Lake Mendocino Forecast-Informed Reservoir Operations (FIRO) Feasibility Assessment Project Planning Workshop

WORKSHOP PURPOSE:
Create a draft work plan for an inter-agency "proof of concept" feasibility project to develop and demonstrate "Forecast-Informed Reservoir Operations" (FIRO) for Lake Mendocino including associated benefits.

WORKSHOP COMMITTEE - Vision, Mission and Strategy:

Vision: Forecast-Informed Reservoir Operations (FIRO) will help increase flexibility in reservoir operations to benefit flood control and water supply operations and to enhance fisheries habitat.

Mission: Carry out a proof-of-concept feasibility project using Lake Mendocino as a model and developing a process that can be used to possibly test FIRO at other reservoirs.

Strategies: Developed at workshop, but that include a benefit analysis.

Agenda Design: The agenda is designed to get the information needed for the work plan:
1. *WHAT WE HAVE NOW*: Existing operational capabilities for Lake Mendocino that can serve as a foundation upon which to build FIRO for Lake Mendocino. (Day 1)

2. *WHAT WE NEED:* Gaps that FIRO can fill; priority needs for developing FIRO (noting near term/low resources vs. longer term/additional resources) (Day 2)
   - What priority needs can be met by applying existing capabilities?
   - What priority needs require developing new capabilities?
   - Which agencies should be involved?

3. *HOW WE WILL DO IT:* Draft schedule including specific steps and milestones for rolling out a feasibility plan to apply or develop priority needs (DAY 2/3)

Process for Achieving Output: Gap Analysis:
We need to agree on the vision for Lake Mendocino FIRO: Where we are (starting point) and where we want to be (desired end point) to bracket the conversation

- What are the reservoir operational issues at Lake Mendocino and what problems are we trying to solve?
- What are the gaps between what we have and what we need?
- How can FIRO address these issues?
  - What are the essential components of a FIRO system?
  - Who should be involved and how long will it take?

LAKE MENDOCINO FIRO PLANNING TEAM:
Marty Ralph – co-lead (UCSD/Scripps/CW3E)
Jay Jasperse – co-lead (SCWA)
Mike Anderson (DWR)
Stu Townsley (USACE)
Pat Rutten (NOAA/NMFS – Santa Rosa)
Mike Dettinger (USGS)

FACILITATOR:
Arleen O'Donnell, ERG

DATE/TIME:
The workshop will begin at 1 p.m. on Monday, August 4 and will end at 5 p.m. Wednesday, August 6. [The workshop planning committee will also meet on the morning of Thursday, August 7.]

LOCATION:
Robert Paine Scripps Forum for Science, Society and the Environment
Scripps Institution of Oceanography
8610 Kennel Way
La Jolla, CA 92037
Note: On Monday, Tuesday and Wednesday, the group will be meeting in the Ted Scripps Room- Room 165. On Thursday, the planning committee will be meeting in the Robert Scripps Room- Room 160.

PARKING: Parking is limited. There is nearby street parking in the early mornings. A limited number of parking permits are available at the meeting, $8 per daily pass. Please email Donna Stout, dstout@ucsd.edu, and Ann DuBay, ann.dubay@scwa.ca.gov if you need a pass.

See link for directions and maps:
https://scripps.ucsd.edu/about/venues/seaside-forum/directions

SPONSORED BY:
Sonoma County Water Agency
Scripps Institution of Oceanography/Center for Western Weather and Water Extremes (CW3E)

Logistics Details

- Continental breakfast, lunch, snacks, and refreshments will be provided.
- Attire is casual

Agenda

Day One: Monday Afternoon (*Seaside Forum: "Ted Scripps Room" – Room 165*)

1:00-2:00 PM Validate Workshop Purpose, Work Plan Outline, Anticipated Outcomes, Process for Achieving our Purpose

- Welcome and introductions (Marty Ralph, Scripps CW3E) (10 min)
- Welcome from Dr. Sandra Brown, UCSD Vice-Chancellor for Research (10 min)
- Workshop genesis: IWRSS / Habitat Blueprint (Rob Hartman, NOAA) (10 min)
- Review agenda and ground rules (Arleen O'Donnell, ERG) (10 min)
- Validate background materials reviewed in advance of the workshop:
  Refer to FIRO workshop outcomes, Strawman work plan outline handouts
  (Jay Jasperse (SCWA) and Marty Ralph present, Arleen facilitates) (20 min)

2-2:45 Discuss Current Conditions

- Opening Panel - Presentation on Lake Mendocino Water Management Issues (45 min)
  - Focus on problem: reservoir re-ops; "rule curve" and how more accurate forecasting could provide some flexibility for the timing of releases from Lake Mendocino.
    - Water supply reliability – Jay (SCWA)* (*panel lead)
    - Flood control – Stu Townsley (Corps)
    - Fisheries Conservation Management – Josh Fuller (NMFS)

2:45-3:00-BREAK (15 min)

3-4:00 Round Robin (lightning round) (60 min)

Each agency offers their perspective (no prepared presentations) on the problem (one spokesperson from each agency).

- Bureau of Reclamation (Levi Brekke)
- NOAA NWS (Rob Hartman)
- NOAA OAR (Robin Webb)
- Cal DWR (Mike Anderson)
- USGS (Mike Dettinger)
- Mendocino County Russian River Flood Control District (Sean White)
- Open Mic

4-5:15 Introduction to FIRO and Discussion of Capabilities Needed/Available

- Preliminary FIRO concept (Marty Ralph) (20 min)
- Q&A (15 min)
- Facilitated discussion: Agency perspectives:
  What's needed and what capabilities currently exist; (40 min)
  - Refer to FIRO workshop anticipated outcomes including FIRO definition and graphic to discuss components and identify (high level) what the gaps are between what's currently in place and what would be needed to implement FIRO
  - Keep running tally (and use post-its on FIRO graphic)

5:15-5:30 Wrap Up and Preparation for Day 2 (15 min)

Day Two: Tuesday (*Seaside Forum: "Ted Scripps Room"- Room 165*)

Tuesday Morning: Identify and Prioritize Gaps, Brainstorm Potential Solutions for Implementing FIRO

8:30-9:00 Working Breakfast: Res Ops 101 – Mike Dillabough, Christy Jones (Corps) (30 min)

9:15-9:30 Transition to case study

9:15-10:30 Folsom Lake Case Study – Experience/Applicability to Lake Mendocino (75 min)

(Purpose is to provide an example to help envision what FIRO applied to Lake Mendocino might look like and to draw from lessons learned at Folsom Lake)

- Stu Townsley (Corps)
- Levi Brekke (Bureau of Reclamation)
- Rob Hartman (NOAA NWS)
- Cal DWR (Mike Anderson)* (*panel lead)

- Discussion

10:30-10:45 BREAK (15 min)

10:45– 11:45 Working Session on Gap Identification: Use graphic and table (1 hour)

Identify agency requirements related to FIRO concept at Lake Mendocino with focus on gaps and opportunities to fill gaps. Refer to FIRO components shown in graphic.

11:45-Noon Wrap up morning session (15 min)

Noon – 1:00 -LUNCH

Tuesday Afternoon: What are Promising Scientific and Technical Alternatives to Fill Gaps (Capabilities, Emerging Science, Methods other Opportunities)?

(Presenters cross-walk promising solutions to gaps, refer to FIRO graphic)

1-2:00 **Atmospheric/Meteorological** (45 min)

- Atmospheric rivers and frontal waves – Marty Ralph (*panel lead)
- Precipitation forecasting – Robin Webb (NOAA OAR)
- West-WRF Model Development - John Helly (Scripps)
- ARs and drought - Mike Dettinger (USGS)

Q&A / Discussion – what gems to extract? (15 min)

2-3:00 **Watershed Conditions** (45 min)

- Unique observations in region including real-time observing network that inform Lake Mendocino watershed - Allen White (NOAA/PSD)
  (*Allen White – panel lead)

- Scanning radar and soil moisture – Rob Cifelli (NOAA/PSD)
- Stream flow, BCM model - Lorrie Flint (USGS)
- Hydro modeling – Lynn Johnson (NOAA PSD)
- Q&A / Discussion – what gems to extract? (15 min)

3-3:15-BREAK (15 min)

3:15-4:00 **Reservoir management** (45 min)

- Forecast-coordinated operations experience- Rob Hartman (NOAA)
- Corps modeling research (HEC) -Matt Fleming (Corps)
- Hydrologic index for reservoir management – Chris Delaney (SCWA)

  * Jay Jasperse – panel lead

Q&A / Discussion – what gems to extract? (15 min)

4-5:00 **Discuss/refine promising methods, technologies that could fill gaps** (45 min)

- Use graphic and populate table

5:00-5:15 Wrap up and Preview Day 3 (15 min)

DAY 3: Wednesday (*Seaside Forum: "Ted Scripps Room"- Room 165*)

Identify Major Elements of a FIRO Feasibility Analysis, Timelines and Expertise Needed; "Stress Test" and Determine Next Steps and Follow-up

Wednesday Morning:

8:30-9:00 Breakfast

9-10:15 Facilitated Discussion and Brainstorming

- Review Results of Day Two (30 min)
- Continue to Populate Needs and Gaps Table (1 hour)

  Determine how best to fill the gaps drawing on Day 2 science, technology & methods discussion

  - Timeframe (short term vs. longer term)
  - Cost (high, medium, low) and
  - Identify agencies that need to be involved

10:15-10:30 BREAK (15 min)

10:30-Noon Stress Test: Extreme Scenarios to Bookend the Needs

10:30 -11:30 "Prime the Pump" Kick off Stress Test Discussion (1 hour)

Each presenter provides 5-10 minute summary (no prepared presentations) including frequency and predication of events, followed by discussion.

Mike Anderson* (moderator) introduces context of risk management and adaptive management

- Summarize past experiences/impacts re: water supplies - Don Seymour (SCWA)
- Summarize experiences/impacts re: extreme flooding -Mike Dillabough (Corps)
- Summarize experiences/impacts re: ecosystem impacts -Josh Fuller/Natalie-Manning (NOAA)
- Climate Change Implications – Dan Cayan (Scripps)

11:30 – Noon **How do we take these extremes into account?** (30 min)

- Note stress test considerations

Noon-1:00-LUNCH

Wednesday Afternoon:

1-1:30 Wrap-up Discussion-Summarize Extreme Conditions Considerations (30 min)

1:30-2:45 Scope Out Potential Feasibility Project *(Facilitated brainstorming)* (75 min)

- Verify key elements of feasibility project and stress test considerations
- Review and discuss draft work plan outline
  - Refer to FIRO strawman work plan handout
- Discuss scoping issues (e.g. specific to Lake Mendocino)
- Rough schedule and milestones
- Benefits
- Outstanding issues/challenges

2:45-3:00 BREAK (15 min)

3:00-4:30 Next Steps (Jay Jasperse and Marty Ralph) (90 min)

- Future of Planning Committee
  - Refer to Planning Team Overview handout
- Next Steps:
  - Timing and Process for work plan development
  - Connection with IWRSS projects/other projects
- Summarize Action Items

4:30-5:00 Closing Remarks and Adjourn (30 min)