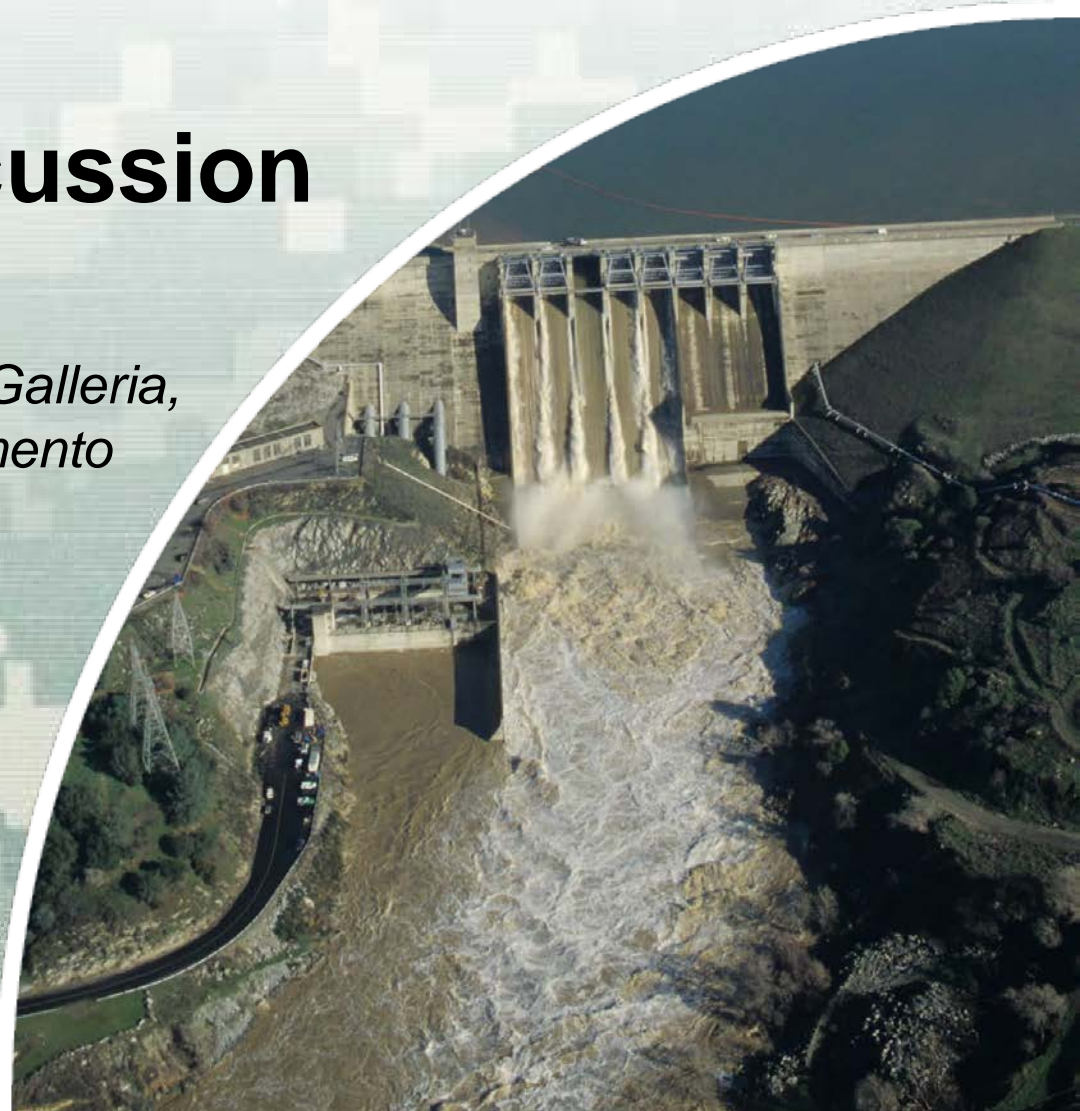


Folsom Dam Water Control Manual Update

Stakeholder Discussion

October 31, 2013

*Location: Tsakopoulos Library Galleria,
East Room, 828 I Street, Sacramento*



WELCOME & INTRODUCTIONS



PURPOSE OF MANUAL UPDATE

- 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

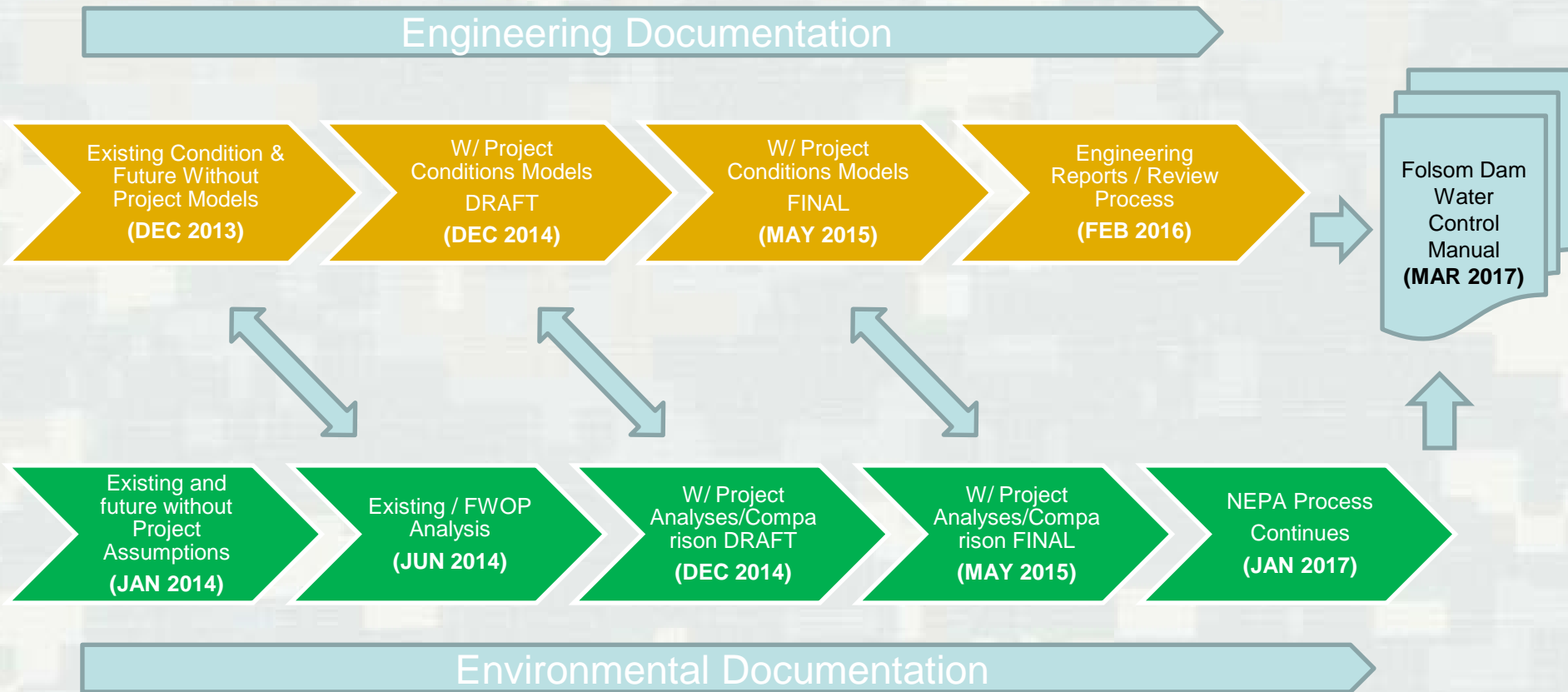
<http://www.spk.usace.army.mil/Missions/CivilWorks/FolsomDamAuxiliarySpillway.aspx>



PROJECT MILESTONE SCHEDULE



SCHEDULE



SCHEDULE

Meeting Sequence	Technical Focus of Meetings		Technical Work Group (TWG)	Environmental Working Group (EWG)	SAFCA Meetings with NGOs	All Stakeholder/Public Workshops	Stakeholder Input Due
	Engineering	Environmental					
1	Aug-13	*Final engineering baseline runs	*Approach to effects evaluation	Aug-13			
	Sep-13	*Tier 1 evaluations	*Baseline assumptions		Sep-13		
	Oct-13				Oct-13	Oct-13	
2	Nov-13	*Draft with-project runs	*Draft baseline runs	Nov-13			*Engineering baseline runs - 11/29/13
	Dec-13	*Tier 1 evaluations	*Tier 2 evaluations		13-Dec		
	Jan-14				Jan-14	Jan-13	
3	Feb-14	*Draft with-project runs	*Final baseline runs	Feb-14			*Draft engineering with-project and draft environmental baseline runs - 2/28/14
	Mar-14	*Tier 1 evaluations	*Tier 2 evaluations		Mar-14		
	Apr-14				Apr-14	Apr-14	
4	May-14	*Draft with-project runs	*Draft with-project runs vs. final baseline	May-14			*Engineering draft with-project and final environmental baseline runs - 5/31/14
	Jun-14	*Tier 1 evaluations	*Tier 2 and 3 evaluations		Jun-14		
	Jul-14				Jul-14	Jul-14	
5	Aug-14	*Final with-project runs	*Draft with-project vs final baseline runs	Aug-14			*Draft engineering with-project and draft environmental with-project runs - 8/31/14
	Sep-14	*Tier 1 evaluations	*Tier 2 and 3 evaluations		Sep-14		
	Oct-14				Oct-14	Oct-14	
6	Nov-14		*Final with-project runs vs final baseline runs	Nov-14			TBD
	Dec-14		*Tier 2 and 3 evaluations		Dec-14		
	Jan-15				Jan-15	Jan, 15	

TBD



Discussion / Questions



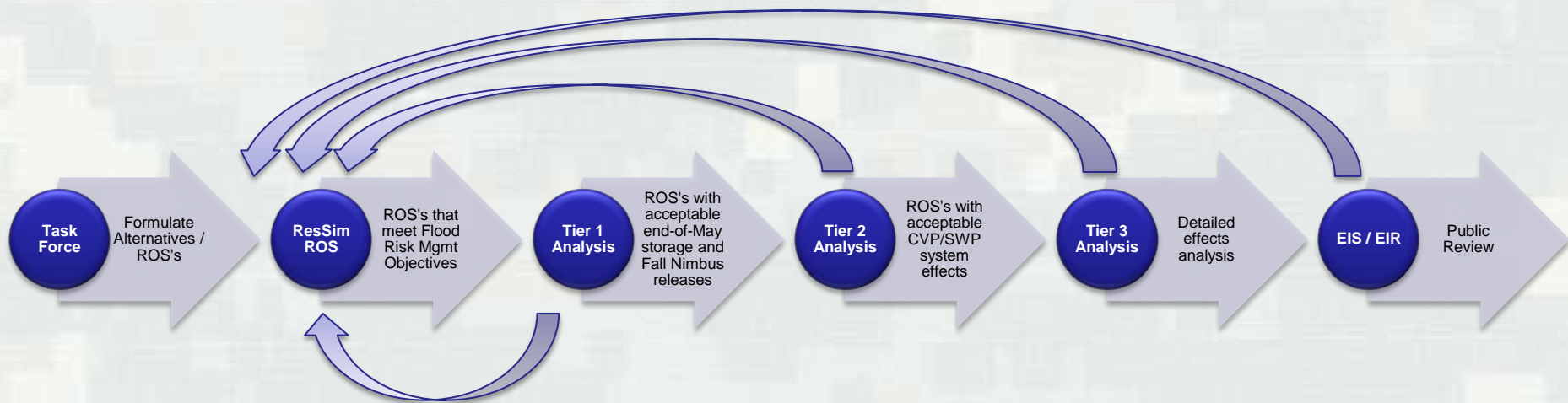
www.aerialsondemand.com



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



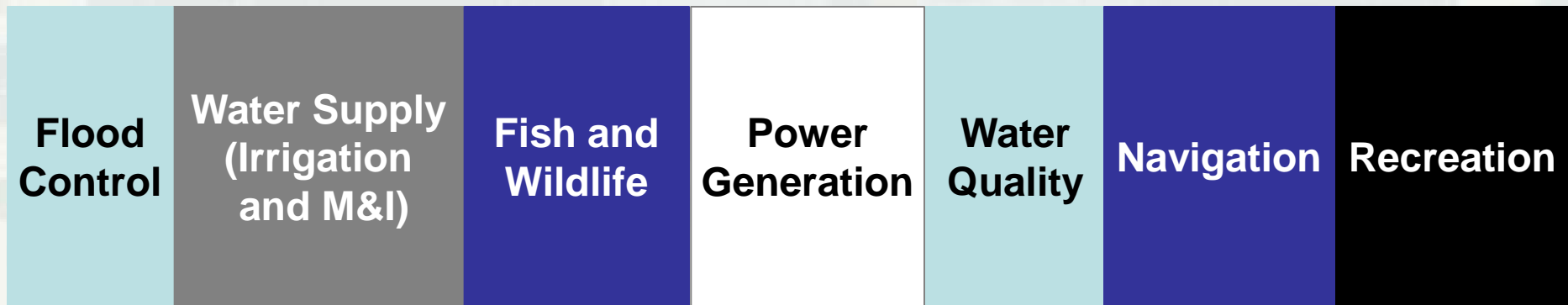
CalSim II Model Build

- 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:



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
- Operations: Current (2004 Operation Rules)



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



NEPA and CEQA

Corps of Engineers

NEPA Lead Agency

Central Valley Flood Protection Board

CEQA Lead Agency

Bureau of Reclamation

NEPA Cooperating Agency

Department of Water Resources

CEQA Responsible Agency

Sacramento Area Flood Control Agency

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



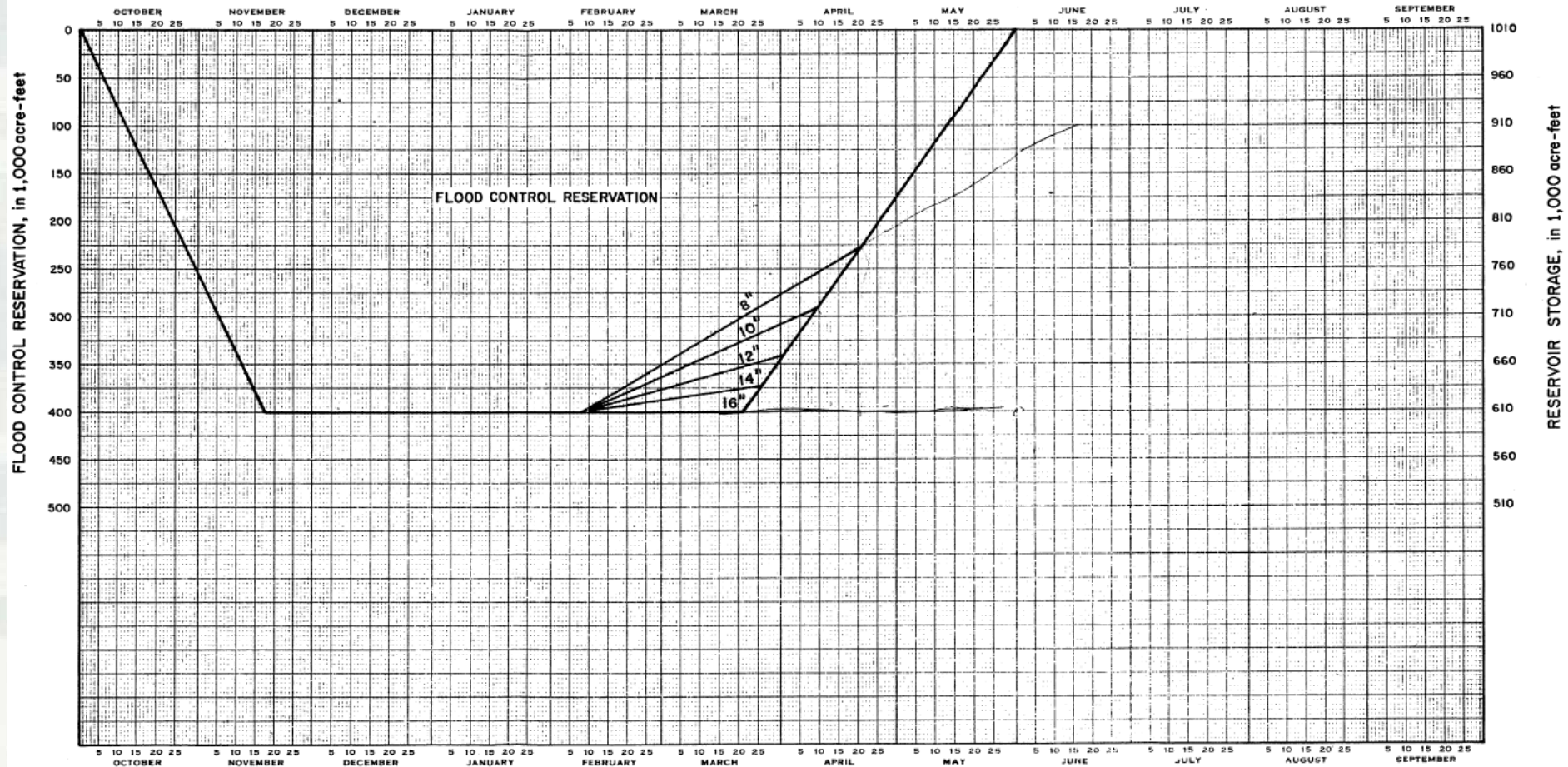
Discussion / Questions



PRESENTATION ON TECHNICAL / MODELING WORK



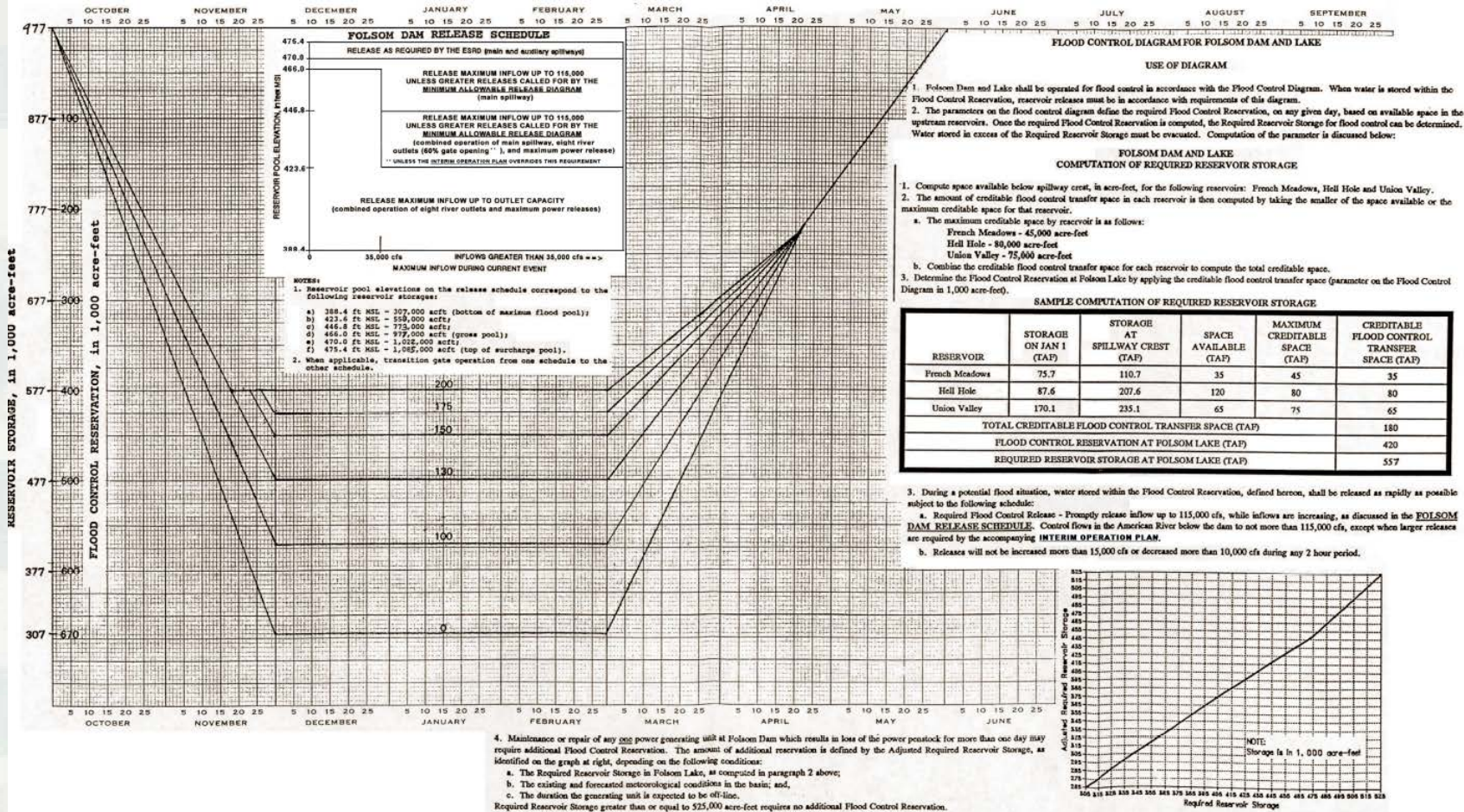
Baseline Comparisons to the With Project Condition -- Cumulative Past -- 400-Fixed Flood Control Storage



Baseline Comparisons to the With Project Control Condition

-- Existing --

400-670 Flood Control Storage



Baseline Comparisons to the With Project Condition -- With Project -- 400-600 Flood Control Storage

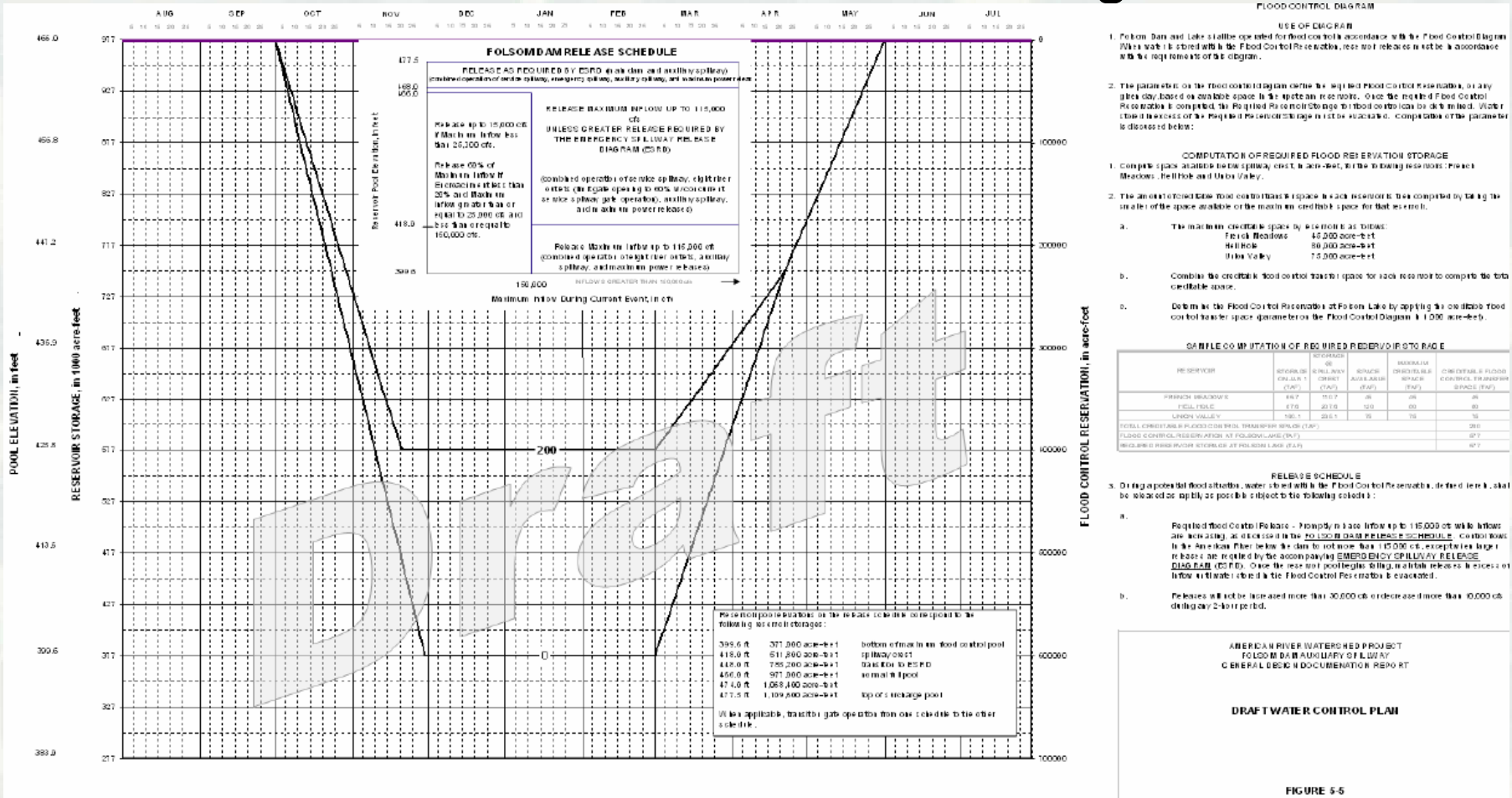


FIGURE 5-5

AMERICAN RIVER WATERHED PROJECT
FOLSOM DAM AUXILIARY OF L.WAY
GENERAL DESIGN DOCUMENTATION REPORT

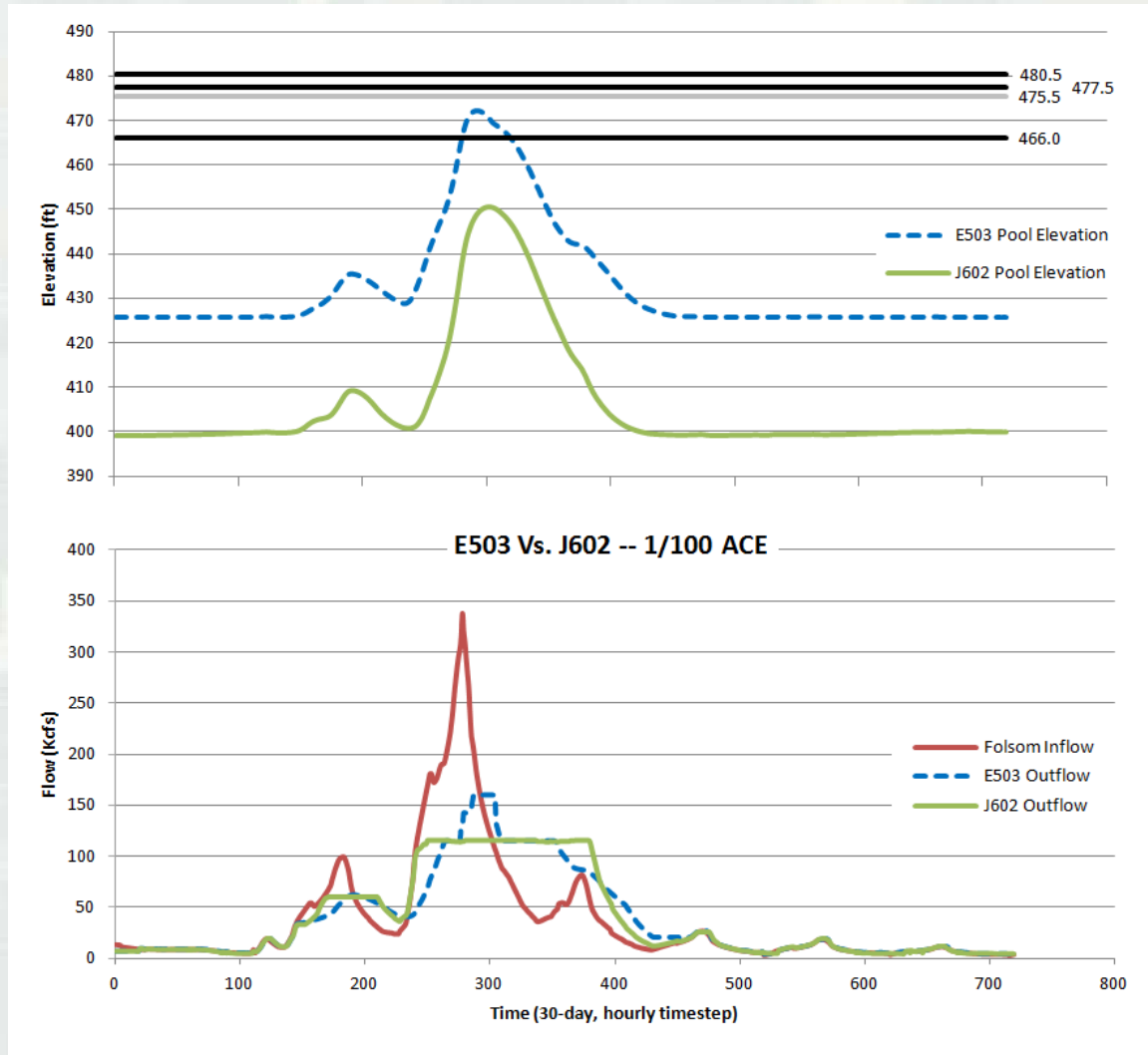
DRAFT WATER CONTROL PLAN



Cumulative Past Vs. With Project Condition

400-Fixed Vs. 400-600 Flood Control

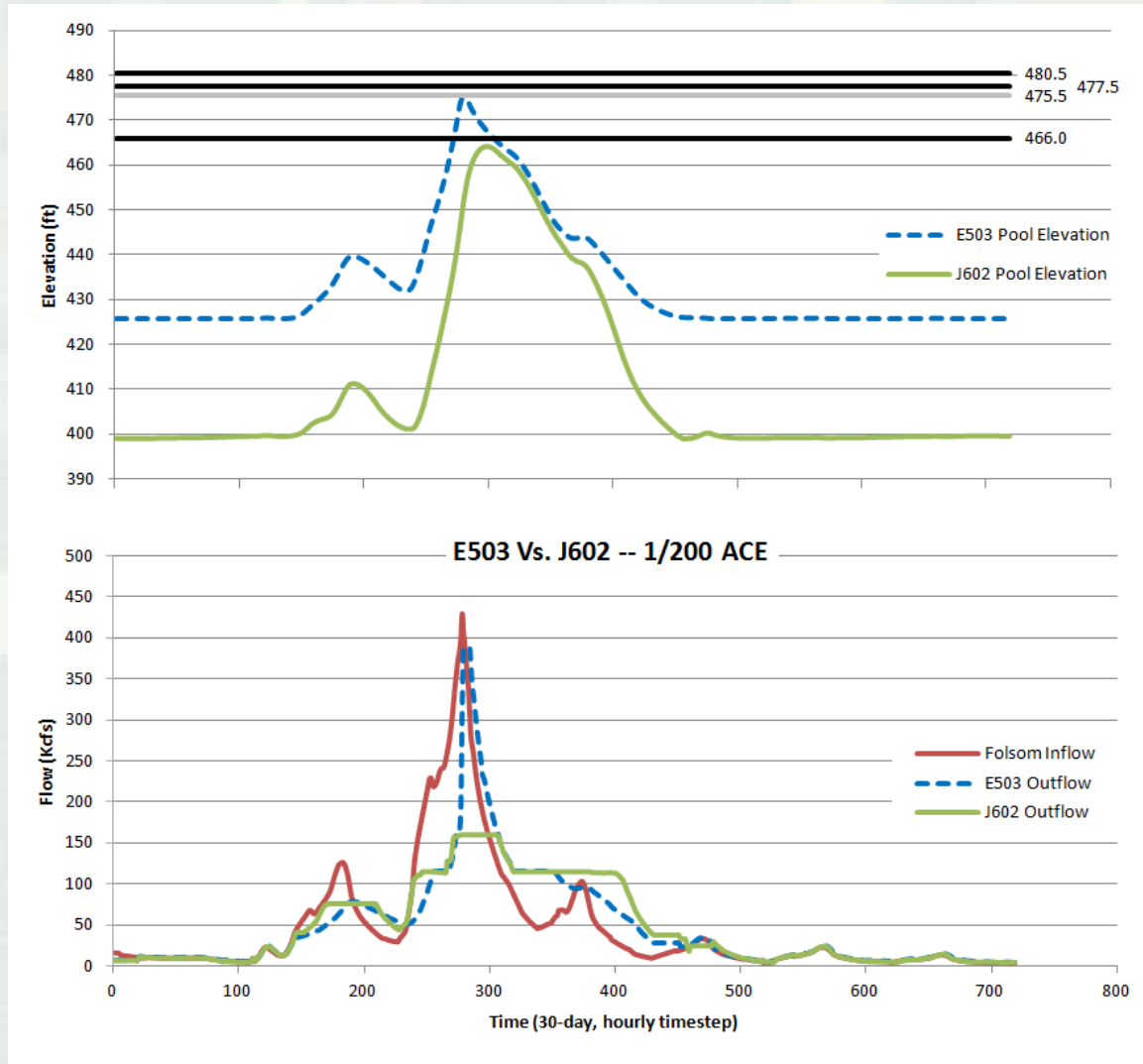
1/100 Routing



Cumulative Past Vs. With Project Condition

400-Fixed Vs. 400-600 Flood Control

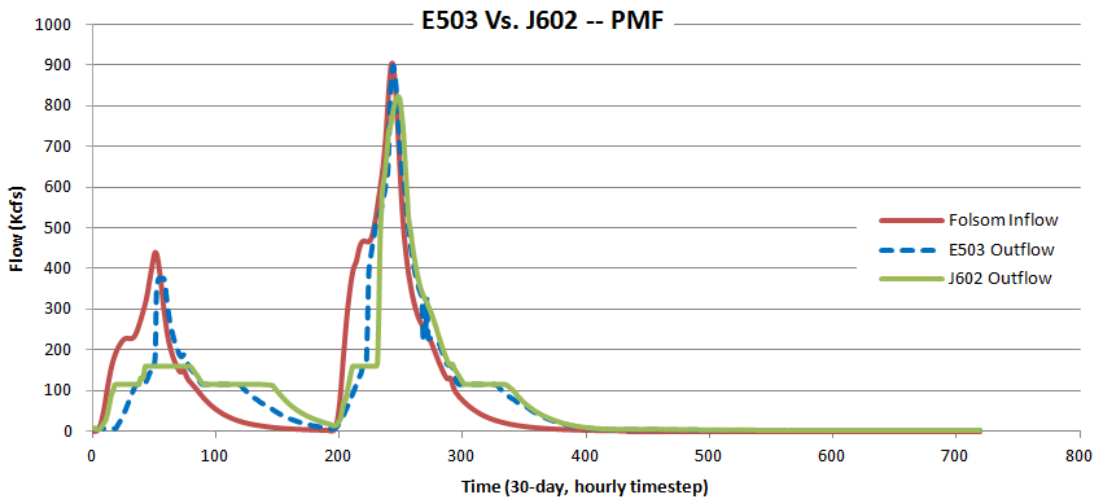
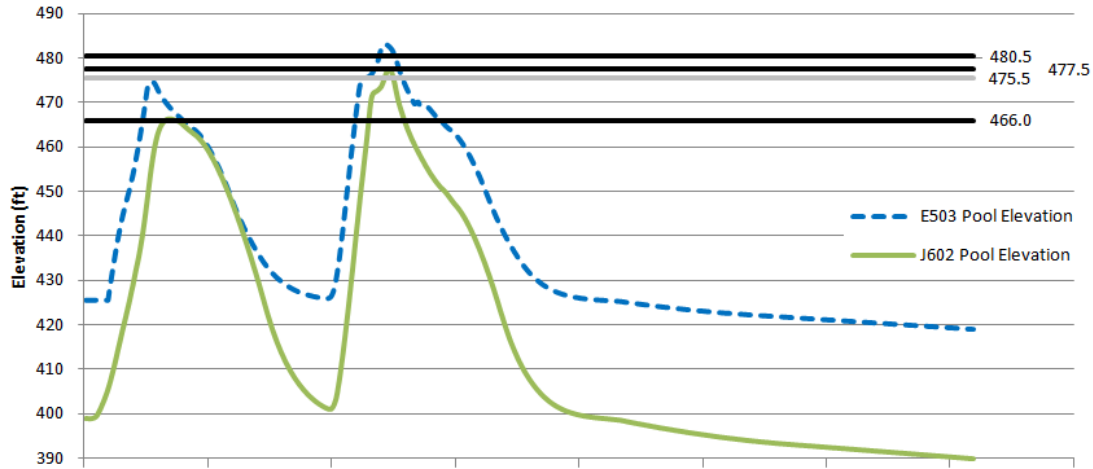
1/200 Routing



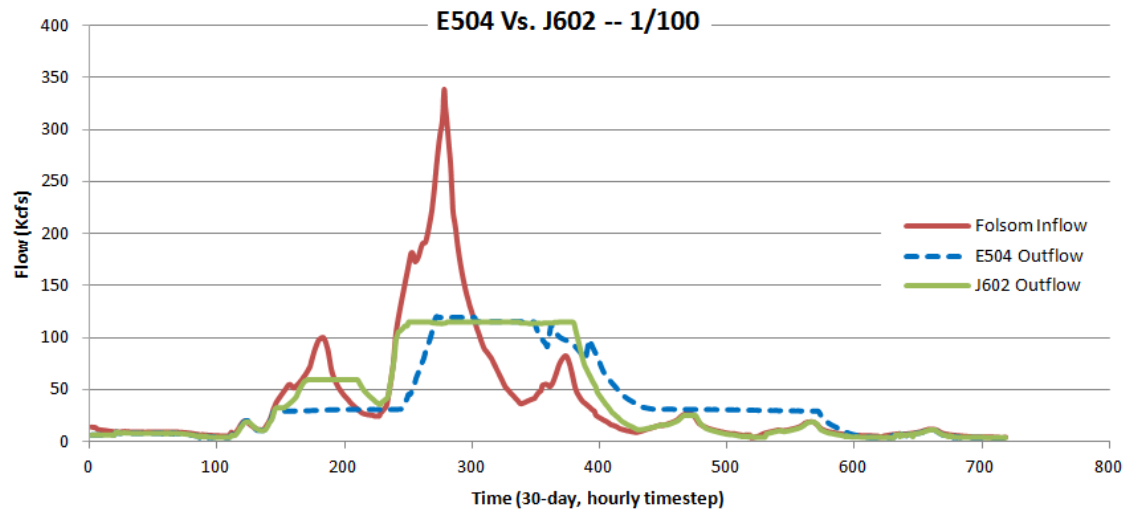
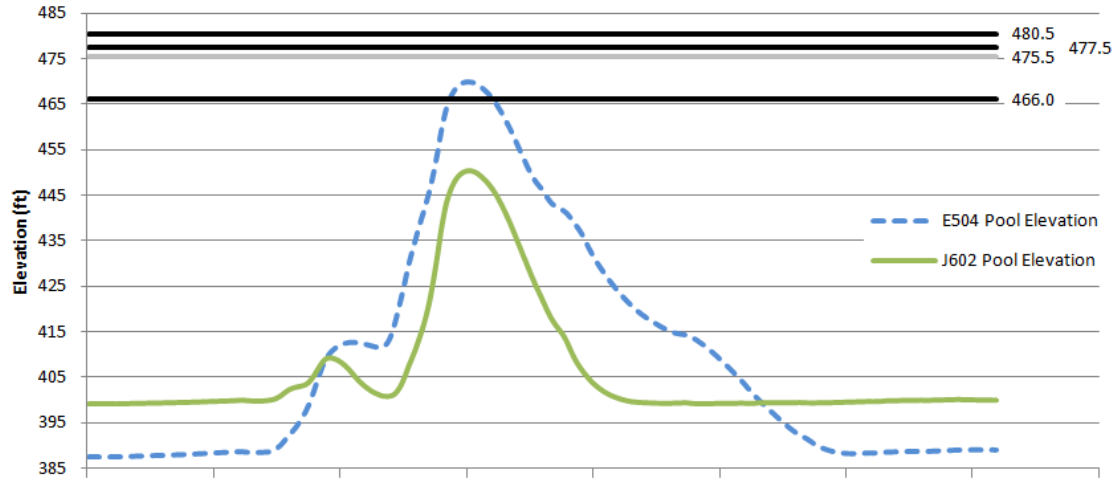
Cumulative Past Vs. With Project Condition

400-Fixed Vs. 400-600 Flood Control

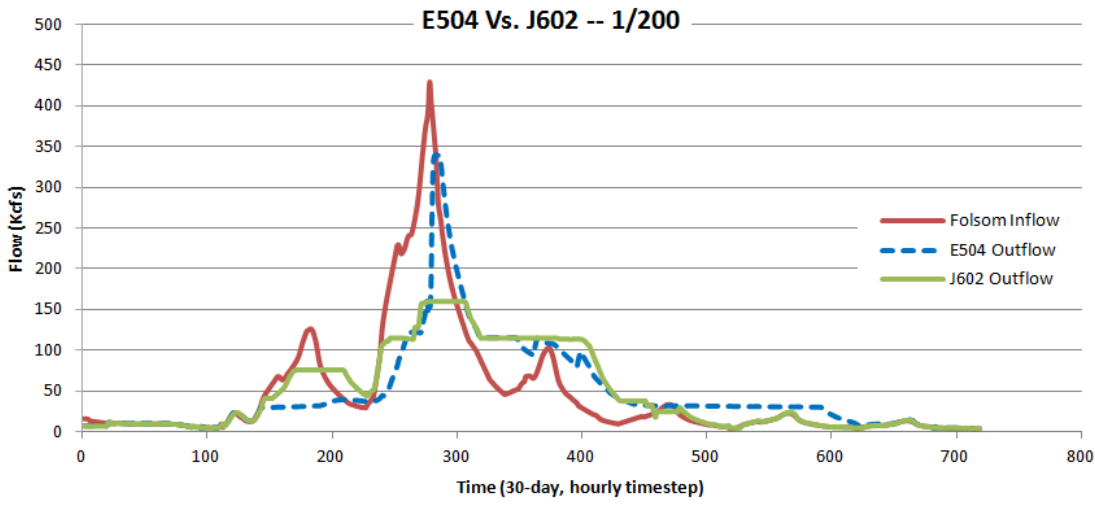
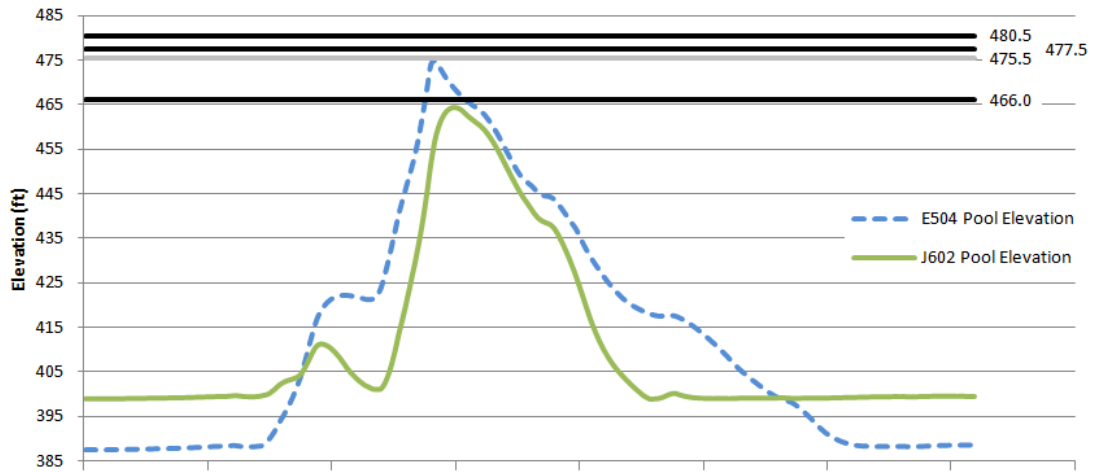
PMF Routing



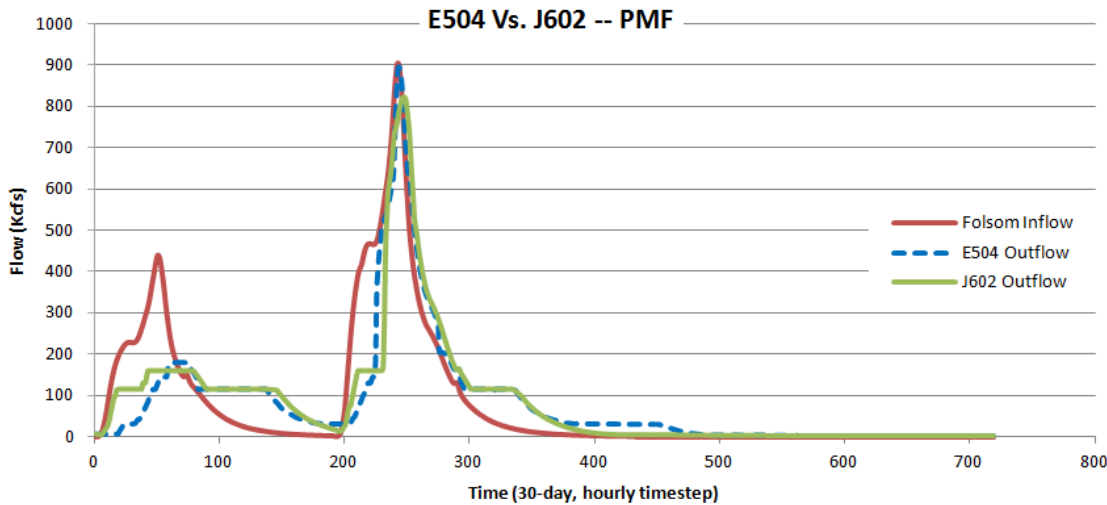
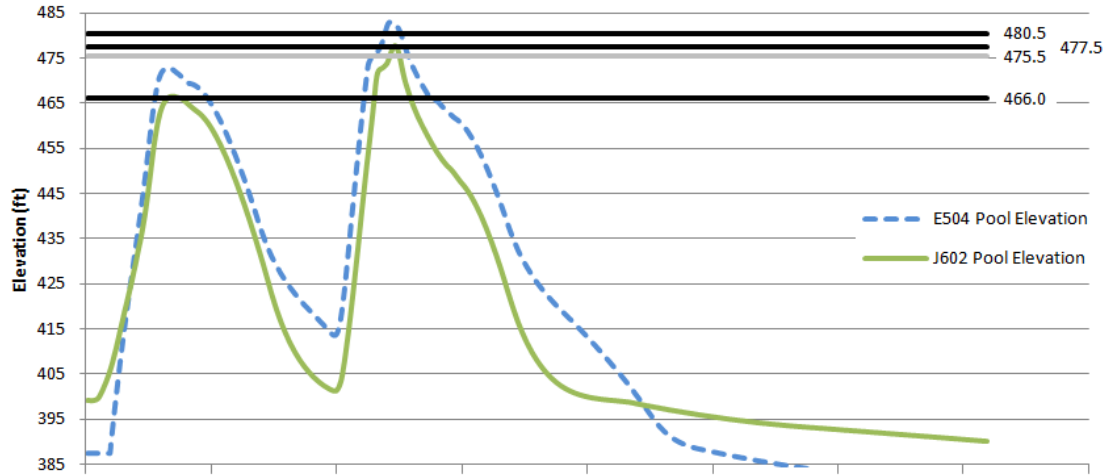
Existing Vs. With Project Condition 400-670 Vs. 400-600 Flood Control 1/100 Routing



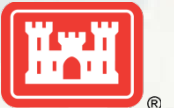
Existing Vs. With Project Condition 400-670 Vs. 400-600 Flood Control 1/200 Routing



Existing Vs. With Project Condition 400-670 Vs. 400-600 Flood Control PMF Routing



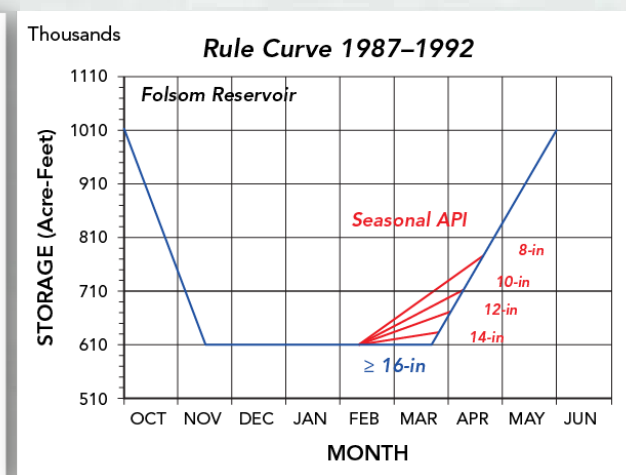
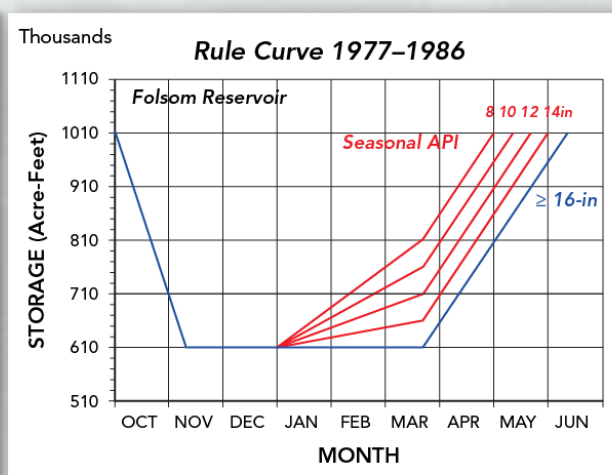
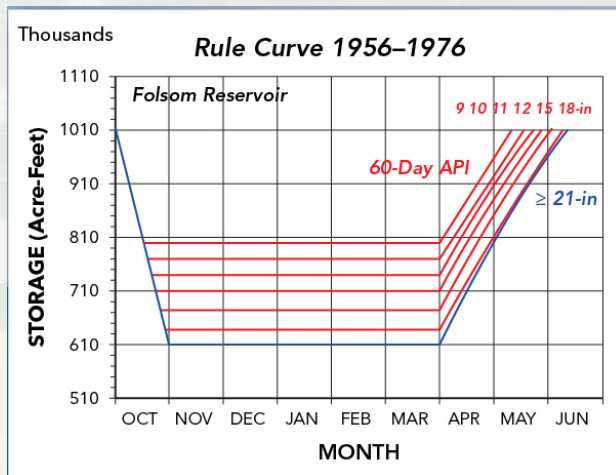
Basin Wetness



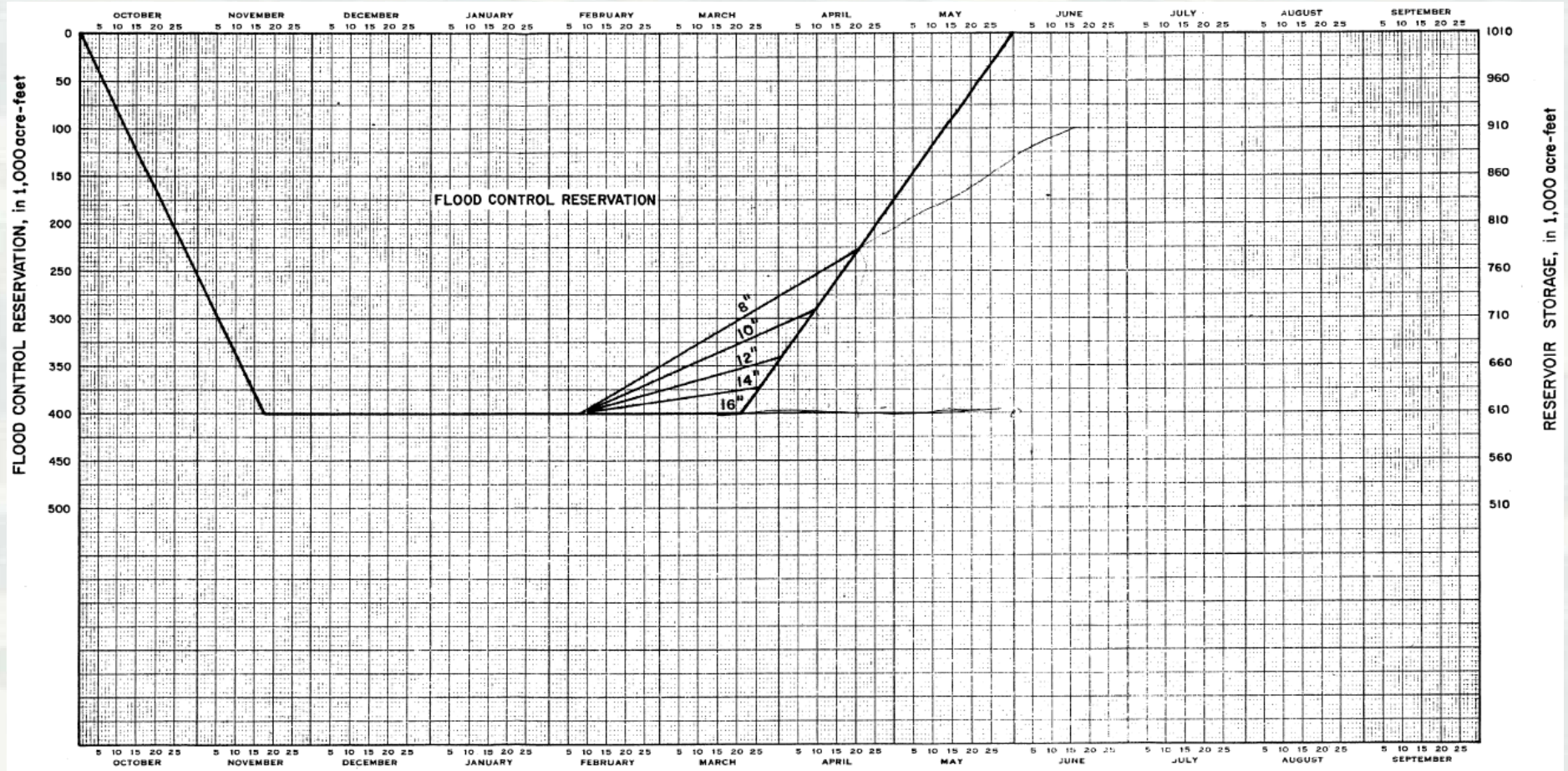
Basin Wetness Index

- Index could be based on basin precipitation, inflow, or projected snowmelt runoff.
- An index has been utilized in the past:

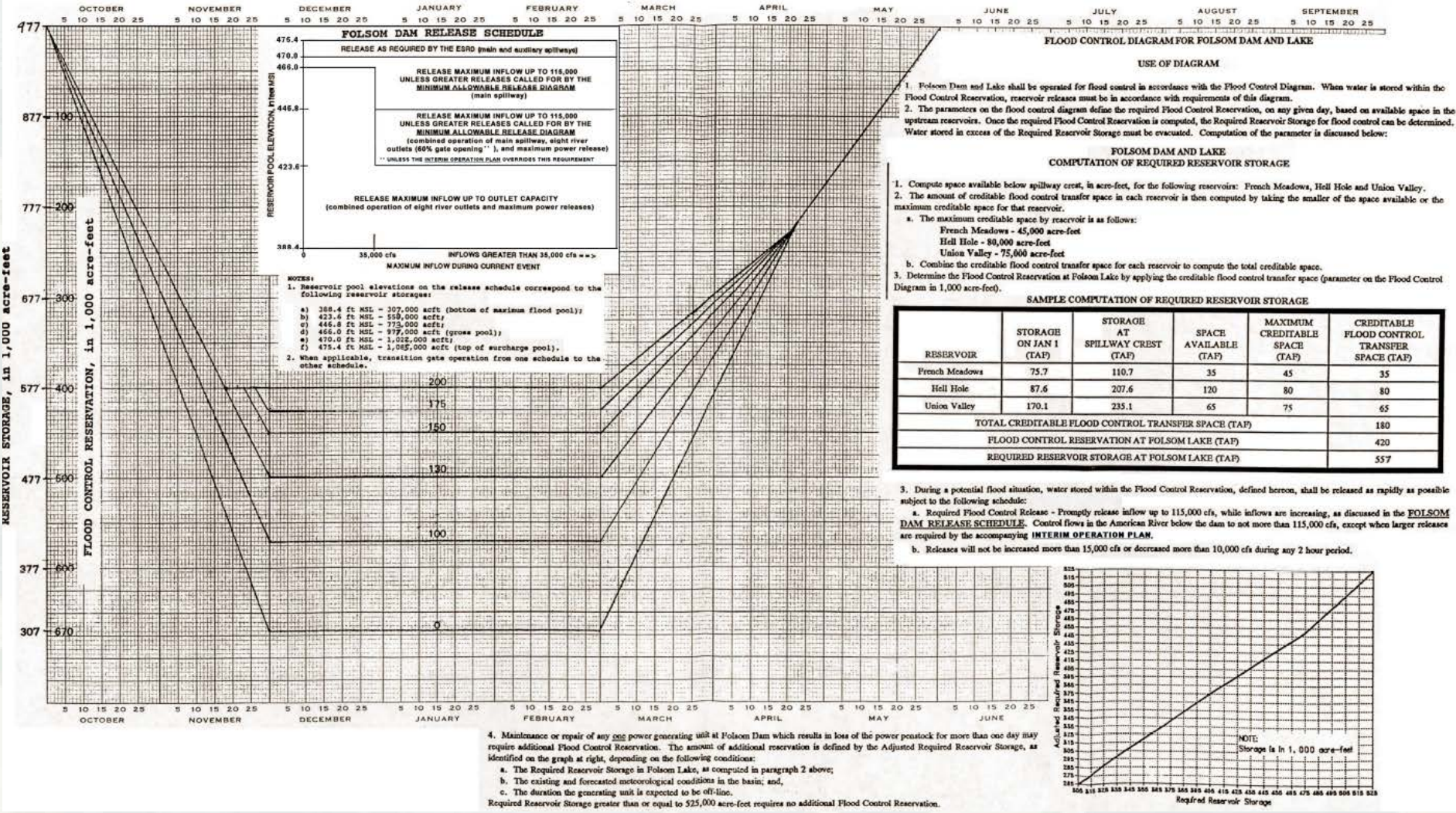
$$\text{PAR} = P_{(\text{today})} + [(\% \text{ Persistence}) * \text{PAR}_{(\text{yesterday})}]$$



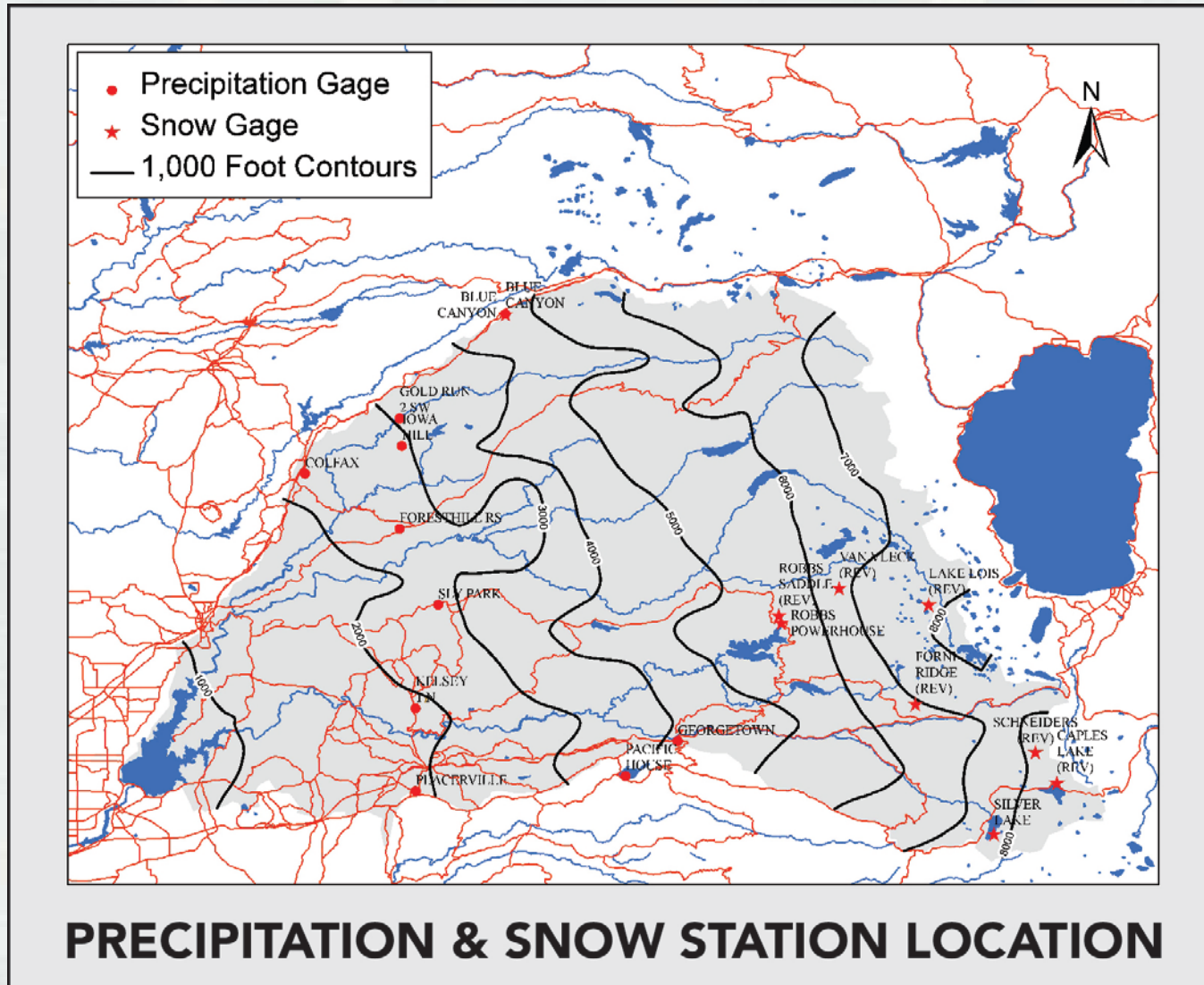
Basin Wetness Index



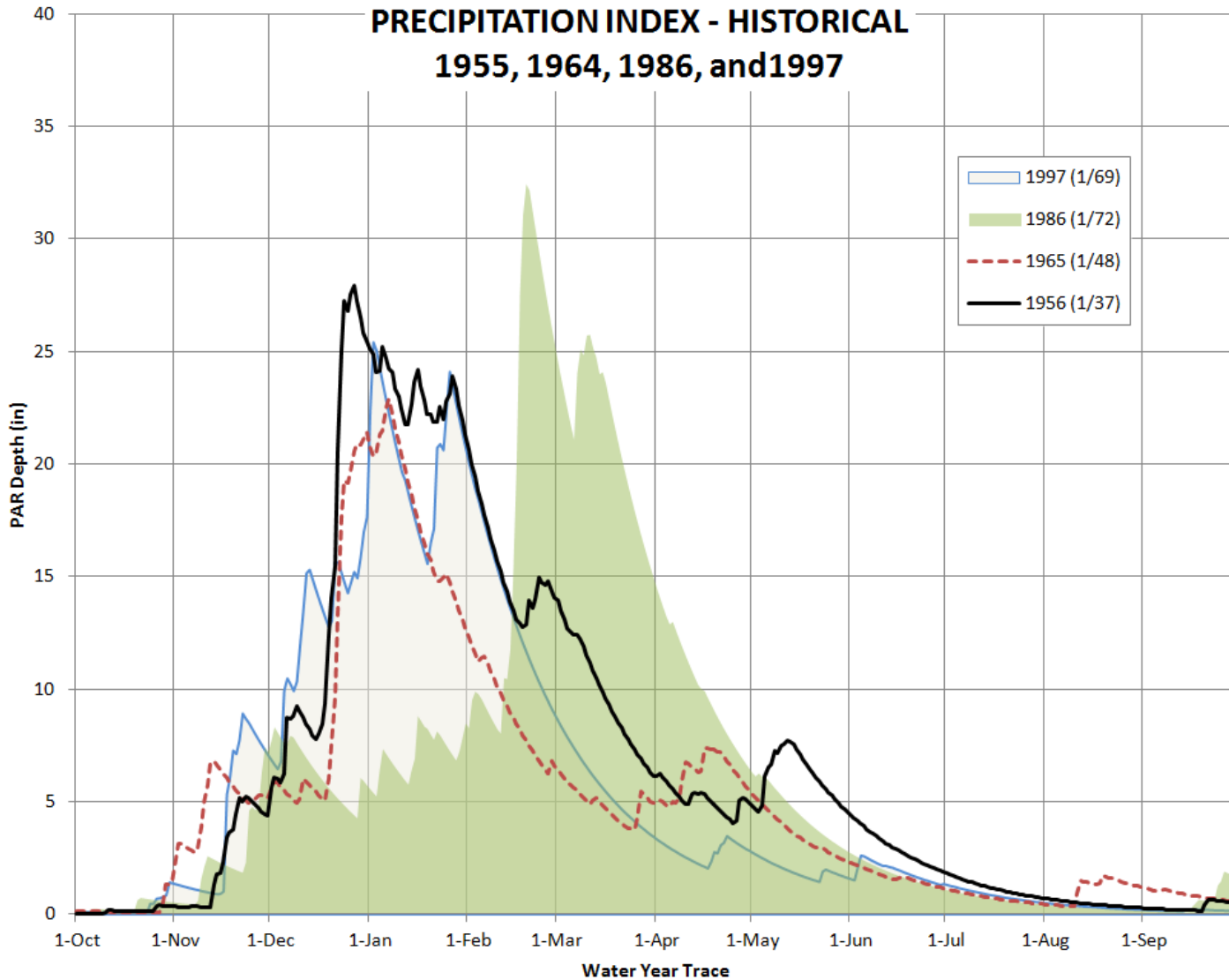
Basin Wetness Index



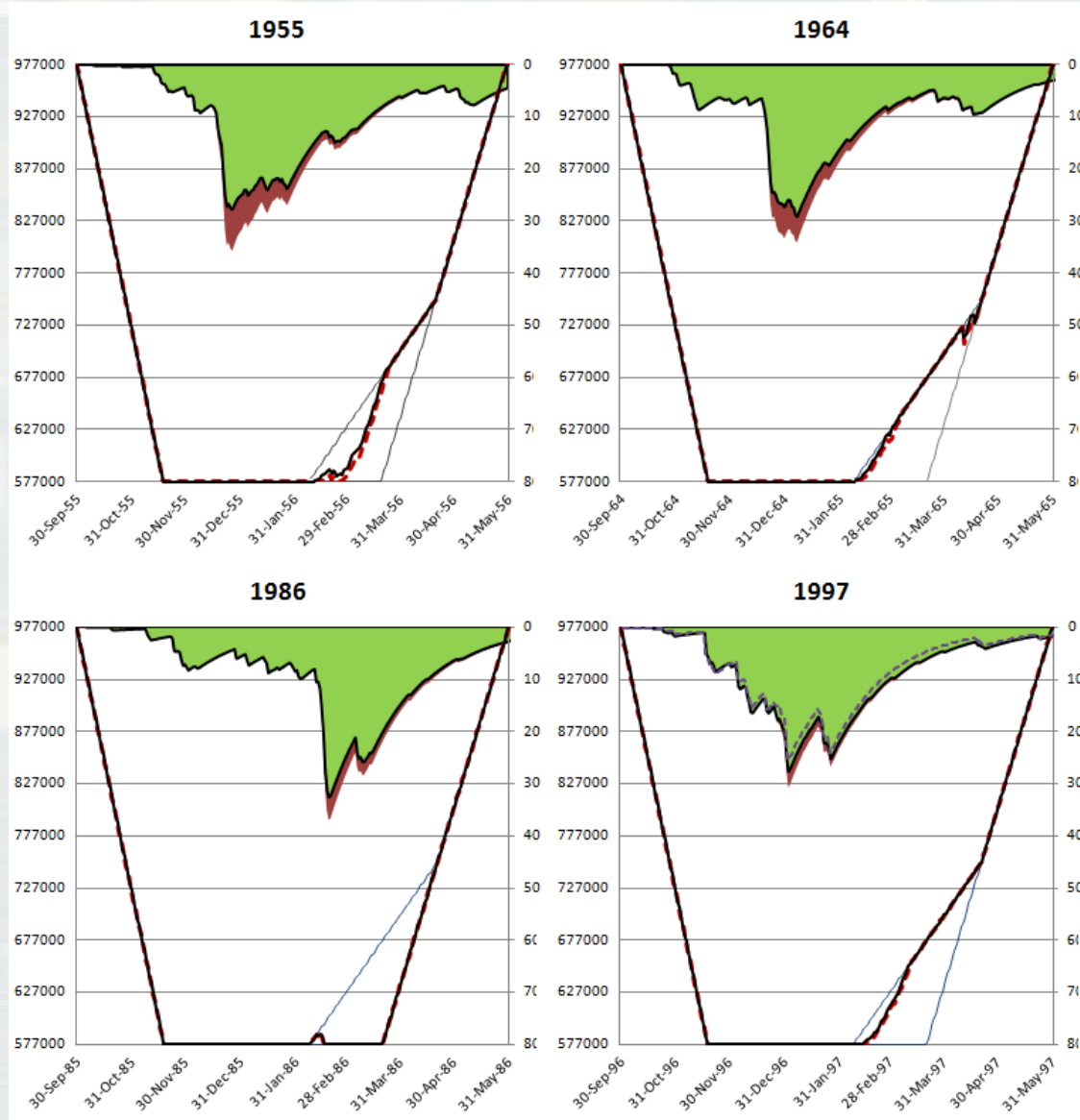
Basin Wetness Index



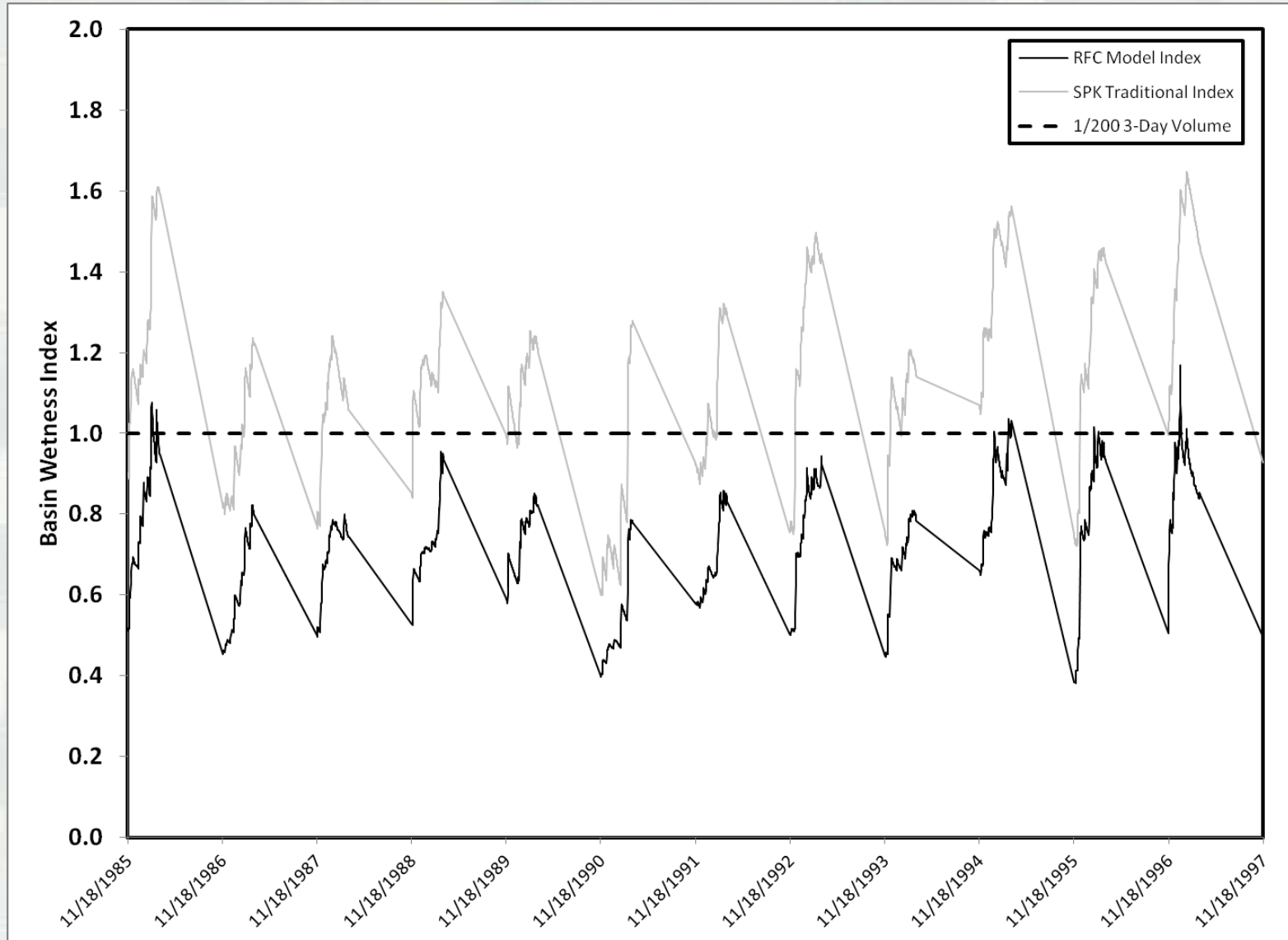
Basin Wetness Index



Basin Wetness Index



Basin Wetness Index



Discussion / Questions



GROUP DISCUSSION & SUMMARY COMMENTS



- **Summary Discussion.**
 - ▶ Existing issues and concerns addressed
 - ▶ New issues and concerns from today's meeting



Closing Remarks

