



U.S. ARMY

Forecast Informed Reservoir Operations (FIRO) within USACE

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ICWP-NWSA-WSWC Washington, DC Roundtable
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US Army Corps
of Engineers



“It’s the 21st Century, we need our water to work
harder for us.”

Jeanine Jones, September 2016

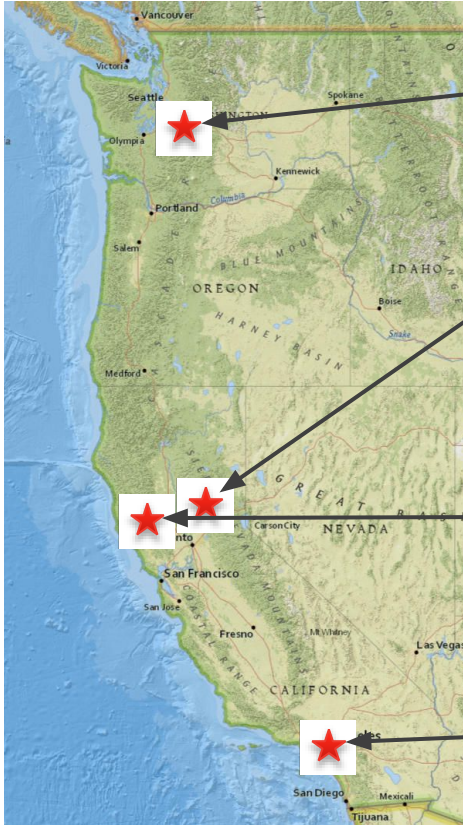
Forecasts in USACE Water Management

- For decades, official guidance dictated that USACE operate based on principle of “water on the ground”
- May 2016 Update to Engineer Regulation (ER) 1110-2-240 Water Control Management adds this sentence:
 - “**Forecasted conditions** may be used for planning future operations, but releases should follow the water control operations plan based on observed conditions within the watershed to the extent practicable.” (*emphasis added*)
- Policy change to *allow* Corps use of forecasts in water operations is in place, but ER doesn't define how the change is to be implemented

Forecast Informed Reservoir Operations (FIRO)

- R&D effort to define how forecast information can be safely and effectively implemented officially in water control manual updates and practice
- FIRO viability assessed at candidate reservoirs through a careful, deliberate and collaborative process
 - FIRO pilot studies being conducted at four sites across the West with a variety of watershed, reservoir volume, and atmospheric and hydrologic driving conditions
 - Results to date indicate 5-20% potential improvement in water availability where FIRO is shown to be viable

Current FIRO Pilot Project Locations



Howard Hanson Dam
Green River, Seattle District USACE



New Bullards Bar Dam
Yuba River, Yuba Water Agency
Oroville Dam
Feather River, CA Dept. of Water Resources



Lake Mendocino/Coyote Valley Dam
East Fork Russian River, San Francisco District USACE



Prado Dam
Santa Ana River, Los Angeles District USACE

FIRO R&D Viability Assessments – Current Status



Lake Mendocino

FVA
Published
Feb 2021



Prado Dam

PVA
Published
July 2021

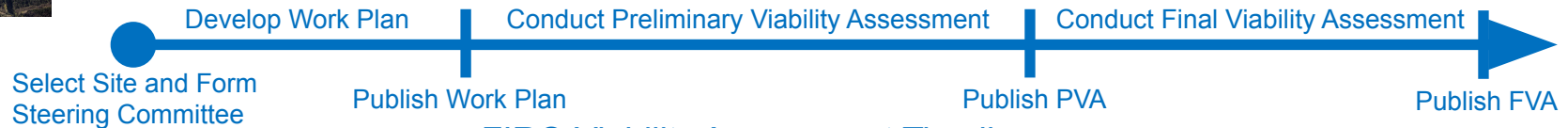


New Bullards Bar
& Oroville Dams

Work Plan
Completed
3/5/21



Howard Hanson Dam



FIRO Viability Assessment Timeline

Collaboration is Key to FIRO Success

- FIRO pilots are led by interagency Steering Committees carefully formed with senior representatives from stakeholder agencies academic partners



- Blend of engineers and scientists from research, operations and regulatory perspectives
- Each agency responsible for supporting their engagement



"This is exactly how we want the Federal Government to operate"

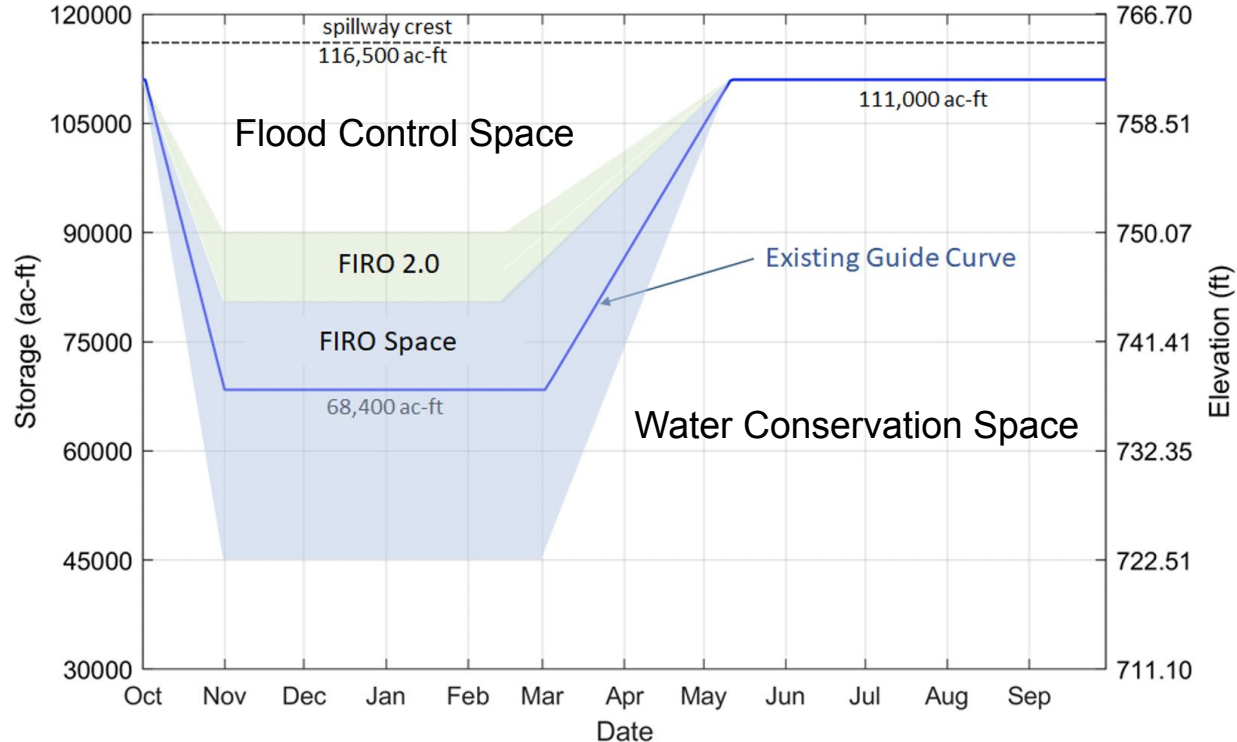
Jaime Shimek

12 April 2018

House Democratic E&W
Appropriations Committee Staff

FIRO = Flexibility for Water Managers

Recommended FIRO Space Modifications to Lake Mendocino Guide Curve

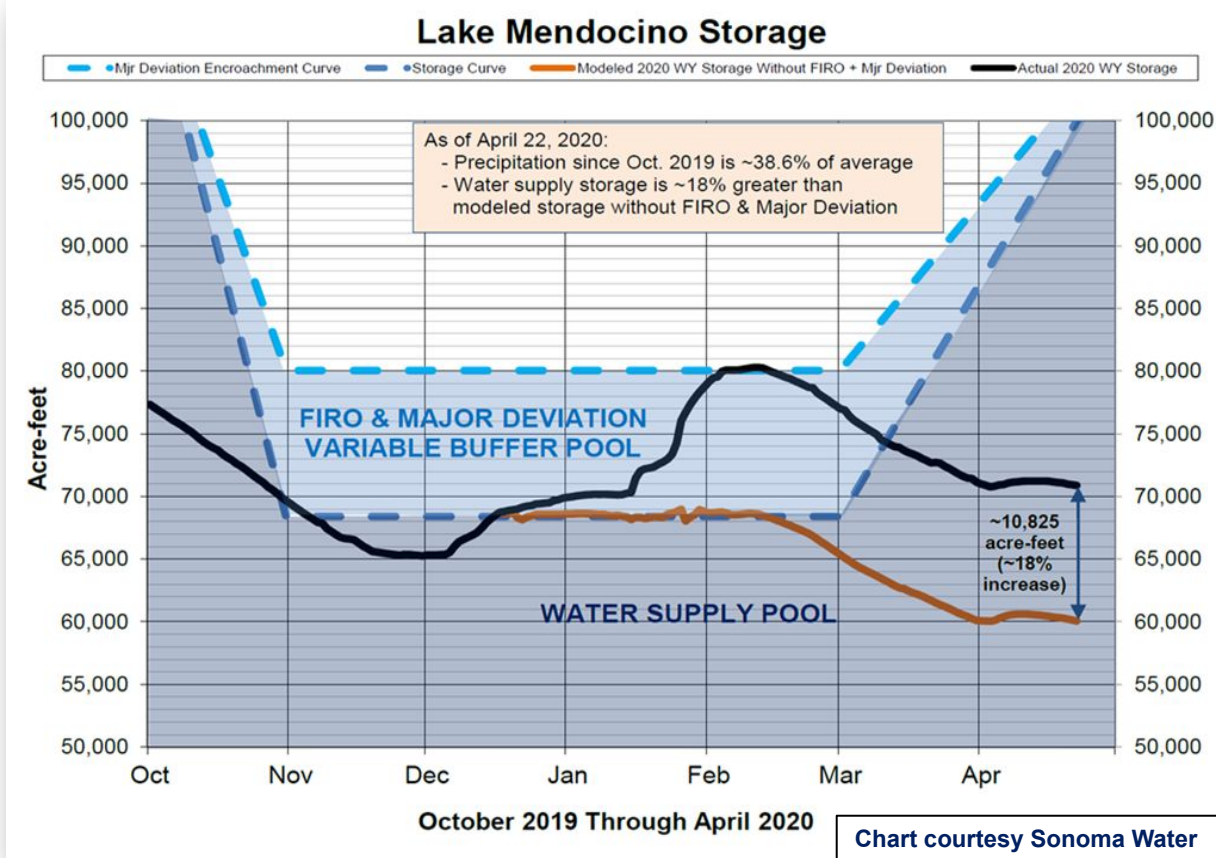


FIRO is an effort to increase water *availability*, not make any changes in allocation

Lake Mendocino FIRO Benefits – WY 2020

3rd driest winter on record in Russian River watershed

10,825 ac-ft is enough water for ~22,000 homes for a year



Seeing the lake so full makes Kyle Farmer, a rancher in Potter Valley, happy every time he drives by it. “It’s a huge deal to become adaptive like that. I don’t think bureaucracies do that naturally,” he said. “It restored my faith in the government, obviously, a little bit.”

Drought or dangerous flooding? Research aims to tame atmospheric river risks — and save California’s rain
By Rachel Becker
www.CalMatters.org
25 February 2020

FIRO Screening Process

Why

- Scale up implementation of FIRO
- Maintain same level of rigor and quality as at original pilot sites but at a screening level
- Determine suitable candidate sites for further FIRO assessments

Goals

- Develop a broadly usable tool to determine sites where FIRO may be appropriate
- Evaluate entire portfolios of reservoirs
- Produce an adaptable, easy-to-use process that empowers more local ownership over FIRO

implementation



Taking FIRO Beyond the Pilot Stage

- WCM update process is inherently a Water Management Process, not R&D
- FIRO has demonstrated value of Research *and* Operations Partnership (RAOP) thus R&D has a role to play in helping the implementation of FIRO be successful
- Screening Process application to Corps portfolio will reveal high-suitability FIRO candidates
- FIRO funding is in FY23 President's Budget for USACE for the first time and FY22 work plan has ~\$25M for WCM updates

Key FIRO Takeaways

- USACE has entered a new phase of water management where forecasts can be officially incorporated into water control manuals and other water management practices
- FIRO provides an effective means of increasing the efficiency and resiliency of existing water resources infrastructure to achieve multi-purpose benefits and provide increased flexibility demanded by climate change – all without costly construction projects