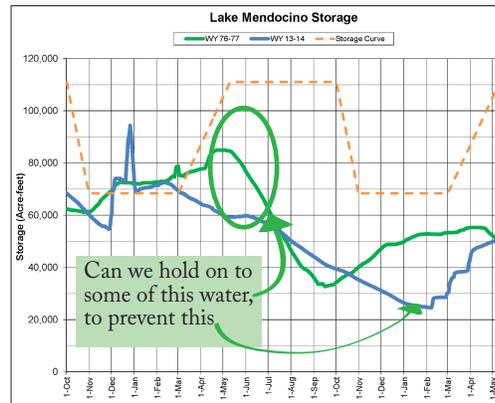


DEVELOPING RESILIENCY FOR DROUGHTS & FLOODS: FORECAST-INFORMED RESERVOIR OPERATIONS

Summer 2016

PROJECT PARTNERS



BACKGROUND Lake Mendocino, located on the East Fork of the Russian River, in Mendocino County, California has a total storage capacity of 122,500 acre-feet. Lake Mendocino was created by Coyote Valley Dam (CVD), which was constructed in 1958 for flood control, and provides water supply, recreation and stream flow. The US Army Corps of Engineers (Corps) owns the project and makes flood control releases in accordance with the Water Control Manual. Sonoma County Water Agency (SCWA) is the local partner and controls releases when levels are in the water supply pool.

The Manual, issued in 1959 and revised in 1986, was developed without the benefit of recent meteorological forecasting methods. The manual dictates release flows according to a rule curve that specifies the top of the water supply conservation pool throughout the year. The reservoir is operated to store water during a flood event, to be released soon thereafter to create storage space for another potential event. The rule curve is predicated on typical historical weather patterns – wet during the winter, dry otherwise.

THE PROBLEM The rule curve does not account for increased variation in weather patterns and reductions to inflows into Lake Mendocino from PG&E's Potter Valley Project (which historically diverted water from the Eel River to the Russian River). This region experiences some of the most variable weather in California, with a high rate of both droughts and floods. As a result, the water supply reliability of Lake Mendocino is impaired with significant consequences to downstream municipal and agricultural water users as well as endangered coho salmon, threatened steelhead trout and Chinook salmon.

For example, following an atmospheric river type storm in December 2012, per the control manual, the Corps released water to create space in the flood pool. Cumulative releases dropped reservoir levels by more than 25,000 acre-feet. With 2013 being the driest year on record, there was little inflow to refill in the spring. By December 2013, lake levels were extremely low, and remained low until 2015. Valuable water was lost that could have been stored for water supply and other uses.

THE POTENTIAL SOLUTION A Steering Committee from several government agencies is undertaking a Preliminary Viability Assessment to determine if Forecast-Informed Reservoir Operations (FIRO) can provide improved water

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STEERING COMMITTEE MEMBERS

FIRO CO-CHAIRS

Jay Jasperse
Sonoma County Water Agency

F. Martin Ralph
Center for Western Weather and Water Extremes

Michael Anderson
California State Climate Office,
Department of Water Resources

Levi Brekke
Bureau of Reclamation

Mike Dillabough
US Army Corps of Engineers

Michael Dettinger
United States Geological Survey

Joseph Forbis
US Army Corps of Engineers

Rob Hartman
NOAA's National Weather Service

Patrick Rutten
NOAA Restoration Center

Cary Talbot
US Army Corps of Engineers

Robert Webb
NOAA's Earth System
Research Laboratory



supply, flood control and ecosystem benefits at Lake Mendocino.

FIRO is a management strategy that uses data from watershed monitoring programs and improved weather and water forecasting to help water managers selectively retain or release water from reservoirs in anticipation of upcoming conditions. FIRO represents an innovative use of emerging science and technology to optimize limited resources and relieve potential impacts of climate change without building expensive new infrastructure. This management strategy also has the potential for more informed decisions to enhance flood protection and dam safety.

Examples of tangible benefits include:

1. Drought-resiliency: FIRO could help retain more water in the lake when recent storms have caused encroachment into the flood pool, but no major precipitation is predicted for several days.
2. Reducing flood risk: FIRO could result in water releases that would encroach into the conservation pool when a storm is predicted to be potentially intense enough to risk flooding and there is high confidence of significant reservoir inflow. This could reduce flood risk, with confidence that the storm will refill at least that amount of encroachment.
3. Ecosystem benefits: Increased reservoir storage improves water quality conditions and reliability of released water for threatened and endangered fish.

PROJECT STATUS

Since Lake Mendocino FIRO was conceived in 2013, the following has been accomplished:

- The first annual FIRO workshop was held in 2013 to exchange information
- In 2014, the Steering Committee was created and it decided to develop a work plan
- At the 2015 workshop, the Steering Committee released a draft work plan for assessing the viability of FIRO. The Final Work Plan (September 2015) presents an approach for conducting a proof-of-concept FIRO viability assessment using Lake Mendocino as a model. The Work Plan describes current technical and scientific capabilities, and outlines technical/scientific analyses and future efforts to demonstrate the potential of FIRO to improve reservoir management.
- The Preliminary Viability Assessment and scientific research are underway, and draft findings are expected at the end of 2016. The assessment will present a suite of actions ranging from practical, short-term steps to longer-term research needs. If deemed viable, FIRO will likely be implemented incrementally, as science evolves and implementation criteria are met.

The preliminary viability assessment will include identification, assessment and enhancement of the best science available to improve reservoir operations. The evaluation will identify realistic, short-term steps to improve modeling and refine data gathering to provide more accurate and timely information about weather and watershed conditions. While transferability of this project to other reservoirs has not been assessed, the processes used to study the applicability of FIRO could be applied elsewhere.

Steering Committee: UC San Diego Center for Western Water and Weather Extremes - Sonoma County Water Agency - US Army Corps of Engineers - National Oceanic and Atmospheric Administration - United States Geological Survey - California Dept. of Water Resources - US Bureau of Reclamation, - Mendocino County Russian River Flood Control and Water Conservation Improvement District

CONTACTS/STEERING COMMITTEE CO-CHAIRS:

Jay Jasperse (FIRO Co-Chair), Chief Engineer, Sonoma County Water Agency

707.547.1959 • jay.jasperse@scwa.ca.gov

F. Martin Ralph (FIRO Co-Chair), Director, Center for Western Weather and Water Extremes at

UC San Diego's Scripps Institution of Oceanography 858.822.1809 • mralph@ucsd.edu

SUPPORT STAFF

David Ford, David Ford Consulting Engineers

Arleen O'Donnell, Eastern Research Group

Ann DuBay, Sonoma County Water Agency

