

Folsom Dam Water Control Manual Update

Joint Federal Project, Folsom Dam

Public Workshop

May 28, 2015

Library Galleria

828 I Street, Sacramento, CA



US Army Corps of Engineers
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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 '95



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.



TODAY'S DISCUSSION

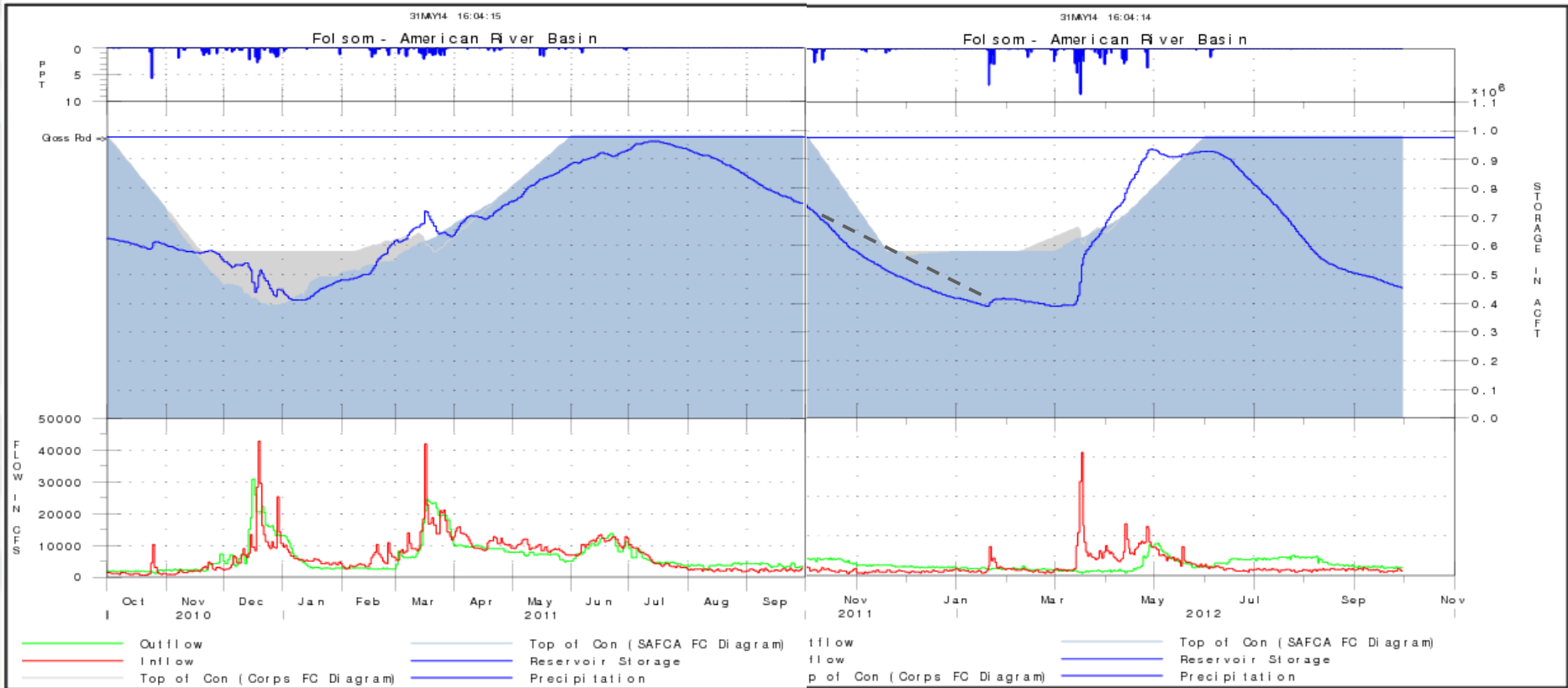
- Fall Reservoir Drawdown Operations
- Proposed New Spring Refill Storage Boundary
- Efforts to Develop & Assess Forecast-Based Alternative
- Project Milestone Schedule



FALL RESERVIOR DRAWDOWN OPERATIONS

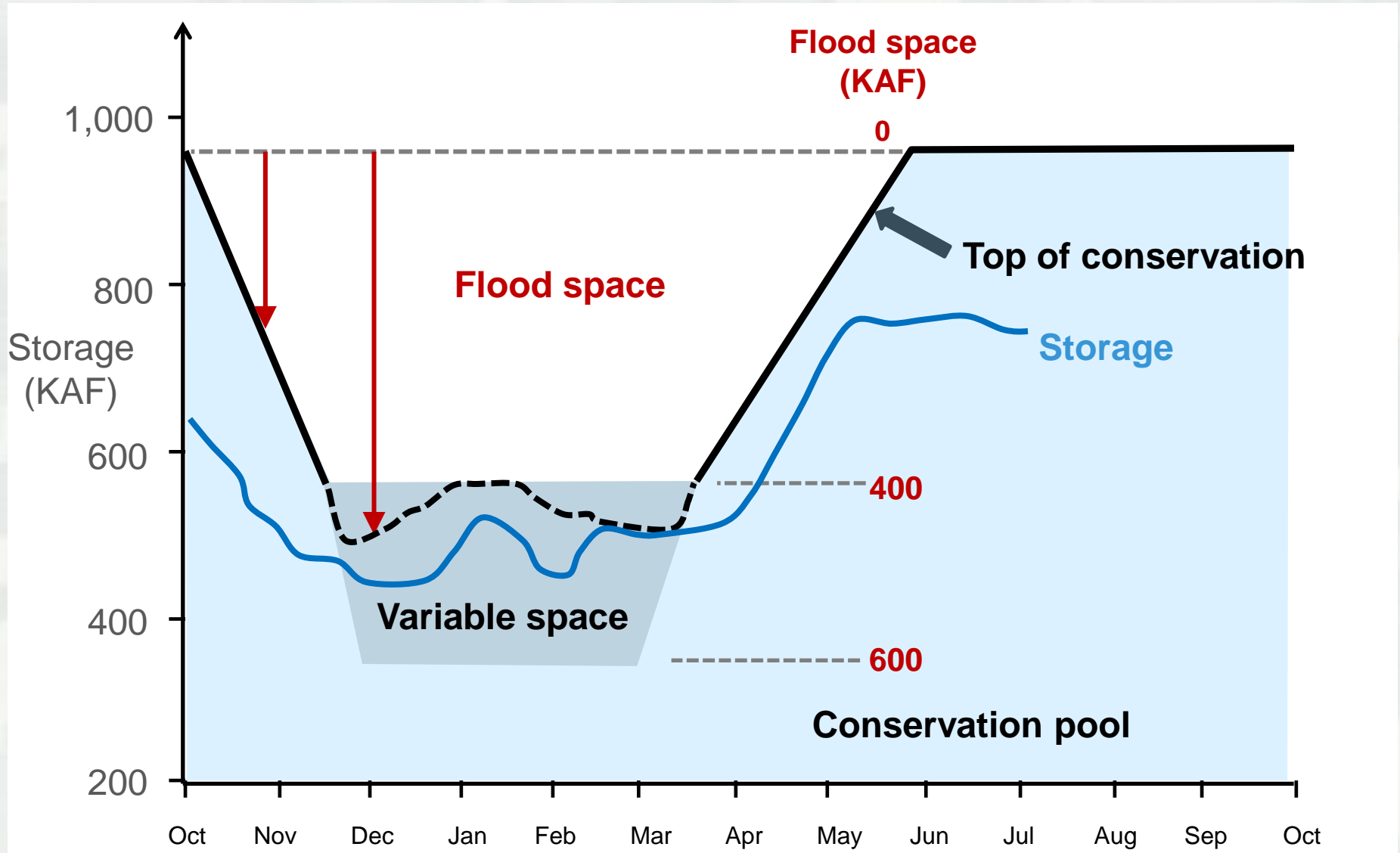


Fall Drawdown Folsom Lake – Water Years 2011 and 2012

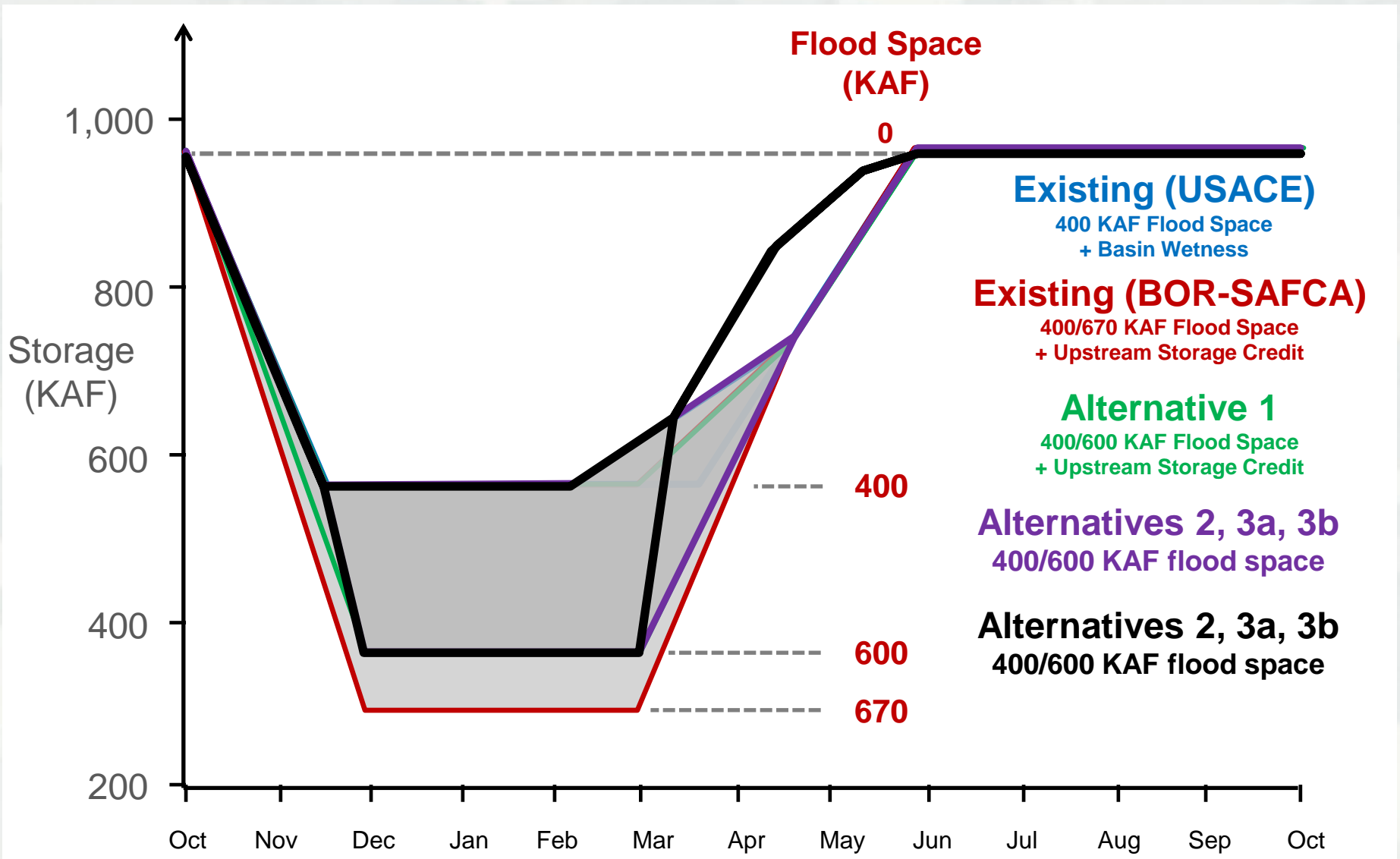


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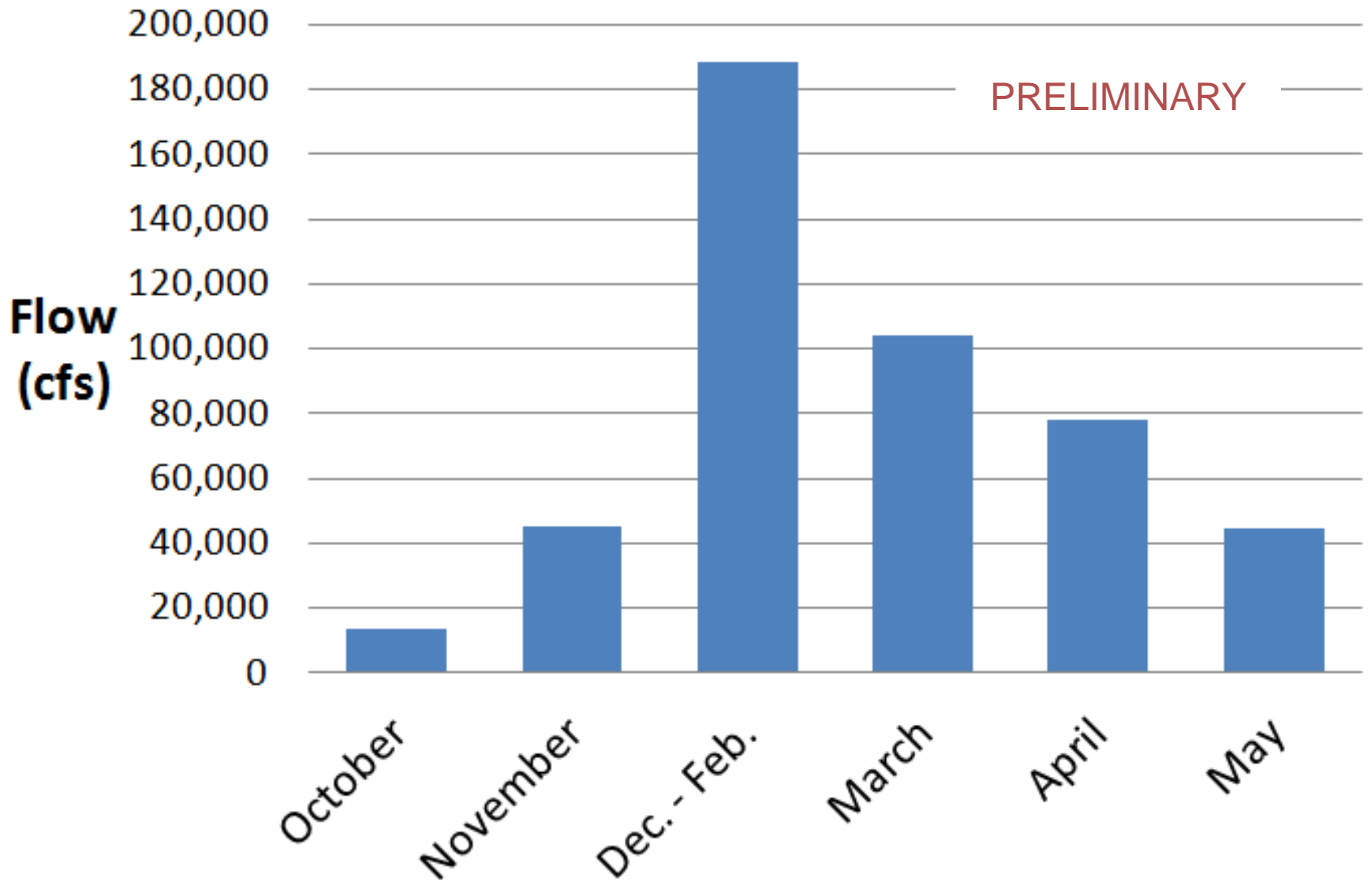
WATER CONTROL DIAGRAM REFRESHER



WATER CONTROL DIAGRAM



3-Day Average Flow (100-year)

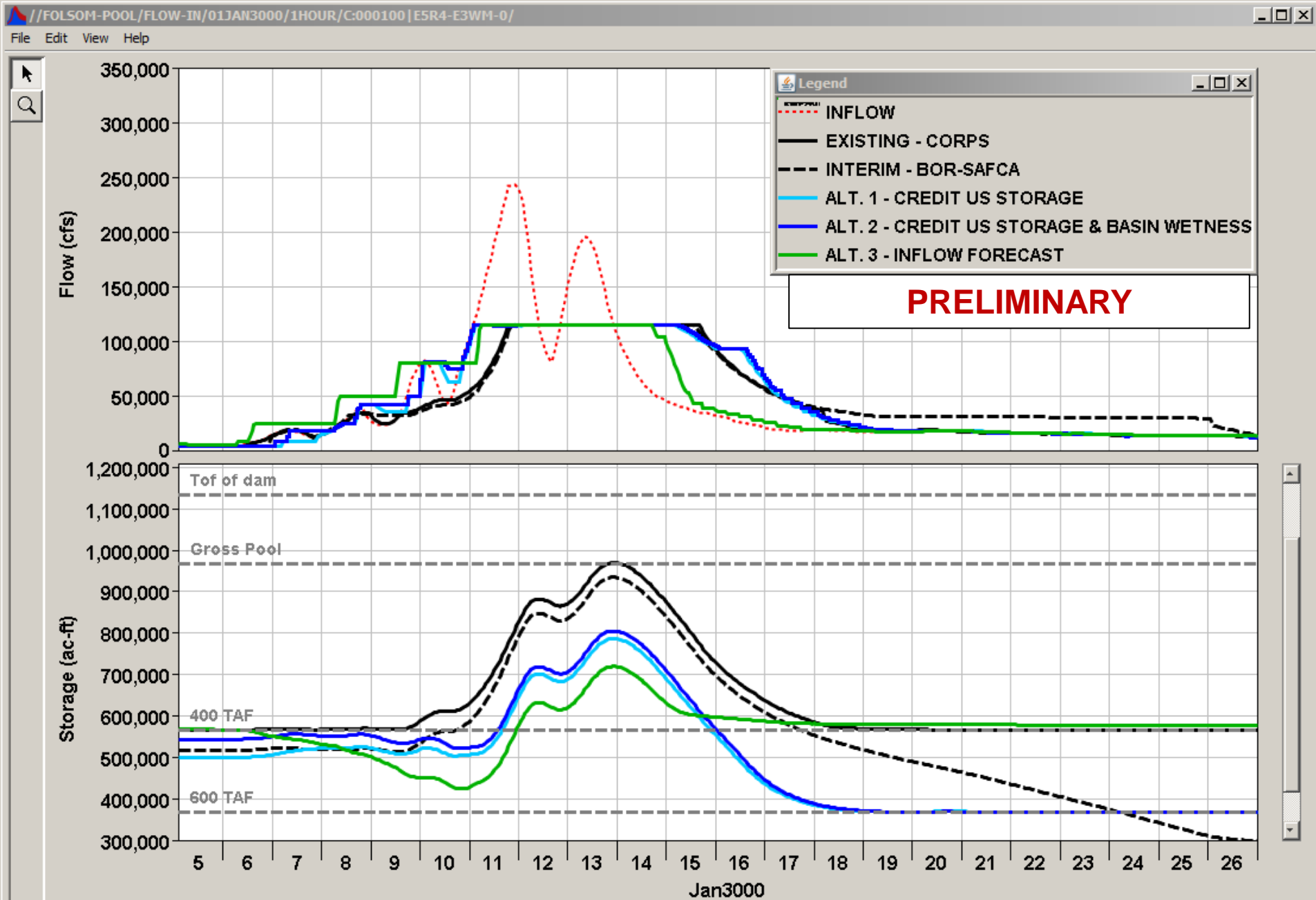


FORECAST ALTERNATIVE

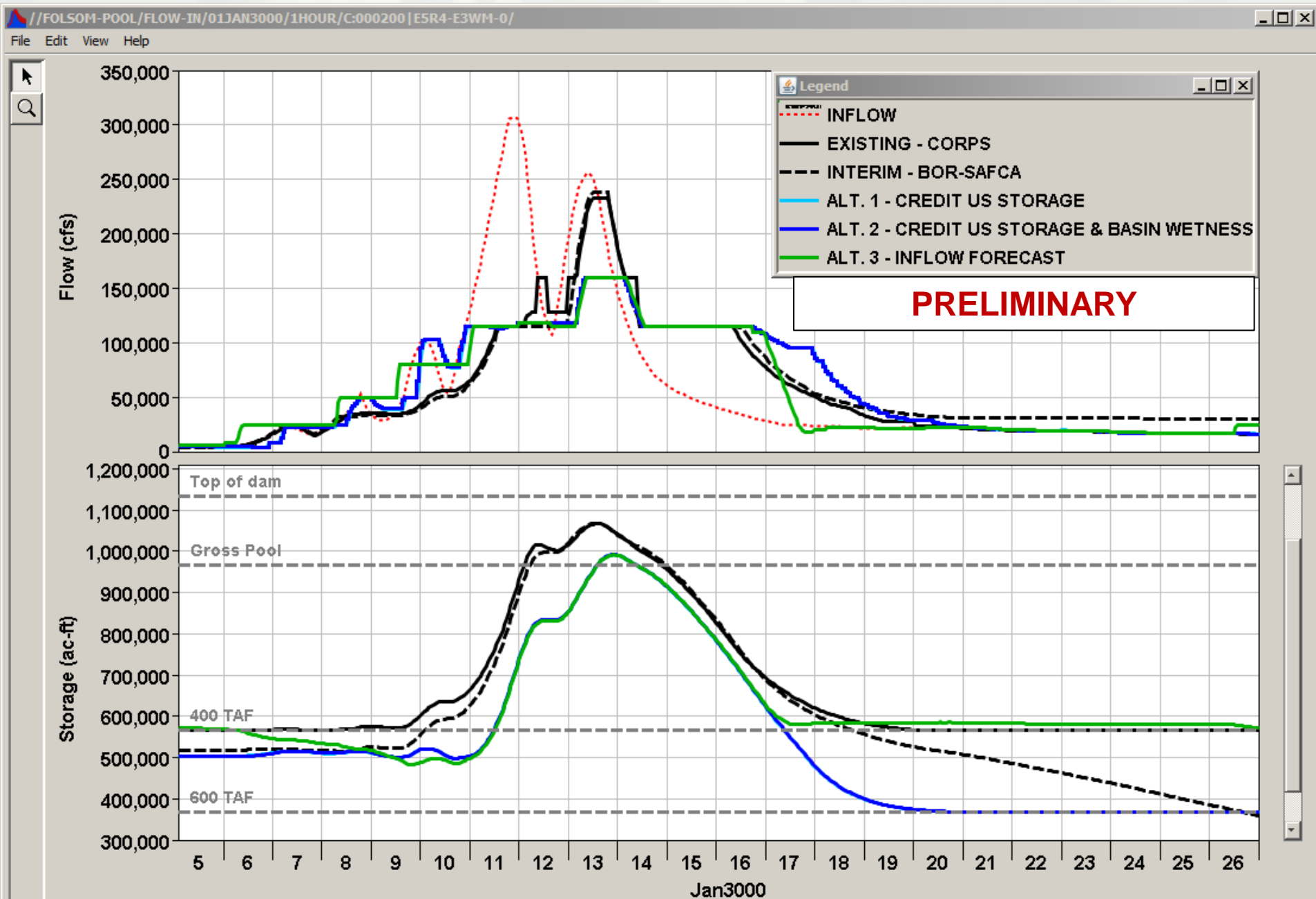
- Preliminary results
- How it works
- Assessment



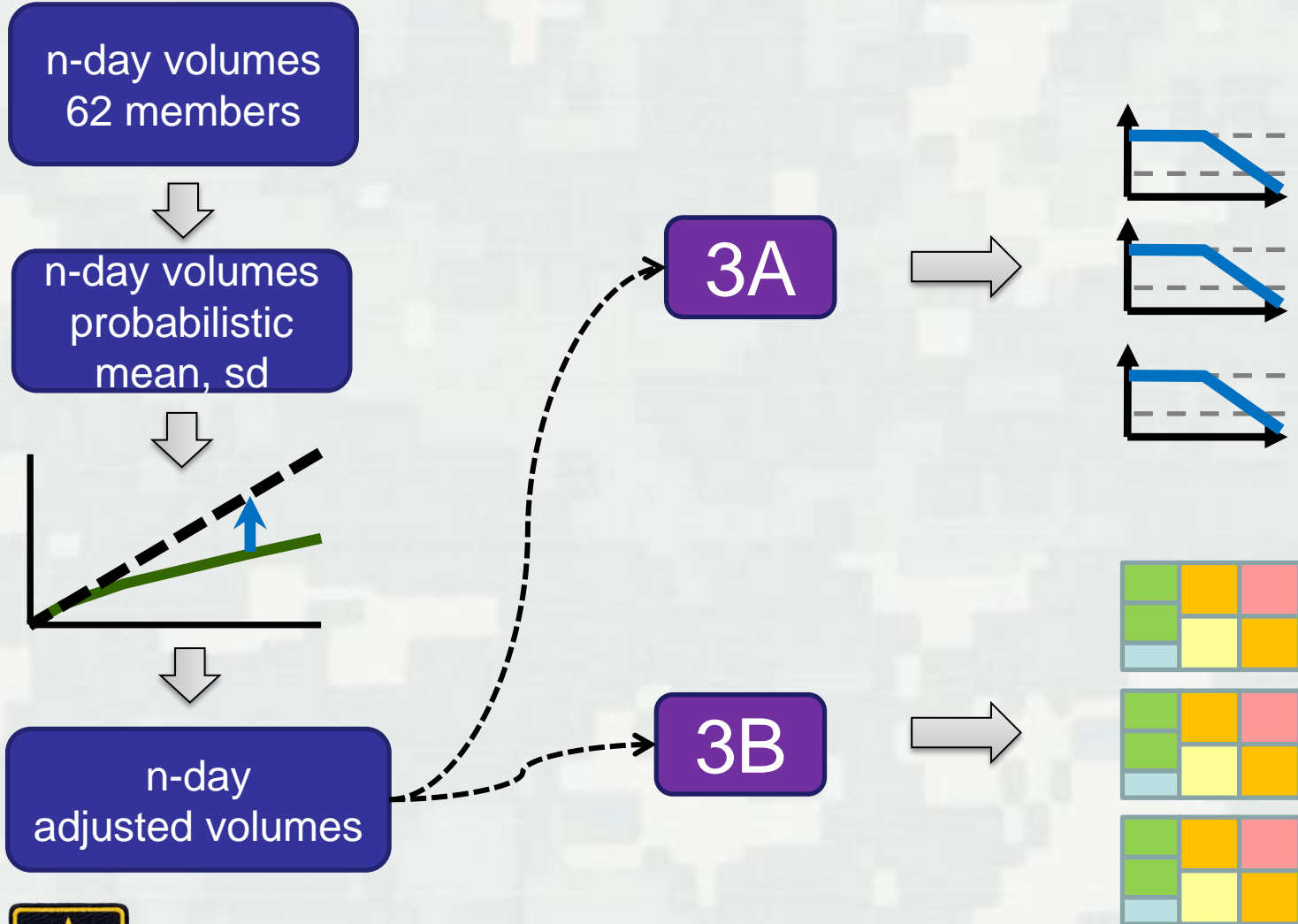
100-YR, 1986 PATTERN, EXISTING AND ALTERNATIVES



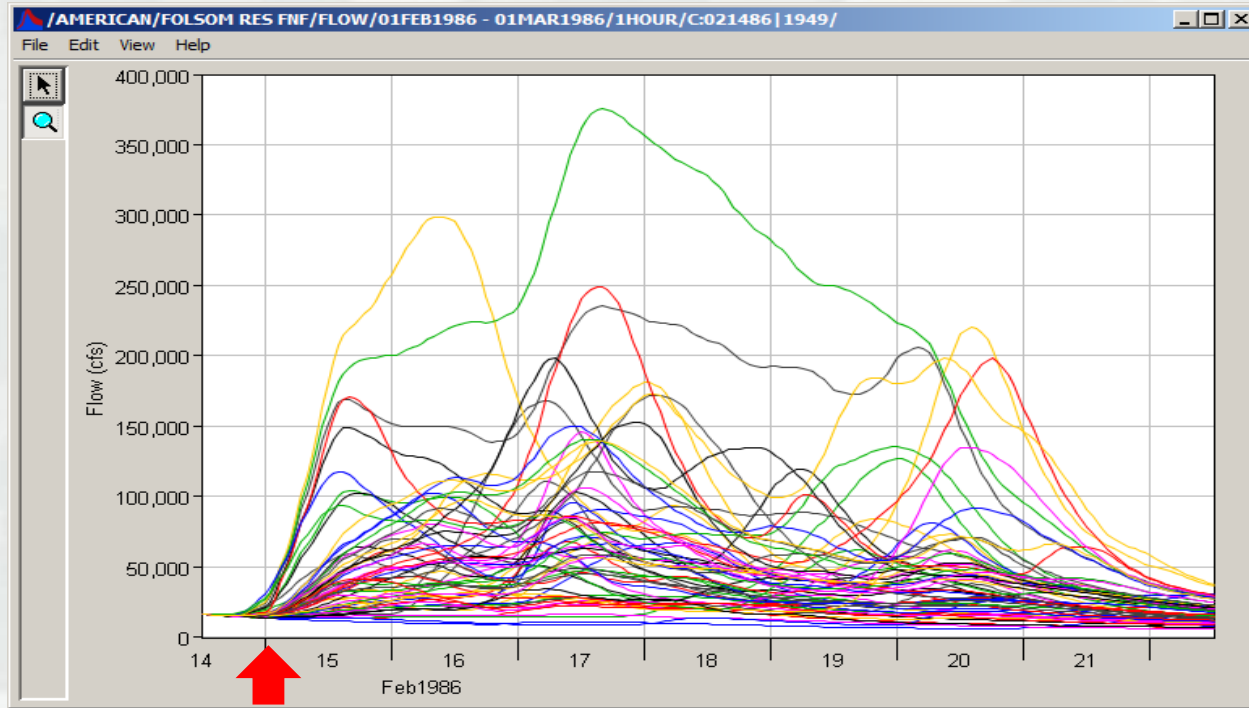
200-YR, 1986 PATTERN, EXISTING AND ALTERNATIVES



FORECASTING ALTERNATIVE

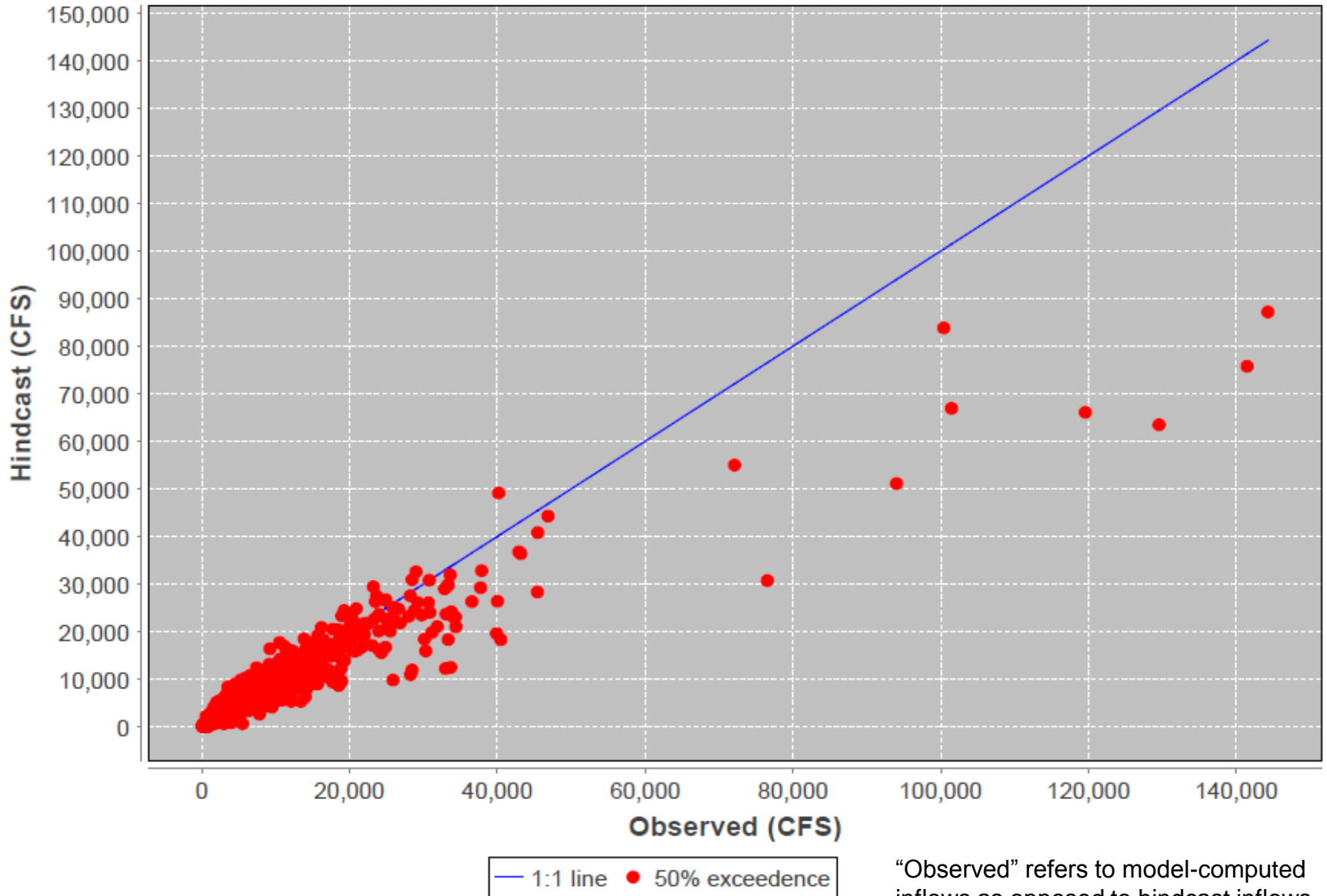


COMPUTE INFLOW VOLUMES FROM FORECAST ENSEMBLES



HINDCAST VS INFLOW (3-DAY)

50% exceedence
Lead time: 0 Averaging period: 72

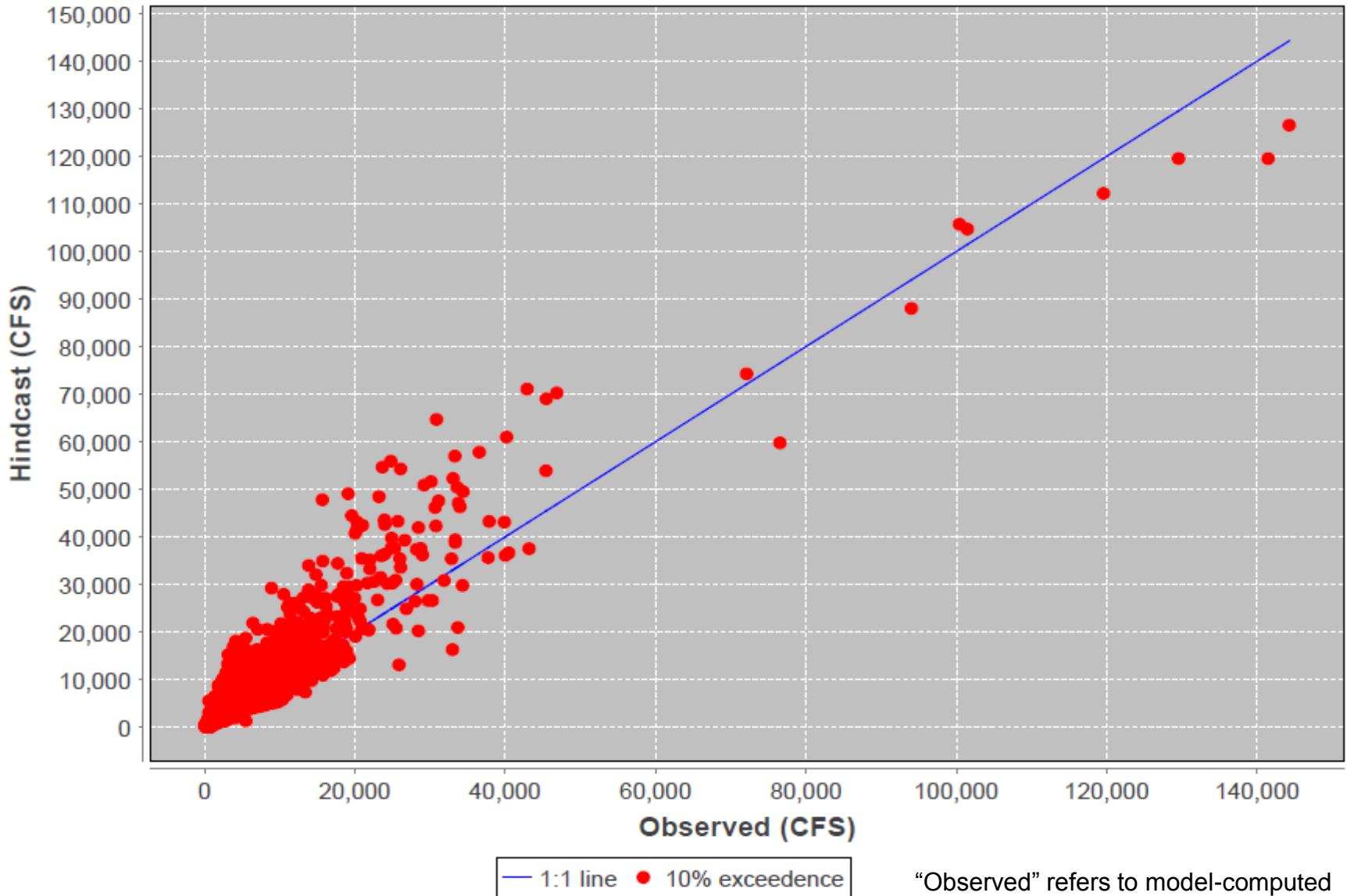


“Observed” refers to model-computed inflows as opposed to hindcast inflows.

HINDCAST VS INFLOW (3-DAY)

10% exceedence

Lead time: 0 Averaging period: 72

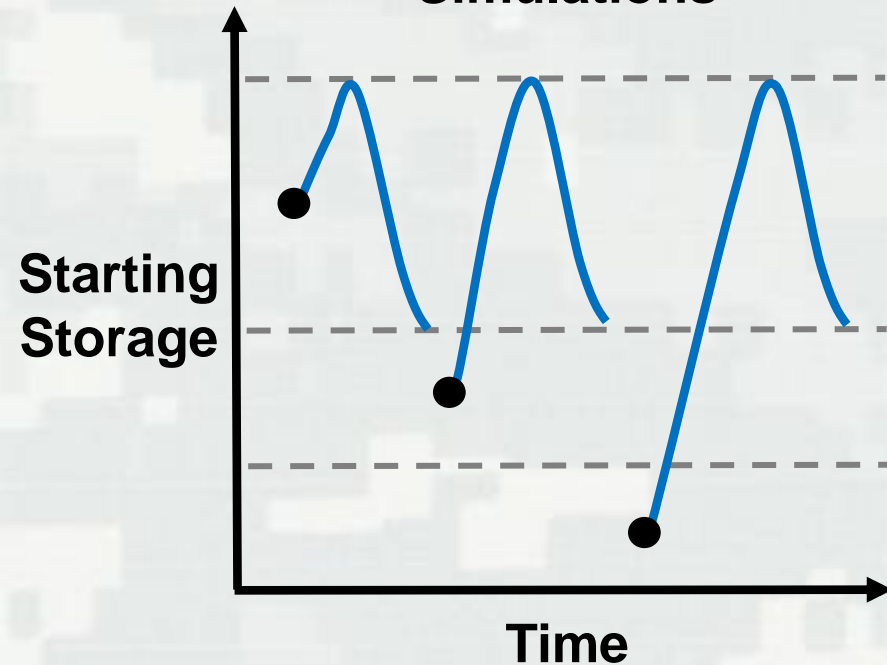


“Observed” refers to model-computed inflows as opposed to hindcast inflows.

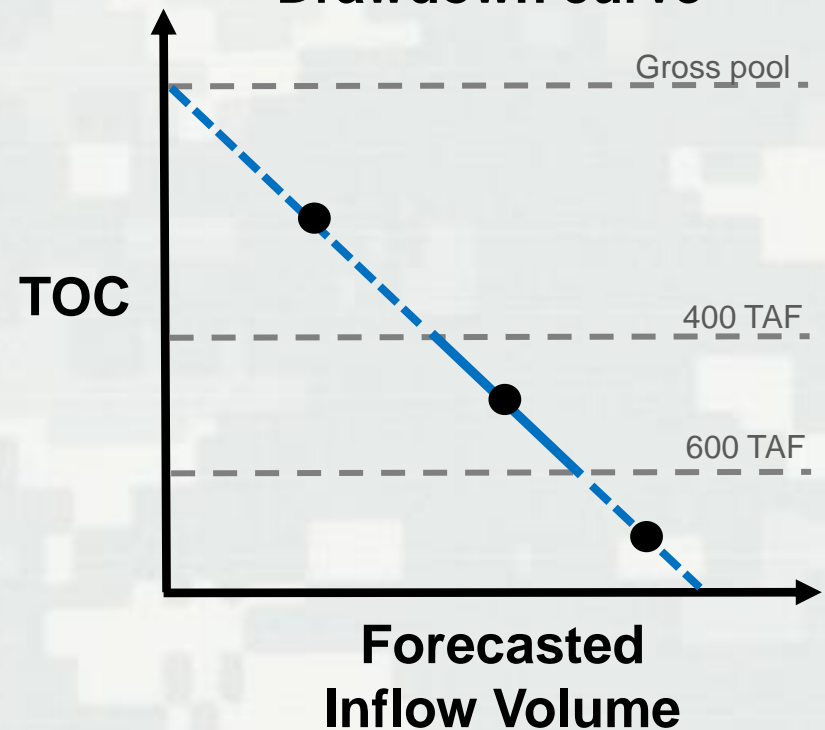
DRAWDOWN CURVE

Defines top of conservation (TOC) based on forecasted inflow volume.

Simulations



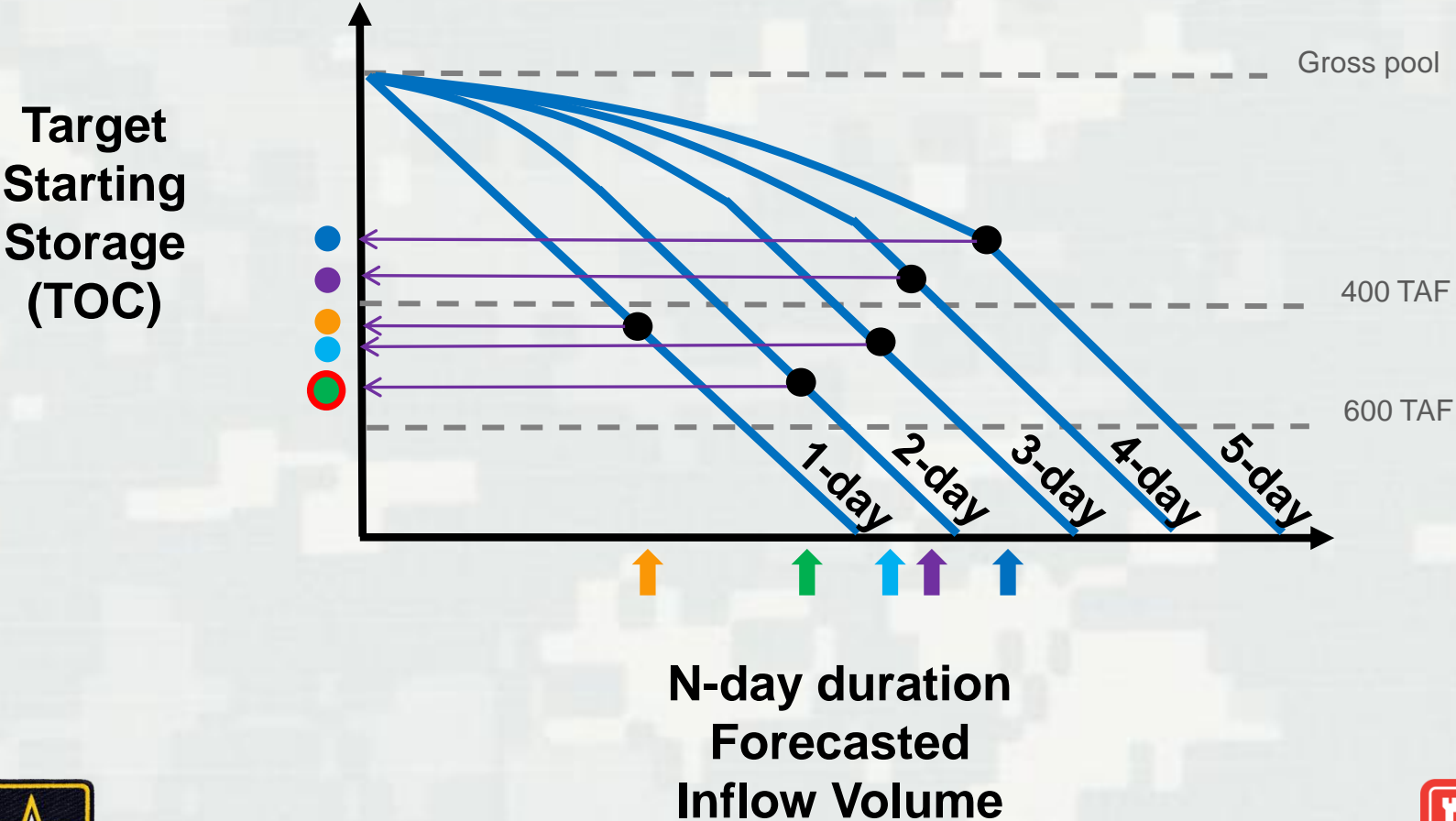
Drawdown curve



**Success = do not encroach into surcharge
AND peak release \leq 115K cfs**

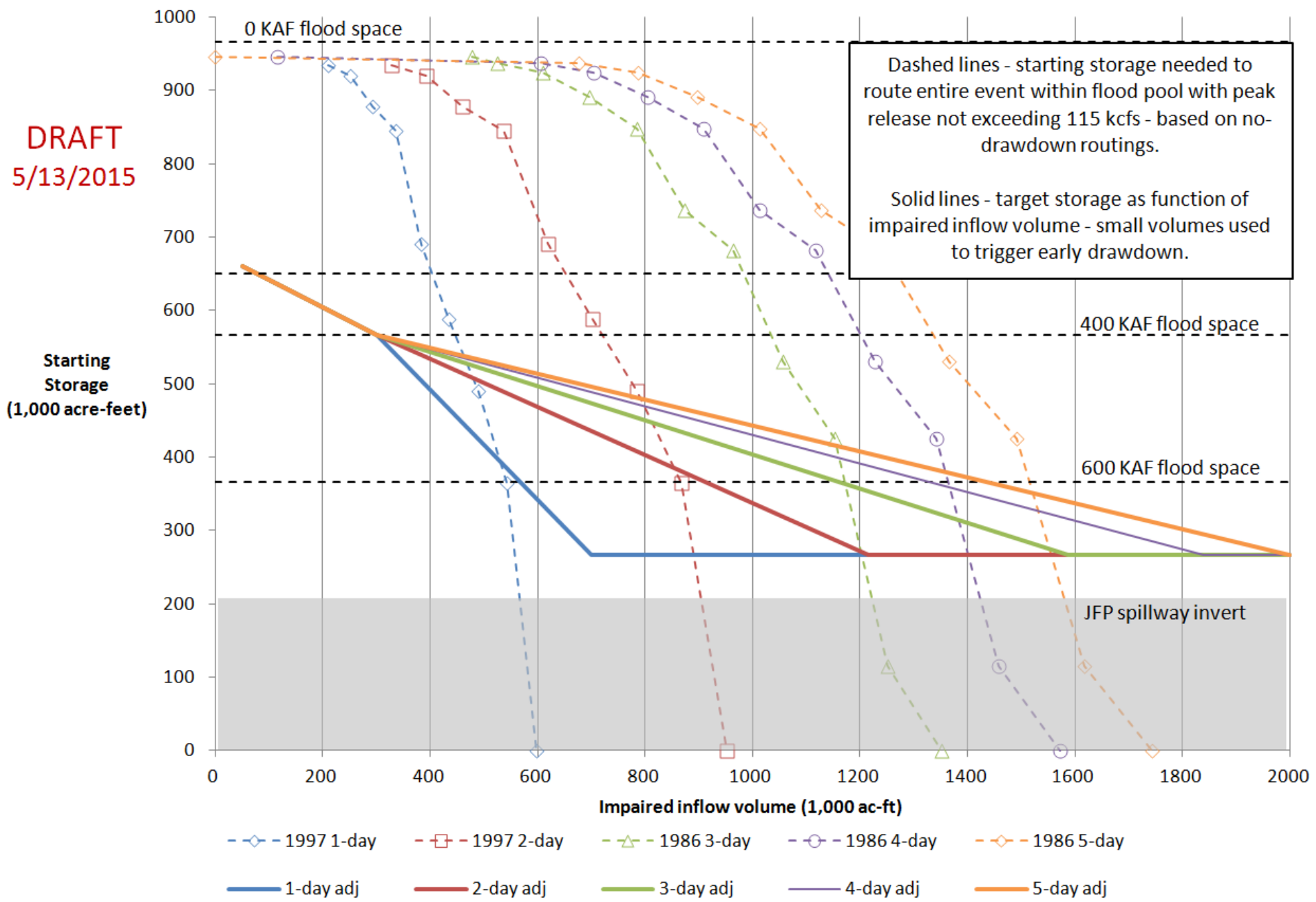


DRAWDOWN CURVES

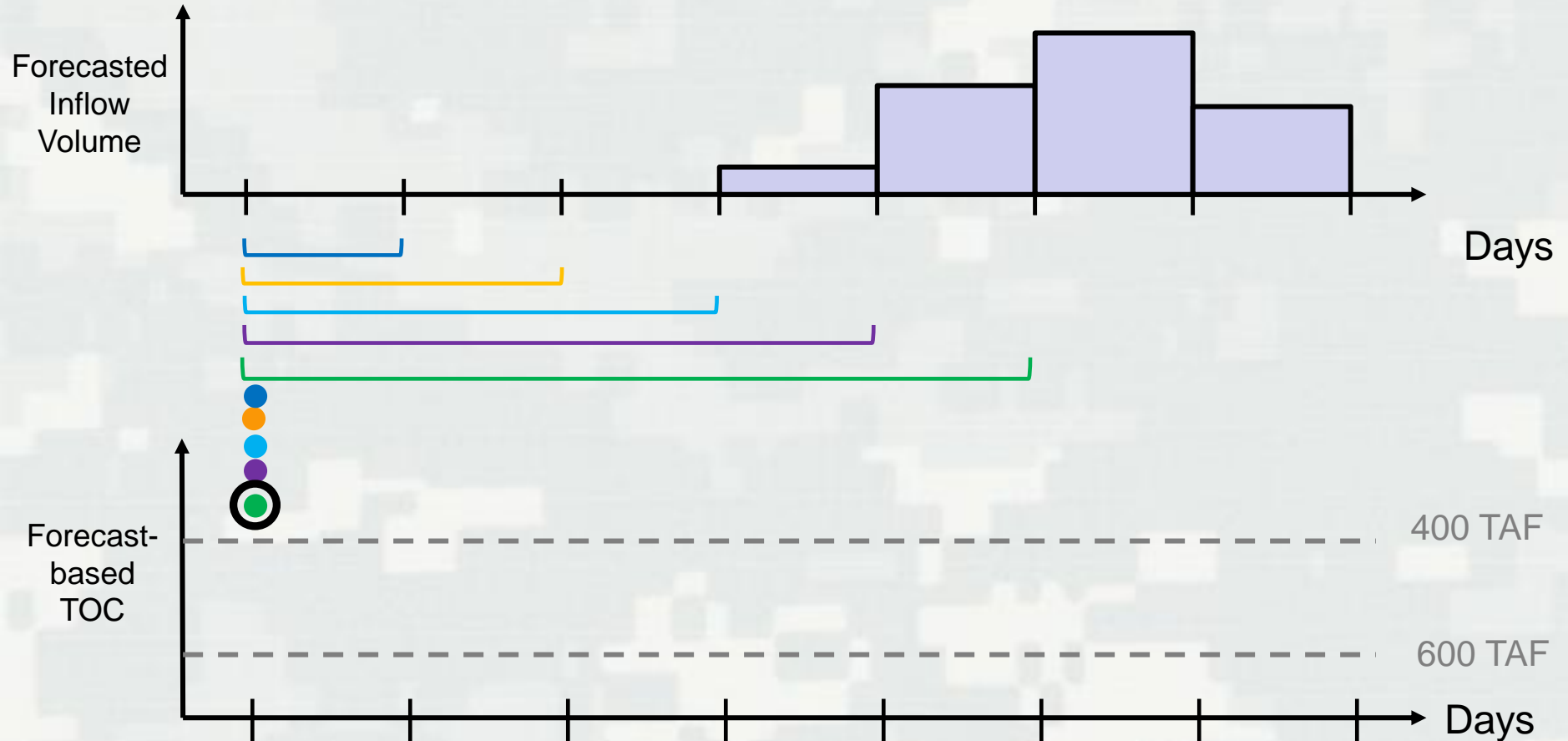


Folsom target storage vs. inflow volume

DRAFT
5/13/2015



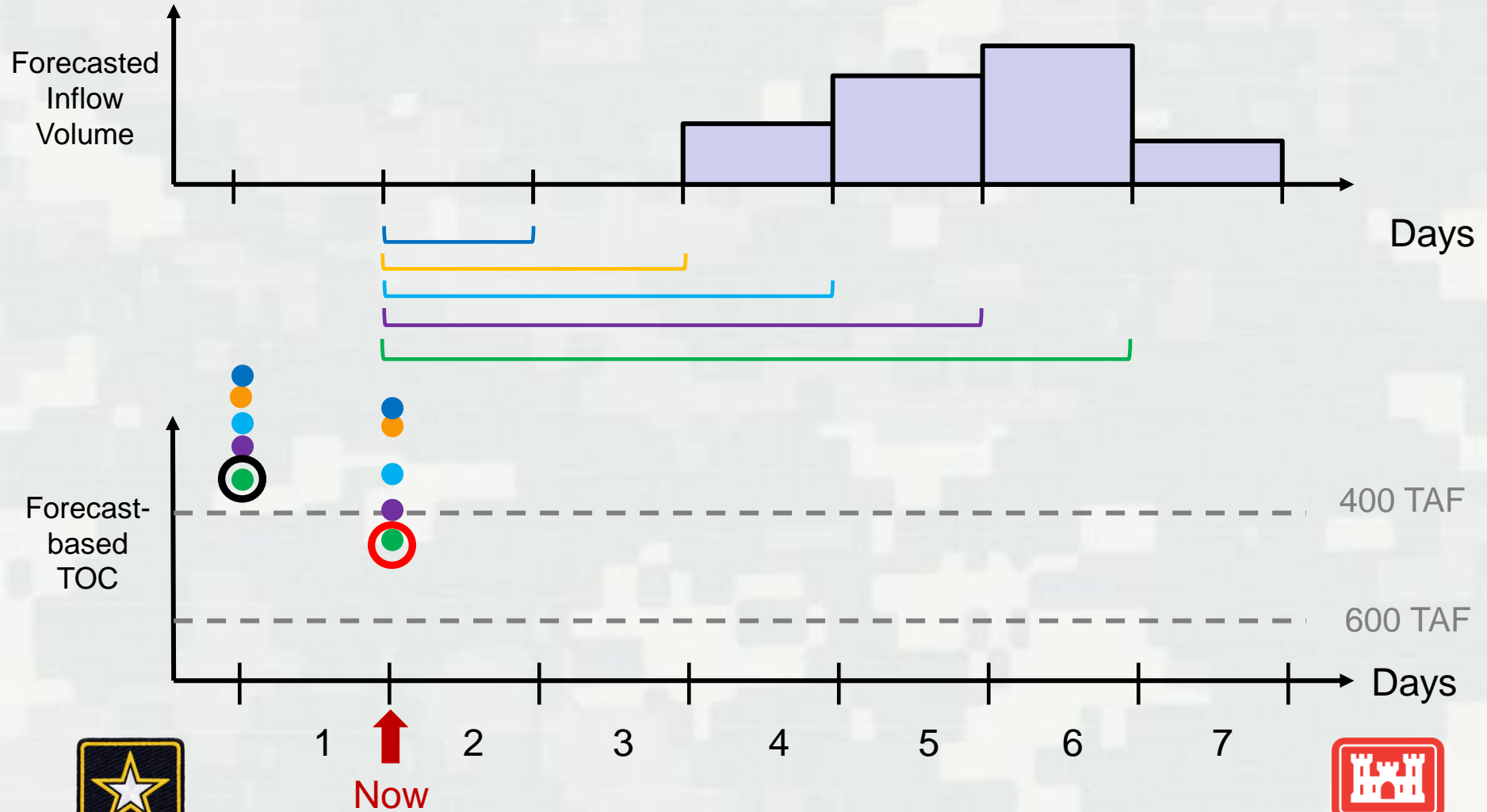
FORECAST-BASED TOC



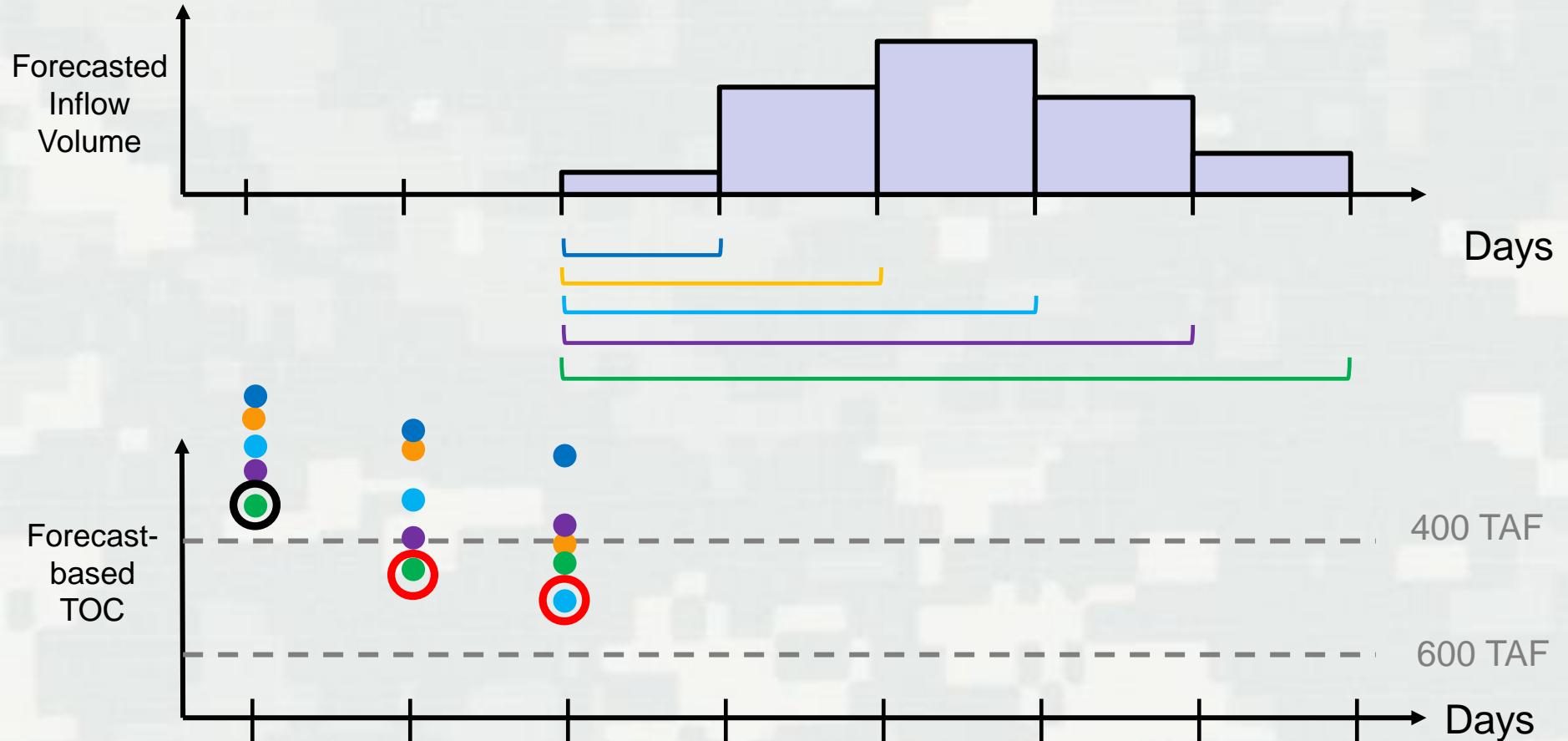
Now



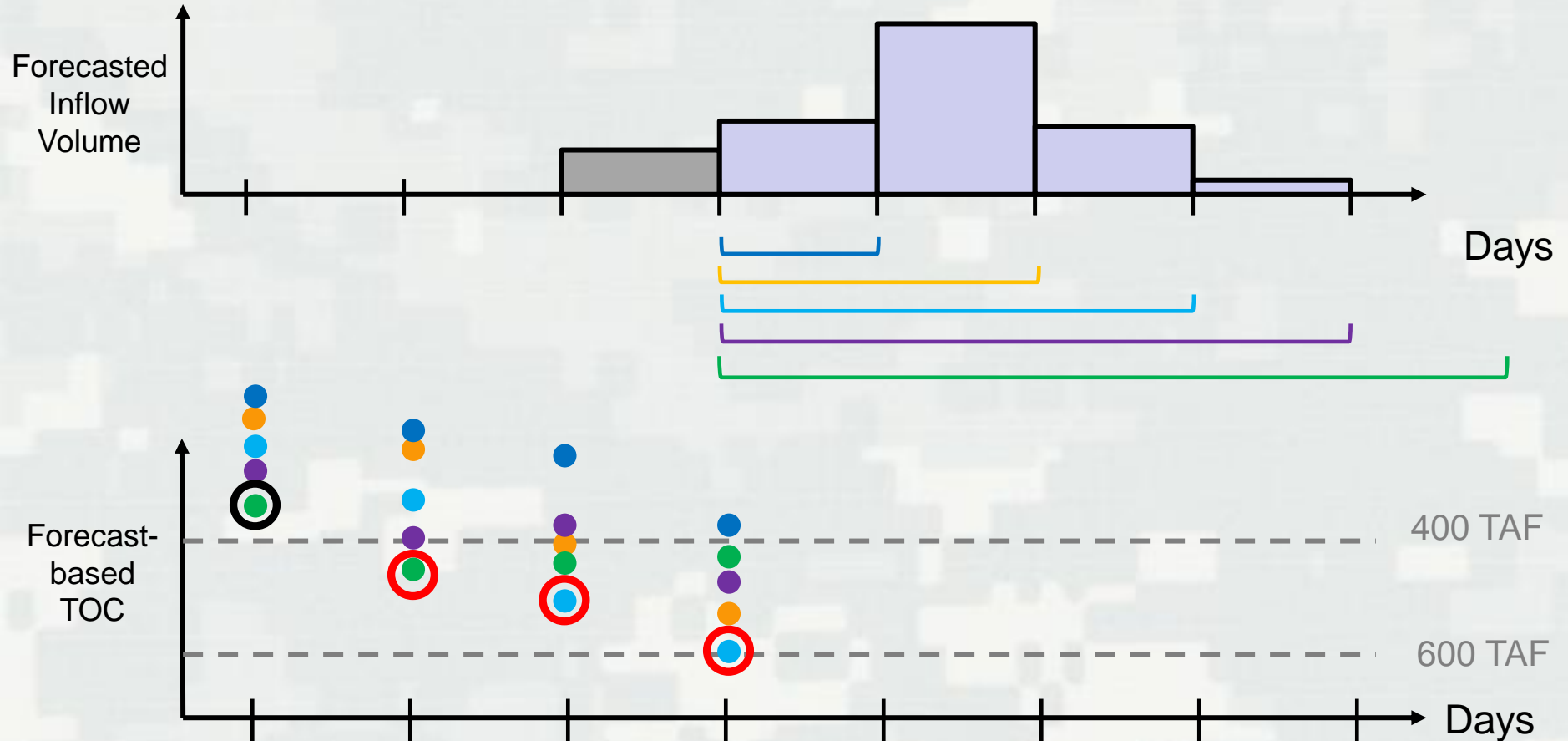
FORECAST-BASED TOC



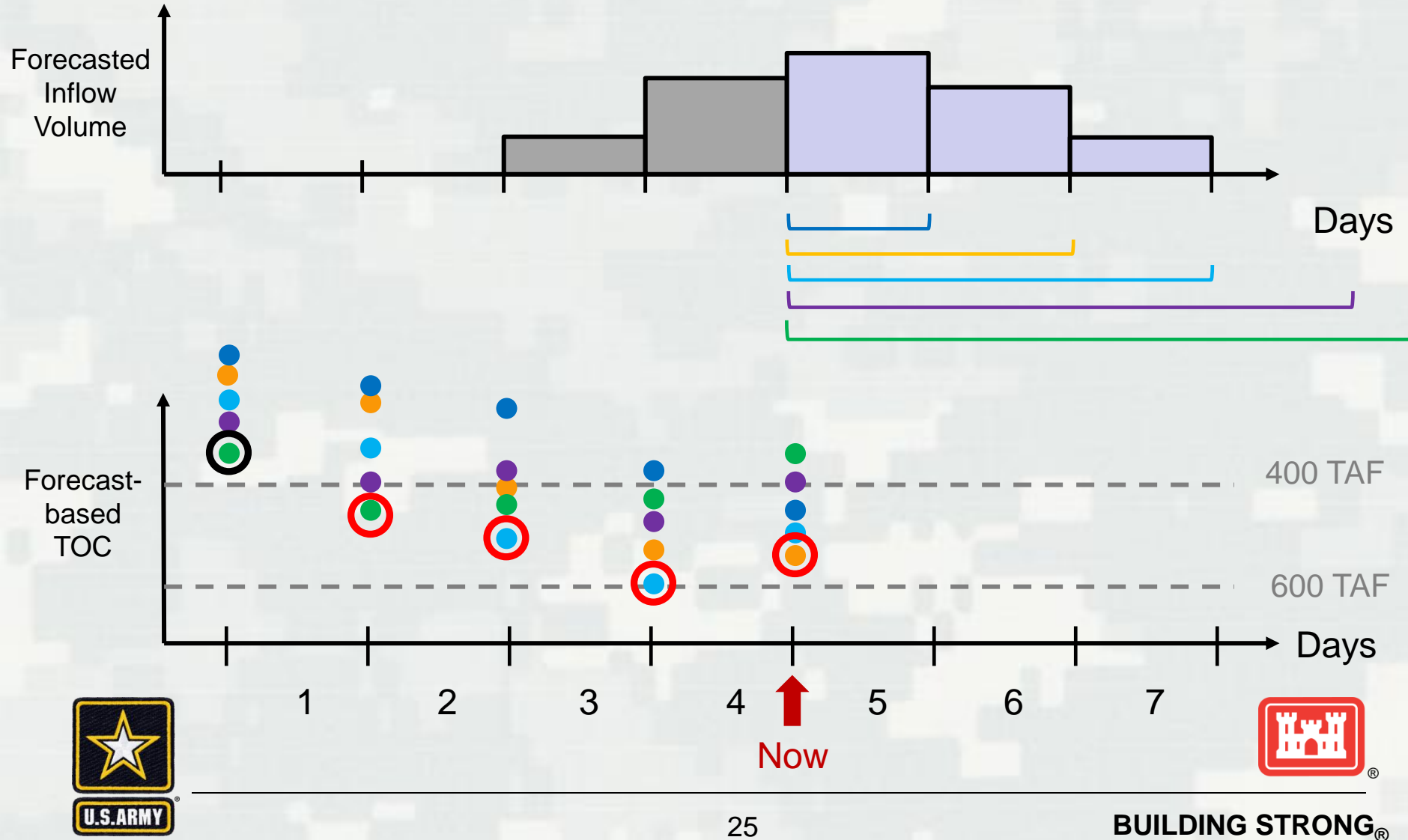
FORECAST-BASED TOC



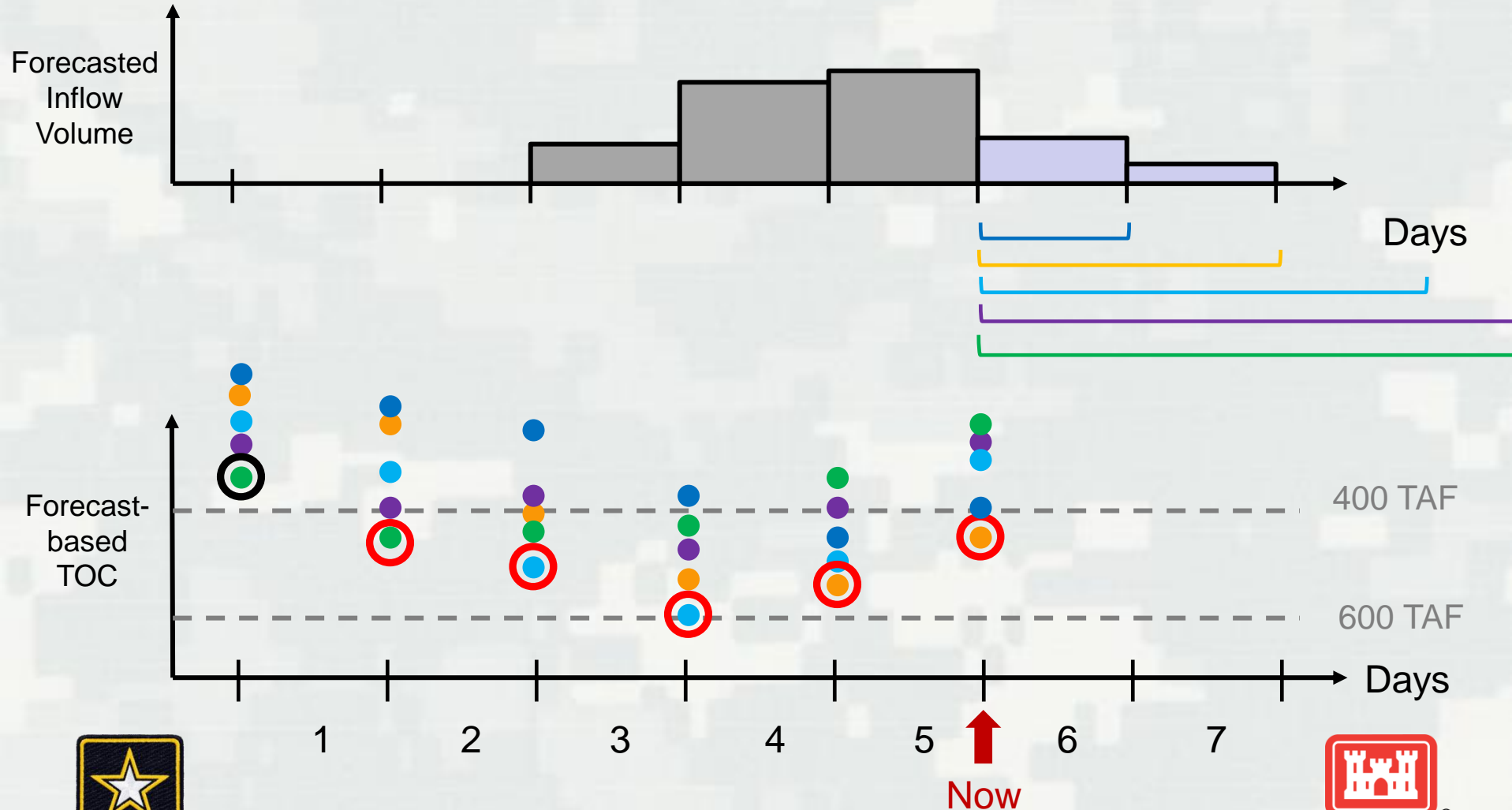
FORECAST-BASED TOC



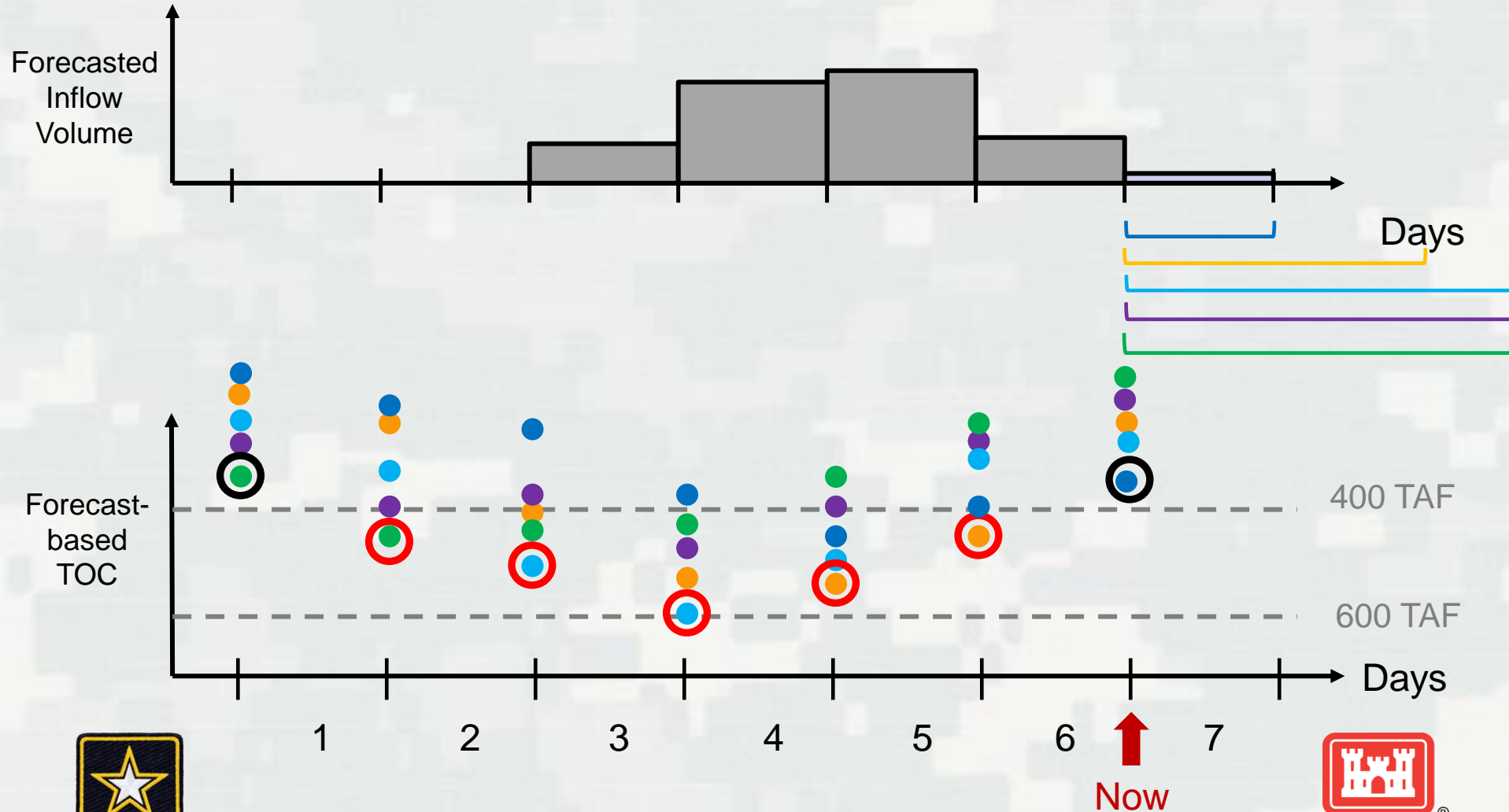
FORECAST-BASED TOC



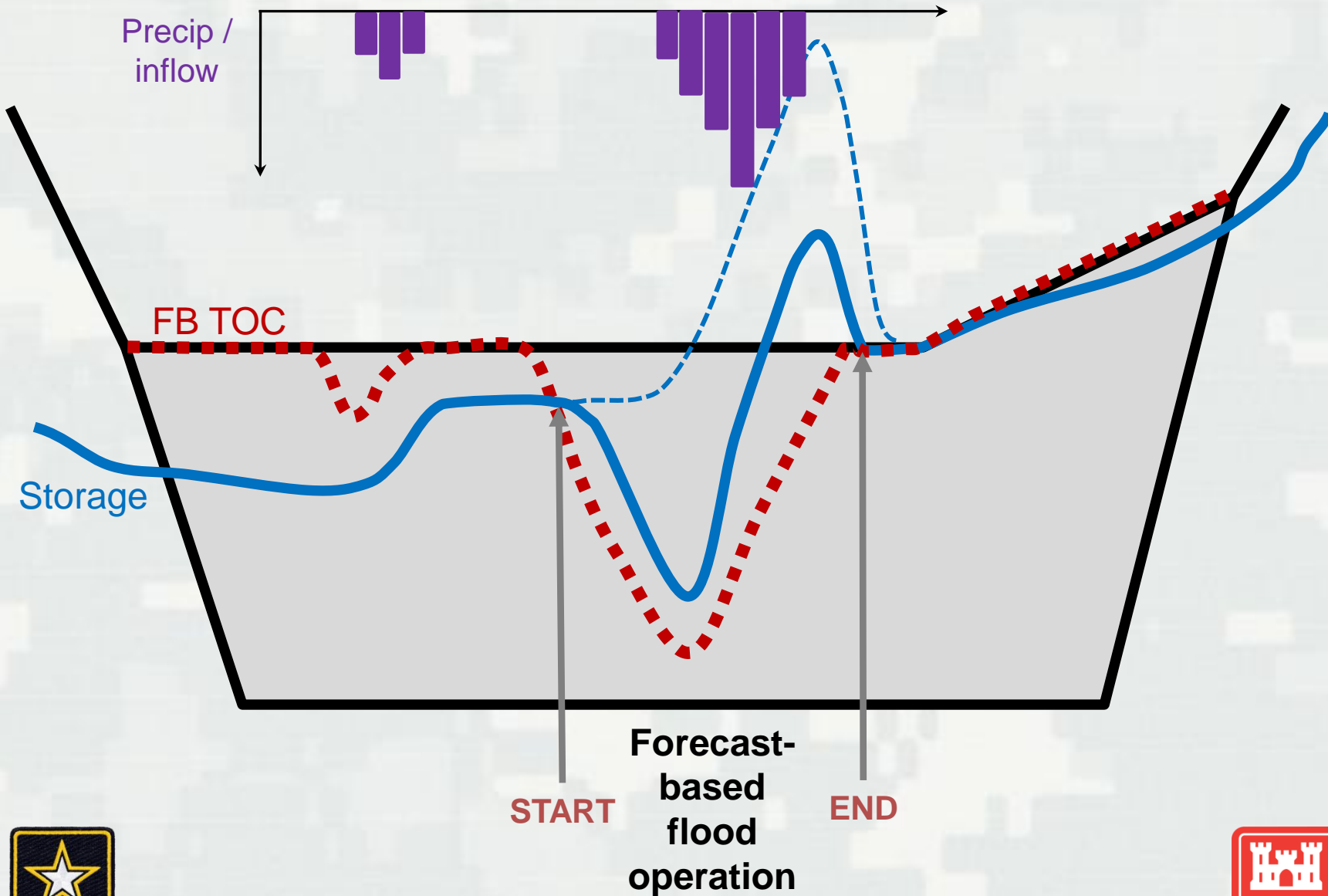
FORECAST-BASED TOC



FORECAST-BASED TOC



FORECAST-BASED OPERATION



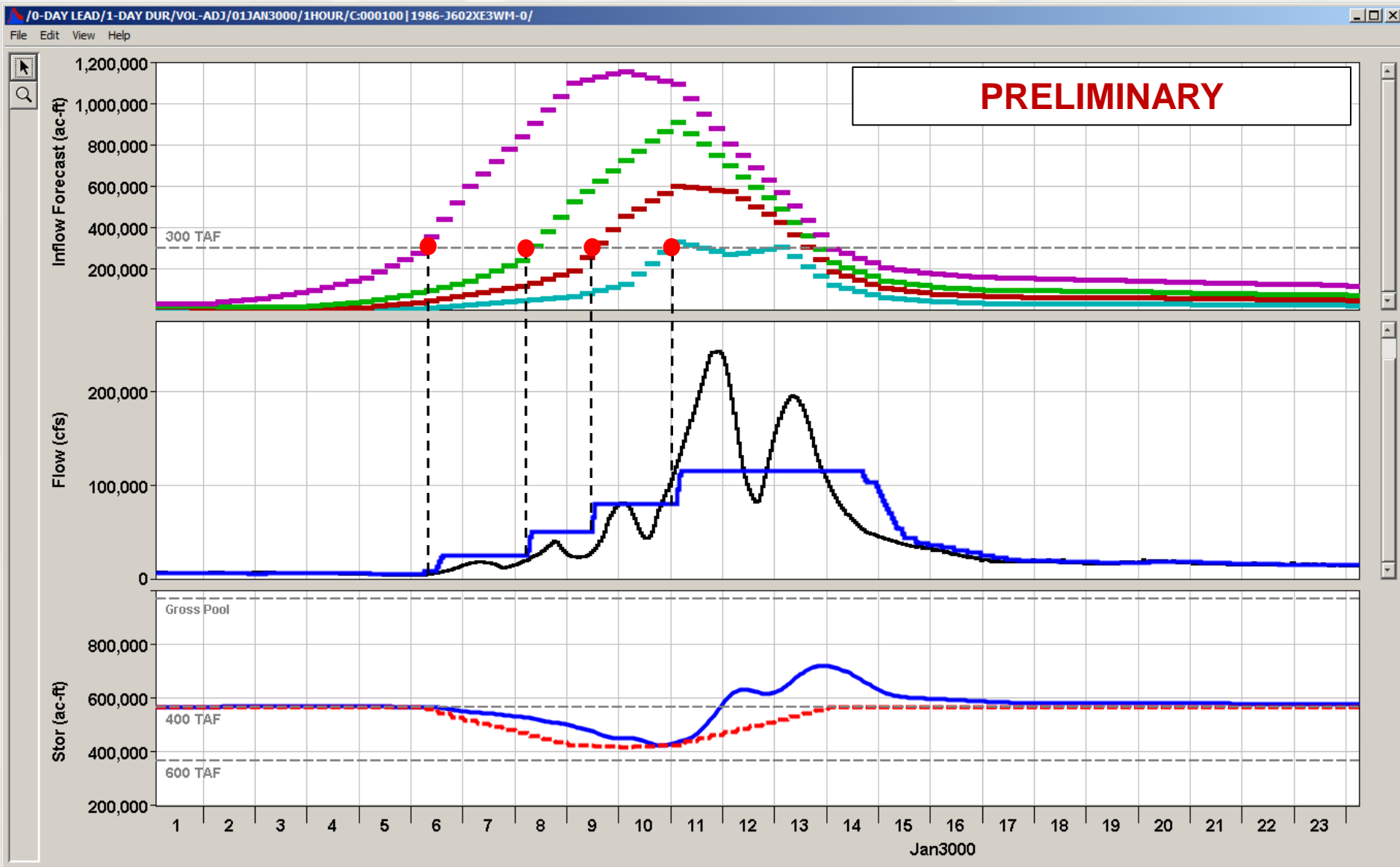
FORECAST-BASED RELEASES

PRELIMINARY

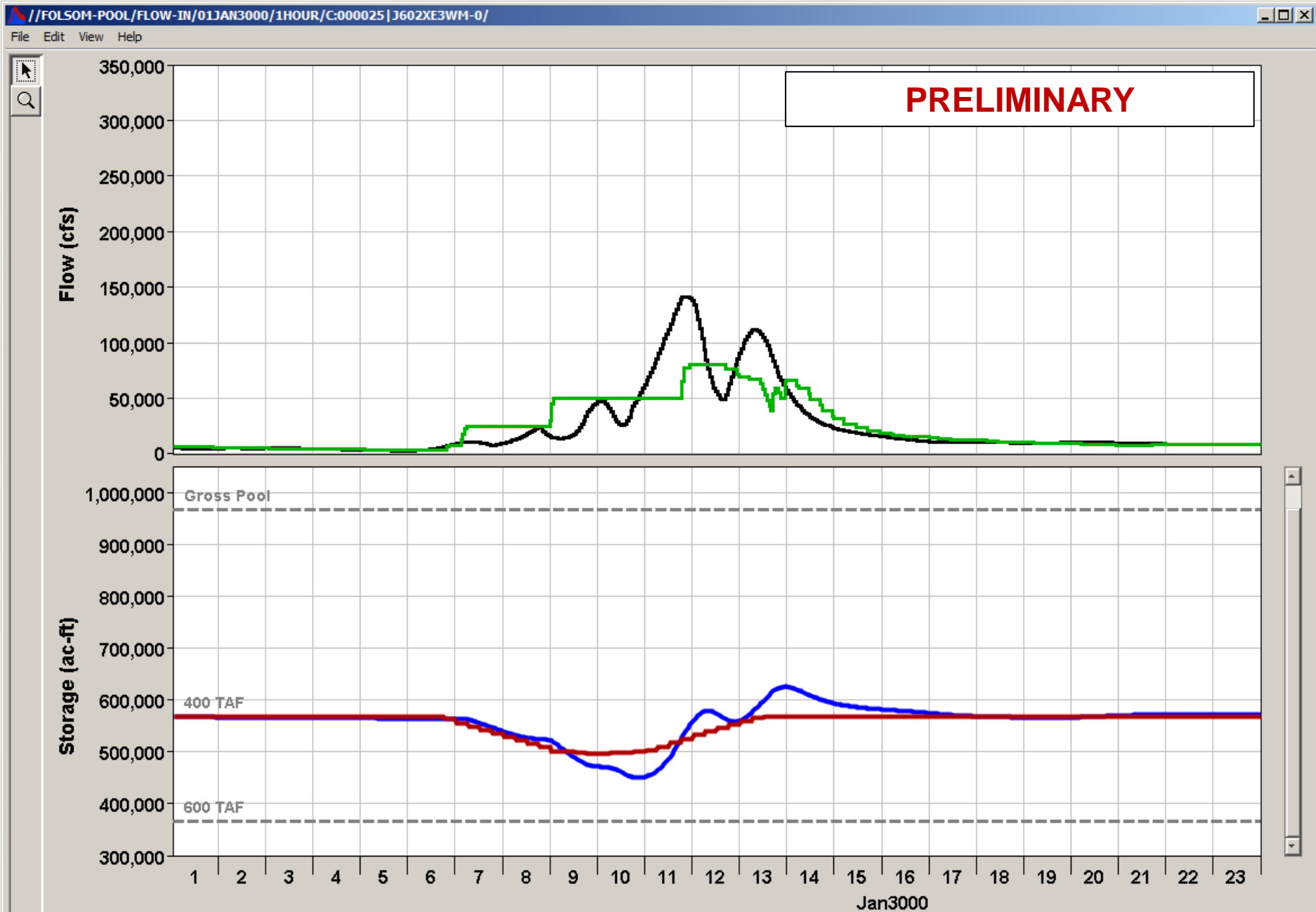
Forecast duration (days)	Forecast volume threshold (ac-ft)	Maximum Release (cfs)
5	< 300,000	8,000
5	300,000	25,000
3	300,000	50,000
2	300,000	80,000
1	300,000	115,000



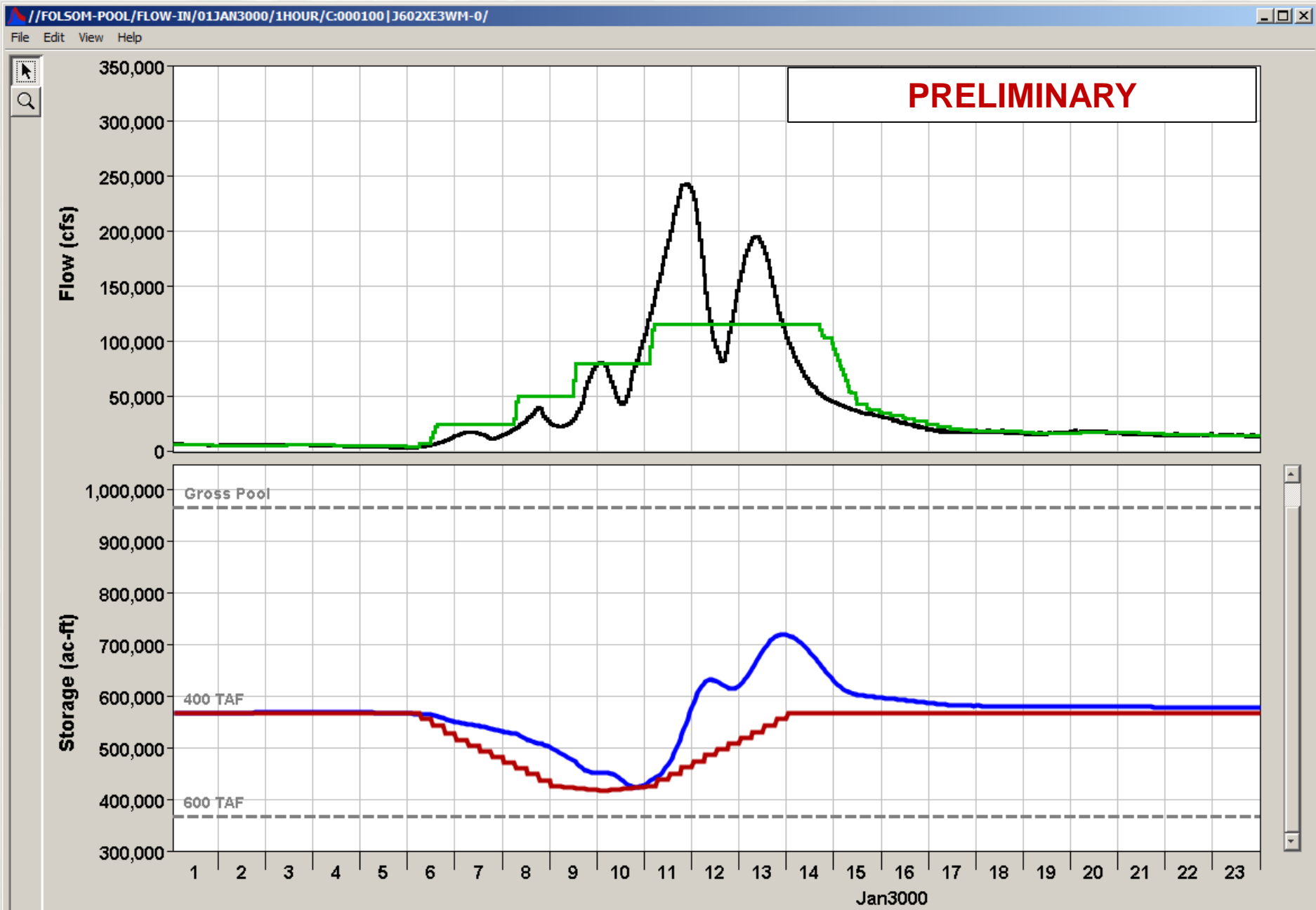
FORECAST-BASED RELEASES



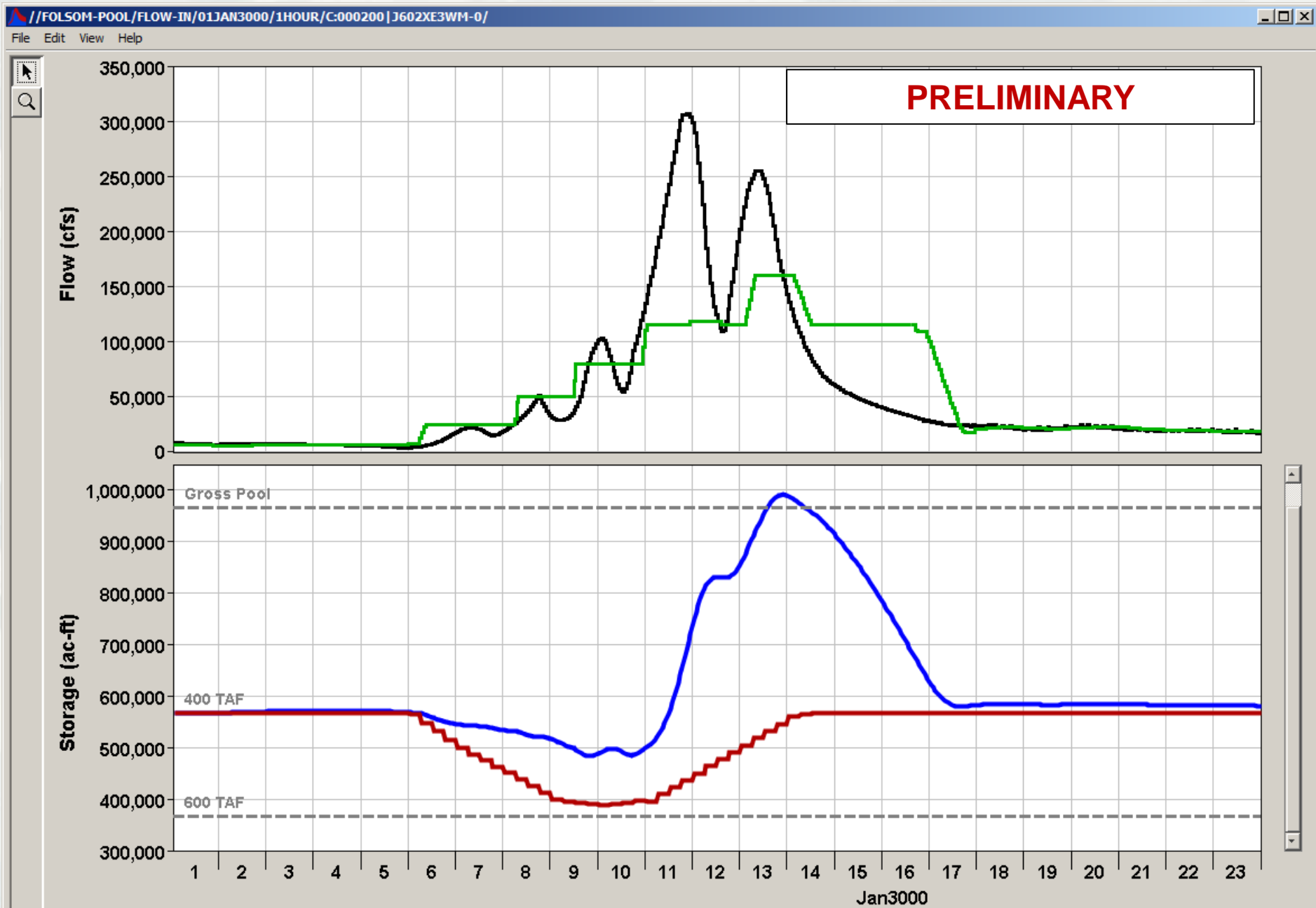
1986 PATTERN – 25-YR



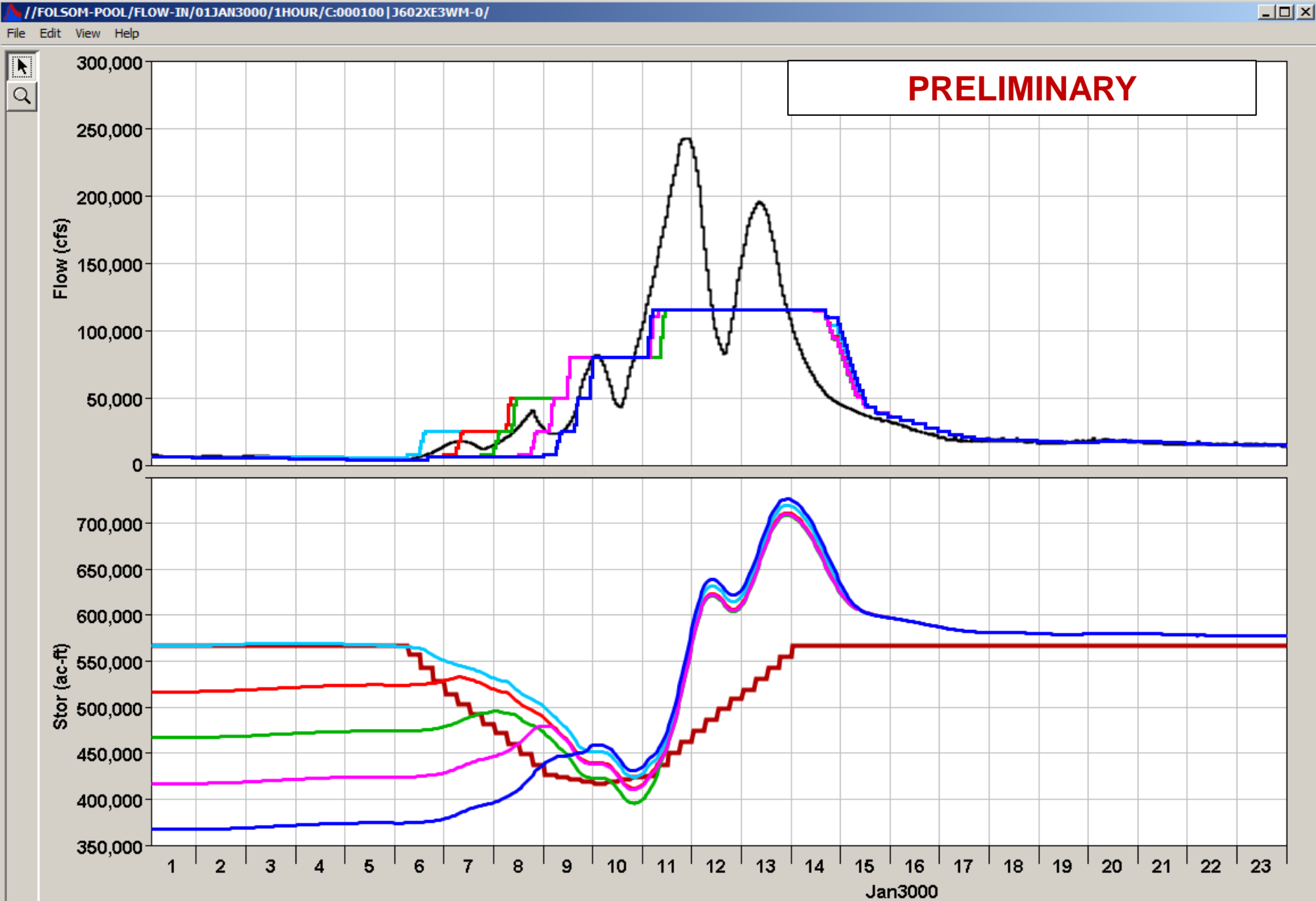
1986 PATTERN – 100-YR



1986 PATTERN – 200-YR



1986 PATTERN – 100-YR STARTING STORAGE SENSITIVITY



TENTATIVE ASSESSMENT

- **A forecast-based operations plan appears viable at Folsom Dam.**
 - ▶ Early results indicate clear benefits over other plans
 - ▶ Supportive response from USACE Headquarters
 - ▶ Potential significant adverse impacts not apparent
- **Performance trade-offs**
 - ▶ Frequency of flood operations not yet determined
 - ▶ Address potential for not refilling



NEXT STEPS

- Refine based on hindcast-based simulation results and operational considerations
- Adjust release triggers, magnitudes and rules to avoid impacts, balance trade-offs, and reasonably optimize performance
- Robust testing under historic and hypothetical hydrologic and operational conditions
- Additional USACE policy and technical review



QUESTIONS?



PROJECT MILESTONE SCHEDULE

SEPTEMBER 2015	HOLD PUBLIC WORKSHOP
JANUARY - FEBRUARY 2016	HOLD PUBLIC WORKSHOP TO: PRESENT AND DISCUSS TENTATIVELY RECOMMENDED ALTERNATIVE
FEBRUARY - JULY 2016	USACE PERFORMS FINAL REVIEW USACE COMPLETES DRAFT NEPA / CEQA DOCUMENTS



DISCUSSION & QUESTIONS



OCT 2017

