Forecast Informed Reservoir Operations (FIRO): USACE Perspectives

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Why USACE FIRO Engagement

- May 2016 Update to Engineer Regulation (ER) 1110-2-240 Water Control Management
  - “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, FIRO effort is defining how it will be implemented
- FIRO assessments setting important policy application precedents for USACE and other partner agencies
  - FIRO seeks to improve water availability, not change allocation
It is important to note that FIRO is a research and operations partnership.
Concept of FIRO Space

Recommended FIRO Space Modifications to Lake Mendocino Guide Curve

- Spillway crest: 116,500 ac-ft
- FIRO 2.0: 111,000 ac-ft
- FIRO Space: 68,400 ac-ft

Dates:
- Oct
- Nov
- Dec
- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
Collaboration is Key to FIRO Success

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

#### Howard Hanson Dam
- Develop Work Plan
- Conduct Preliminary Viability Assessment
- Conduct Final Viability Assessment
- Select Site and Form Steering Committee
- Publish Work Plan
- Publish PVA
- Publish FVA

#### Prado Dam
- Work Plan Completed 3/5/21
- PVA Published July 2021

#### New Bullards Bar & Oroville Dams

#### Lake Mendocino

#### FVA
- Published Feb 2021

**FIRO Viability Assessment Timeline**

**Building Strong**

US Army Corps of Engineers • Engineer Research and Development Center
Lake Mendocino Final Viability Assessment
Available for download from:
https://cw3e.ucsd.edu/firo_lake_mendocino_fva/

- Four FIRO-based alternatives evaluated and compared to current operations
- All FIRO alternatives allow more water storage carried into dry season and allow reservoir levels to be lowered ahead of major storms, providing additional flood protection
- Alternatives evaluated against 16 metrics and a “best” option recommended for implementation
- Economic study shows significant benefits to fisheries, recreation, water supply and flood risk management
- Water Control Manual update underway at Lake Mendocino
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 Next Steps

- Develop, test and apply Screening Process to portfolio of USACE dams
- Test FIRO viability in basin-wide management systems
- Assess current forecast skill nationwide
- Continue support of research to improve forecast skill for atmospheric rivers and other weather extremes that cause flood and drought conditions
Specific ACF Stakeholders FIRO Questions

What is FIRO?
Why might we want to implement it?
How does the Corps navigate FIRO development?
What is the policy?
How is it funded?
Does it need specific Congressional Authorization?
Where else does/will it work, or not work, and why?
FIRO Impacts: Key Takeaways

- FIRO assessments setting important policy application precedent for USACE and other partner agencies
- Significant opportunity for policy and perspective change by combining researchers, operators and regulators focused collectively on improving water management strategies
  - Collaborative effort builds **institutional trust** between partners which leads to willingness to make accommodation for each other’s objectives in operational decisions
- FIRO provides an effective means of increasing the efficiency and resiliency of existing water resources infrastructure to achieve multi-purpose benefits – all without costly construction projects