Forecast-**C**oordinated **O**perations at New Bullards Bar and Oroville Reservoirs

California Extreme Precipitation Symposium
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Hydrology and Flood Operations Office
Division of Flood Management
California Department of Water Resources

Div. of Flood Management Mission Statement

To prevent loss of life and reduce property damage caused by floods, and assist in recovery efforts following any natural disaster.

Forecast-Coordinated Operations (F-CO)

- Before F-CO
- Current F-CO
- Beyond F-CO

Before F-CO

- 1986 &1997 Floods
- Flood Emergency Action Team Report
- Sacramento/San Joaquin River Basins Comprehensive Study
- Yuba-Feather Supplemental Flood Control Project -lead to the pilot Yuba-Feather (Y-F) F-CO

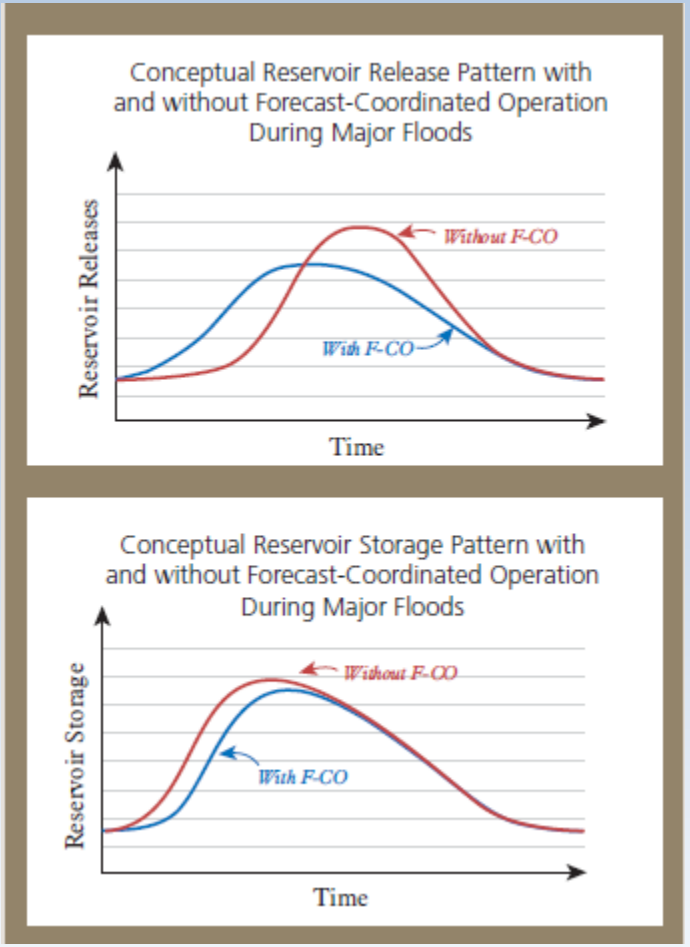
Current F-CO

Goal: Improve flood protection w/o impacting water supply

Objectives: Reduce d/s peak flood flows with improved

-Forecasting (reservoir inflows and river stages)

-Coordination of reservoir releases



Current F-CO

- Initial Y-F F-CO Federal/State/Local partnership:
  -CA Department of Water Resources (DWR)
  -US Army Corps of Engineers (USACE)
  -NWS CA-NV River Forecast Center (CNRFC)
  -Yuba County Water Agency (YCWA)
- Now expanded to reservoirs on the San Joaquin
- ~10 years since Y-F F-CO became operational

YCWA

USACE

State Water Project

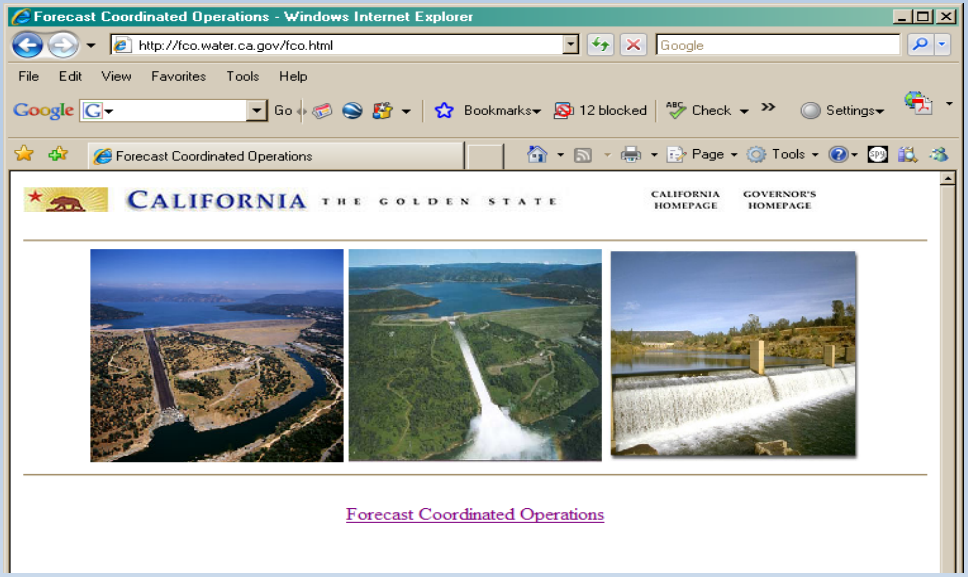
CNRFC

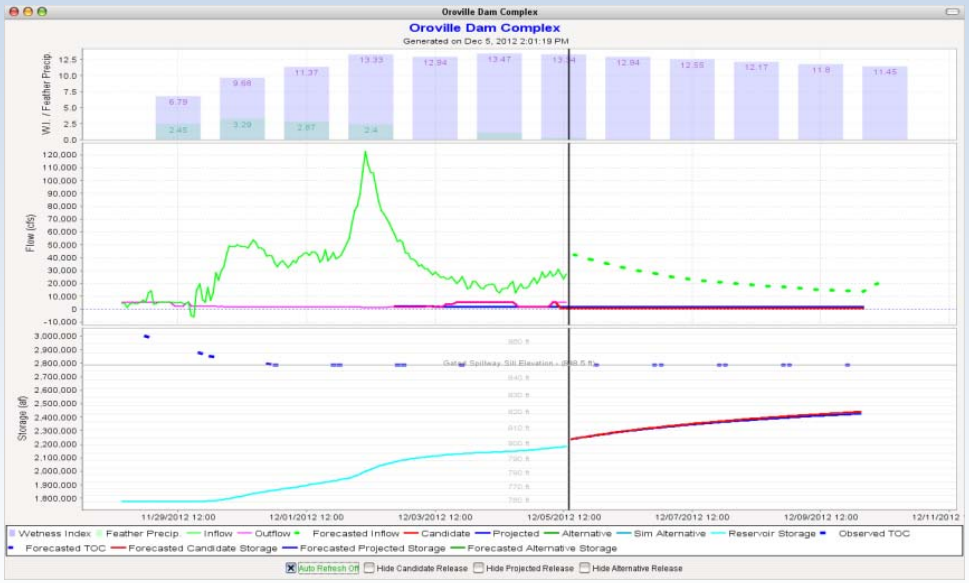
F-CO

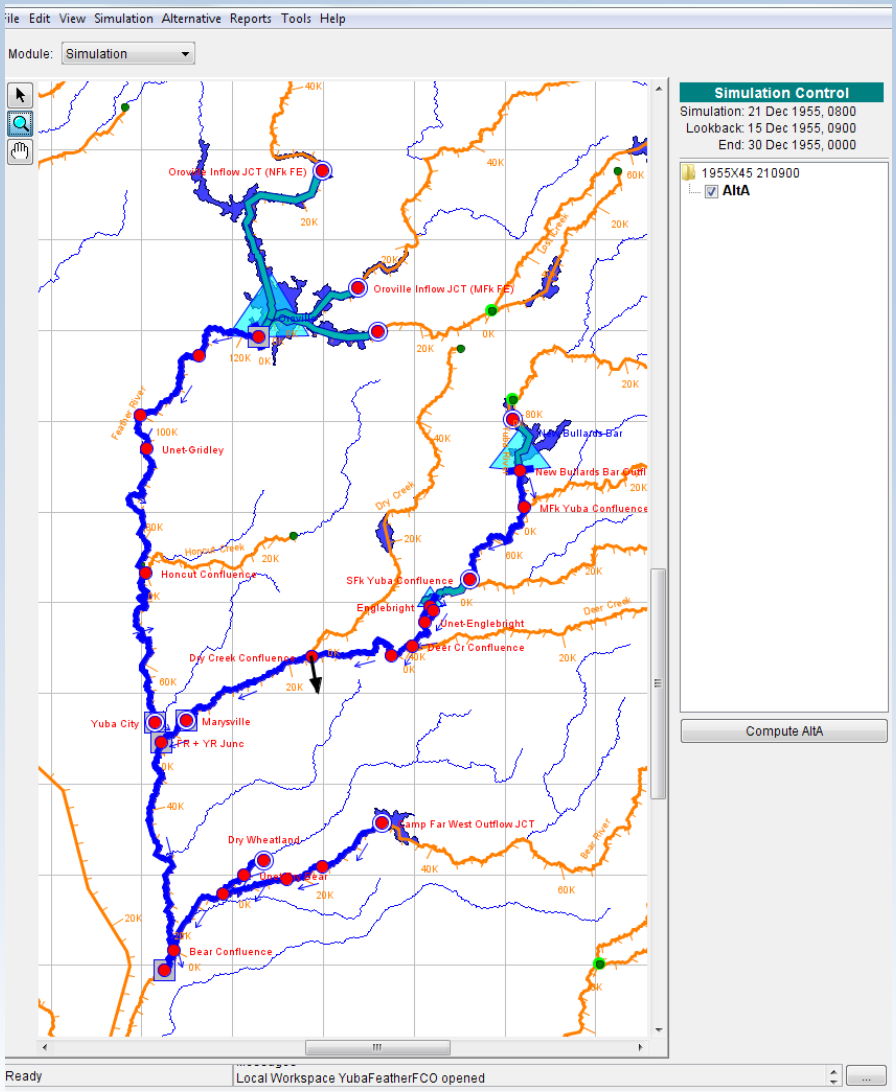
CA Data Exchange Center

Flood Management

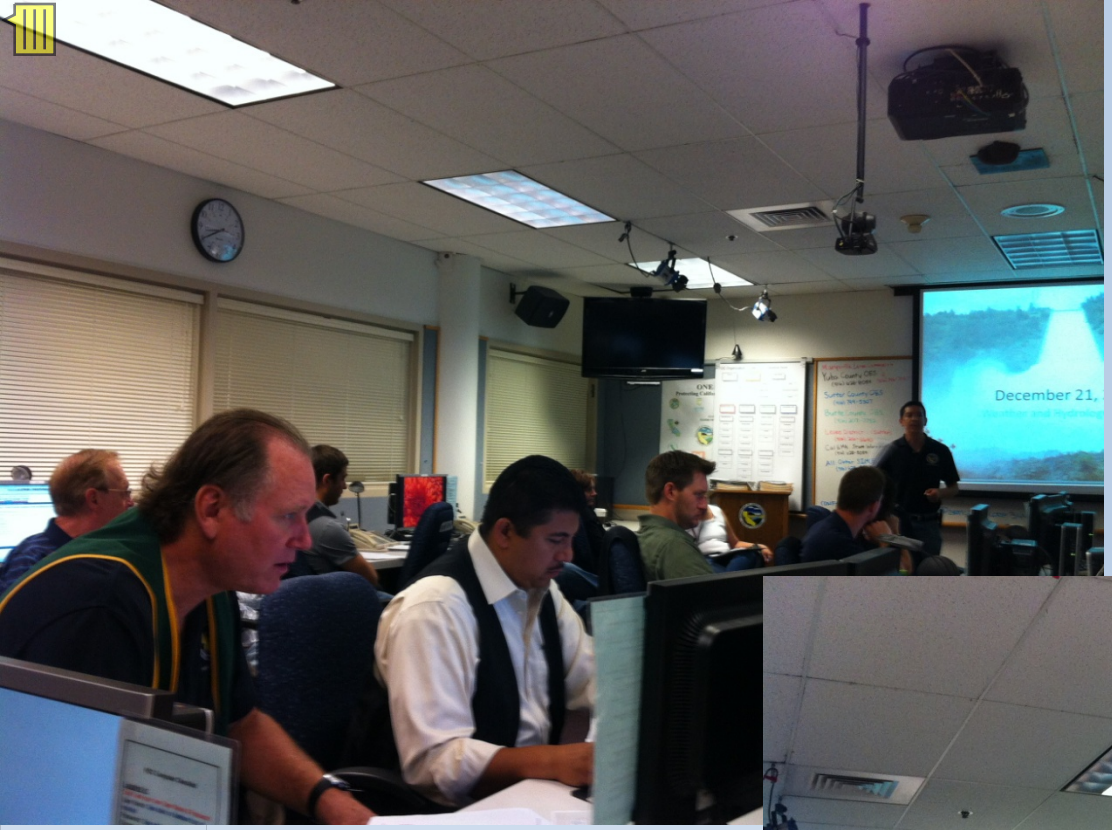
Y-F F-CO Operational Tool



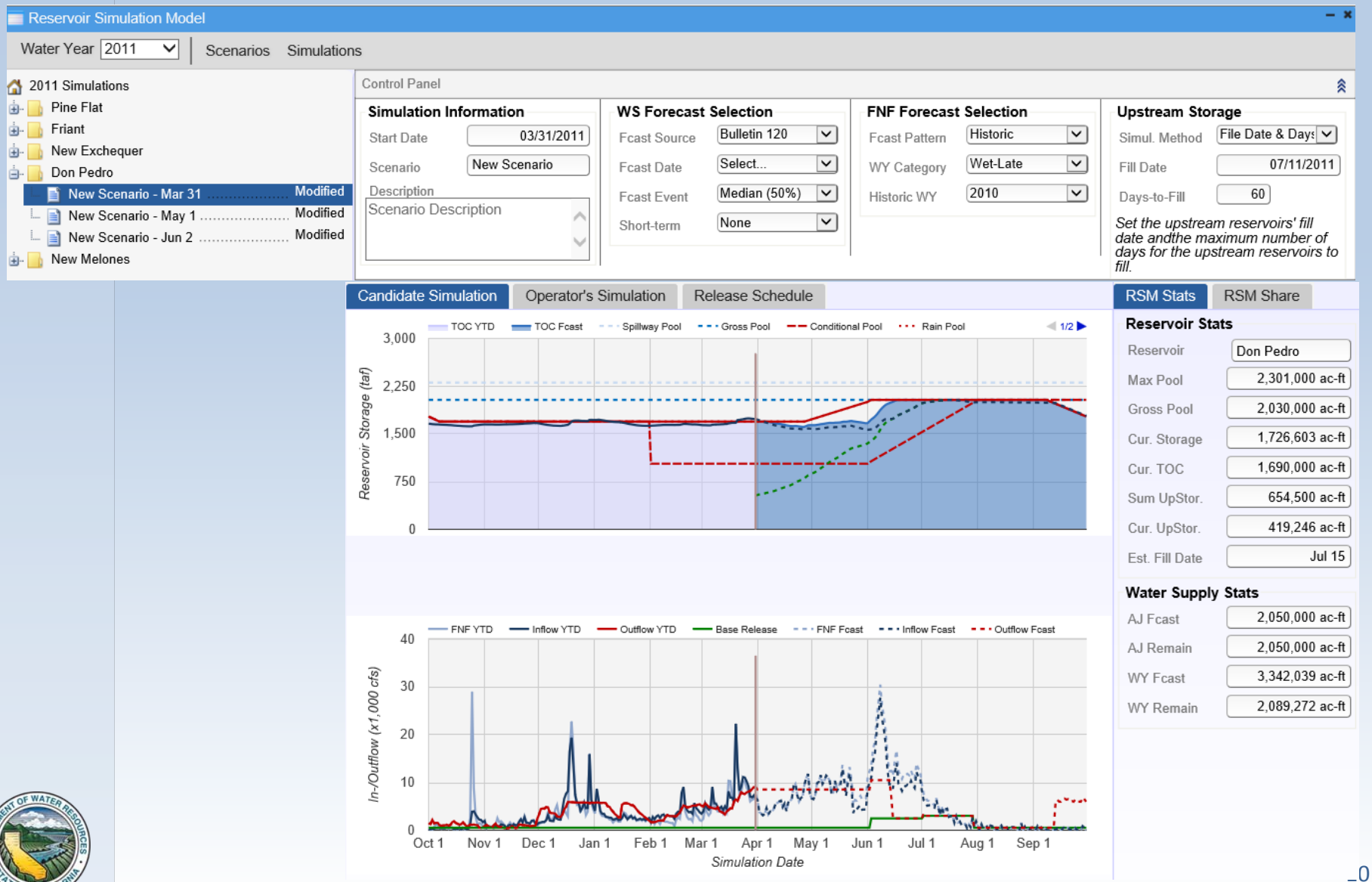




Annual F-CO Exercise



San Joaquin F-CO Tool (in development)



Beyond F-CO

Forecast-Informed Operations (F-IO) has the potential improve both flood protection and water supply.

Benefits:

- Can reduce flood risk downstream of reservoirs
- Can provide water supply enhancement

Risk:

- May not refill following pre-release

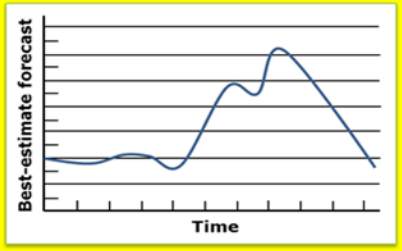
Beyond F-CO

To implement F-IO at New Bullards Bar and Oroville:

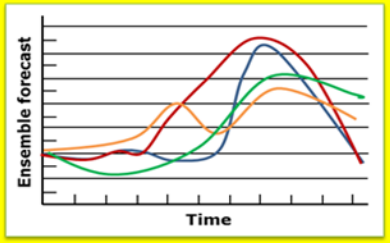
- Leverage Folsom Dam F-IO work
- Use of short-term and seasonal ensemble reservoir inflow forecasts
- Detailed analysis to understand potential benefits, risks, and feasibility of F-IO
- Approval of USACE and Congress to change the FCD

Application of Ensemble Forecasting

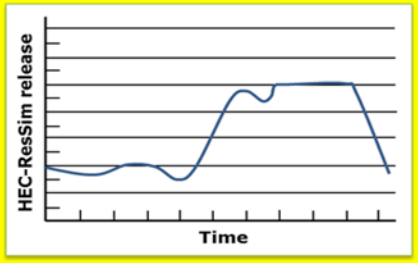
1. CNRFC provides *best estimate* forecast of reservoir inflows and uncontrolled local flows, using current state + QPF.



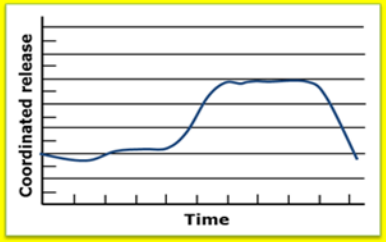
CNRFC also provides ensemble of forecasts of reservoir inflows and uncontrolled local flows. Some forecasts greater and some smaller than best estimate.



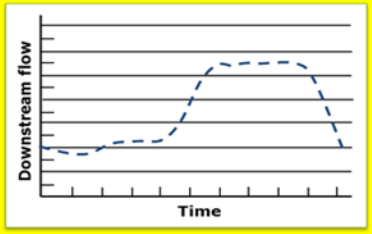
2. Operators run HEC-ResSim (throught F-CO DSS interface) with best estimate forecast to identify recommended release schedule with strict interpretation of rules.



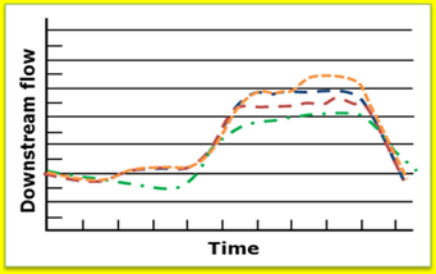
3. Operators review HEC-ResSim results, coordinate, collaborate to select *coordinated release schedule*.



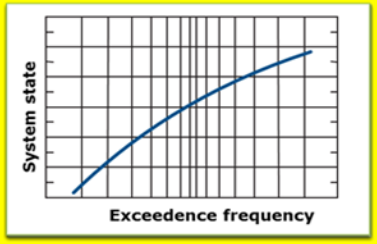
4. Downstream conditions computed with HEC-ResSim, using coordinated schedule.



5. For each ensemble member, HEC-ResSim computes system states with coordinated release schedule from Step 3



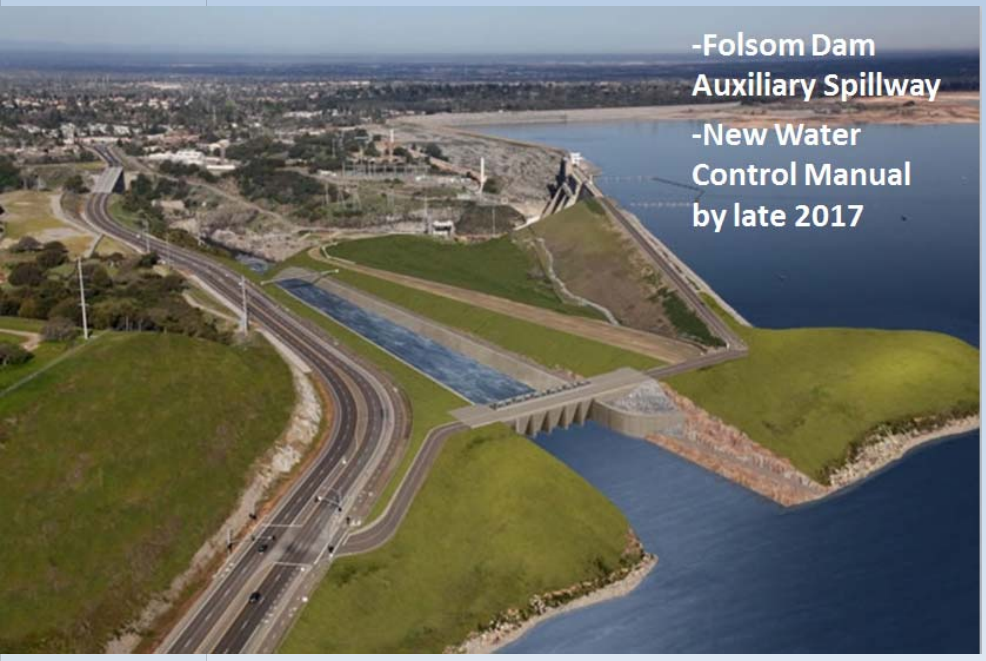
6. Frequency of exceedence of critical system states analyzed and reported. If hazard deemed unacceptable, process is repeated starting with Step 3.



(David Ford Consulting Engineers)

On-going F-IO Projects

Folsom Dam



(USACE)

Russian River

(IWRSS)

F-CO Federal/State/Local Partnership

QUESTIONS?

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