Stakeholder Discussion
October 31, 2013

Location: Tsakopoulos Library Galleria, East Room, 828 I Street, Sacramento
WELCOME
&
INTRODUCTIONS
Revise operation rules for Folsom Dam to reduce flood risk based on the capabilities of the Folsom Joint Federal Project (JFP).

Reflect operational capabilities created by improved weather forecasts.

Potentially reduce the volume of flood control reservation in Folsom Reservoir at any particular time by comparison to the operations that have been in effect since 1995.
OBJECTIVES OF MANUAL UPDATE

- Pass the Probable Maximum Flood while maintaining 3 feet of freeboard below the top of dam to stay within the dam safety constraints of the U.S. Department of Interior, Bureau of Reclamation.

- Control a 1/100 annual chance flow ("100-year flood") to a maximum release of 115,000 cubic feet per second as criteria set by the Sacramento Area Flood Control Agency to support Federal Emergency Management Agency levee accreditation along the American River.

- Control a 1/200 annual chance flow ("200-year flood") as defined by criteria set by the State of California (State) Department of Water Resources to a maximum release of 160,000 cubic feet per second, when taking into account all the authorized modifications within the American River Watershed.
PURPOSE OF TODAY’S AGENDA

- Involving Public, Other Government Agencies, & Non-Governmental Organizations
- Project Schedule
- Presentation on Environmental Effects Approach
- Presentation on Technical / Modeling Work
- Group Discussion & Summary Comments
INVOLVING THE PUBLIC, OTHER GOVERNMENT AGENCIES & NON-GOVERNMENTAL ORGANIZATIONS
INTERESTS

- Regional Flood Management
- Folsom Lake, Lake Natoma and Lower American River Recreation
- In-Basin Water Supply & Irrigation
- Other Water Supply & Irrigation
- Generation of Hydropower
REVIEW ISSUES & CONCERNS
PUBLIC INVOLVEMENT

- Quarterly Public/ Stakeholder Session

- In-Depth Sessions - Government Entities:
  - Quarterly Technical / Modeling
  - Quarterly Environmental Effects

- In-Depth Sessions - Non-Governmental & Public
  - Quarterly Meetings convened by SAFCA.

- Other Conversations USACE
INFORMATION AVAILABLE ON LINE
Folsom Dam Water Control Manual Update

- July 2012 Briefing Paper
- Summary of 2012 Scoping Meetings
- Stakeholder Assessment
- Other Documents

PROJECT MILESTONE SCHEDULE
SCHEDULE

Engineering Documentation

Existing Condition & Future Without Project Models
(DEC 2013)

W/ Project Conditions Models
DRAFT
(DEC 2014)

W/ Project Conditions Models
FINAL
(MAY 2015)

Engineering Reports / Review Process
(FEB 2016)

Existing and future without Project Assumptions
(JAN 2014)

Existing / FWOP Analysis
(JUN 2014)

W/ Project Analyses/Comparison DRAFT
(DEC 2014)

W/ Project Analyses/Comparison FINAL
(MAY 2015)

NEPA Process Continues
(JAN 2017)

Environmental Documentation

Folsom Dam Water Control Manual
(MAR 2017)
<table>
<thead>
<tr>
<th>Meeting Sequence</th>
<th>Technical Focus of Meetings</th>
<th>Technical Work Group (TWG)</th>
<th>Environmental Working Group (EWG)</th>
<th>SAFCA Meetings with NGOs</th>
<th>All Stakeholder/ Public Workshops</th>
<th>Stakeholder Input Due</th>
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</thead>
<tbody>
<tr>
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Discussion / Questions
ENVIRONMENTAL EFFECTS APPROACH
CURRENT MODELING PLAN OVERVIEW

Task Force = Corps, Reclamation, CVFPB/DWR, SAFCA representatives

ROS = Reservoir Operations Set

ResSim ROS = ResSim model developed for each ROS and evaluated for flood risk management performance
Tier 1 Analysis

- ‘High level’ evaluation of effects to project beneficial uses
- Developed from period of record (POR) HEC-ResSim and CalSim II runs using the same flood storage reserve requirements
- Compares HEC-ResSim and CalSim II end-of-month storages and lower American River (LAR) fall flows
- General consistency between the two models is viewed as consistency with meeting project beneficial uses
CalSim II Model Build

- Current CalSim II model build subject to concurrence between USACE, Reclamation and DWR

- Any modifications to base model assumptions will be further discussed by the partner agencies
Environmental Effects Analysis

- Environmental effects analyses will be centered around effects flood management operations alternatives would have on the other Folsom Dam Project purposes:

<table>
<thead>
<tr>
<th>Flood Control</th>
<th>Water Supply (Irrigation and M&amp;I)</th>
<th>Fish and Wildlife</th>
<th>Power Generation</th>
<th>Water Quality</th>
<th>Navigation</th>
<th>Recreation</th>
</tr>
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</table>

19
Tier 2 Analysis

- Comparison of ‘with ROS’ CalSim II run with baseline CalSim II run
- Monthly flood storage reserve requirement in Folsom is feature of ROS that is incorporated into CalSim II
- Screening level comparison of SWP/CVP beneficial uses of project water using key system indicators
Tier 2 System Indicators

- Water delivery to CVP municipal and industrial contractors north and south of the Delta;
- Water delivery to settlement and exchange contractors;
- Water deliveries to Feather River SWP contractors;
- Water delivery to CVP agricultural contractors north and south of the Delta;
- Minimum release requirements (MRR) CVP and SWP conveyances;
- SWP Delta exports;
Tier 2 System Indicators (cont.)

- Old and Middle River (OMR) flows;
- The position of the X2 (the near-bottom 2 parts per thousand isohaline boundary);
- The Delta export to inflow (E/I) ratio;
- Delta Outflow;
- Water delivery to refuges north and south of the Delta;
- May end-of-month storage in Shasta, Oroville and Folsom Reservoirs, and
- September end-of-month storage in Shasta, Oroville and Folsom Reservoirs.
Tier 3 Analysis

- Evaluate other system effects that CalSim II cannot simulate
- Comparison of alternatives to baseline conditions
  - Long-term average values (period of record) and sorted by water year type
- Closer evaluation of effects in Lower American River
- Screening level evaluation for more distant parts of CVP/SWP system followed by detailed evaluation, as needed
Baseline Conditions - Folsom Reservoir Flood Operation and Configuration

- Existing Conditions/Current Operations
- Future Without Project/No Action
- Cumulative Effects
Existing Conditions/ Current Operations (E504)

- Flood Storage: 400,000/670,000 Acre-Feet (AF)
- Outlet Configuration: Existing (No Auxiliary Spillway)
- Temperature Control Devices (TCD): 3-2-4 shutter configuration
Future Without Project/No Action (J604)

- Flood Storage: 400,000/670,000 AF
- Outlet Configuration: Existing plus Auxiliary Spillway (JFP)
- TCDs: 3-2-4 shutter configuration
- Operations: Current + use of auxiliary spillway for emergency releases only
Cumulative Effects

- **Past** – 400,000 AF (Fixed) flood space; no JFP; 1-1-7 shutter configuration; 1987 WCD (E503 ResSim Model)

- **Present** – 400,000/670,000 AF flood space; no JFP; 3-2-4 shutter configuration; 2004 WCD (E504 ResSim Model)

- **Future** – 400,000/600,000 AF flood space; Authorized 3.5-ft Dam Raise; JFP; 7(1)-2 shutter configuration; 2017 WCD updated for Dam Raise (R702 ResSim Model)
Dam Raise – Future Project

- Not a with-project alternative for this WCM Update; however, considered in cumulative effects analysis

- **Features**
  - Automation of TCD – 7(1)-2 configuration
  - Raise auxiliary dikes by 3.5 feet
  - Retrofit emergency spillway gates
  - Ecosystem restoration at 2 sites on LAR
Dam Raise – Future Project
Other Baseline Assumptions Under Discussion

- Bay Delta Conservation Plan (BDCP)
- Lower American River (LAR) Purveyor Demands
- Level of Development
- Biological Opinions
- Climate Change
- Other Future Projects
EVALUATIONS BY RESOURCE
Ag, M&I Water Supply

- CalSim II Outputs
- Model Parameters
  - Deliveries from Folsom Lake and to the City of Sacramento
  - CVP/SWP deliveries South of Delta
  - Non-CVP/SWP water rights deliveries
  - End-of-May Storage: Trinity, Shasta, Oroville, Folsom Reservoirs
  - End-of-September Storage: Trinity, Shasta, Oroville, Folsom Reservoirs
Power

- CalSim II reservoir storages and releases applied to LTGen and SWPGen models

- Evaluation of:
  - Total capacity, quantity and timing of energy production
  - Any changes in Project use
  - Net capacity and energy at load center
  - Effects to timing of peaking operations at Folsom Dam
Fisheries Resources

- Effects analysis based on river flows, lake levels and water temperature modeling.

- Special-status fish species (i.e., steelhead, Chinook salmon, delta smelt, green sturgeon, etc.).

- Recreationally important species (e.g., striped bass and American shad).
Water Quality

- Parameters evaluated as part of the Fisheries analysis:
  - Water temperature in the Lower American River
  - Salinity dynamics in the Delta

- Salinity dynamics in the Delta
  - Addressed at a screening level (changes in X2, total Delta inflow/outflow, and the E/I ratio).
  - Substantial changes may warrant more detailed evaluation using DSM2

- Salinity quality at key in-Delta points for local Ag and M&I supplies
Terrestrial Resources

- Shoreline understory and wooded areas.

- Reservoir parameters:
  - water surface elevations

- Riverine parameters:
  - Flow
Recreation

- Primary focus is Folsom Lake and Lower American River

- Folsom Lake
  - Water surface elevation as it relates to access, inundation, aesthetics, and time of year

- Lower American River
  - Flows and timing
Erosion

- Changes in erosion rates at key index points along LAR

- Focus is period between completion of JFP/auxiliary spillway and completion of Common Features project
<table>
<thead>
<tr>
<th>Corps of Engineers</th>
<th>NEPA Lead Agency</th>
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<tr>
<td>Central Valley Flood Protection Board</td>
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<td>CEQA Lead Agency</td>
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<td>Department of Water Resources</td>
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<td>CEQA Responsible Agency</td>
<td>Sacramento Area Flood Control Agency</td>
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**CEQA Responsible Agency**
BASIS OF ALTERNATIVE DEVELOPMENT
Parameters Common to Each Alternative

- **Flood Storage**: As directed by Congress, 400,000/600,000 AF at Folsom with upstream storage credit considerations

- **Outlet Configuration**: Existing outlets and auxiliary spillway

- **Temperature Control Diagram Configuration**: 3-2-4 shutter configuration
Variable Alternative Parameter

- **Operating Rules**: Rule curves that derive flood storage reserve requirements from some combination of the following:
  - Basin Wetness
  - Forecast Information
Discussion / Questions
PRESENTATION ON TECHNICAL / MODELING WORK
Baseline Comparisons to the With Project Condition
-- Cumulative Past --
400-Fixed Flood Control Storage

FLOOD CONTROL RESERVATION

RESERVOIR STORAGE, in 1,000 acre-feet

FLOOD CONTROL RESERVATION, in 1,000 acre-feet
Baseline Comparisons to the With Project Condition

-- With Project --

400-600 Flood Control Storage
Cumulative Past Vs. With Project Condition
400-Fixed Vs. 400-600 Flood Control
1/100 Routing

Elevation (ft)

E503 Pool Elevation
J602 Pool Elevation

E503 Vs. J602 -- 1/100 ACE

Flow (Kcf/d)

Folsom Inflow
E503 Outflow
J602 Outflow

Time (30-day, hourly timestep)
Cumulative Past Vs. With Project Condition
400-Fixed Vs. 400-600 Flood Control
1/200 Routing
Cumulative Past Vs. With Project Condition
400-Fixed Vs. 400-600 Flood Control
PMF Routing
Existing Vs. With Project Condition
400-670 Vs. 400-600 Flood Control
1/100 Routing
Existing Vs. With Project Condition
400-670 Vs. 400-600 Flood Control
1/200 Routing
Existing Vs. With Project Condition
400-670 Vs. 400-600 Flood Control
PMF Routing

![Graph showing elevation and flow over time for different conditions.](image-url)
Basin Wetness
Index could be based on basin precipitation, inflow, or projected snowmelt runoff.

An index has been utilized in the past:

\[ PAR = P_{\text{today}} + [(% \text{ Persistence}) \times PAR_{\text{yesterday}}] \]
Basin Wetness Index
Basin Wetness Index

- Precipitation Gage
- Snow Gage
- 1,000 Foot Contours

Precipitation & Snow Station Location
Basin Wetness Index

PREcipitation INDEX - HISTORICAL

1-Oct 1-Nov 1-Dec 1-Jan 1-Feb 1-Mar 1-Apr 1-May 1-Jun 1-Jul 1-Aug 1-Sep

PAR Depth [in]
Basin Wetness Index

1955

1964

1986

1997
Discussion / Questions
Summary Discussion.

► Existing issues and concerns addressed
► New issues and concerns from today’s meeting
Closing Remarks