

Folsom Dam Water Control Manual Update

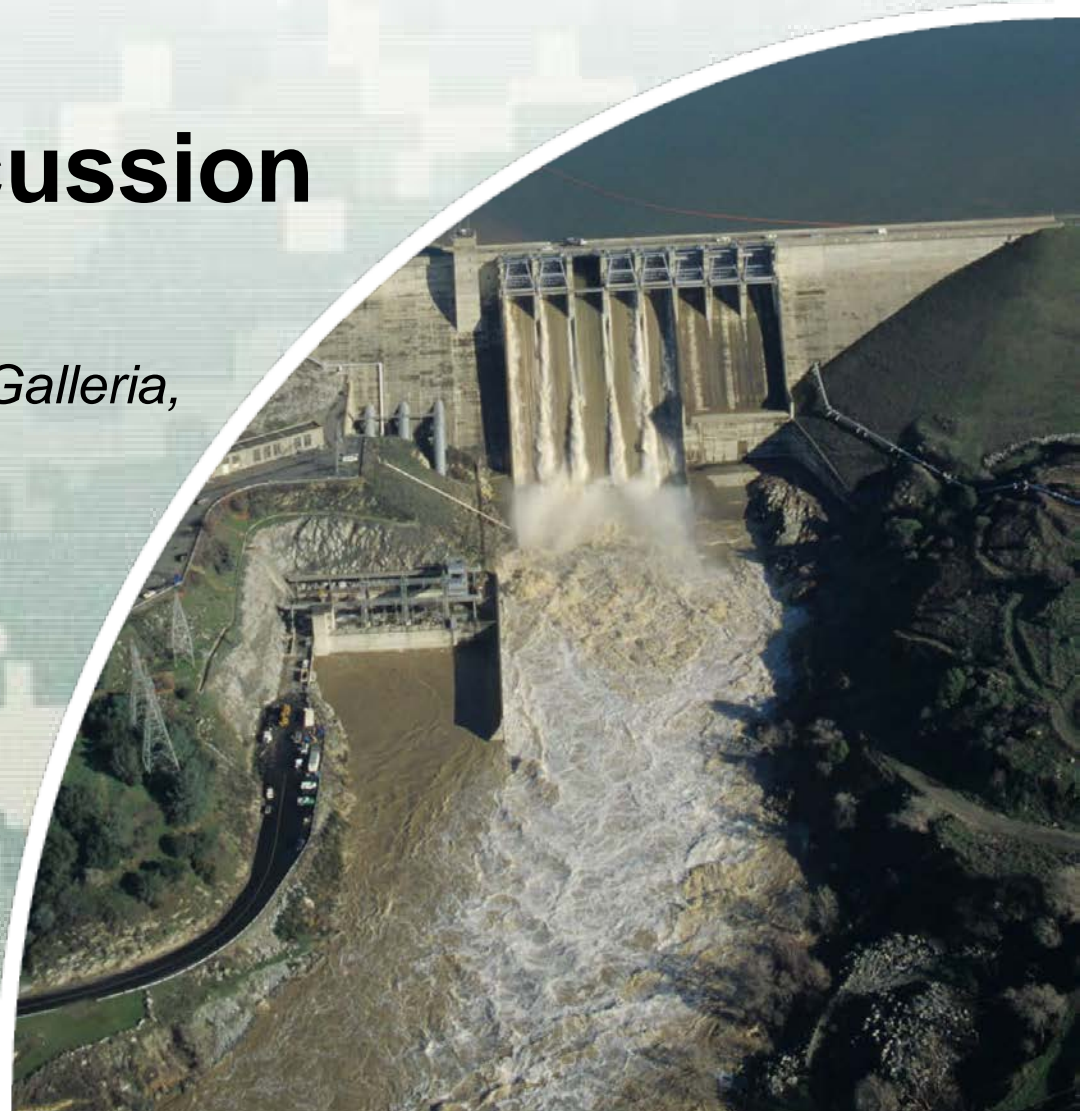
Stakeholder Discussion

February 28 & March 28, 2013

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



US Army Corps of Engineers
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WELCOME AND 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.



PURPOSE OF TODAY'S SESSION

- Review project schedule
- Present/discuss stakeholder assessment
- Discuss stakeholder engagement plan
- Present/discuss technical update
- Discuss next steps



PROJECT MILESTONE SCHEDULE



<i>Oct 2012</i>	<i>NEPA/CEQA Initial Public Scoping</i>
Apr 2012–Aug 2013	Develop and Run Existing Condition Reservoir Routing Models
<i>Apr 2012–Jul 2013</i>	<i>Stakeholder Input for Existing Condition Models</i>
Jun 2013–Dec 2013	Develop and Run Future without Project Conditions Models
<i>Nov 2013–Oct 2014</i>	<i>Stakeholder Input for Future without Project Conditions</i>
Sept 2013–Sept 2014	Establish Existing System Water Operations Conditions
<i>Jun 2013–Apr 2014</i>	<i>Stakeholder Input for Existing Conditions</i>
Oct 2013–Sept 2014	Develop and Run With Project Alternative Models
<i>Oct 2013–Aug 2014</i>	<i>Stakeholder Input for Project Alternative Models</i>
Jan 2014–May 2014	Establish Future without Project Environmental Condition
May 2014	In Progress Review Conference- SPD/USACE HQ
Jan 2014–Feb 2015	Establish with Project Environmental Conditions and carry out Environmental Effects Analysis for With-Project Alternatives
<i>Jan 2014–Dec 2014</i>	<i>Stakeholder Input for with Project Environmental Conditions and Effects Analysis for With Project Alternatives</i>
Jan 2015–Mar 2015	Identification of Recommended Plan with Input from Stakeholders
Jul 2015	In Progress Review Conference- SPD/USACE HQ
Nov 2015	In Progress Review Conference- SPD/USACE HQ
<i>Jan 2016</i>	<i>Public Review of Draft EIS/EIR</i>
Mar 2016	Response to Public Comment of Draft EIS/EIR
<i>Aug - Sep 2016</i>	<i>Public Review of Final EIS/EIR</i>
Oct 2016	CEQA Notice of Determination
Oct 2016	NEPA Record of Decision
Nov 2016	Final Approval of Water Control Manual Update

STAKEHOLDER ASSESSMENT & ENGAGEMENT PLAN



STAKEHOLDER ASSESSMENT

- Introduction
- Stakeholder Issues and Interests
- Assessment Findings



ASSESSMENT INTRODUCTION

- Why do an Assessment?
- What Stakeholders were part of the Assessment?
- How was the Assessment done?
- What about other stakeholders?



STAKEHOLDERS

- Regional Flood Management Entities
- Folsom Lake, Lake Natoma and Lower American River Recreational Interests
- Regional Environmental Organizations
- In-Basin Purveyors
- CVP and SWP Contractors
- Electric Power Utilities and their Associations



HOW WAS ASSESSMENT DONE?

- Rigorous identification of stakeholders
- Five stakeholder-specific discussions in Sept.
- Significant outreach for stakeholder attendance
- Focus of September Discussions:
 - Engage stakeholders in policy & technical info
 - Understand stakeholders' interests & issues
 - Ask stakeholders how best to involve them



WHAT ABOUT OTHER STAKEHOLDERS?

- Business Community
- Emergency Response Agencies
- Lower Sac/ North Delta
- Tribal
- Agencies/ parties w/ infrastructure in floodway (e.g. Caltrans)



STAKEHOLDER ISSUES & INTERESTS

**What is an Interest?
What is an Issue?**



REGIONAL FLOOD ORGANIZATIONS INTERESTS

- Understanding/reducing impacts related to:
 - Planning and preparation
 - Financing maintenance & improvements
- Updating of population evacuation triggers (working with emergency management agencies)



REGIONAL FLOOD ORGANIZATIONS ISSUES

- Bank erosion of channels downstream of Dam
 - Medium-sized flows more damaging over time
 - High flows are damaging if prolonged
- Increased Flows in the By-Pass
- Costs
 - Changes to PL 84-99 trigger?
 - Maintenance costs
 - Study to evaluate need for floodway compensation for damages



RECREATION FOLSOM LAKE/LAKE NATOMA INTERESTS

- Lake levels to support recreation, especially May – September
- Continued advanced notification of high releases for informational and safety purposes



RECREATION FOLSOM LAKE/LAKE NATOMA ISSUES

- Low Folsom Lake Levels
 - Boat ramp access
 - Distance from parking area
 - Loss of daily use revenue
 - Loss of revenue for marinas and concessions
- Safety of rowing events with high flows
- Modeling Analysis: Recreation use by lake levels, by month



LAR RECREATION INTERESTS

- Recreational and safety impacts of flow levels and timing of flows, especially weekends
May- September
- Effects to Sac County infrastructure with high flows
- Recreation Fishing: Health of Fisheries



LAR RECREATION ISSUES

- Adequate Flows: 1750 – 6,000 cfs. Over 6000 cfs is a safety threshold
- LAR Infrastructure
 - Submerged trails, bike paths, bathrooms
 - Bank damage
 - Electrical equipment damage - Discovery Park
- Continued and expanded advance notification of high flows



REGIONAL ENVIRONMENTAL ORGANIZATIONS INTERESTS

- Successful WCM Operations – Avoid need for new upstream dams to reduce flood risks
- Healthy fisheries, especially for salmon and steelhead, related to temperature/ cold water pool & flow regimens.



REGIONAL ENVIRONMENTAL ORGANIZATIONS RESERVOIR OPERATIONS ISSUES

- Once all authorized improvements done to Folsom Dam, WCM ops control floods exceeding 1/200 frequency
- Water stored in flood space, in exchange for draw down of conservation space when warranted (Conditional Storage)
- WCM rules for early & aggressive release and forecasting for big storms
- Rules optimized, but not open flexibility



REGIONAL ENVIRONMENTAL ORGANIZATIONS

HEALTHY FISHERIES ISSUES

- Use WCM to improve cold water pool
- Con'd storage if “additional” water also used for:
 - USBR revised water right - LAR Flow Standard
 - Pulse releases provided Jan – May
- Understand fish stranding issue
- Authorized automatic shutters – Implement, unless effect achieved through other means
- Need Elephant Trunk



IN-BASIN PURVEYORS INTERESTS

- Enhanced water supplies for the protection of in-basin M&I and environmental uses, particularly through a proactive approach to the acquisition and use of high quality basin wetness data



IN-BASIN PURVEYORS ISSUES

- Folsom drawn down below M&I intake in back-to-back critically dry years.
- Investigate: Temporarily increase water held in storage, while carefully monitoring basin wetness & forecasts, until either the probability of significant near term precip. reaches level of concern for possible flooding, or water reaches level needed to diminish concern for drought.



IN-BASIN PURVEYORS ISSUES (cont.)

- Thorough understanding of risks & benefits associated with different levels of flood and water storage
- More instrumentation for and monitoring, collection & use of watershed wetness data
- USACE/ USBR engage in process for establishing new Delta flow standards, as relates to WCM Update



CVP/SWP/ELECTRIC UTILITIES INTERESTS

- Maximize water resources for all purposes
- CVP cost allocation implications related to WCM operations
- Informed decision-making on WCM through access to integrated input from other interests



CVP/SWP/ELECTRIC UTILITIES ISSUES

- Optimize end of May storage for cold water pool & higher carry-over for critically dry years
- Flexible rule curve depending on basin wetness & forecasting
- Minimize releases that by-pass penstocks
- Update shutters to improve cold water pool



CVP/SWP/ELECTRIC UTILITIES ISSUES (cont.)

- Track Delta standards discussion as relates to WCM, esp. as related to X-2 sensitivity analysis
- WCM affect on existing cost allocation & CVP Cost Reallocation Study
- Assumptions (e.g. hydrology; environmental) carried forward in other studies
 - Downstream environ. regulatory baseline coordination w/ CVP Cost Reallocation Study



ASSESSMENT FINDINGS

Shared Perspectives & Potential Tensions among Stakeholders



SHARED PERSPECTIVES AMONG ALL

- WCM Update potential (not guarantee) to benefit all, particularly through Con'd Storage (increased end-of-May storage), increased Folsom Lake levels, and managed flood releases.
- Need for understanding risks and benefits associated with combined use of:
 - Auxiliary spillway
 - Increased basin wetness data
 - NWS forecasting application
 - Incidental storage in upstream Reservoirs



SHARED PERSPECTIVES AMONG ALL

- Want better understanding:
 - What can be accomplished through basin wetness & forecasting tools
 - Effect of Folsom Dam raise and associated surcharge space on operations and impacts
- Informed decisions-making on WCM through access to integrated input from all interests
- WCM as opportunity to improve cold water pool



POTENTIAL TENSIONS

- Historic tension between flood management & water supply: Balance of neither releasing water “too late” nor “too early” in face of uncertainties.
- “Additional” water potentially gained from conditional storage is CVP Project water. Although outside the scope of the WCM, this raises issues/ tensions re: use of that water.



STAKEHOLDER ENGAGEMENT PLAN



STAKEHOLDER ENGAGEMENT PLAN

Three Different Needs Expressed

1. Periodic progress meetings and updates
2. More in-depth and frequent discussions
3. Focus on special topics - examples:
 - Basin wetness data: instrumentation, monitoring, collections and use
 - Improvement to cold water pool



STAKEHOLDER ENGAGEMENT PLAN

1. Two – Three “Progress Meetings” a Year: All stakeholders invited
2. Three venues for in-depth and frequent discussions, designed to comply with FACA:
 - USACE Work Groups for governmental agencies (Water, power, other gov’t agencies)
 - SAFCA work groups and discussions for NGO’s (environmental and recreation organizations; others)
 - For Flood Organizations, SAFCA to integrate discussion of WCM into regional planning effort



STAKEHOLDER ENGAGEMENT PLAN

USACE Work Groups for Governmental Agencies

1. Technical Working Group: Discusses technical topics, including basin wetness
Staff: Kyle Keer
2. Environmental Effects Working Group:
Staff: Dan Artho



STAKEHOLDER ENGAGEMENT PLAN

SAFCA Forums for NGOs

(Environmental; Recreation Interests; Others)

1. SAFCA reconvening Lower American River Task Force. Will be co-sponsored by Water Forum. Half of meeting dedicated to WCM; half to LAR Flow Standard
2. SAFCA available for more in-depth discussions for topics not fully covered at LAR TF



SAFCA's Role with Environmental, Recreation, Regional Flood, other NGOs

SAFCA has the responsibility to provide in-depth information on WCM to these groups and to share stakeholder perspectives with PASS Task Force, USACE Technical Working Group, USACE Environmental Effects Working Group, and other WCM meetings with USACE, USBR and DWR, and to advocate for the perspectives with which they agree.



COLD WATER POOL ISSUE

- Perspective of WCM Update Agencies:
Other than incidental gains, WCM does not have responsibility for improving cold water pool.
- USBR and SAFCA will work with stakeholder group on cold water pool issues. Interested stakeholders invited. Stay tuned for specifics.



QUESTIONS & DISCUSSION

Stakeholder Assessment & Engagement Plan



CURRENT PROJECT ACTIVITIES

- Development of ResSim models to evaluate existing conditions, future without project conditions, and with project conditions.
- Development of methods for:
 - Developing a basin wetness index.
 - Incorporating forecasts in the operational decision process.
 - Integrating HEC-ResSim and CalSim II output for water supply assessments.



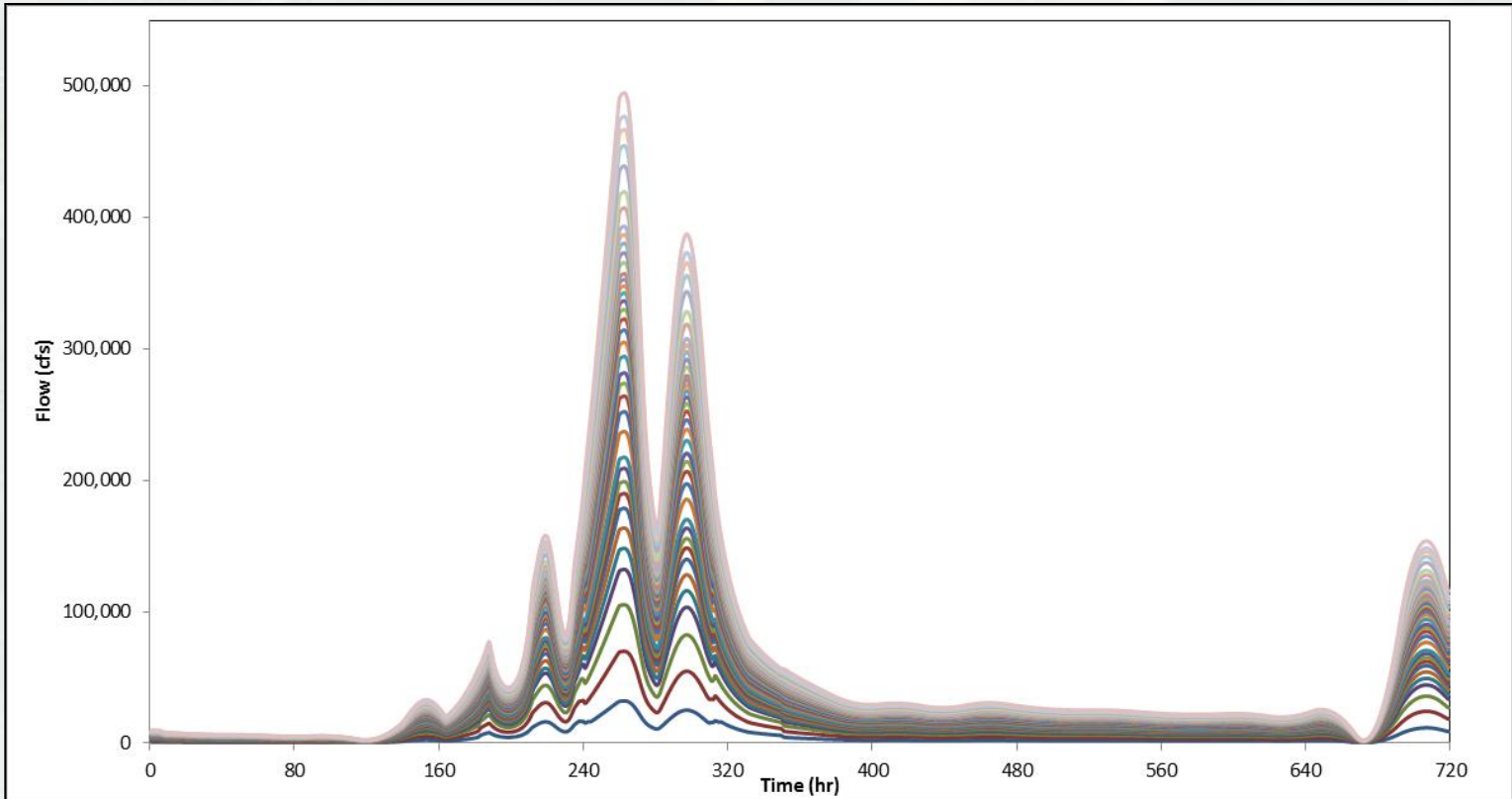
RESSIM MODEL DEVELOPMENT PROCESS

- Build model with a reservoir operation set (ROS)(i.e., existing conditions and future auxiliary spillway).
- Test model to confirm that it meets project flood protection objectives (1%, 0.5%, and PMF).
- District Quality Control (DQC) Review.
- Revise model, as needed, until objectives are met (iterative).



HYDROLOGY UPDATE

Unregulated Events, 1986 Pattern



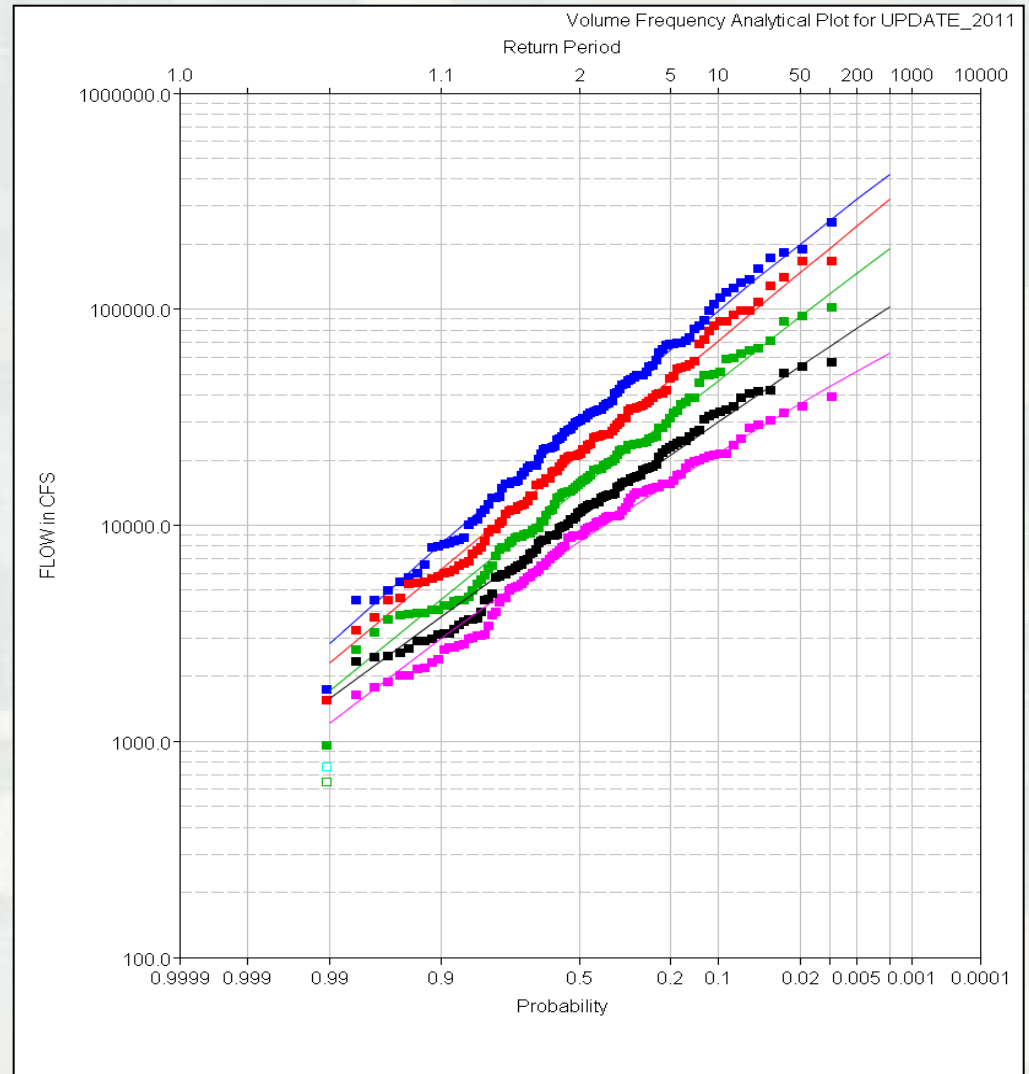
HYDROLOGY UPDATE

1.0% Chance Exceedence Event

	1 Day cfs	3 Day cfs	7 Day cfs
1997	276,000	196,000	113,000
2006	267,000	188,000	112,000
2011	257,000	191,000	117,000
$\Delta\%$	-3.4	1.6	4.5

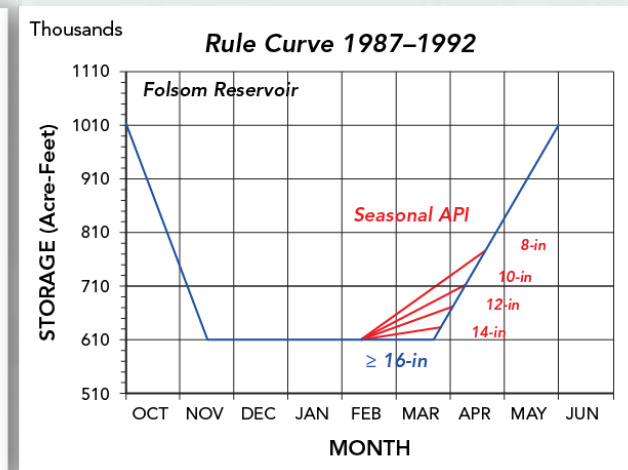
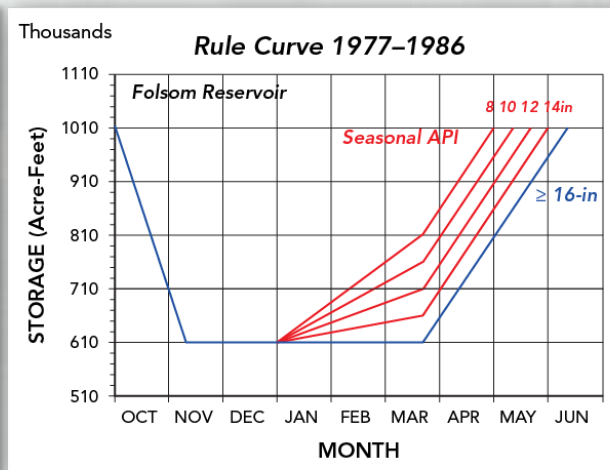
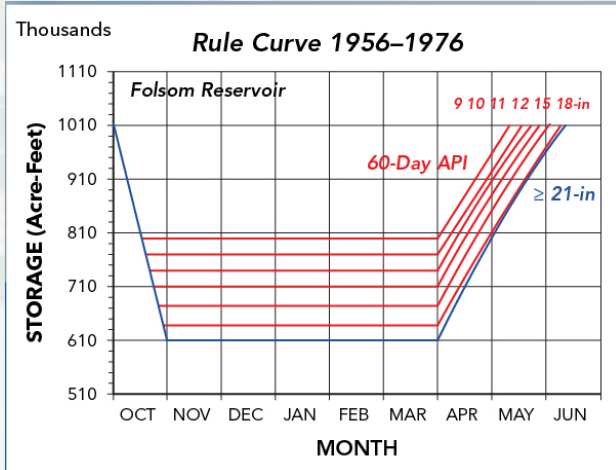
0.5% Chance Exceedence Event

	1 Day cfs	3 Day cfs	7 Day cfs
1997	349,000	247,000	137,000
2006	337,000	237,000	138,000
2011	322,000	242,000	146,000
$\Delta\%$	-4.5	2.1	5.8

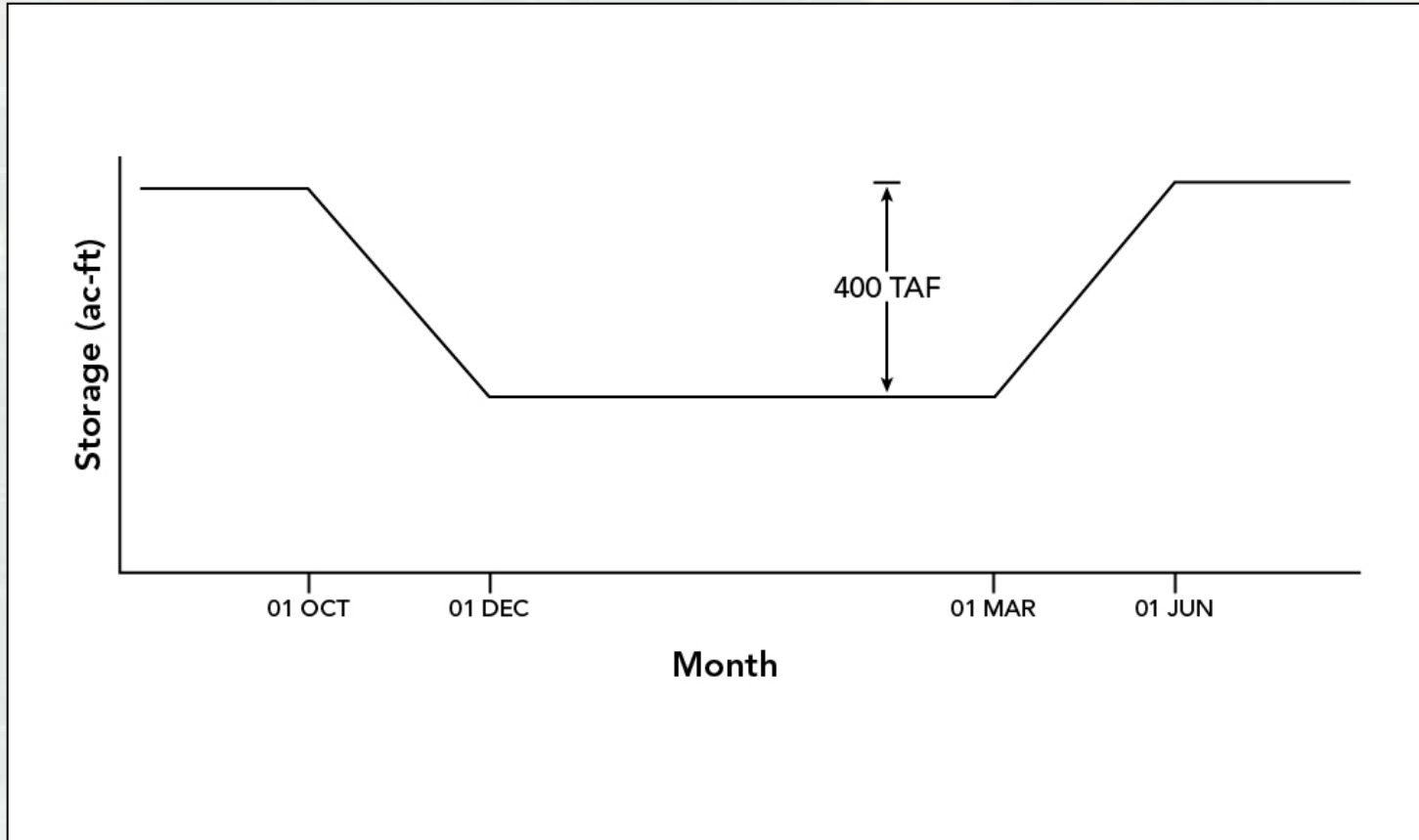


INCORPORATING BASIN WETNESS & FORECASTS IN RESSIM MODELS

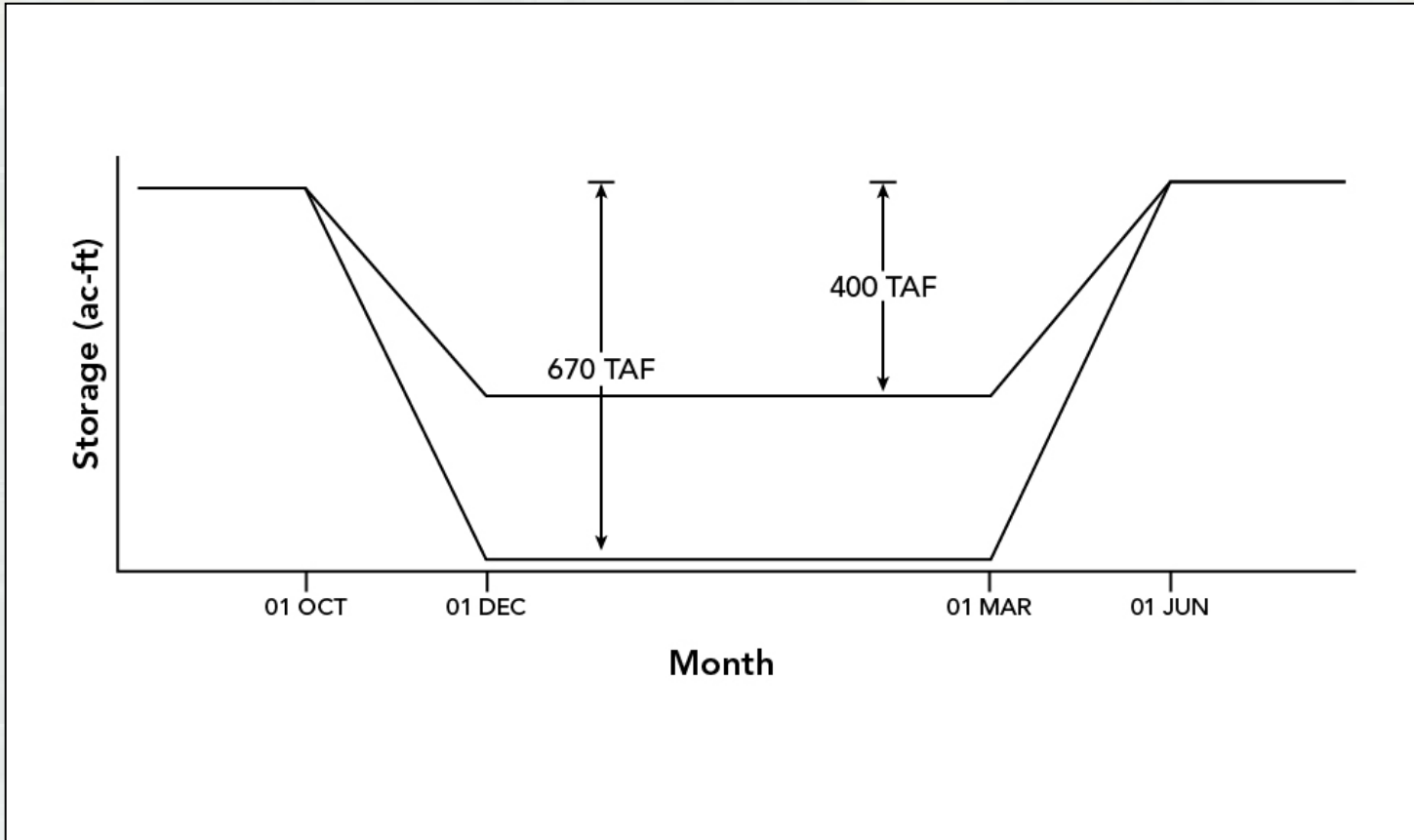
- Index could be based on basin precipitation, reservoir inflow, or projected snowmelt runoff.
- Index had been utilized in the past:



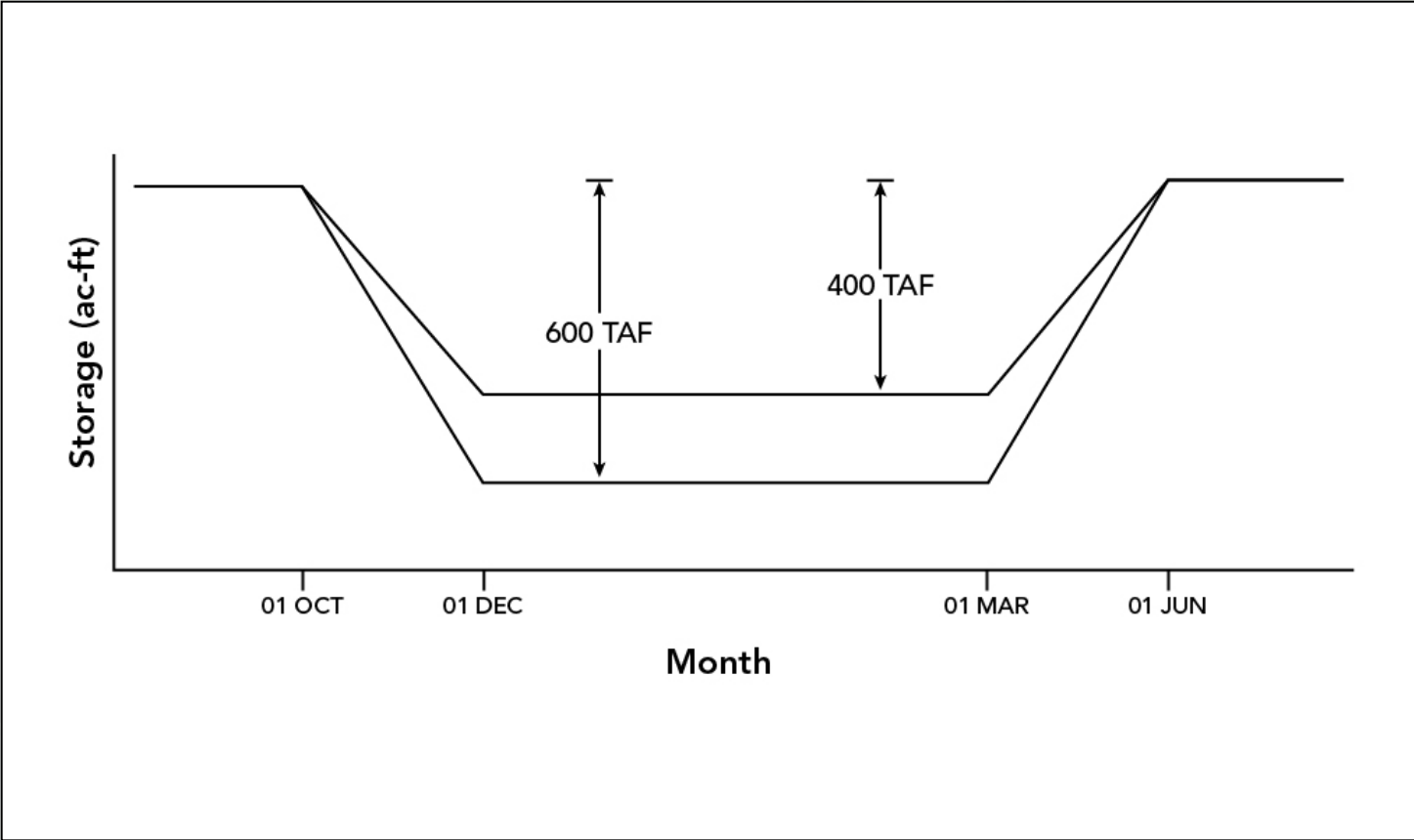
400-FIXED WCD



400/670 WCD

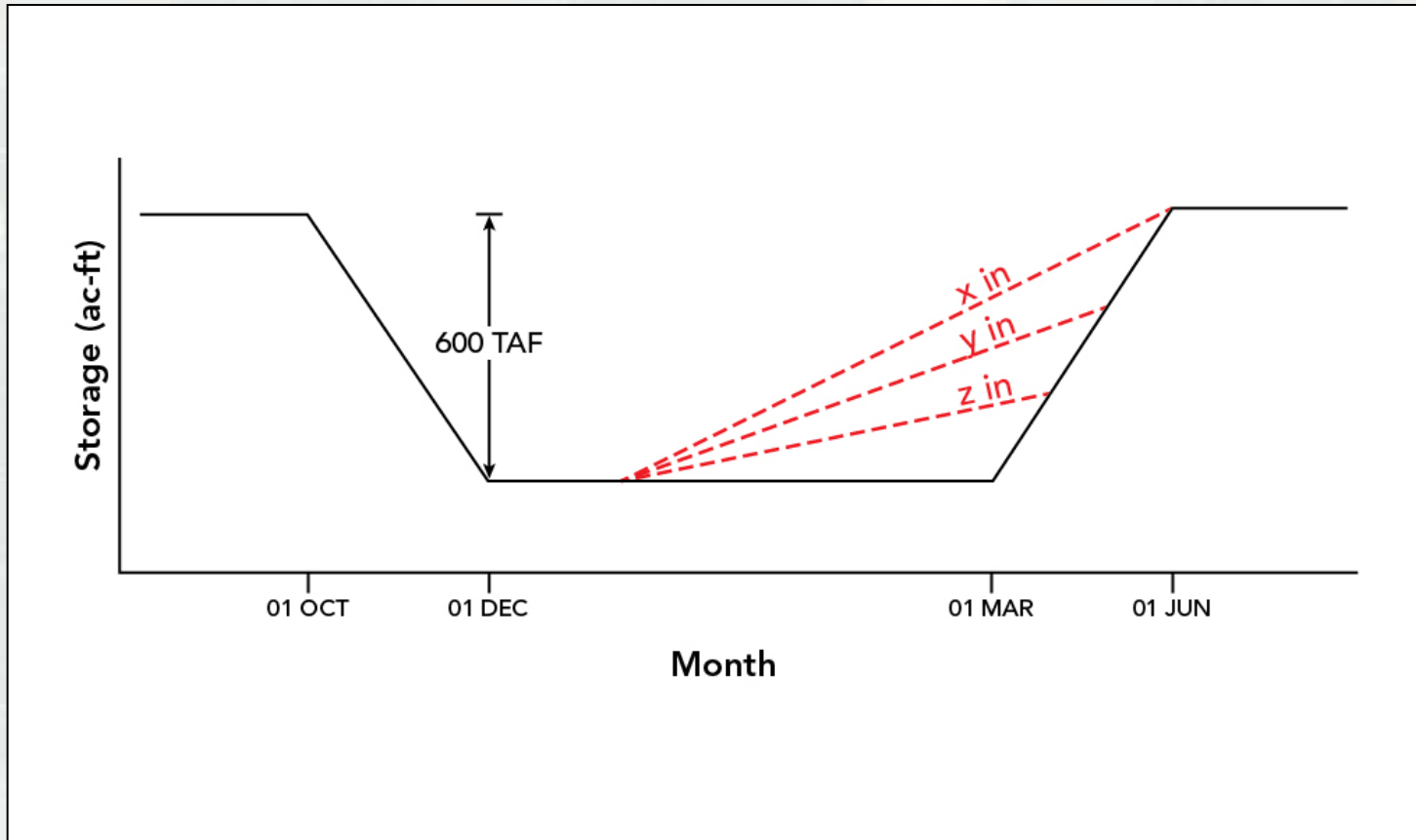


400/600 WCD



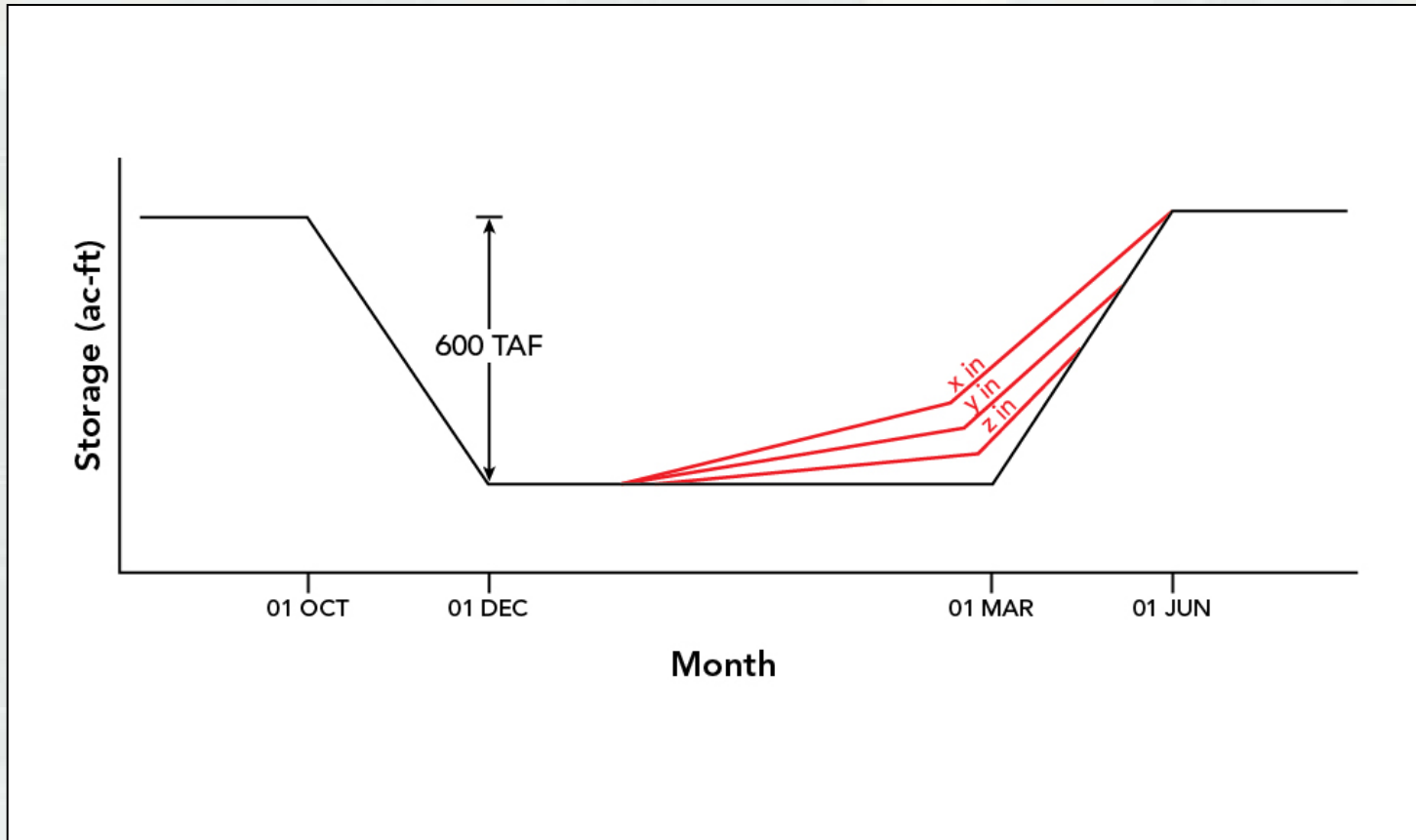
BASIN WETNESS INDEX

TOP OF CONSERVATION ADJUSTMENT



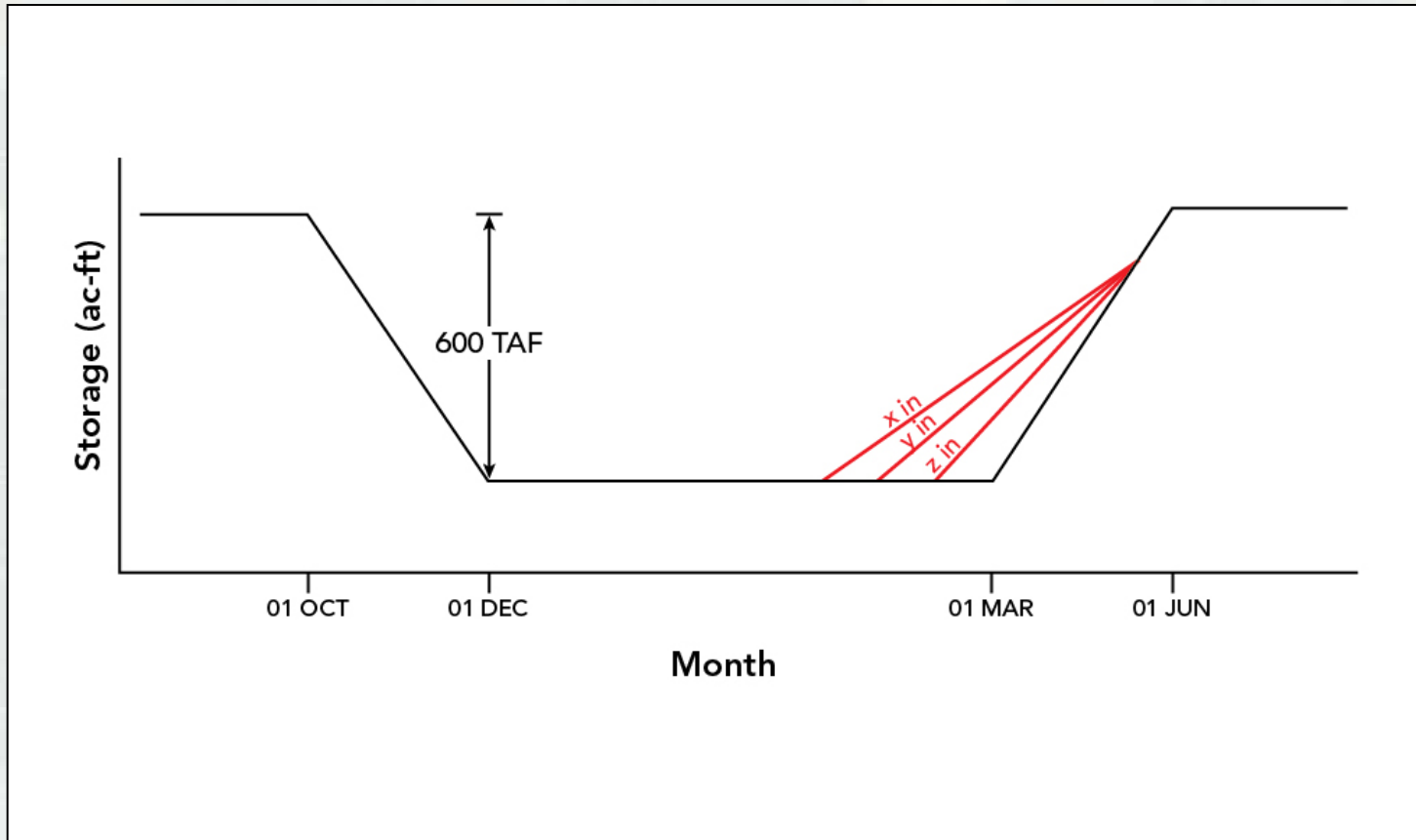
BASIN WETNESS INDEX

TOP OF CONSERVATION ADJUSTMENT



BASIN WETNESS INDEX

TOP OF CONSERVATION ADJUSTMENT



CREDITABLE FLOOD CONTROL TRANSFER SPACE

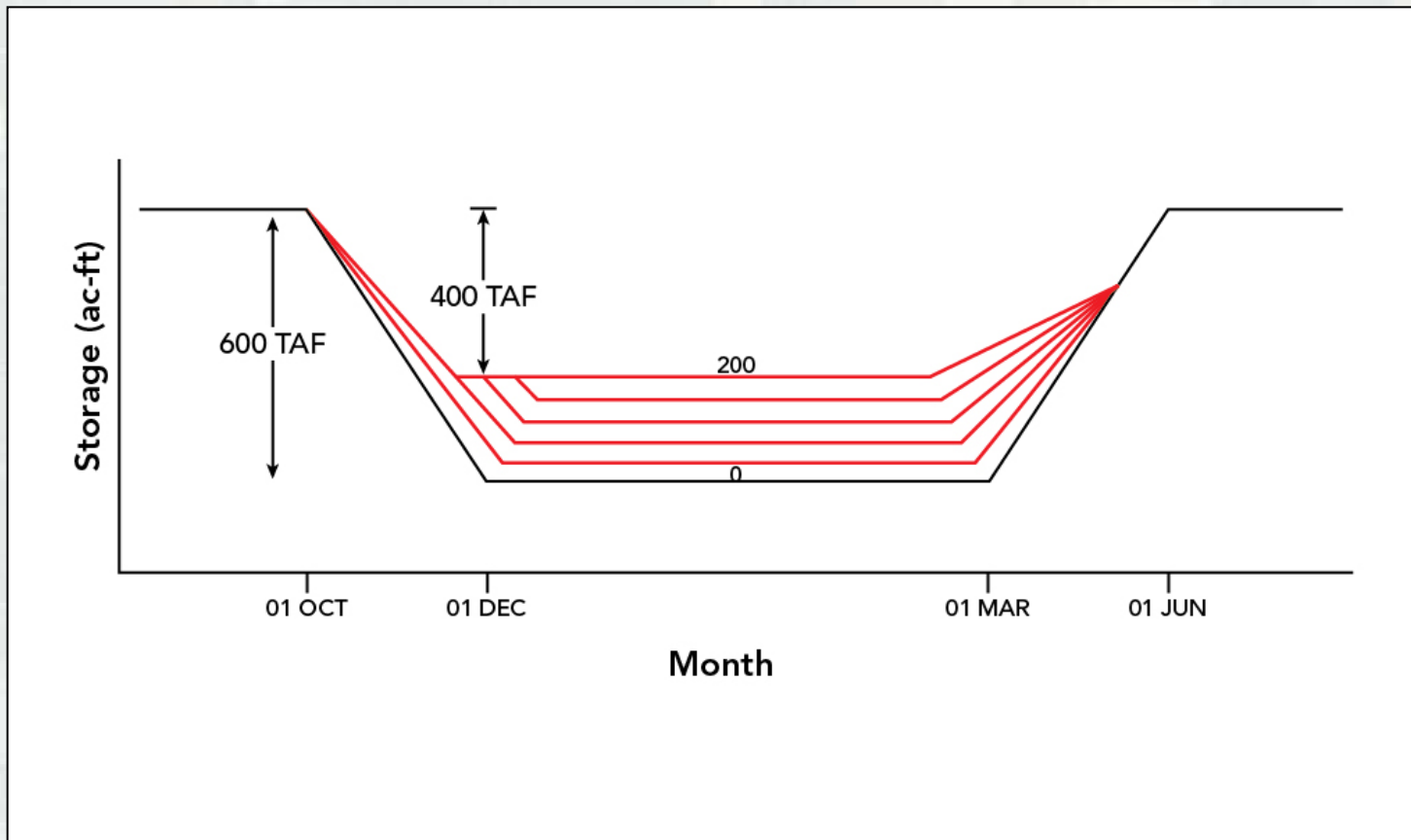
TOP OF CONSERVATION ADJUSTMENT

	CURRENT STORAGE	STORAGE AT SPILLWAY CREST	AVAILABLE STORAGE (y-x)	MAXIMUM CREDITABLE SPACE	ACTUAL CREDITABLE SPACE, LESSER OF A, B, C, OR Z
FRENCH MEADOWS	x	y	z	a	z
HELL HOLE	x	y	z	b	b
UNION VALLEY	x	y	z	c	z
				$\Sigma=200$	$z+a+z$



CREDITABLE FLOOD CONTROL TRANSFER SPACE

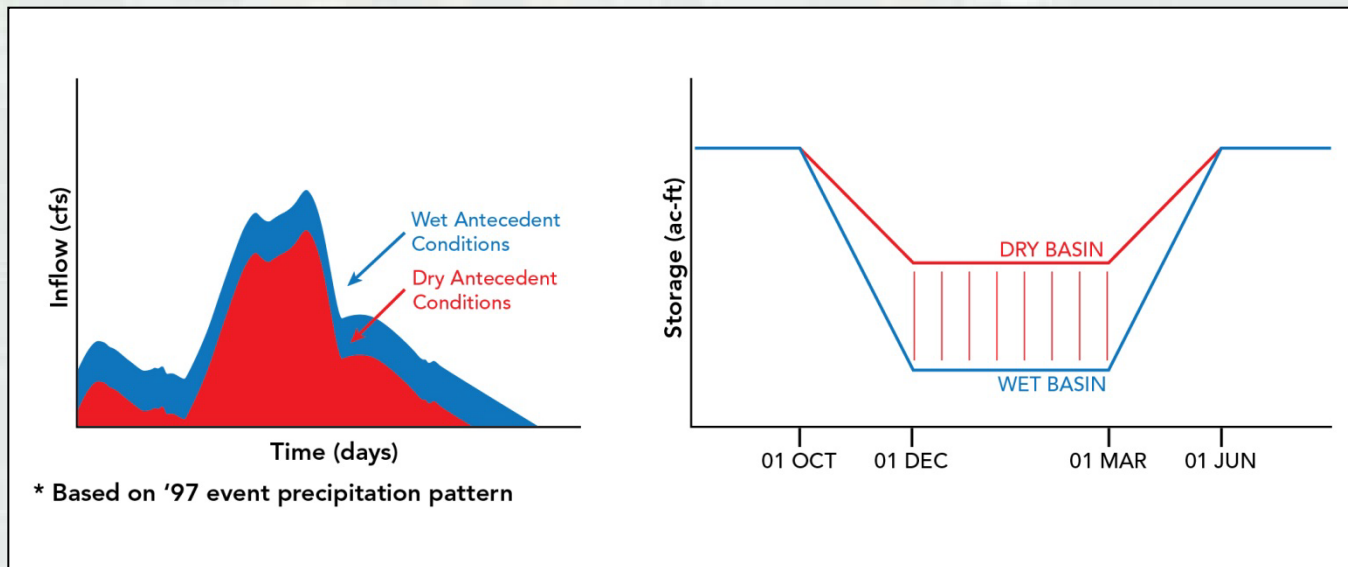
TOP OF CONSERVATION ADJUSTMENT



CREDITABLE FLOOD CONTROL TRANSFER SPACE

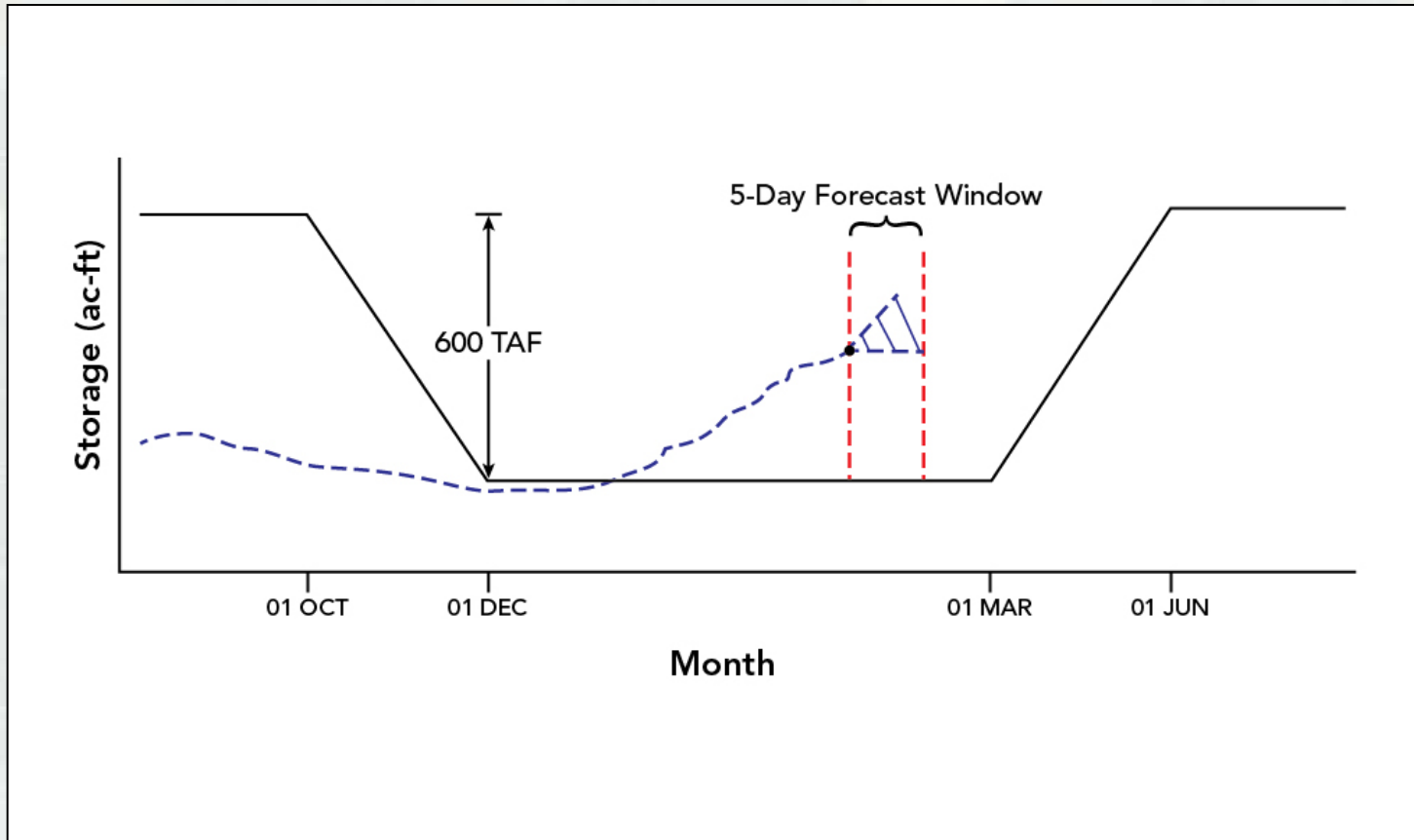
TOP OF CONSERVATION ADJUSTMENT

200-Yr Inflow Hydrograph Sensitivity Analysis Dry vs. Wet Condition



FORECASTS

TOP OF CONSERVATION POOL ADJUSTMENT



WATER SUPPLY EVALUATION

TIER 1

- Will operation set be likely to change water supply for system-wide beneficial uses?
- Approach includes comparison of HEC ResSim and CalSim II Period of Record Runs (WY 1921 – WY 2002).



WATER SUPPLY EVALUATION

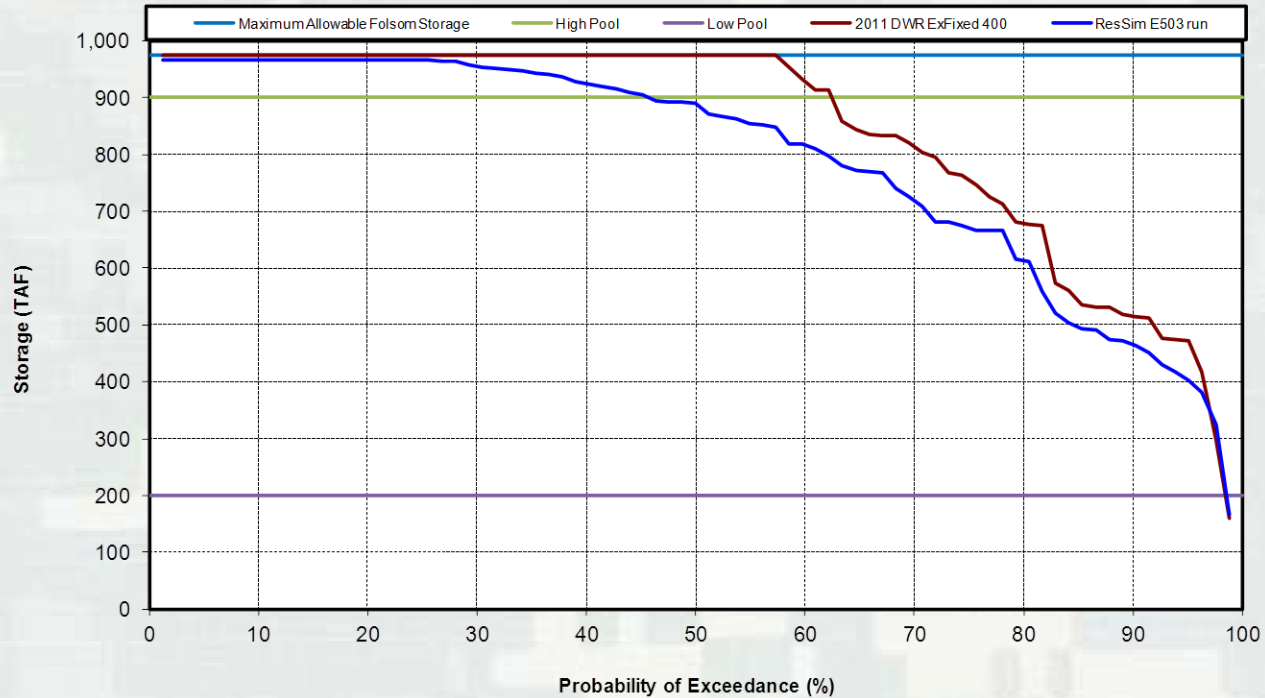
TIER 1 (cont.)

- Data products for Key System Metrics are compared (end of May Storage and Lower American River Flows).
- Assumption is that CalSim II output reflects prioritization of CVP and SWP beneficial uses.
- Similar output implies operation set reasonably able to satisfy water supply for project beneficial uses.



TIER 1 DATA COMPARISONS

Folsom Reservoir End-of-month Storage during May under 2011 DWR ExFixed 400 and ResSim E503 run



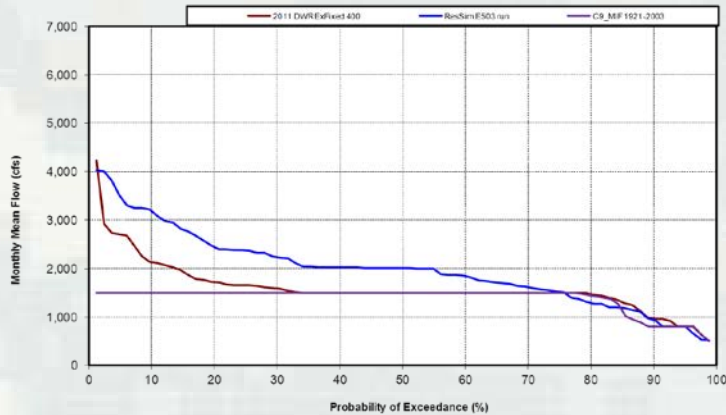
Data Source : 2011_Fixed_400; CALSIM modeling performed by HDR (2011 DRR_EX_Fixed400), Simulation period: Oct 1921 - Sep 2003
 USACE ResSim E503ResSim (2012-12-19/E503/E503/rs/E503-POR/simulation.dss), Simulation period: 6 Oct 1921 - 30 Sep 2002
 Minimum Release Requirement from DWR SWP Delivery Reliability Study Existing conditions Scenario

Originator: DK 1/22/13
 QC: JF 1/23/13



TIER 1 DATA COMPARISONS

Lower American River Flow below Nimbus Dam during October under 2011 DWR ExFixed 400 and ResSim E503 run

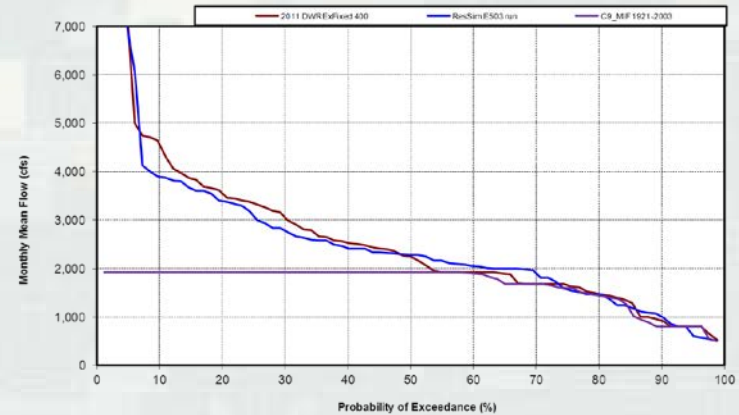


Data Source: 2011_Fixed_400_CALSIM modeling performed by HDR(2011DRR_EX_Fixed400). Simulation period: Oct 1921 - Sep 2003
USACE ResSim E503(Res-Sim(2012-01-18)E503(ES)resESCL-PDR(simulation.dwg). Simulation period: 6 Oct 1921 - 30 Sep 2002
Minimum Release Requirements from DWR SVP Delivery Reliability Study Existing conditions Scenario

Originator: DK 12/28/12

OC_F 1/23/13

Lower American River Flow below Nimbus Dam during November under 2011 DWR ExFixed 400 and ResSim E503 run

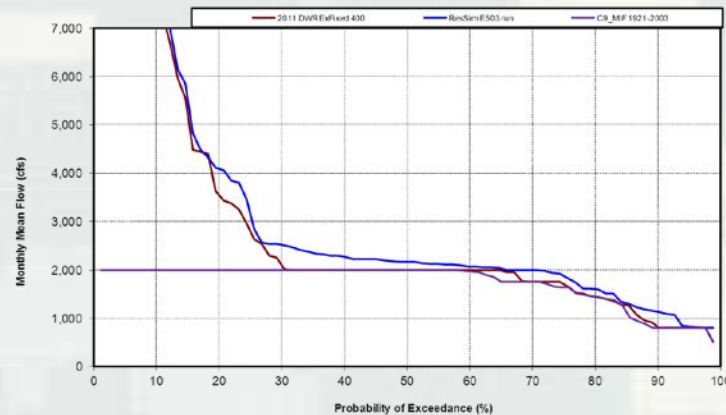


Data Source: 2011_Fixed_400_CALSIM modeling performed by HDR(2011DRR_EX_Fixed400). Simulation period: Oct 1921 - Sep 2003
USACE ResSim E503(Res-Sim(2012-01-18)E503(ES)resESCL-PDR(simulation.dwg). Simulation period: 6 Oct 1921 - 30 Sep 2002
Minimum Release Requirements from DWR SVP Delivery Reliability Study Existing conditions Scenario

Originator: DK 12/28/12

OC_F 1/23/13

Lower American River Flow below Nimbus Dam during December under 2011 DWR ExFixed 400 and ResSim E503 run



Data Source: 2011_Fixed_400_CALSIM modeling performed by HDR(2011DRR_EX_Fixed400). Simulation period: Oct 1921 - Sep 2003
USACE ResSim E503(Res-Sim(2012-01-18)E503(ES)resESCL-PDR(simulation.dwg). Simulation period: 6 Oct 1921 - 30 Sep 2002
Minimum Release Requirements from DWR SVP Delivery Reliability Study Existing conditions Scenario

Originator: DK 12/28/12

OC_F 1/23/13



NEXT STEPS

- Continue with details and model iterations-refinement.
- Real-time review and quality control of model builds and output data sets.
- Outreach and Coordination.



QUESTIONS & COMMENTS

