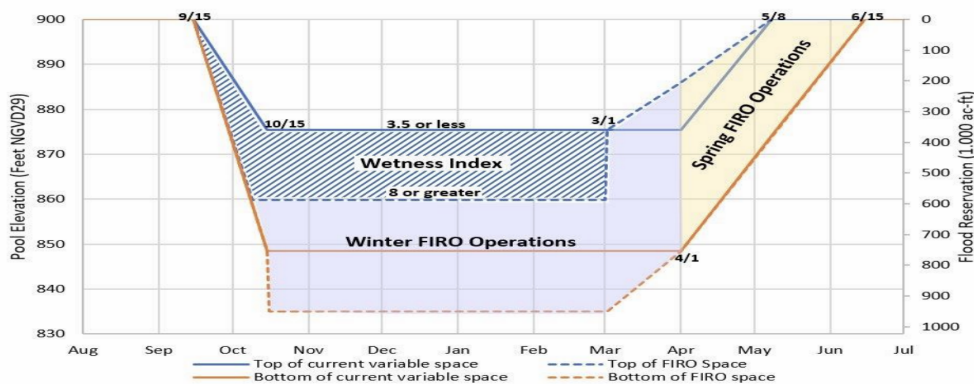
### **Fisheries and Recreational concerns**

**Concerns 9) The Fall Salmon Fishery is being heavily impacted by the timing, temperature and duration of the WCM fall reservoir drawdown curve.** The September 15th reservoir drawdown in the WCM can create significant flows triggering salmon migration. Temperatures in the Low-Flow area and lack of spanning gravel can cause large numbers of fish to spawn below the Afterbay outlet. When correct reservoir levels are reached, flows drop to minimum cfs levels and the spawning beds and fry are exposed to life threatening temperature and disease. Additional studies with the Department of Fish & Wildlife and Northern California Guides and Sportsman Association are needed to balance these risks with that of early flood protection..

**Concern 10) This rapid fall drawdown of the reservoir also has a negative effect on the recreational lake fishing and boating.** October is a prime month for visiting the lake, but rapid drawdown makes fishing, boat launching, and morning difficult when such early drawdowns may not be necessary. ORAC should be consulted for their suggestions, then determine if rapid reservoir drawdowns could be eased and extended.

**Concern 11) The proposed Spring Reservoir Refill can start as early as the first of March, depending on the Soil Wetness Index.** Additional studies on calculating the snow water equivalency available for runoff are needed since warm AR storm events like 2017 and 2023 have threatened the river system in the middle of March.

**Concern 12) This time period is also the peak of the sturgeon and striped bass spawning migration.** The 50 miles from Verona to the Oroville Afterbay Outlet is prime spawning habitat for these two species. Recently there have been many years where the fish have moved into the river system and then aggressive reservoir refill starts. River levels switch from spring runoff to minimum flows. The fish are forced to retreat out of the river and then journey back to the Sacramento River system to find similar spawning conditions around Colusa. That puts extreme pressure on the fish and destroyed some of the best recreational fishing in the watershed. Additional studies with California Department of Fish & Wildlife and Northern California Guides and Sportsman Association is needed to balance these risks with that of early flood protection.



**Figure 3-3.** FIRO Space for ORO Reservoir.



