

# WaterSMART

Basin Study Program—Reservoir Operations Pilot Study



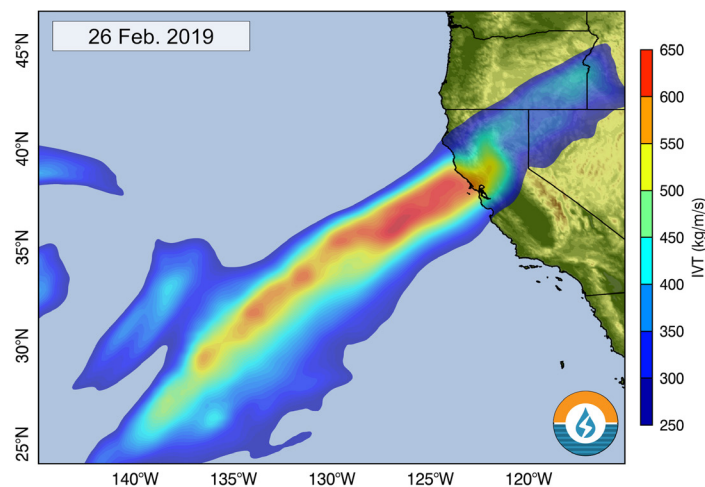
— BUREAU OF —  
RECLAMATION

## Economic Benefits of Alternative Reservoir Operations

California frequently experiences severe floods and droughts. **More flexibility in the way reservoirs are managed** in anticipation of weather extremes could help alleviate flood and drought impacts, providing both **economic and environmental benefits**.



Lake Mendocino



An atmospheric river making landfall in the Russian River area in February 2019.

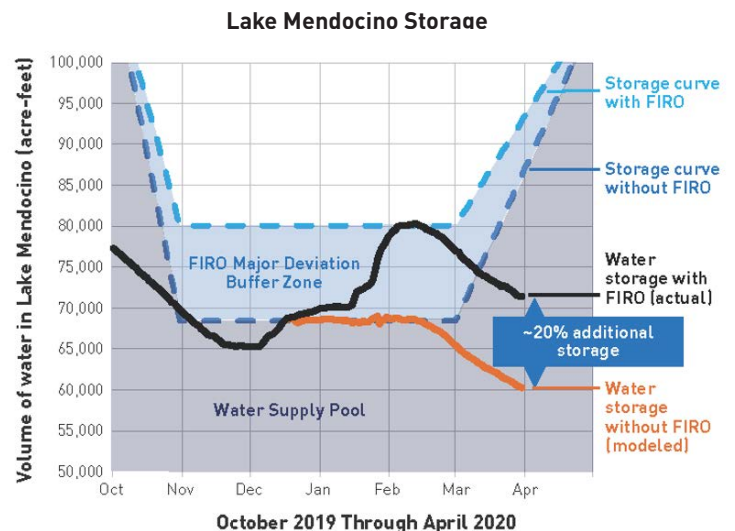
## FIRO at Lake Mendocino

A Final Viability Assessment (FVA) was completed to assess FIRO at Lake Mendocino. The FVA establishes the basis and pathway for updating the Lake Mendocino Water Control Manual to improve water supply reliability and environmental conditions in the upper Russian River watershed. The economic benefits of FIRO at Lake Mendocino were estimated to be approximately \$9.4 million per year.

## Forecast Informed Reservoir Operations (FIRO)

is a reservoir management approach that uses modern technology and forecast improvements, particularly forecasting atmospheric rivers—the main driver of variability—to mitigate the impacts of droughts and floods without requiring expensive new infrastructure.

FIRO is being applied at four reservoirs in California to increase resilience to climate change and improve water supply reliability and/or flood risk management.



FIRO interim operations have improved Lake Mendocino storage by nearly 20 percent.

## Economic Decision Support Tool (DST)

A user-friendly DST was developed to help water managers estimate the economic benefits of alternative reservoir operations. Benefit estimates can be used for screening assessment purposes to gauge the potential economic benefits of FIRO.

The DST can estimate five types of benefits based on site-specific, user-input data for FIRO approaches aimed at improving water supply reliability and environmental conditions. The **key input** for each benefit category is the **volume of additional water** stored in the reservoir as a result of FIRO.



Truckee River System

## Recommendations

Future work should include assessing the economic benefits of FIRO for systems with multiple reservoirs and considering FIRO costs to inform year-to-year operational decisions. These updates should be pursued in consultation with dam operators and could be achieved by integrating the DST into the Russian River Decision Support System, or other watershed-based decision support systems.

The DST estimates benefits for five categories:



Irrigation and Agricultural Water Supply



Municipal and Industrial Water Supply



Hydropower



Fisheries



Recreation

## DST Transferability Test: Prosser Reservoir

The U.S. Bureau of Reclamation is assessing FIRO at Prosser Reservoir in the Truckee River Basin. The economic benefit assessment methods and DST were tested during a stakeholder workshop to ensure transferability of the DST from Lake Mendocino to other reservoirs.



Prosser Reservoir

Interested in learning more about FIRO?

Visit the Center for Western Weather and Water Extremes website: <https://cw3e.ucsd.edu/firo/>