FORECAST-COORDINATED OPERATIONS PROGRAM UPDATE

CA Cooperative Snow Surveys Program
61st Annual Meeting
November 4, 2015

Boone Lek
Hydrology Branch
Reservoir Coordinated Operations Section

Forecast-Coordinated Operations Program (F-CO)

- F-CO overview
- Forecast-Informed Operations
- San Joaquin F-CO Decision Support System

F-CO Goal and Objectives

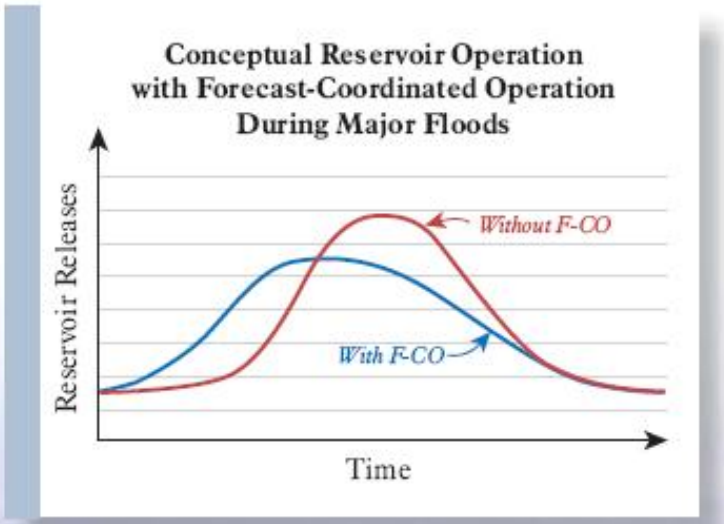
Goal: Improve flood protection without impacting water supply

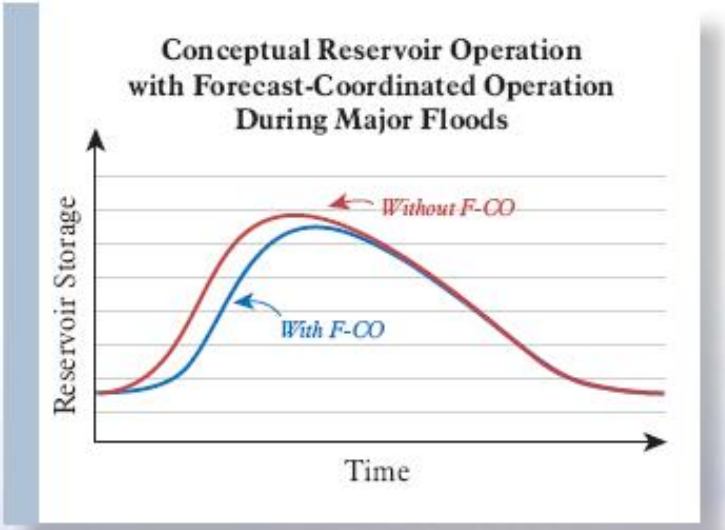
Objectives: Reduce d/s peak flood flows with

-Enhanced data collection

-Improved forecasting

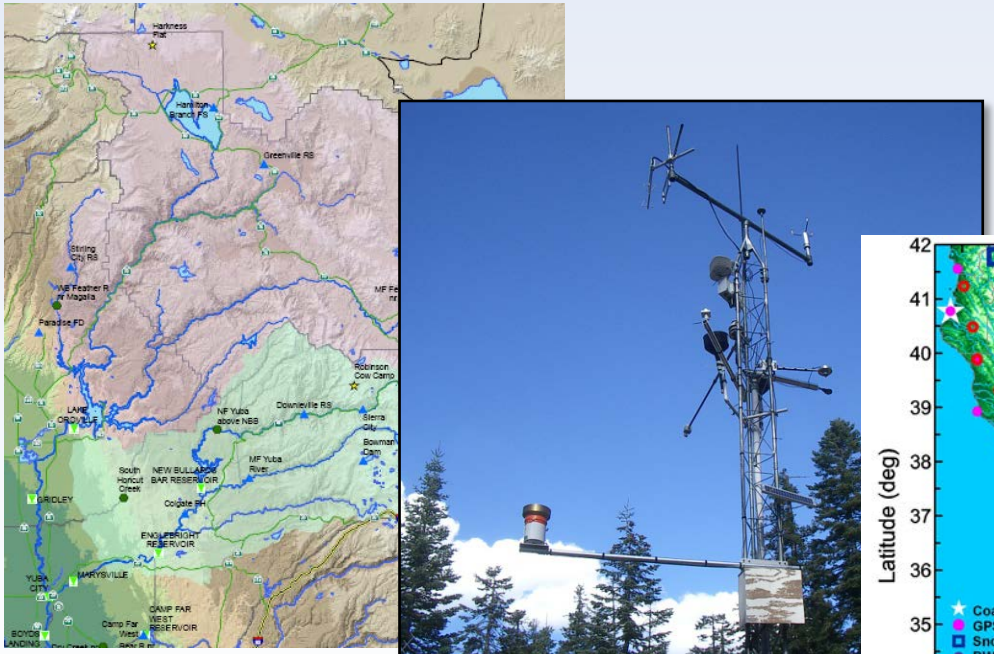
-Common tool for better coordination

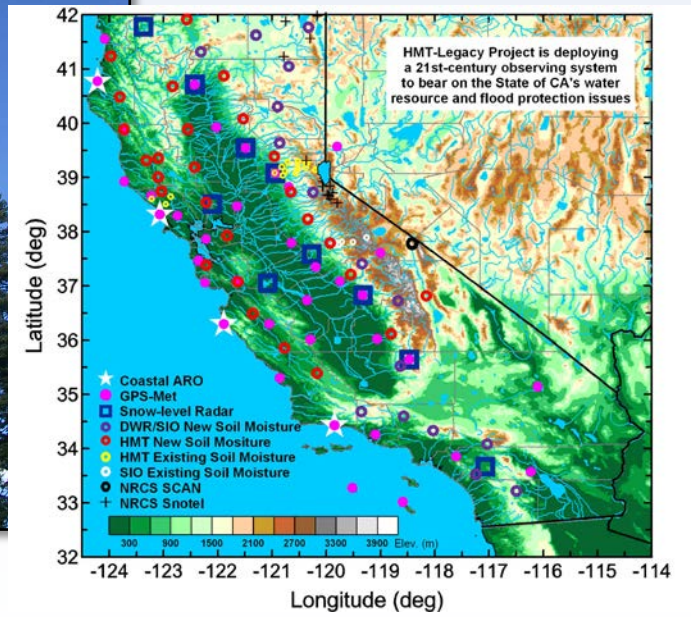




Objectives

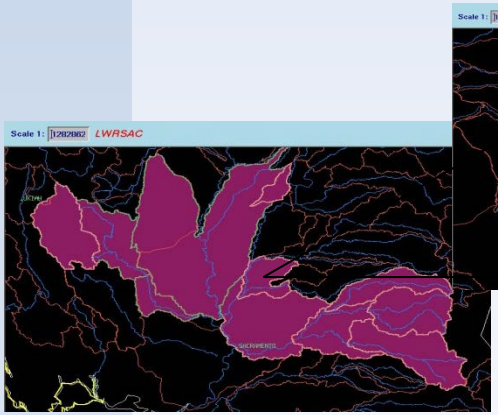
Enhance data collection

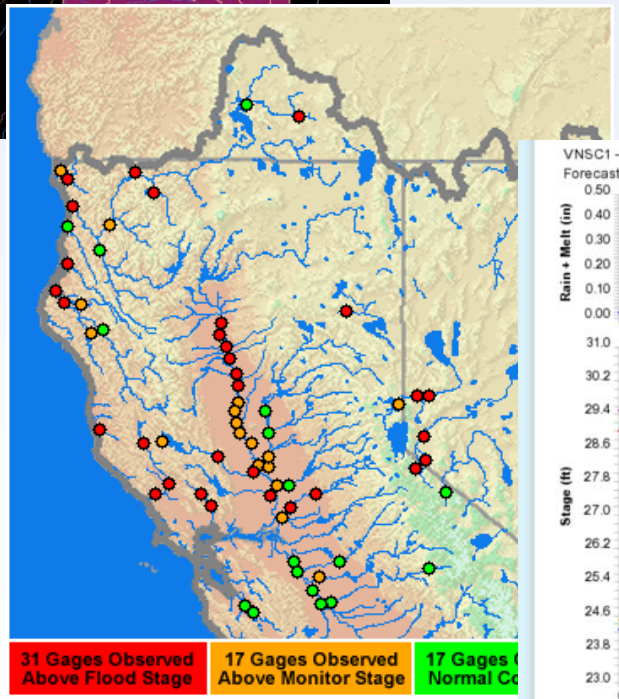


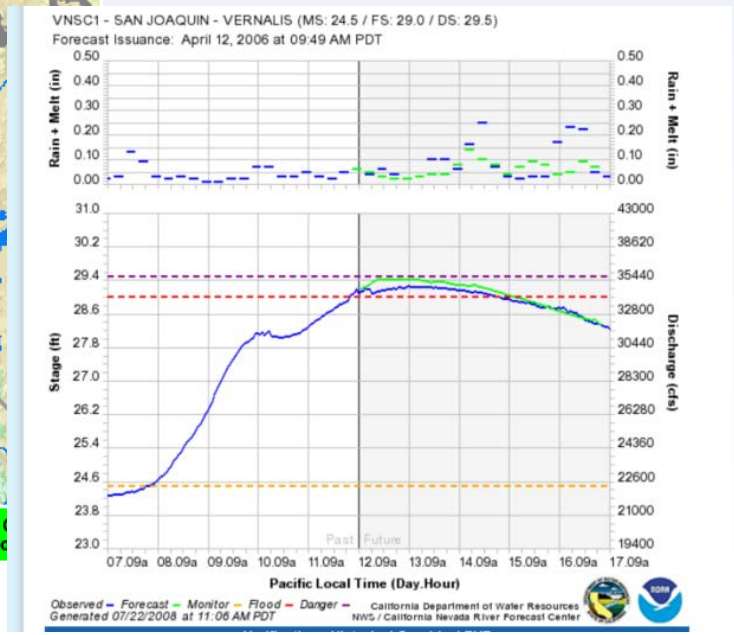


Objectives

Improve Forecasting

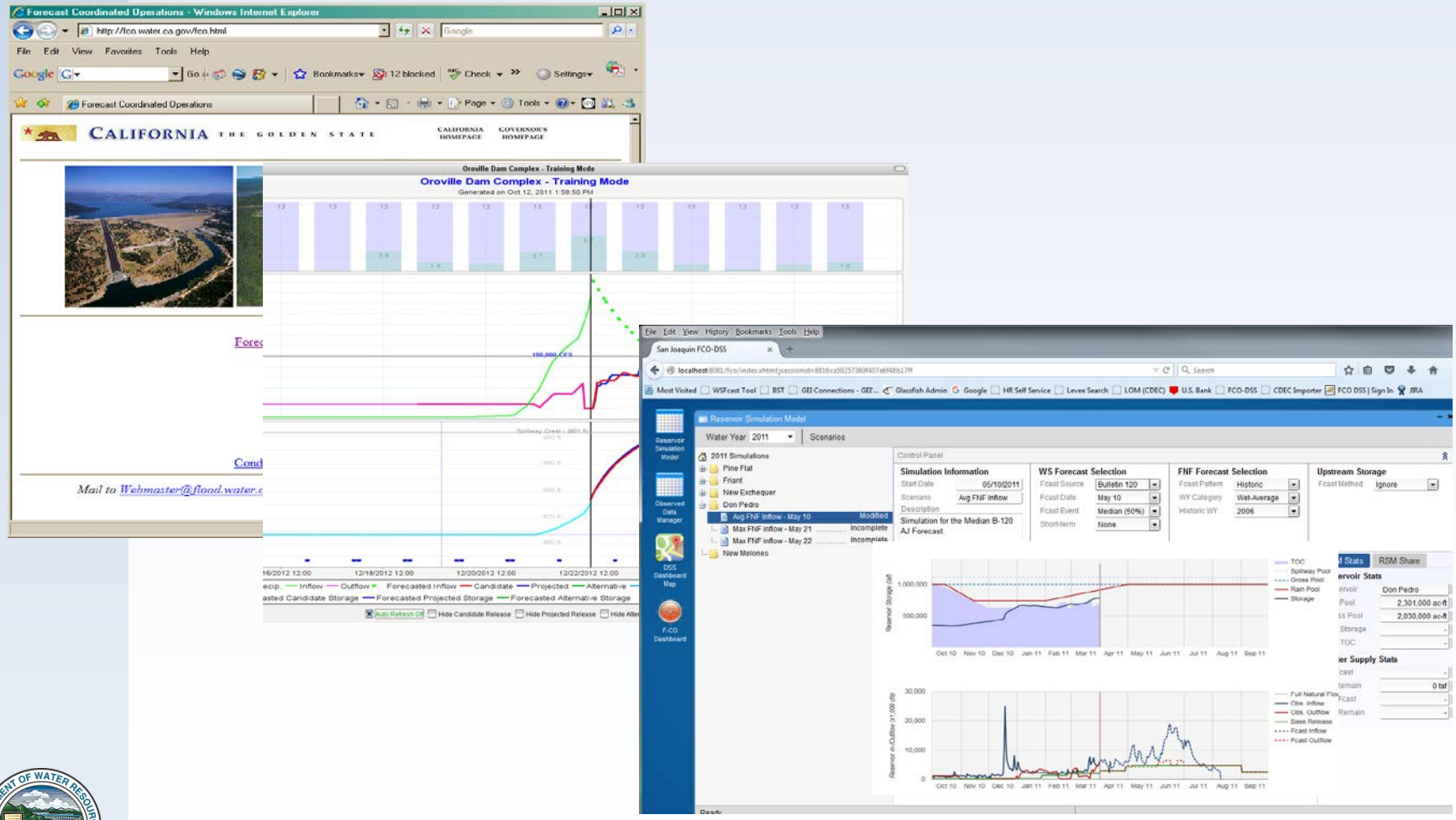


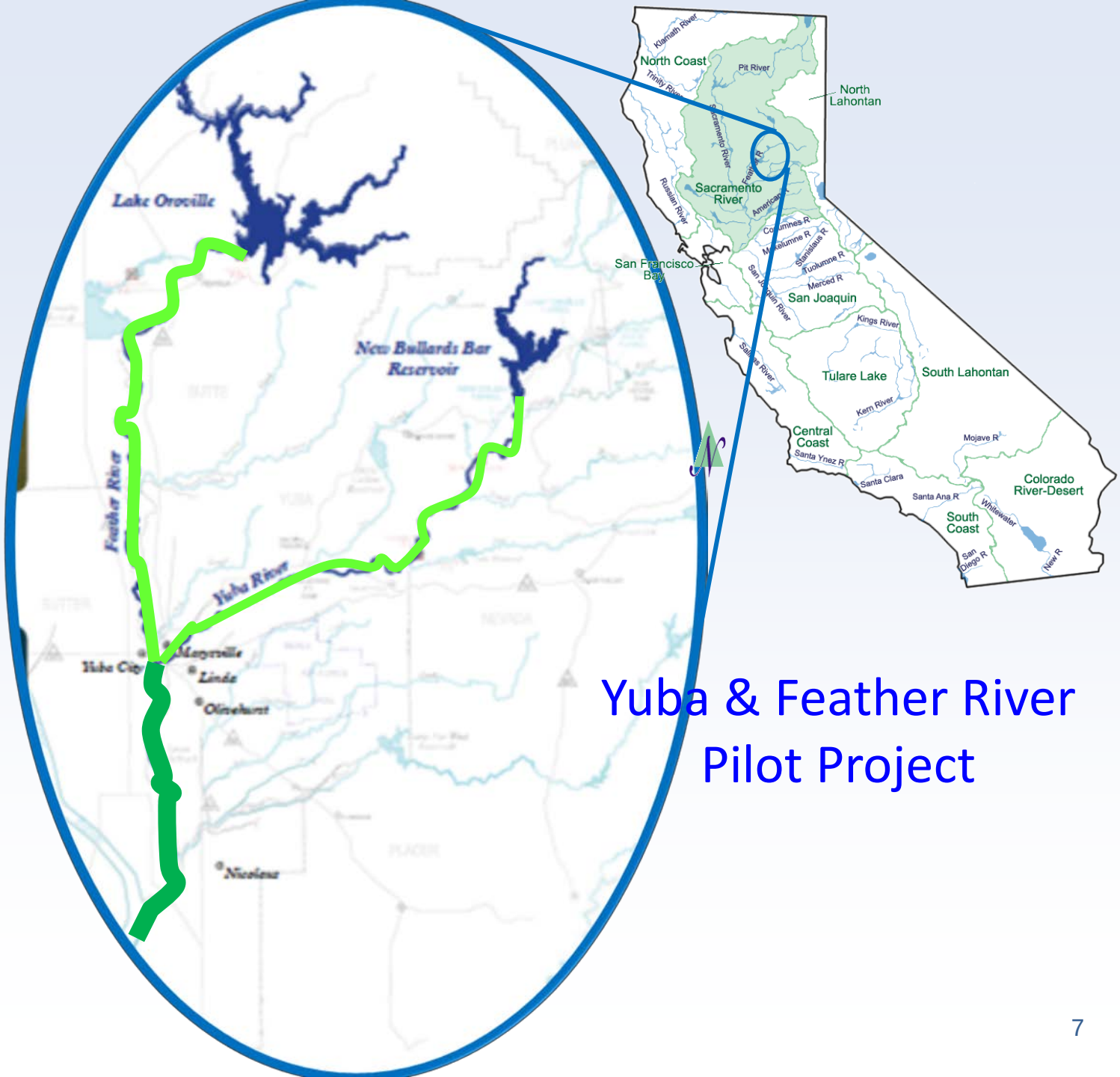




Objectives

Build Common Interface





Yuba & Feather River Pilot Project

Forecast-Informed Operations (F-IO)

Forecast-Informed Operations (F-IO) is a program to optimize water and flood operations reservoirs

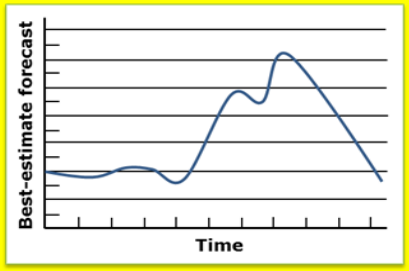
F-IO benefits:

- Will reduce flood risk downstream of reservoirs
- Can provide water supply enhancement

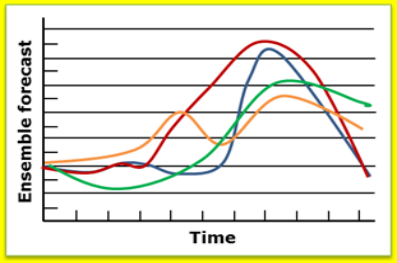
To implement F-IO:

- Improved seasonal reservoir inflow forecasts
- Dynamic/variable reservoir flood control diagram (FCD) that allows pre-releases
- Development and use of ensembles in forecasting
- Detailed engineering analysis to understand & document the potential benefits and feasibility of F-IO
- CEQA and NEPA compliance
- Approval of USACE and Congress to change the FCD

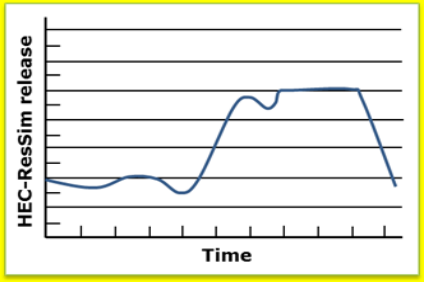
1. CNRFC provides *best estimate* forecast of reservoir inflows and uncontrolled local flows, using current state + QPF.



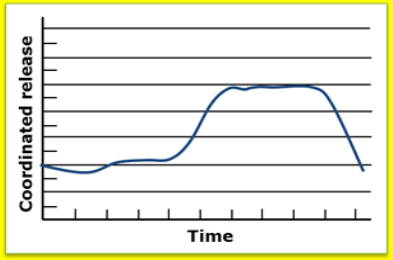
CNRFC also provides ensemble of forecasts of reservoir inflows and uncontrolled local flows. Some forecasts greater and some smaller than best estimate.



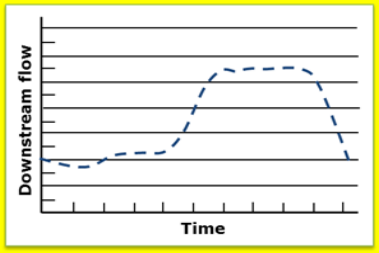
2. Operators run HEC-ResSim (throught F-CO DSS interface) with best estimate forecast to identify recommended release schedule with strict interpretation of rules.



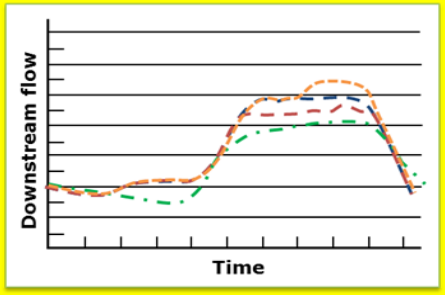
3. Operators review HEC-ResSim results, coordinate, collaborate to select *coordinated release schedule*.



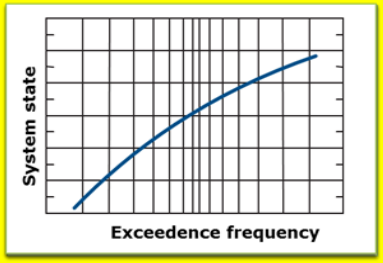
4. Downstream conditions computed with HEC-ResSim, using coordinated schedule.



5. For each ensemble member, HEC-ResSim computes system states with coordinated release schedule from Step 3



6. Frequency of exceedence of critical system states analyzed and reported. If hazard deemed unacceptable, process is repeated starting with Step 3.

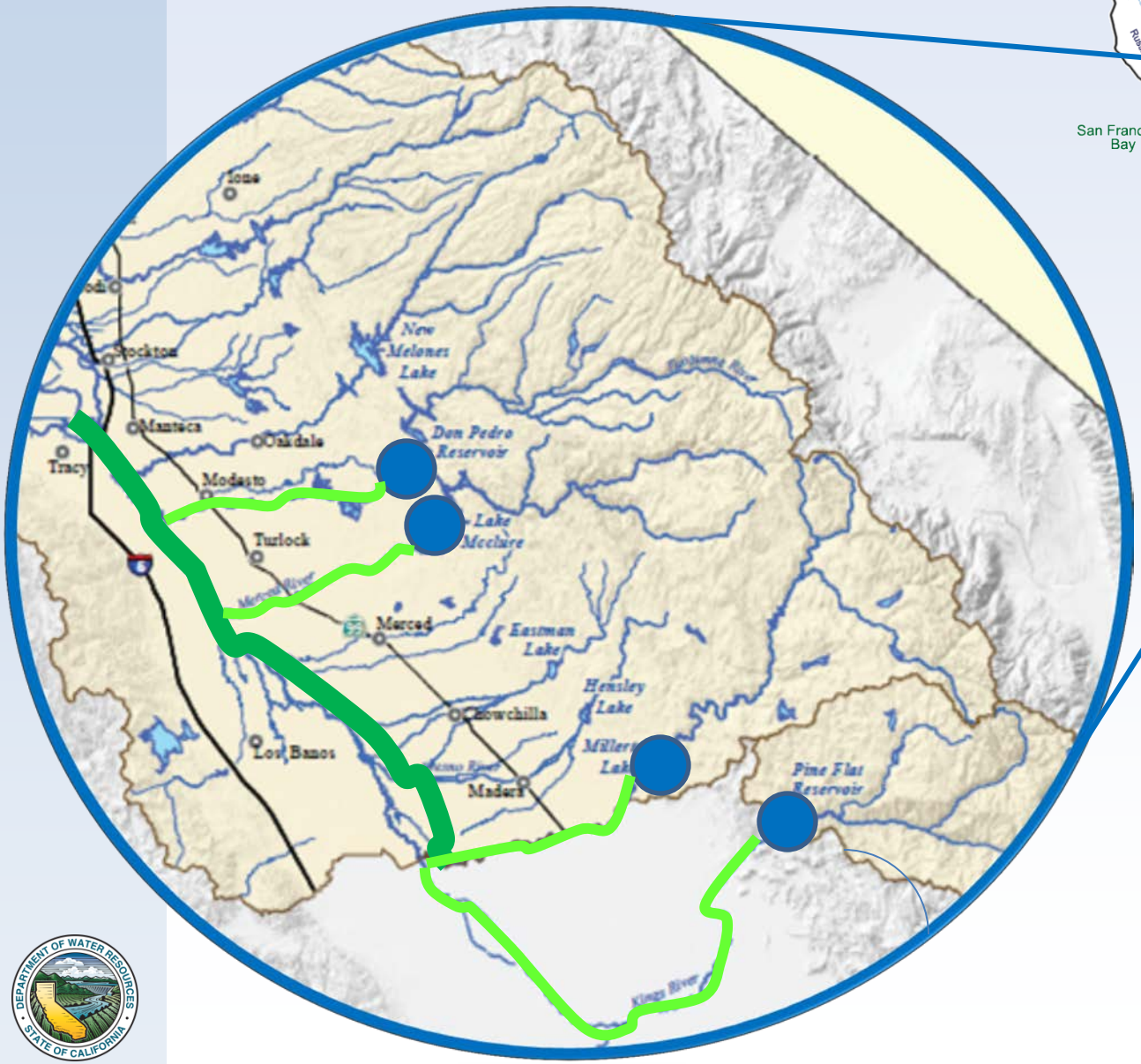



-Folsom Dam Auxiliary Spillway
-$900M
-late 2017 completion date

- F-IO requires willing participation from reservoir operators

- Any changes to the provision in the water control manuals, whether to improve flood control, water supply, or other purposes, must be enacted by Congress.

F-CO on the San Joaquin River System



F-CO Program Partners

San Joaquin F-CO
Decision Support System (SJ F-CO DSS)

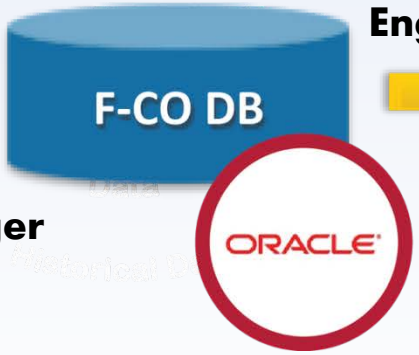
- For snowmelt floods
- Daily time step

SJ F-CO DSS

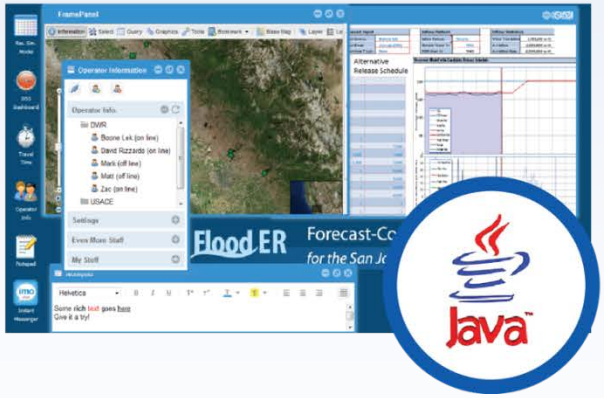
Source Data	Oracle Database	SJ F-CO DSS

US Army Corps of Engineers®

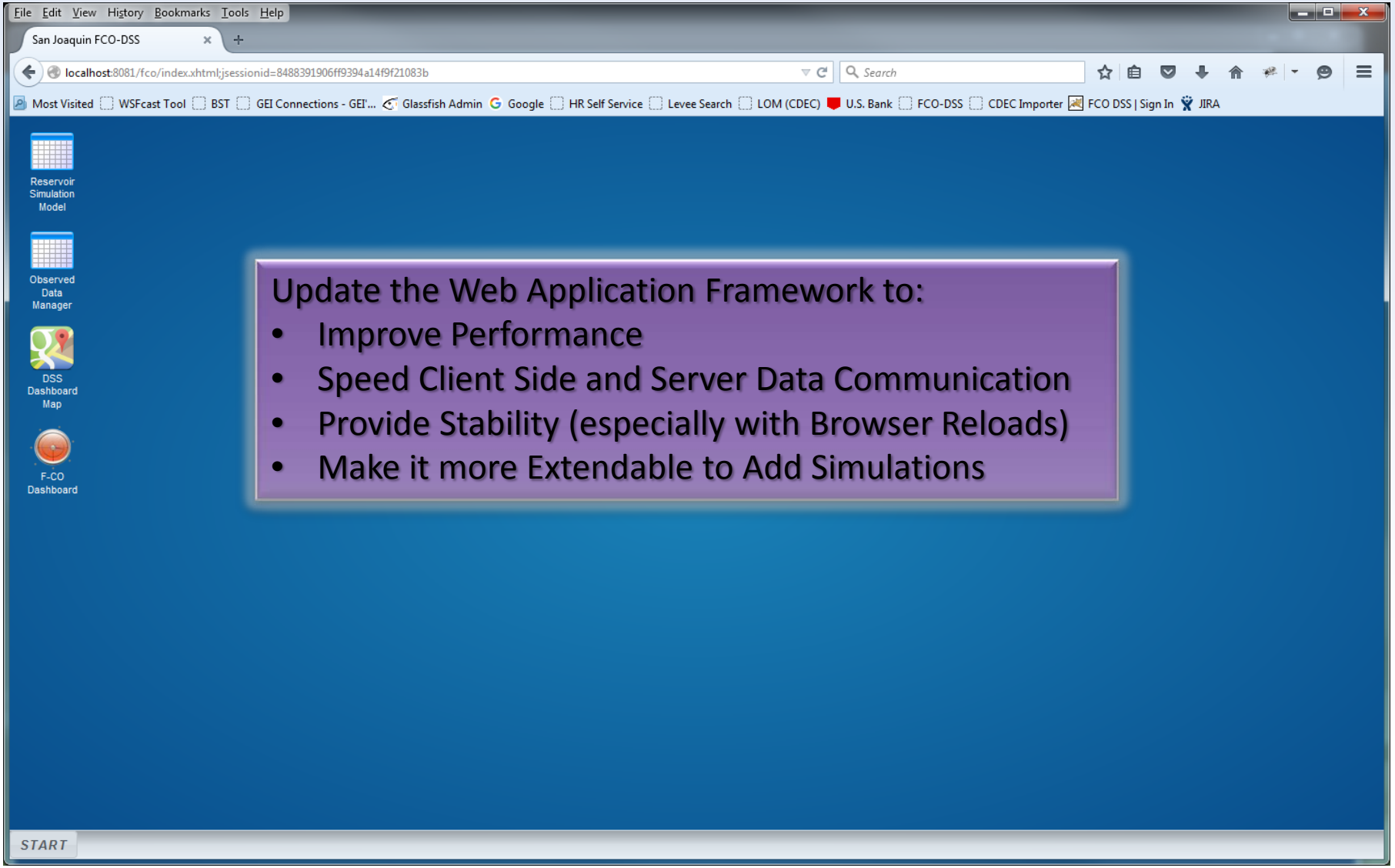
Data Manager



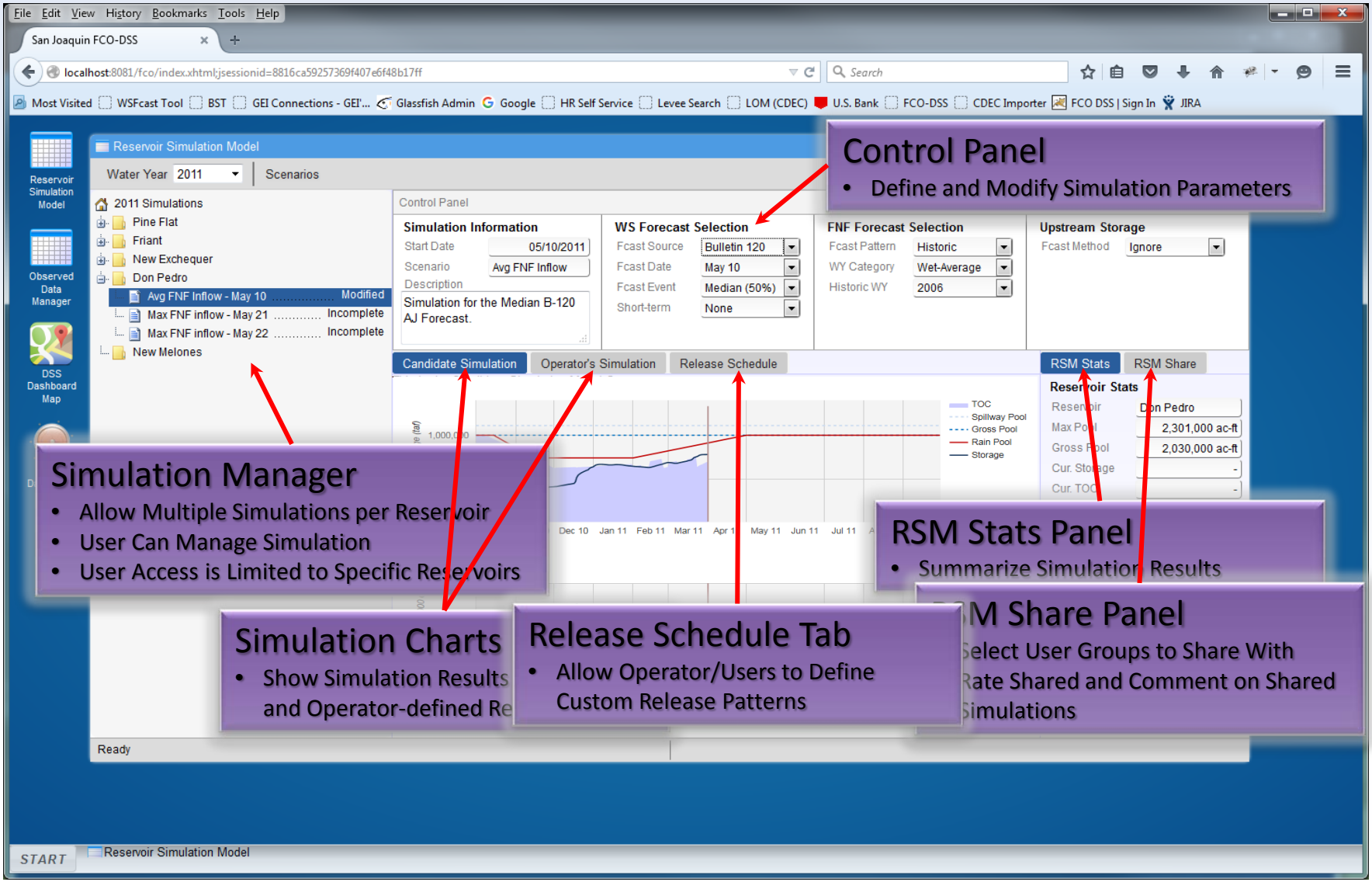
Model Engine



SJ F-CO DSS


File Edit View History Bookmarks Tools Help
San Joaquin FCO-DSS
localhost:8081/fco/index.xhtml;jsessionid=8488391906ff9394a14f9f21083b
Search
Most Visited
WSFcast Tool
BST
GEI Connections - GEI'...
Glassfish Admin
Google
HR Self Service
Levee Search
LOM (CDEC)
U.S. Bank
FCO-DSS
CDEC Importer
FCO DSS | Sign In
JIRA
Reservoir Simulation Model
Observed Data Manager
DSS Dashboard Map
F-CO Dashboard
Update the Web Application Framework to:
• Improve Performance
• Speed Client Side and Server Data Communication
• Provide Stability (especially with Browser Reloads)
• Make it more Extendable to Add Simulations
START

SJ F-CO DSS


Control Panel
• Define and Modify Simulation Parameters
Simulation Manager
• Allow Multiple Simulations per Reservoir
• User Can Manage Simulation
• User Access is Limited to Specific Reservoirs
RSM Stats Panel
• Summarize Simulation Results
Simulation Charts
• Show Simulation Results
and Operator-defined Re
Release Schedule Tab
• Allow Operator/Users to Define
Custom Release Patterns
M Share Panel
elect User Groups to Share With
ate Shared and Comment on Shared
imulations
Reservoir Simulation Model
Water Year 2011
Scenarios
2011 Simulations
Pine Flat
Friant
New Exchequer
Don Pedro
Avg FNF Inflow - May 10 Modified
Max FNF inflow - May 21 Incomplete
Max FNF inflow - May 22 Incomplete
New Melones
Control Panel
Simulation Information
Start Date 05/10/2011
Scenario Avg FNF Inflow
Description
Simulation for the Median B-120 AJ Forecast.
WS Forecast Selection
Fcast Source Bulletin 120
Fcast Date May 10
Fcast Event Median (50%)
Short-term None
FNF Forecast Selection
Fcast Pattern Historic
WY Category Wet-Average
Historic WY 2006
Upstream Storage
Fcast Method Ignore
Candidate Simulation
Operator's Simulation
Release Schedule
RSM Stats
RSM Share
Reservoir Stats
Reservoir Don Pedro
Max Pool 2,301,000 ac-ft
Gross Pool 2,030,000 ac-ft
Cur. Storage -
Cur. TOC -
TOC
Spillway Pool
Gross Pool
Rain Pool
Storage
Dec 10
Jan 11
Feb 11
Mar 11
Apr 1
May 11
Jun 11
Jul 11
Ready
START
Reservoir Simulation Model

SJ F-CO DSS: current status

- Completing the Reservoir Simulation features.
- Testing and Debugging the Reservoir Simulation Engine for each Reservoir.
- Deployment and Training Session in December 2015

SJ F-CO DSS: what's next

- Plan and develop annual flood exercise
- Evaluate ResSim for rain flood events
- F-CO Grant

QUESTIONS?

http://cdec.water.ca.gov

boone.lek@water.ca.gov
916-574-2633