

WHY PLAN? AN UPDATE ON THE COLORADO RIVER RISK STUDY

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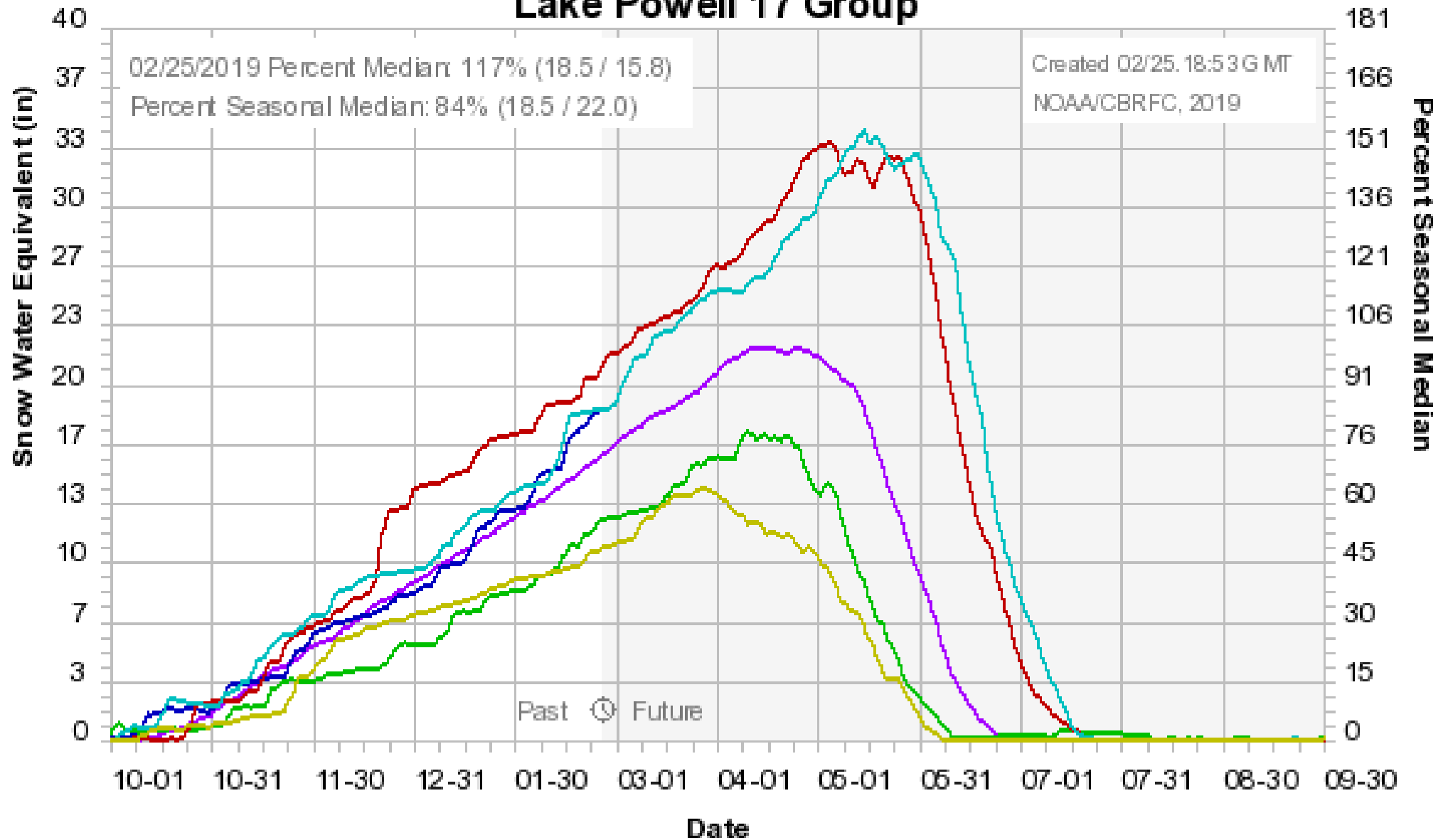
JANUARY 25, 2019



BACKGROUND AND CATALYST FOR RISK STUDY

- 2014: In light of the ongoing drought, and at the urging of Secretary Jewell, Upper Colorado River Commission and Lower Basin States begin coordinated, but independent development of Drought Contingency Plans (DCP).
- Dec 2014 Joint West Slope BRT Meeting. Participants express an interest in understanding more about the risks of ongoing drought , the DCPs, and what a demand management program might look like for Colorado River water users.
- Colorado's Water Plan: Take actions that will minimize risk of compact curtailment actions (pt. 4 of Seven Point Framework)
- We are now in Phase III of the Study.

Colorado Basin River Forecast Center Lake Powell 17 Group



02/25/2019 Percent Median: 117% (18.5 / 15.8)
Percent Seasonal Median: 84% (18.5 / 22.0)

Created 02/25, 18:53 GMT
NOAA/CBRFC, 2019

Past ⌚ Future

Median 1981-2010 2019 2018 2011 1995 2002

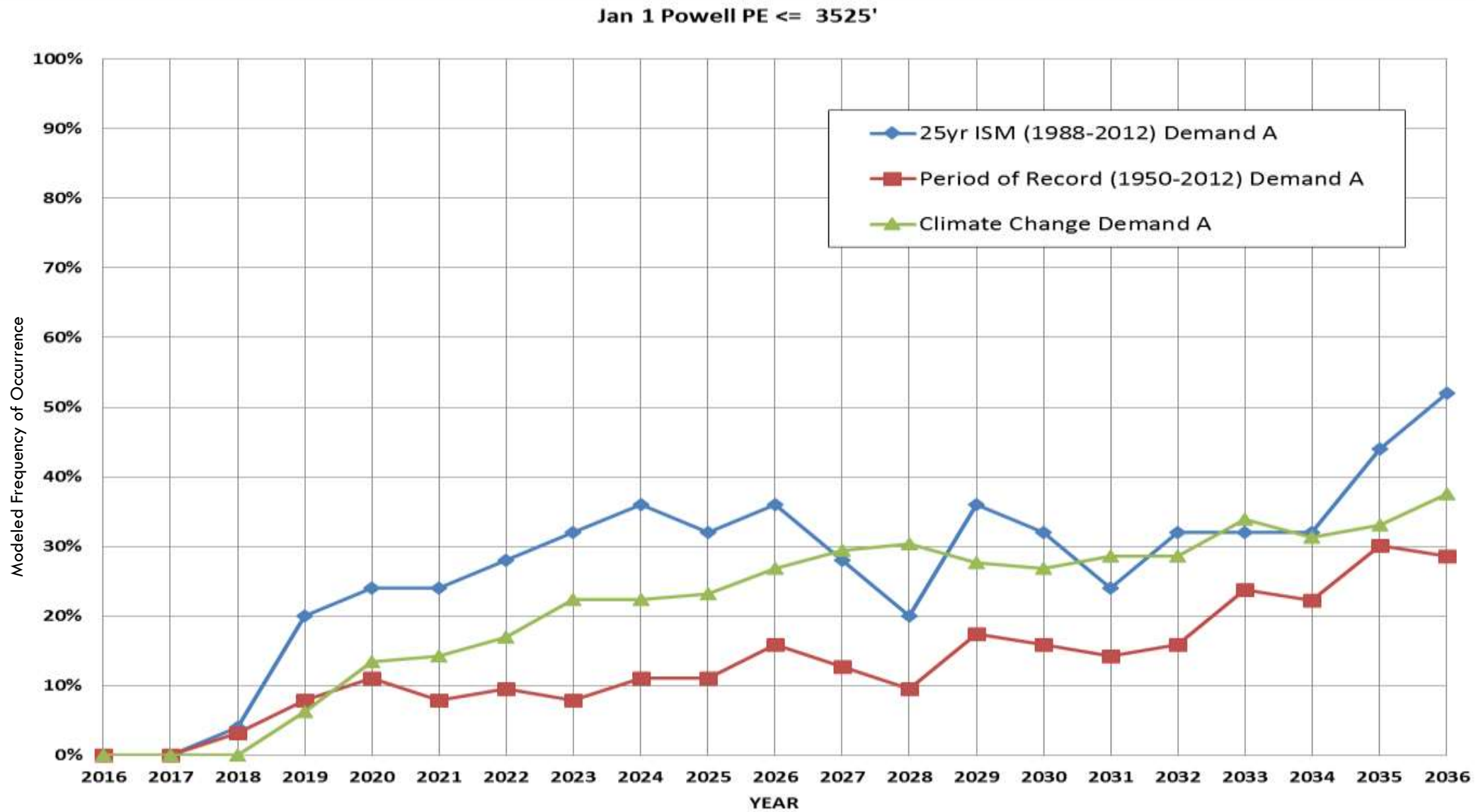
IS THE “CUP” HALF FULL OR HALF EMPTY?

- FEB 20:
 - MEAD ELEV 1,087' = 10.56 MAF (40% OF 26.2 MAF CAPACITY)
 - POWELL ELEV 3,573' = 9.38 MAF (39% OF 24.3 MAF CAPACITY)

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- HALF FULL? NEED 4 2011 RUNOFF YEARS IN A ROW TO REFILL BOTH POWELL AND MEAD
- HALF EMPTY? ANOTHER 2002 COULD DROP POWELL CLOSE TO ITS MINIMUM POWER POOL (*IF NO CORRECTIVE ACTION WERE TAKEN)

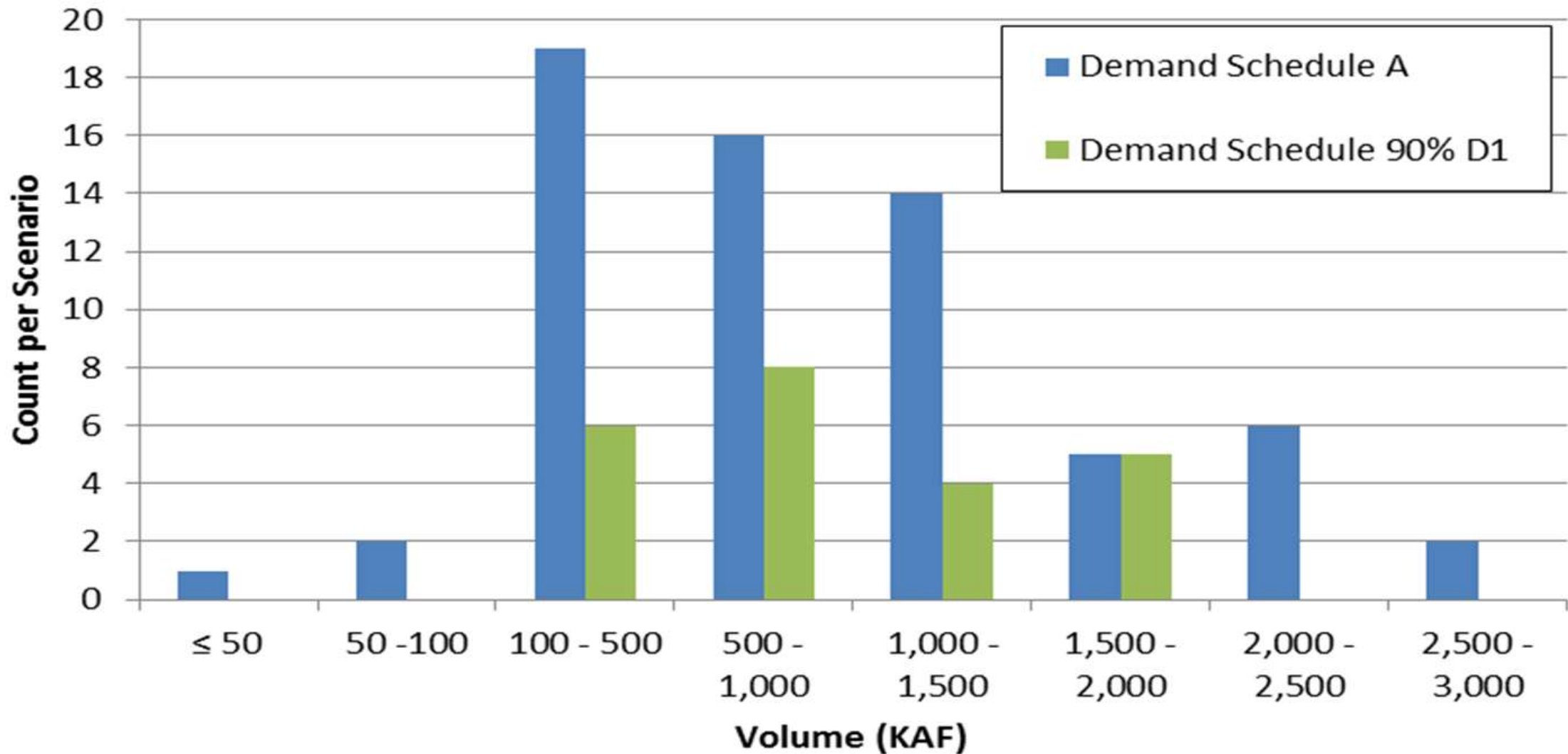
RISK DRIVERS: HYDROLOGIC UNCERTAINTY



RISK STUDY HIGHLIGHTS

- Objective: Better understand how proposed actions (e.g., Drought Contingency Plan, Demand Management) and continuing drought impact users of Colorado River water within Colorado.
- How? Look at a variety of questions using 2 models:
 - CRSS: Reclamation's model of the entire Colorado River Basin (Interim Guidelines)
 - StateMod: CWCB model for analysis of water rights administration in CO.
- What are the risks we are trying to understand?
 - Compact Deficit / Compact Call?
 - Voluntary (or otherwise) demand management?
 - Loss of Hydropower?
 - To avoid these "bad situations", **How much water is needed and how often?**

**Annual Volumes Needed to Maintain Powell > 3525 on Dec 31
2016-2036 Simulation Period**



THE BIG PICTURE (SO FAR)

- Regarding Risk: Hydrology, Consumptive Use, and Future Demand growth matter. We can't control hydrology, but the higher the consumptive use in the Upper Basin coupled with a given hydrology will increase the likelihood of critical events at Lake Powell.
- Phase I Take-away:
 - CRSP reservoir drought operations reduces the risk, but in more severe droughts, demand management could be necessary to maintain critical elevations. (And some of these volumes are large)
- Phase II Take-aways:
 - A “water bank” to support Powell elevations and Lee Ferry flows can limit the annual volumetric impacts to water users by spreading conservation over many years (see DCP agreement for 500kaf pool).
 - By coupling StateMod with CRSS, we have a tool capable of addressing the administrative questions of demand management together with the external driver of Lake Powell operations.

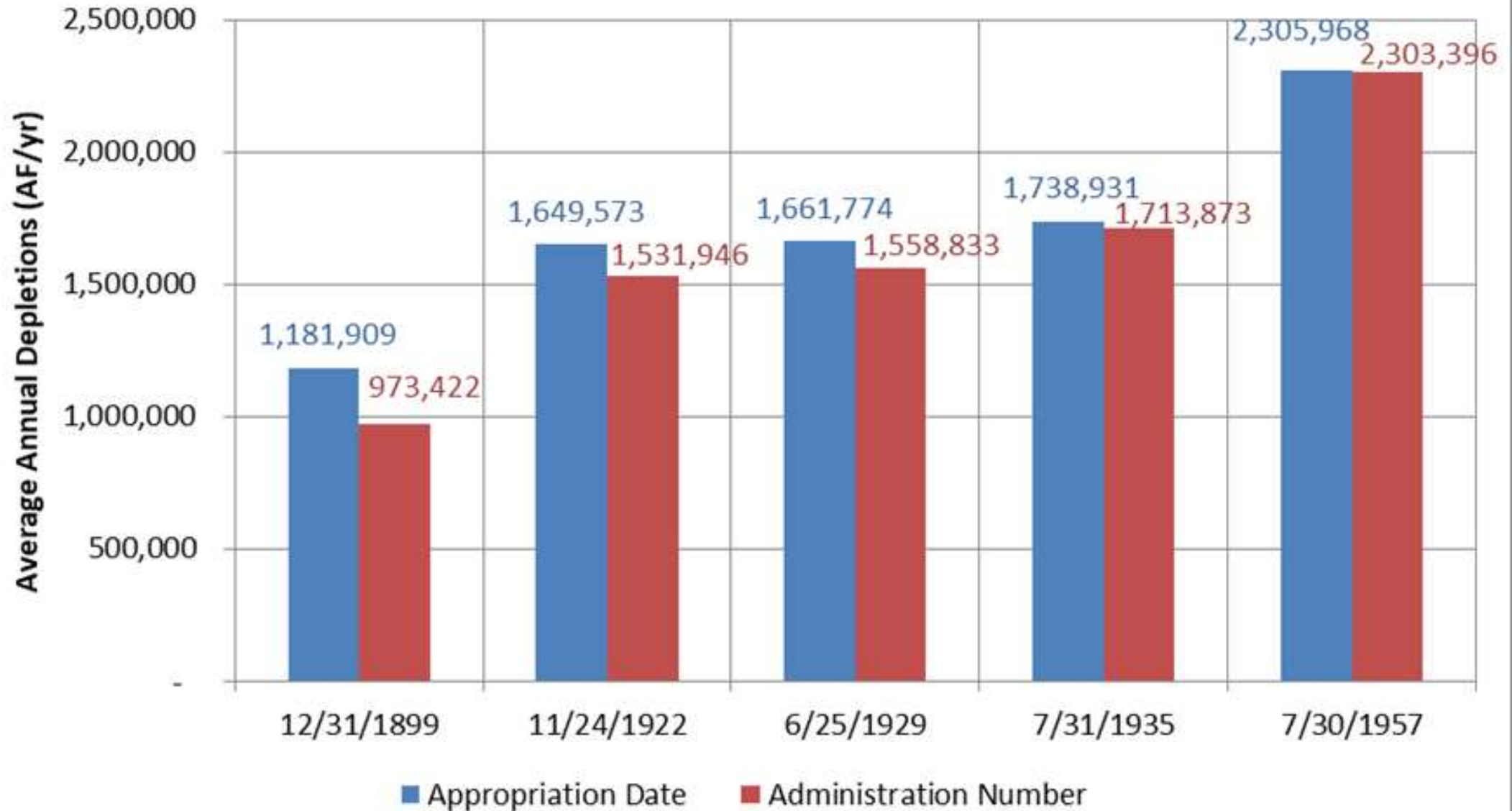
ONGOING WORK: PHASE III

- Current and future conditions modeling in both CRSS and StateMod
 - Current = 2018 Demand schedule from UCRC (CRSS); StateMod's baseline
 - Future Demands = Define first for StateMod, then synchronize with CRSS
- Investigate StateMod behavior with respect to admin and adjudication dates:
 - within and across west-slope basins
 - Using several different administration dates
- Evaluate different curtailment assumptions in StateMod:
 - Volumes by basin
 - Volumes by west slope / TBD pro-rata (split by basin or as a whole)
- Evaluate a 1.0 MAF water bank at Powell with 100kaf and 200kaf annual contributions

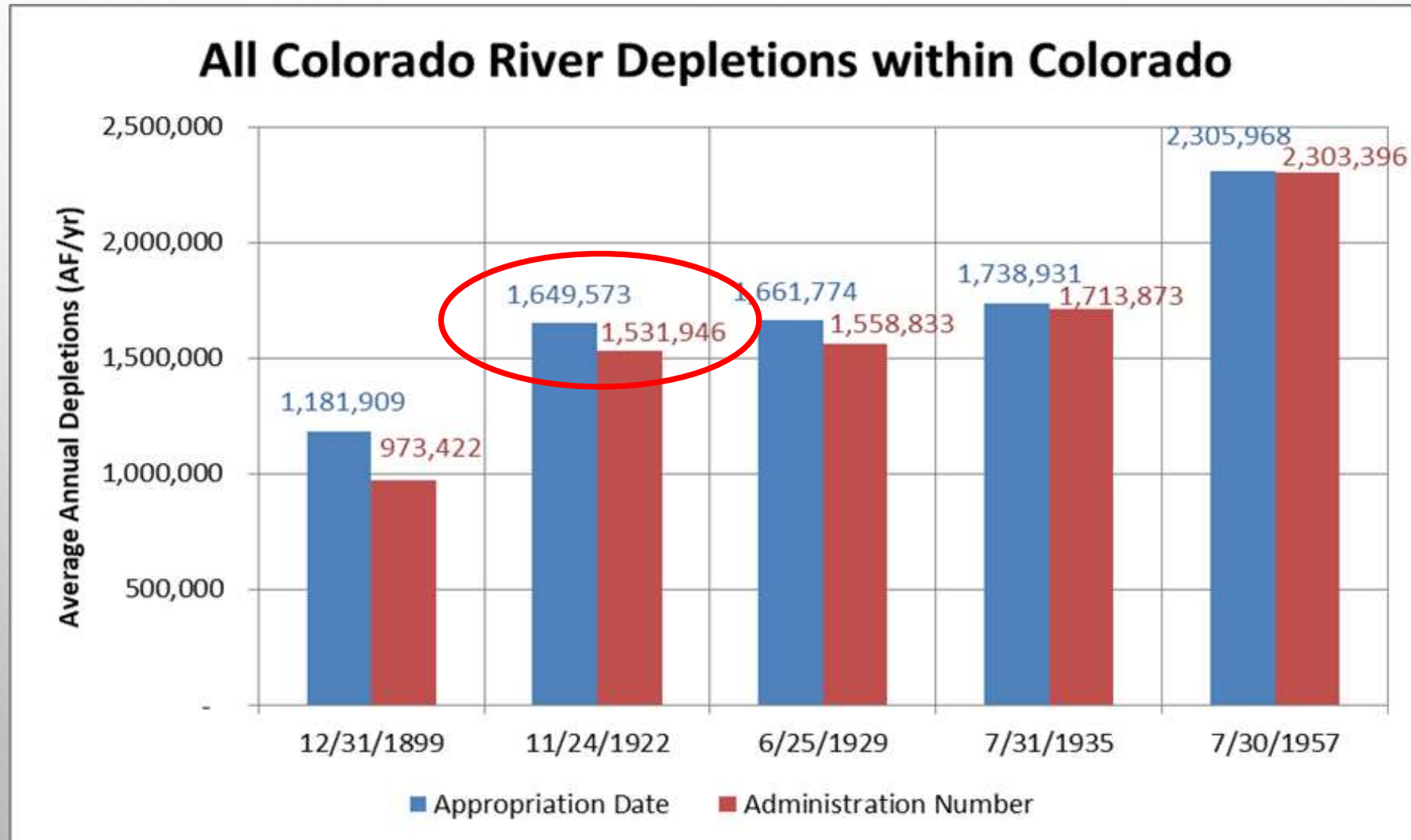
ADMINISTRATION DATES

- (12/31/1899) TURN OF THE TWENTIETH CENTURY
- (11/24/1922) THE SIGNING OF THE COLORADO RIVER COMPACT
- (6/25/1929) THE SIGNING OF THE BOULDER CANYON PROJECT ACT
- (7/31/1935) ONE DAY PRIOR TO THE COLORADO-BIG THOMPSON PROJECT AUTHORIZATION
- (7/30/1957) THE DAY AFTER THE FRYINGPAN-ARKANSAS PROJECT AUTHORIZATION

All Colorado River Depletions within Colorado



- NOTE THE SIMULATED PRE-COMPACT CONSUMPTIVE USE NUMBERS
- WHY? INCREASED IRRIGATION EFFICIENCY IF ONLY USING PRE-1922 RIGHTS, AND SIGNIFICANT CHANGES IN ESTIMATES OF ET WHEN USING NEW METHODS



WHAT'S NEXT?

- Simulate Future Demands based on input from BRTs
 - Confirm each Basin's demands
 - Simulate in CRSS and StateMod
- Conduct StateMod runs to evaluate different admin scenarios:
 - Pro-rata volumes by sub-basin
 - Pro-rata volumes east/west
 - Total volumes by admin dates
 - Etc.
- Meetings: look to late winter/early spring for meetings with BRTs

The image features a light gray background with a subtle radial gradient. The word "END" is centered in a bold, black, sans-serif font. Water droplets of various sizes are scattered in the corners, with a cluster in the top-left, a single one in the top-right, and a group in the bottom-right. The droplets are rendered with soft shadows and highlights, giving them a three-dimensional appearance.

END

Upper Colorado River Basin High/Low Snowpack Summary

Based on Provisional SNOTEL data as of Jan 13, 2019

