

## **Yuba Feather Stakeholder Concerns - Current and New Water Control Manual** (August 22nd 2024)

### **A - Encroaching Flood Pool with Soil Wetness index without incorporating Snow Melt**

- The non-built Marysville Reservoir would have provided 260,000 af of flood storage.
- Despite the 22% reduction, flood storage is often compromised further before flood events from the “Wetness Index” which is based solely on assumed soil absorption.
- The Wetness Index’s calculation used to reduce the size of the flood pool doesn’t factor in Snowpack Water Equivalency (SWE) that is sitting on top of the watershed’s soil.
- NOAA /Scripts report found snowmelt increased Oroville’s 2017 inflows by 37 %.
- Oroville’s flood pool wasn’t adjusted for + 37% inflows and the Auxiliary Spillway Failed.
- Adding snowmelt estimates to the reservoir inflow forecast, increased the inaccuracy of the required reservoir outflows, and the reduced flood pool filled quickly and spilled over.
- The logic for not adjusting flood pool size for SWE appears to be water delivery driven.
- Improvements in snow surveys are great, but knowing where to apply that data is better.

**Recommendation - R1)** Low/ Mid elevation SWE belongs in the Wetness Index (FIRO zone), not inflow forecast. CNRFC should separate out < 5,500 ft SWE from their reservoir inflow forecast and apply it to increasing the size of the flood pool or FIRO Zone.

### **B - Flood infrastructure not certified for Water Control Manual’s proposed operations**

- Auxiliary Spillway geology and erodibility not analyzed for the 10 ft. surcharge operations
- Using other’s assumed infrastructure conditions allowed for others to assume the blame
- Lack of ownership for failure of flood system’s infrastructure (Auxiliary Spillway, Levees)
- Consequences of surcharging Auxiliary Spillway on Hyatt Power Plant never considered

**Question - Q1)** Do infrastructure regulators (FERC) and flood operators (USACE) collaborate on WCM updates?

**Q2)** - Was the 2012 FERC Part 12 Independent Consultants informed of 10 ft. surcharge flows in the WCM before assigning Oroville Dam a “safe to operate” rating?

**R2)** - WCM’s RES SIM models must be incorporated into future FERC Part 12 inspections, so when the Dam receives a “safe to operate” rating, it includes all possible “standard operations” permitted in WCM updates.

### **C - Dam Owners and Operation Regulator’s preparedness for infrastructure failure**

**Q3)** - Is the resilience and redundancy of the dam infrastructure a requirement or concern within the FIRO and WCM update?

**Q4)** - Has the robustness of FIRO hydrology models been tested should a FCO Bulkhead be employed.

**R3)** The risks from known seepage, slouching, settling elevations or FCO gate closure at Oroville Dam should be considered as it relates to the hydrology models getting evaluated in the FIRO and WCM process.

#### **D - Downstream Flood Protection Levees not certified for the WCM's Operations**

- Flood protection systems are only as safe as their weakest link / historical failure point
- Levee Failure occurred 3 of 4 times maximum flows occurred; 1956 (1964) 1986, 1997
- Maximum releases were used for storm frequencies of 1/ 75-year storms and less.
- Historical risk of levee failure for 1/ 75 yr storm was 3 out of 4 or 75% risk of failure.
- Flood system levees were not adequately analyzed for resilience to the river flows; volumes, durations, and down ramping rate permitted in the 1970 Water Control Manual.

**R4)** - Don't use levee data or conclusions from statewide studies that fail to incorporate the actual hydrological conditions considered standard operational procedures in the WCM. Suggested certification according to FEMA and USACE is Levee Design ER 1110-2-1913. Slope stability requires analysis of Shear Strength for various Pore Water Pressures resulting from maximum flow volumes, over extended durations, followed by rapid down ramping.

**Q5)** - Are any studies in the works, such as AECOM who is tasked with providing engineering support services to update, validate, and develop fragility curves.

**Q6)** - Please provide the detailed methodology and data sets being used in the 2020 update that's using the U.S. Army Corps of Engineers' (USACE's) HEC-FDA, examining 11 impact areas and 19 index points along the Yuba, Feather, and Bear Rivers;

#### **E - WCM does not regulate downramp rate for the levees downstream of Marysville**

- Reservoir down ramping is regulated at 5,000 cfs. / 2hrs. for levee safety and fisheries.
- All three levee failures 1956,1986,1997 occurred at or below confluence of Yuba River, where down ramping rates have not been regulated or monitored at actual river gauges.
- 1986 / 1997 levee failure occurred during rapid downramping, after sustained max.flows
- The risk factor % of the various FIRO operations should be analyzed and incorporated.
- The FIRO PVA is hydrology focused and doesn't seem to be waiting for such analysis.

**Q7)** – Who is liable/ responsible for levee failure floods resulting from rapid down ramping?

**Q8)** - Can tiered flows / durations / down ramping rates get run through USACE' s HEC-FDA to help obtain various risk factors such as those associated with various down ramping rates?

#### **F - Ensemble Forecast Operations (EFO) proposal formulated to manage various risks**

With Ensemble Forecast Operations flood control release decisions are formulated by managing forecasted risk of exceeding a defined storage threshold to a specified risk tolerance level.

- The top of the flood pool would be held at 900 ft,
- The bottom of the flood pool would be undefined however prereleases would rarely draw storage below the crest of the secondary gated spillway (815 ft)
- Ensemble Forecast Operations (EFO) fully incorporates forecast uncertainty
- The evaluation of the forecast completed by the model is simple in concept and is easy

- Through the evaluation of forecasted risk, this approach provides a recommended reservoir release.
- Provides useful forecast metrics for situational awareness and decision support.
- Methodology is very adaptive to future advancements in forecast skill and reliability.
- Use of CNRFC ensemble forecasts demonstrated to better manage flood risk and increase water storage.

**Q8) -** Can Oroville (EFO) adapt to run ensemble for other risks, such as levee failure

**Q9) -** If (EFO) isn't currently able to incorporate levee slope stability risk due to the FIRO operations Is the methodology adaptable for future advancement in decision support?

**Q10) -** Who gets to decide what tolerable risk levels are, and what is currently being considered?

### **G - Flood Protection verse End of Season Water Storage Priority**

- Stakeholders believe flood protection can be met without average annual impact to water.
- Although stated as cursory benefit, Water storage benefit is over weighted by FIRO team
- FIRO PVA Table C-5. Operational Considerations that Should be Evaluated in the HEMP  
 "Alternatives should not reduce the ability to meet water supply delivery objectives"

**R6) -** The water supply objectives used in evaluation of alternative plans should not compromise safety based on water storage at the end of a 1/35-year storm event.

**R7) -** Water benefit should be determined for the 50 life of FIRO Plan, not for a single event thus allowing for occasional uncertainty errors to be made towards safety during larger events.

**R8) -** Fear of "False Alarms" from forecast uncertainty should not delay the start of early releases.

**Q11) -** What forecast certainty rate is proposed to trigger early FIRO releases (50, 75, 90%) ?

**Q12) -** How does the forecast certainty rate change the trigger from a 3-day to 5-day lead time?

### **H - Organizational / Industrial / Human Behavior**

FIRO Operations on the nation's largest dam and water benefit to the state water project would be a heroic accomplishment and something to be proud of. But don't let such admirable goals allow us to deviate from our responsibility to achieve the project's primary objective, that of improved flood protection to the people, property and economies of the Feather River Basin.

To achieve this all members of both the FIRO Team and the Water Control update need to;

- 1) incorporate the all necessary analysis needed for the entire flood protection system, including downstream levees
- 2) develop and obtain the most relevant and revealing data sets needed for various required levels of safety such as; Probable Maximum Flood (PMF) Standard Project Flood (SPF) and 1/200-year levee failure floods.
- 3) don't delete, alter or fail to pursue any data because it may jeopardize one's own desired outcome.

Following the 2017 Oroville spillway event, the Independent Forensic Team Report stated; "None of the reports covering the Oroville assets that were prepared for regulatory purposes identified the design inadequacies ... There was cutting and pasting of inaccurate geological descriptions from previous reports ... inaccurate characterization of sound rock conditions over the entire areas of the spillways was perpetuated by truncating earlier, more complete descriptions... "The IFT believes that these reports are not necessarily deficient in view of similar reports in the industry; rather, they are likely a fair representation of such reports. "Normalization of deviance" (where departures from desirable conditions become expected and accepted)

#### **I - Public transparency and stakeholder involvement in WCM updates is required**

**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".*

The stakeholder involvement should have occurred throughout the development process. Regardless, both USACE and DWR have been responsive and informative as of late. Reports and analysis addressing these stakeholder's concerns raised here should;

1. be presented to basin interests in a format that allow for open dialog, compromising or justification before the FIRO Team or WCM Team finalize on an alternative plan selection
2. Demonstrate that the most relevant and revealing data sets were pursued to the extent possible given the significance of the project and potential consequences.