

Forecast-Informed Reservoir Operations (FIRO) – draft definition

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FIRO is a system that uses quantitative information, including precipitation, soil moisture and stream flow observations and forecasts, to help water managers selectively retain or release water from single or dual-purpose reservoirs. For regions that experience variable weather conditions such as California and the western United States, FIRO can provide real-time management tools to respond to actual “on the ground” conditions. FIRO can be an important strategy for water managers to improve resiliency of reservoir facilities to provide important water supply, flood control and ecosystem functions for increasingly variable conditions likely to occur in a changing climate. The goal of FIRO is to enable modest deviations from standard flood control guidelines when the risk of adverse impacts of such deviations become vanishingly small, while meaningful benefits to water supply, flood control and/or ecosystems are expected. Examples where FIRO can have tangible benefits include:

- 1) "drought mitigation scenario" that would occur when recent storms have caused encroachment into the flood pool, but no major precipitation is predicted for several days. In this case additional water is retained for future water supply and ecosystems benefits, unless a new storm appears before spring refill, and
- 2) "flood mitigation scenario" would occur when a storm is predicted to be potentially intense enough to risk flooding and there is high confidence of significant reservoir inflow. In this case water releases could encroach into the conservation pool, with confidence that the storm will refill at least that amount of encroachment.

Components of FIRO for the U.S. West Coast are envisioned to include:

- observations of watershed preconditioning and current precipitation
- observations of atmospheric rivers and their precursor conditions to inform predictions
- numerical weather prediction models
- hydrologic prediction models
- post-processing diagnostic systems to integrate this information into probabilities of various atmospheric and hydrologic conditions
- decision-support-tools for reservoir operations that inform operators of the potential impacts of a range of possible reservoir operations decisions
- capability to assess benefits and costs of FIRO decisions

Forecast-Informed Reservoir Operations Lake Mendocino Feasibility Study Components

