

Predicted Hydrology for 2022 Spring/Summer

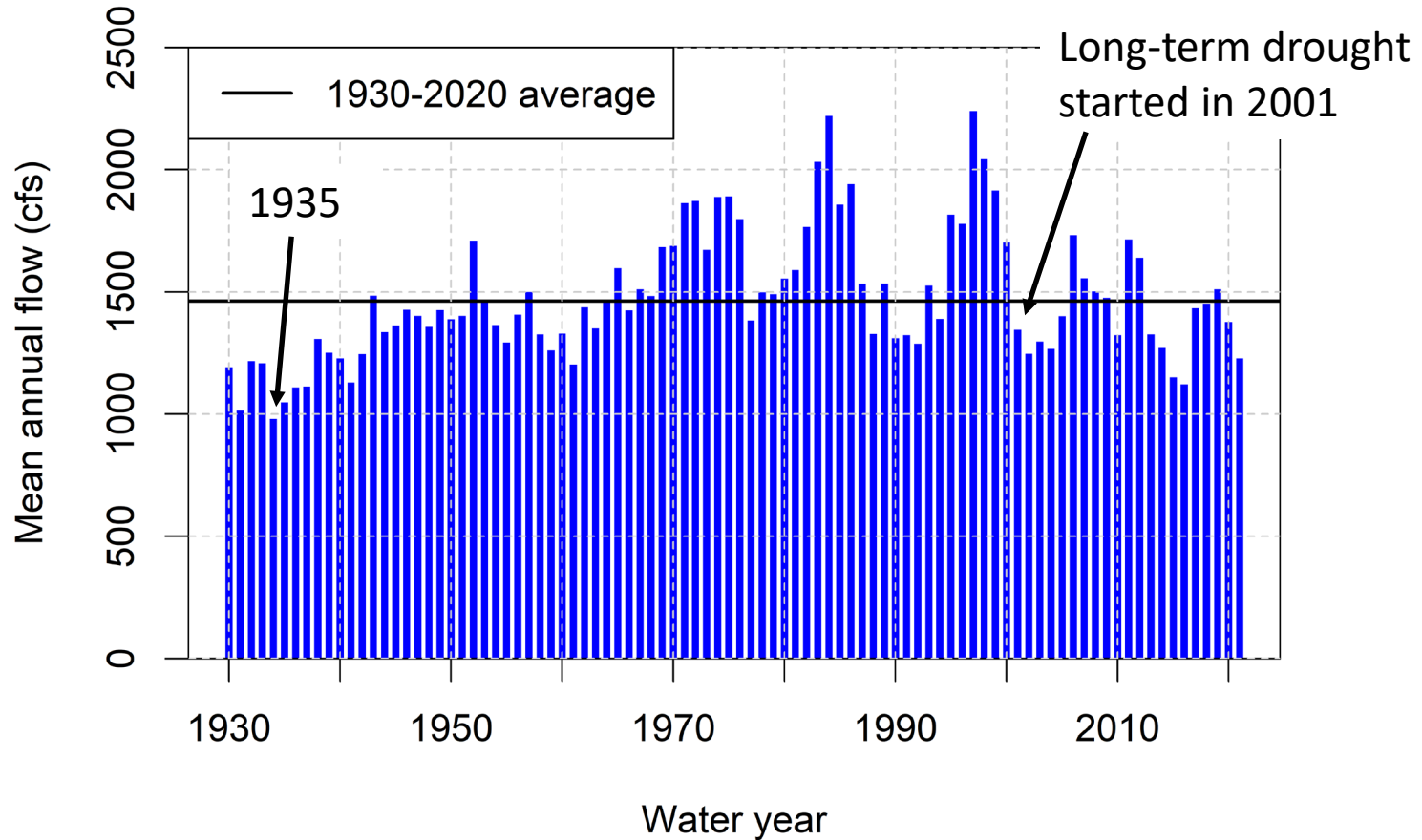
Henry's Fork Watershed Council, April 12 2022



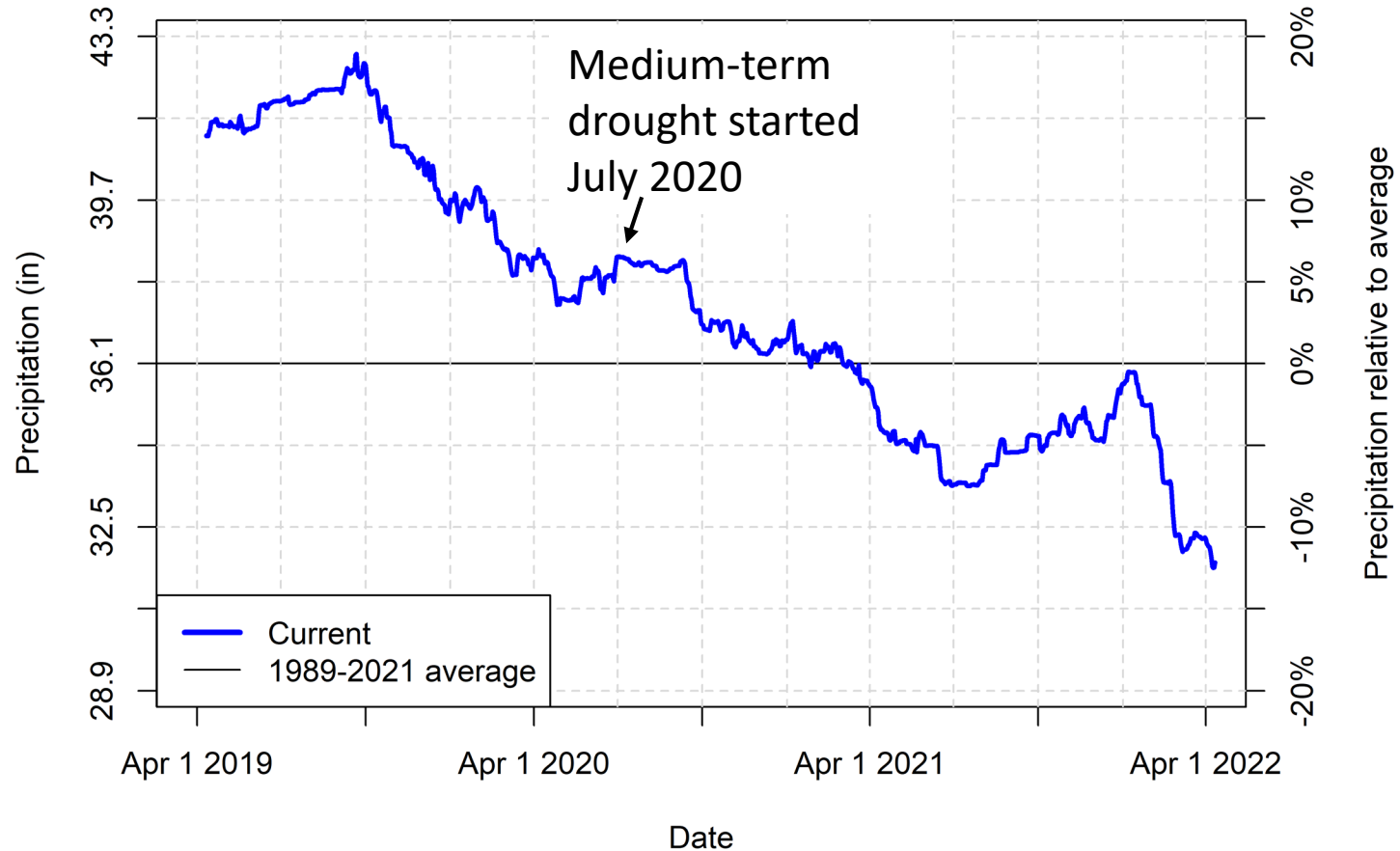
Outline

- Current drought: long- and short-term
- A disappointing winter
- Natural flow predictions
- Irrigation-season model inputs
- Irrigation management scenarios
- Model results

Mean water-year natural inflow: Henry's Lake to Ashton



Three-year Average Annual Watershed Precipitation



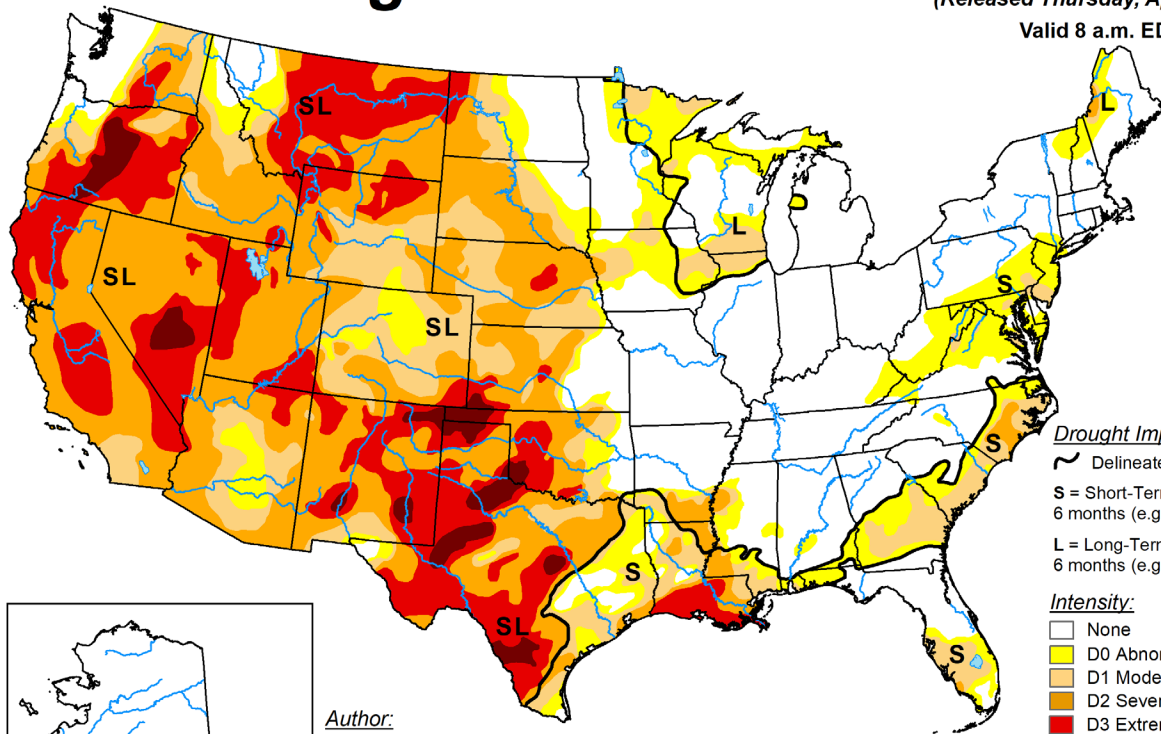
U.S. Drought Monitor

April 5, 2022

(Released Thursday, Apr. 7, 2022)

Valid 8 a.m. EDT

...and here we are.



Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Author:

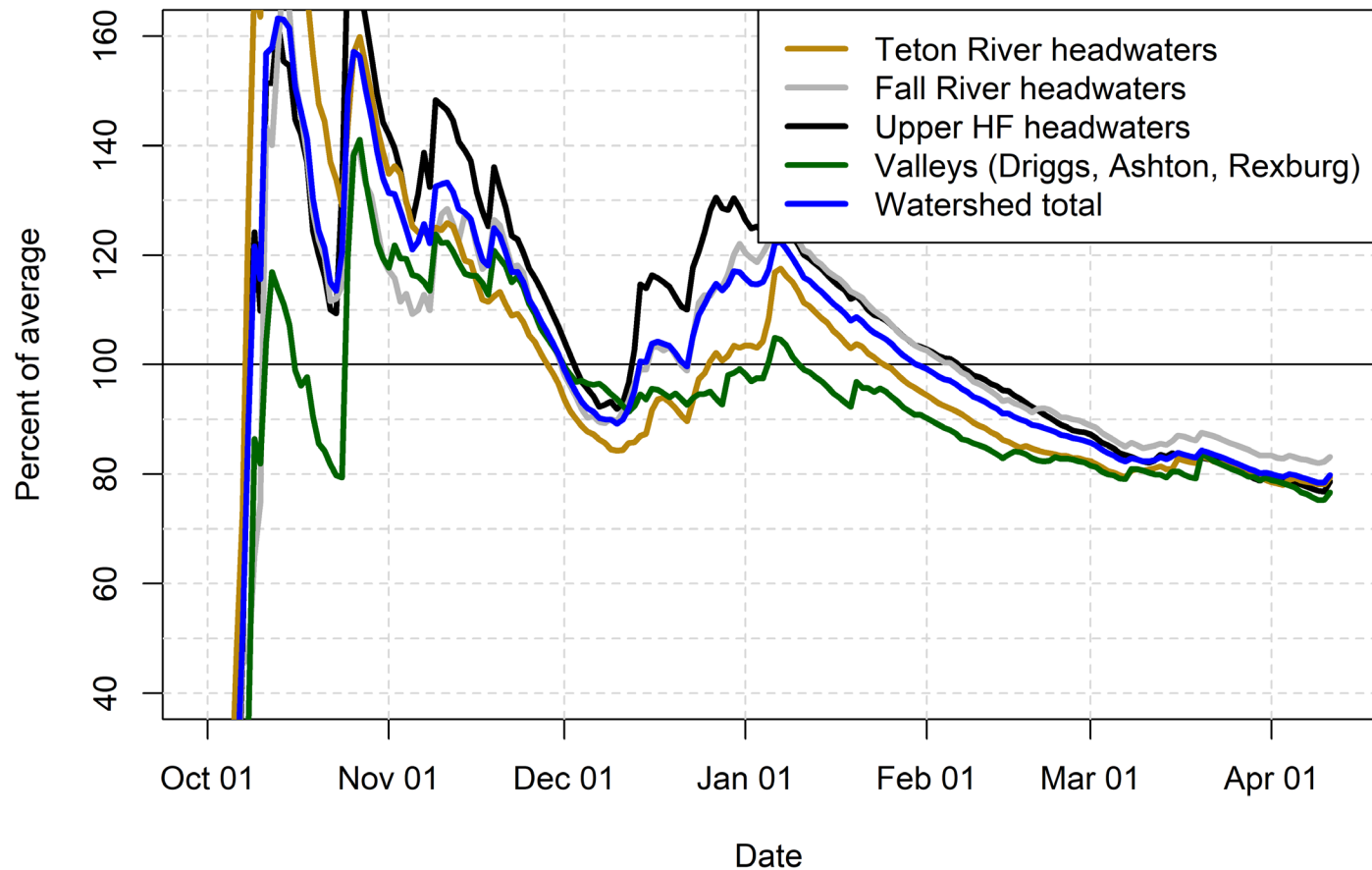
Deborah Bathke
National Drought Mitigation Center

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

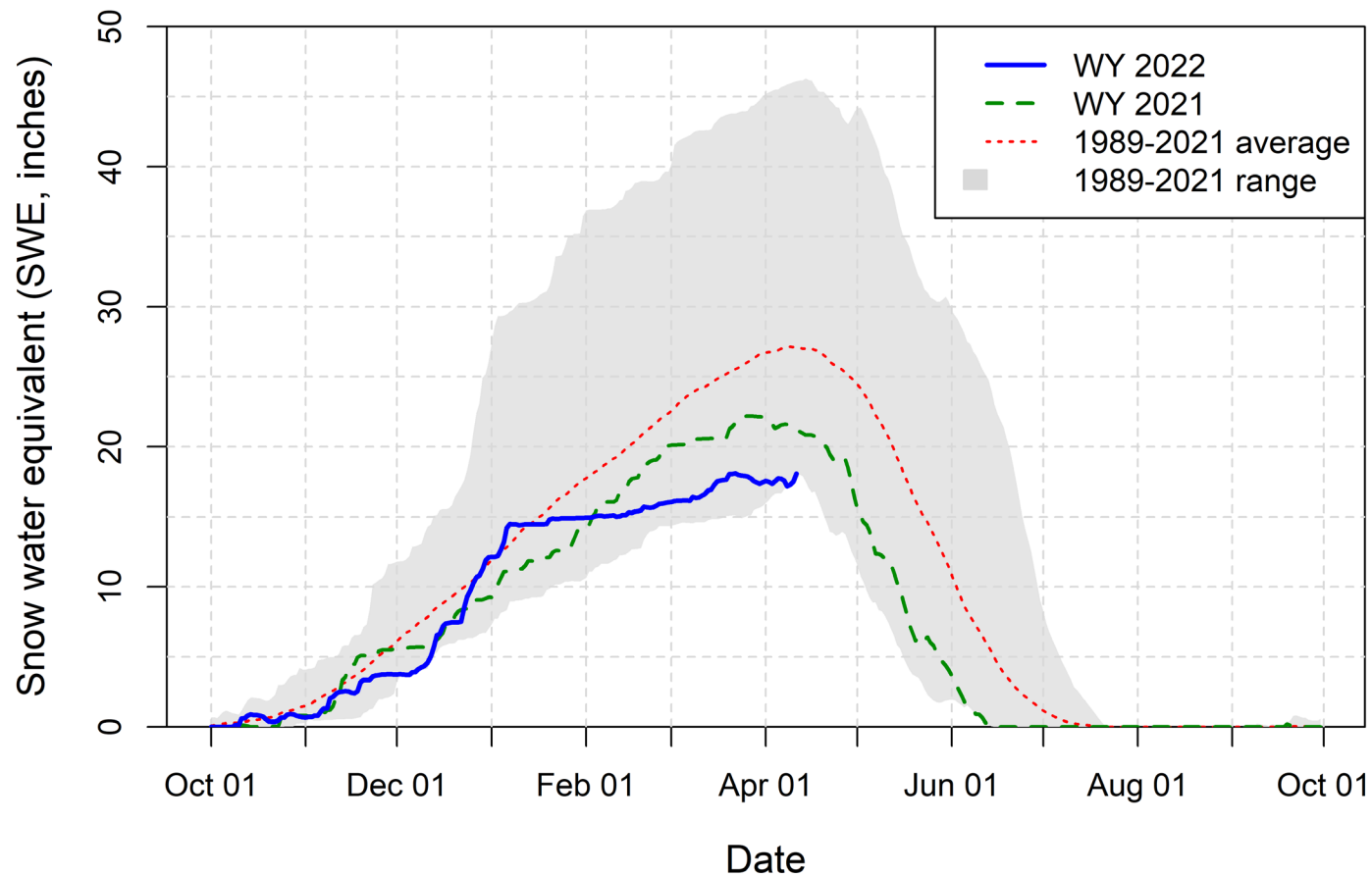


droughtmonitor.unl.edu

Henry's Fork Watershed Water-year Precipitation, Tue Apr 12 2022

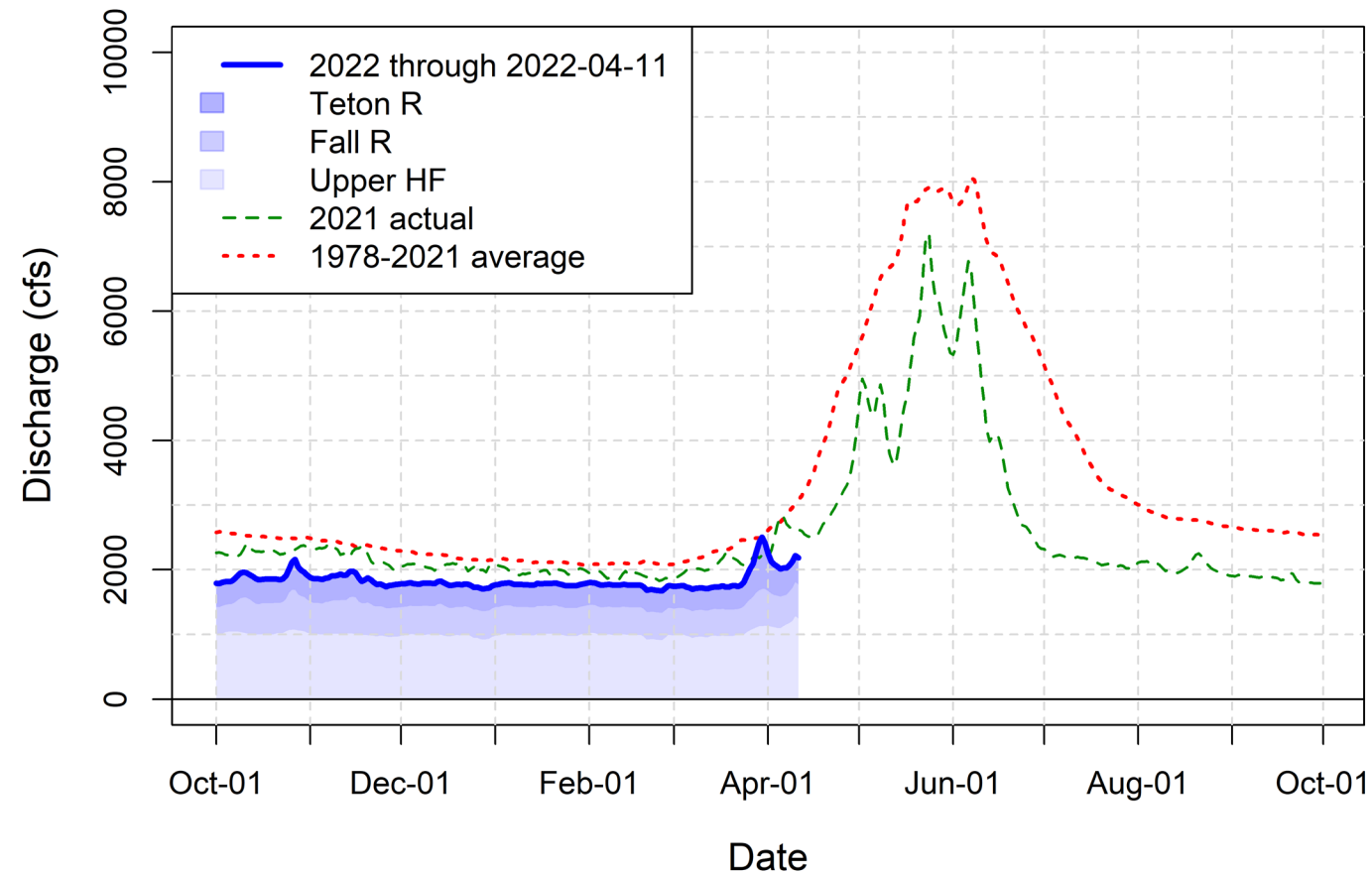


Henry's Fork Watershed Mean SWE Accumulation Apr 12 2022



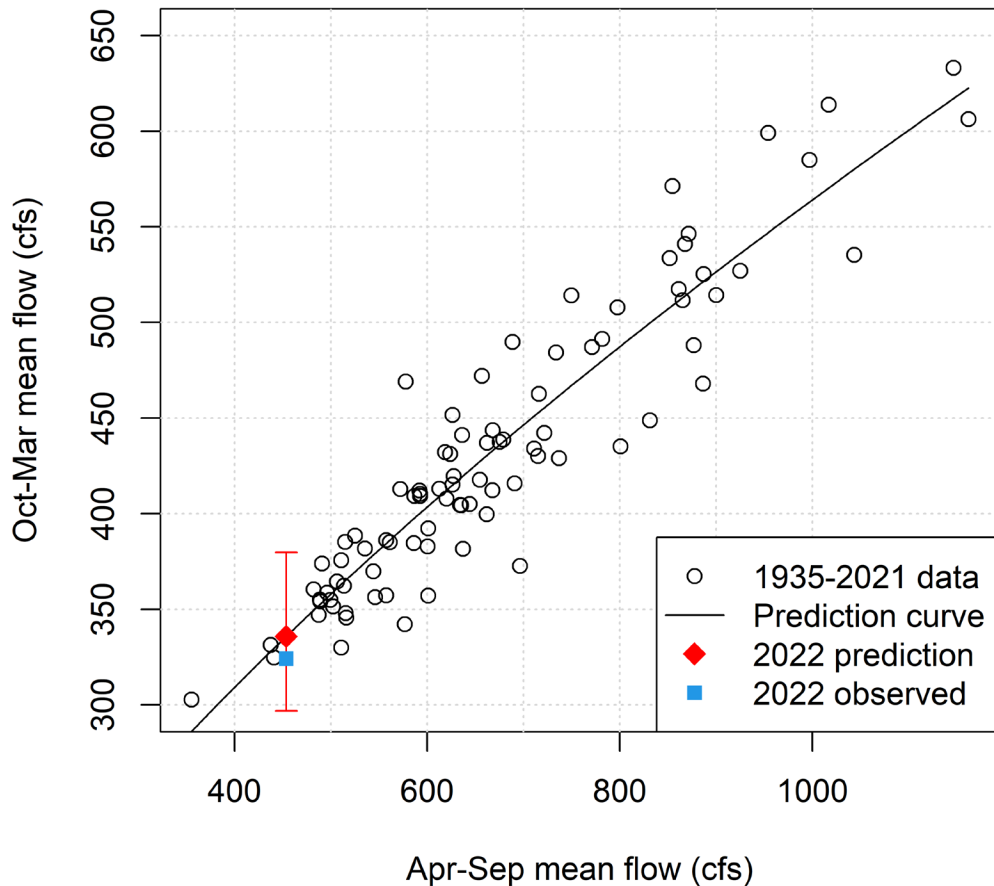
Since April 1, SWE is among lowest three years, with 2001 and 2015.

Henry's Fork Total Natural Flow (Water Supply)



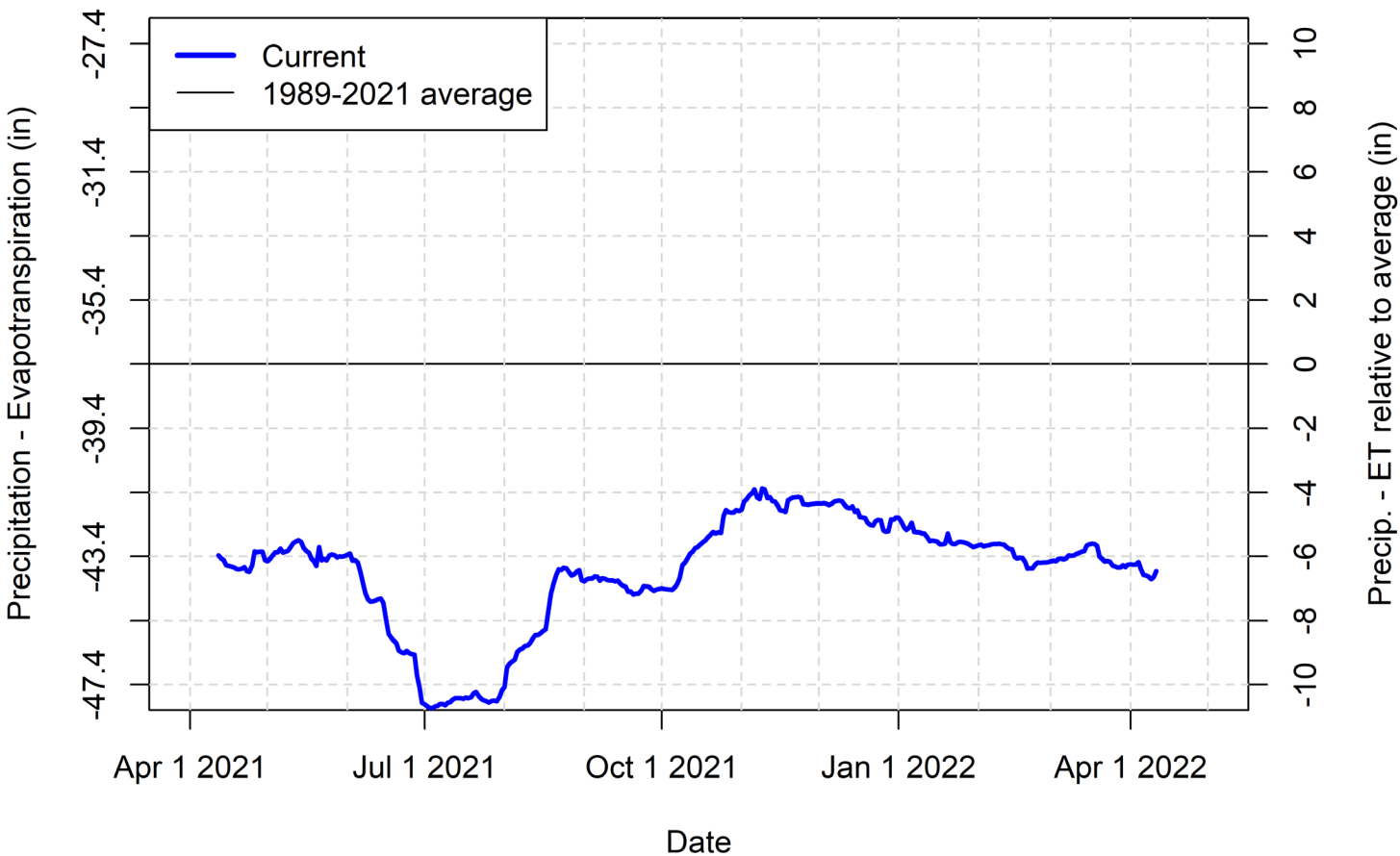
Winter base flow
80% of average and
among lowest on
record.

Oct-Mar Henry's Lake to Island Park inflow



- 75% of long-term average
- Second lowest only to 1935

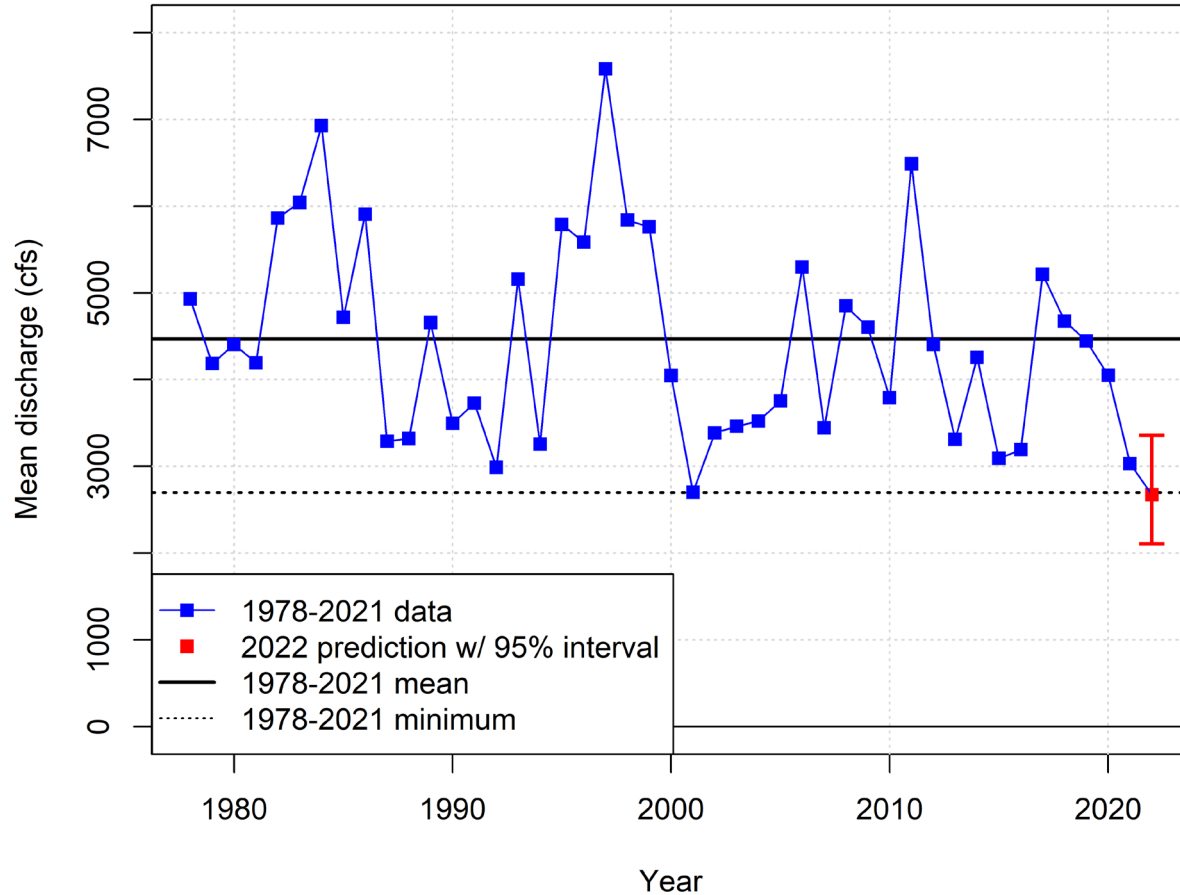
One-year Cumulative Agricultural Moisture Availability



Moisture deficit as a predictor:

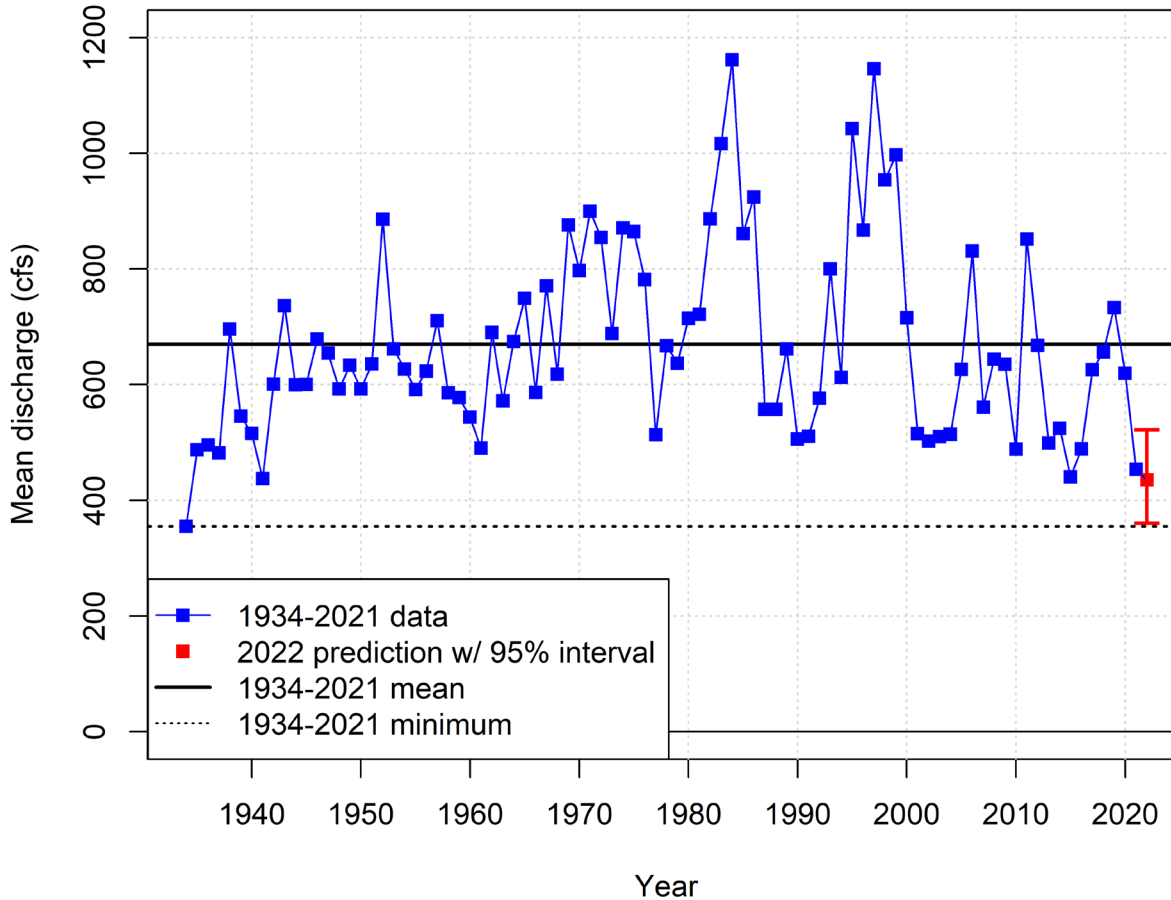
- Lowered predicted streamflow
- Decreased prediction error
- Most influential in upper HF

Apr-Sep Henry's Fork Watershed Natural Flow



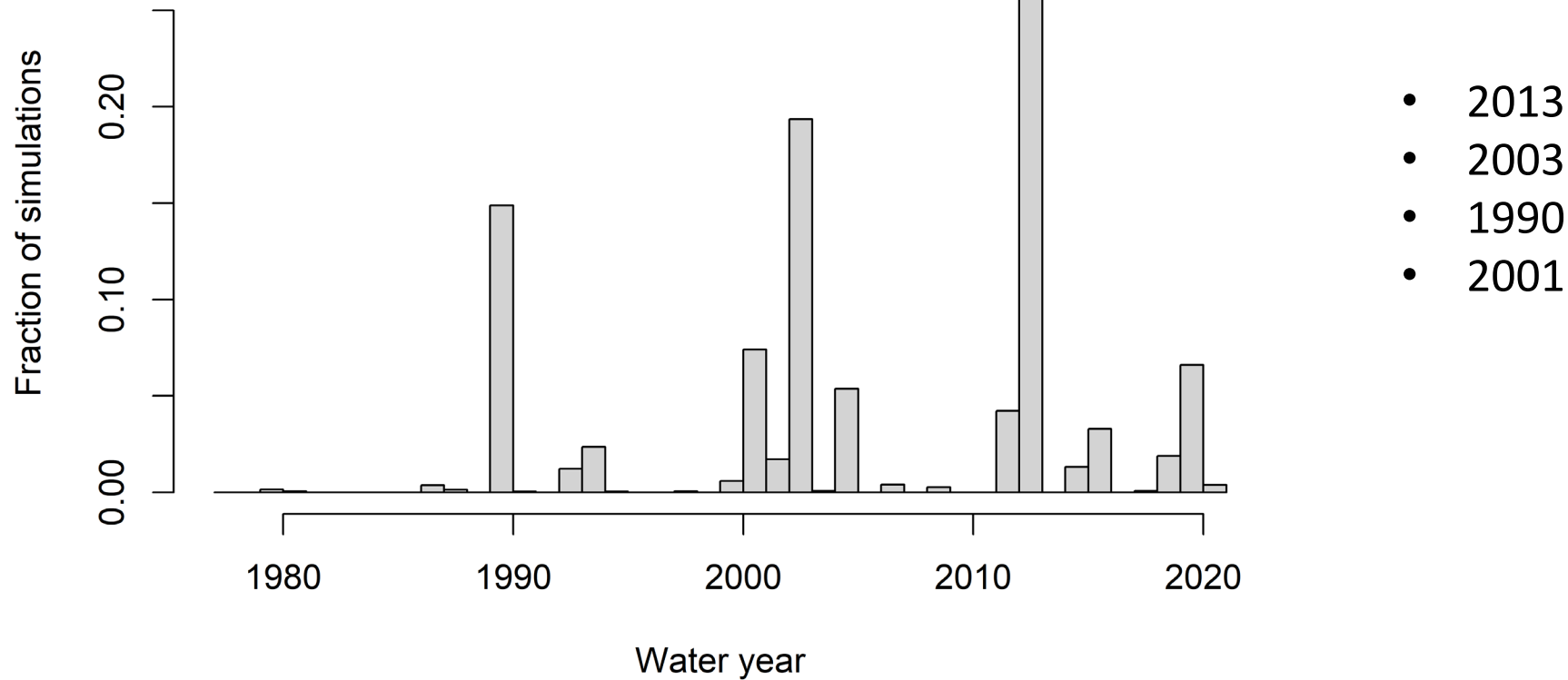
- 60% of “modern” average
- Prediction ties 2001 for lowest
- > 50% probability of being worse than 2001

Apr-Sep Natural Inflow between HL and IP

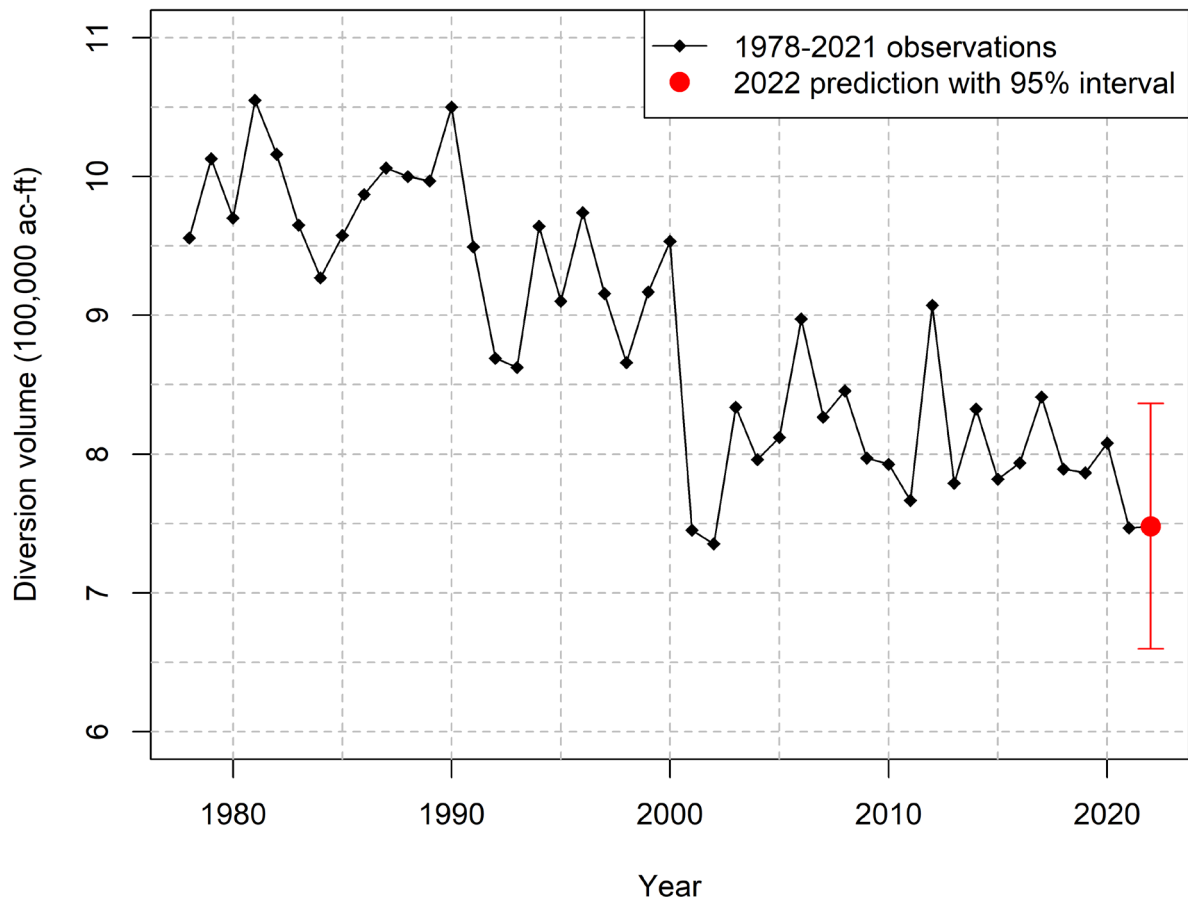


- 64% of long-term average
- Prediction is second lowest to 1935
- ~ 2% probability of being as low as 1935

Distribution of Analog Years for Runoff Timing

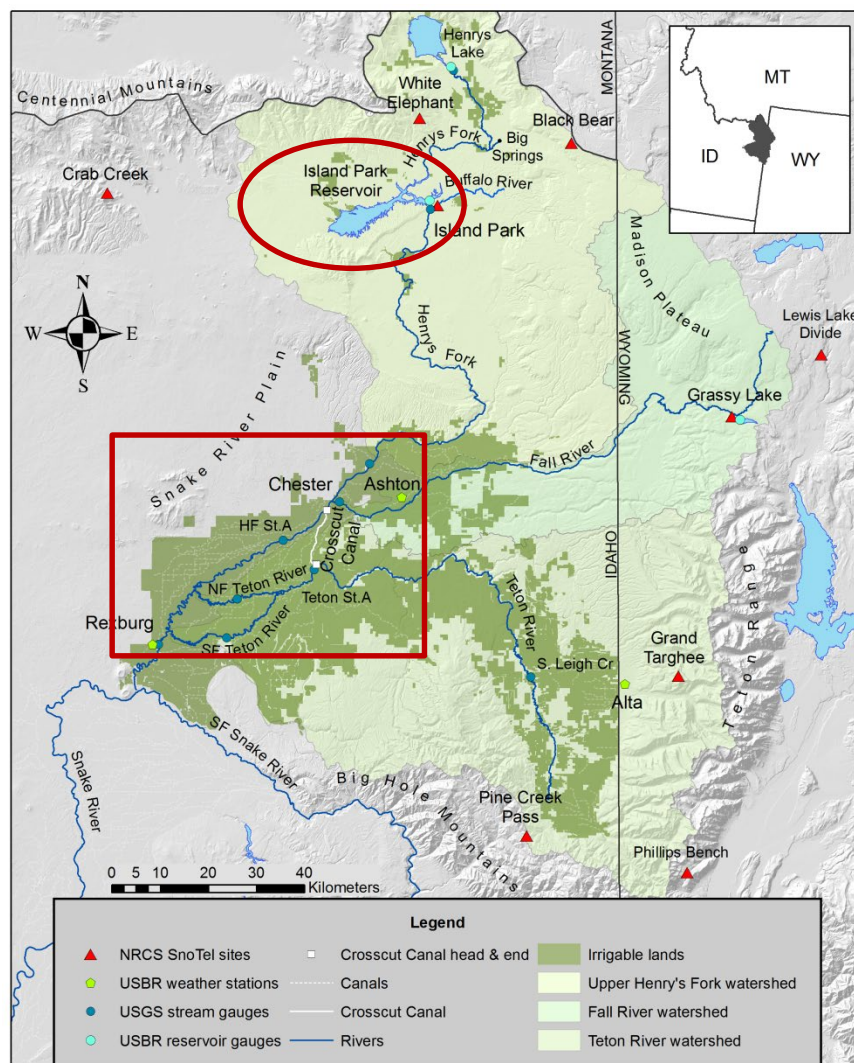


April-September Diversion Volume



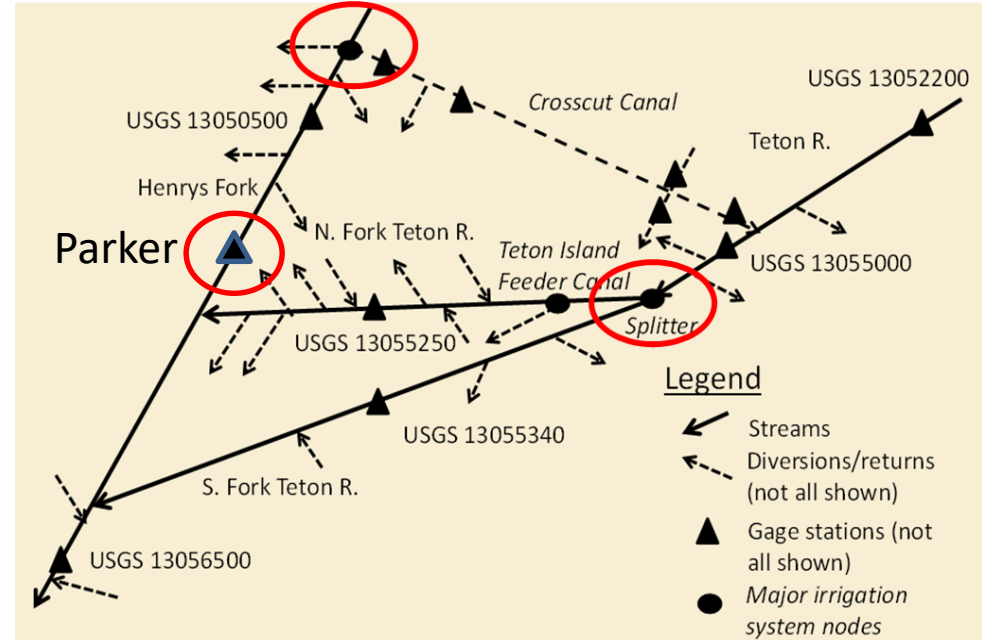
Analog years

- 2021
- 2002
- 2010



Henry's Fork Irrigation System

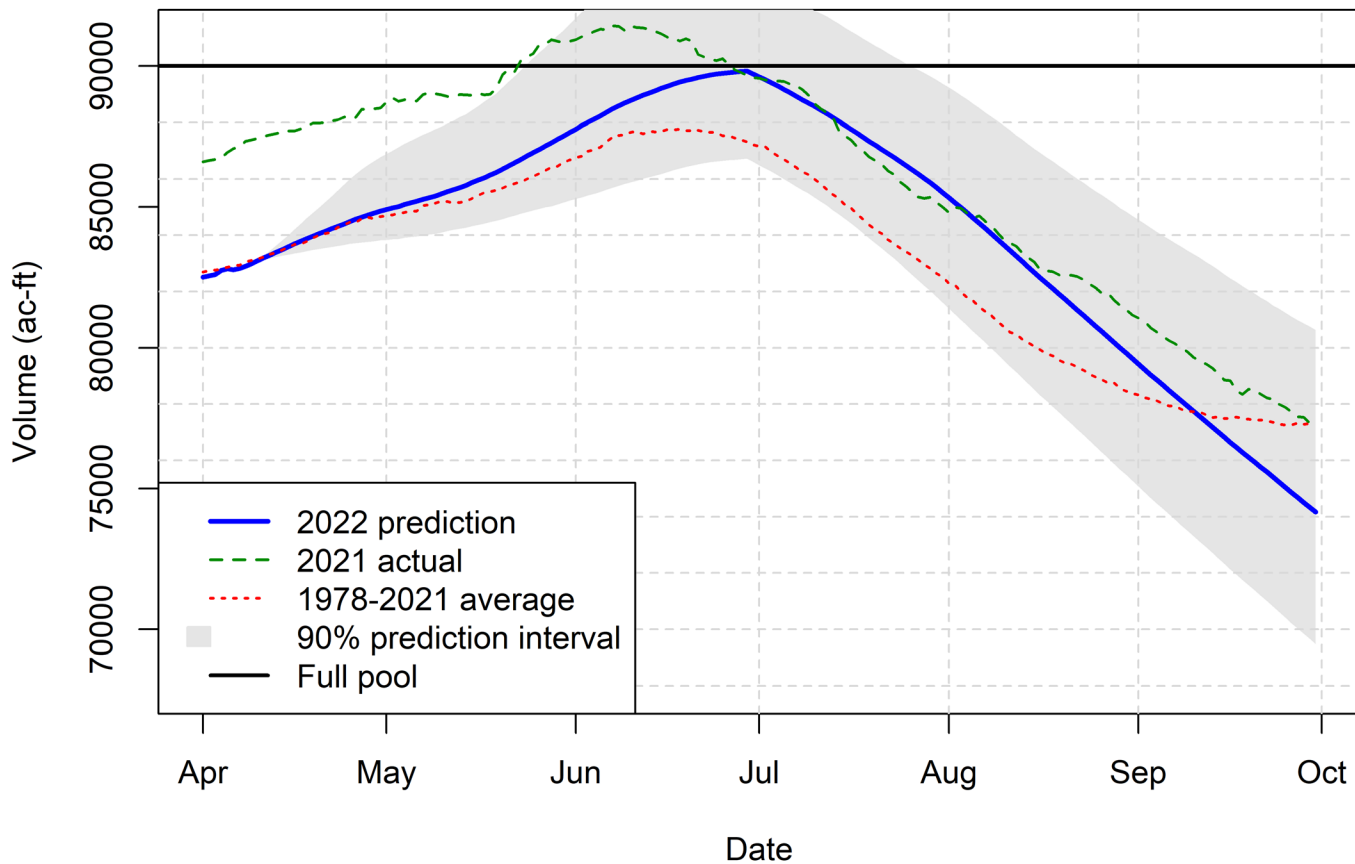
- Island Park is primary storage reservoir
- Most need for storage water is delivery to Teton River through Crosscut Canal
- Streamflow target at Parker constraints IP storage delivery.



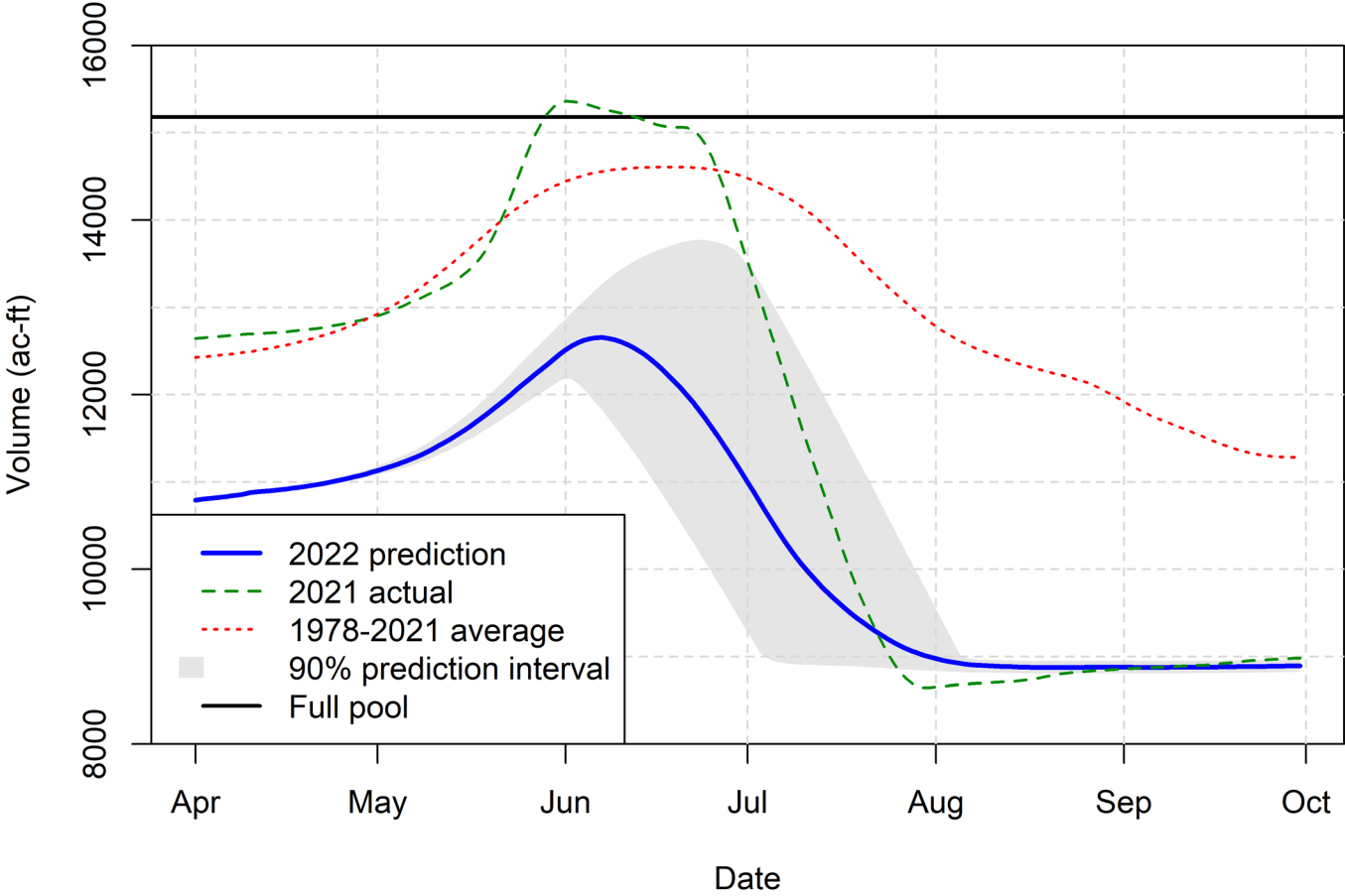
Management scenario: “HFW on its own”

- Henry’s Lake outflow: 70 cfs
- Grassy Lake outflow: 65 cfs
- Grassy Lake minimum: 11,000 ac-ft
- IP Reservoir minimum: 5,000 ac-ft (3.7% full)
- Parker target: 450 cfs
- Teton River targets: SF 100 cfs, NF 0 cfs
- Make up Teton River shortfall with exchange wells
- Record physical-water shortfalls elsewhere
- If IPR < 40,000 ac-ft:
 - HL Outflow to 100 cfs
 - Grassy Minimum to 9,000 ac-ft
 - Parker target to 350 cfs

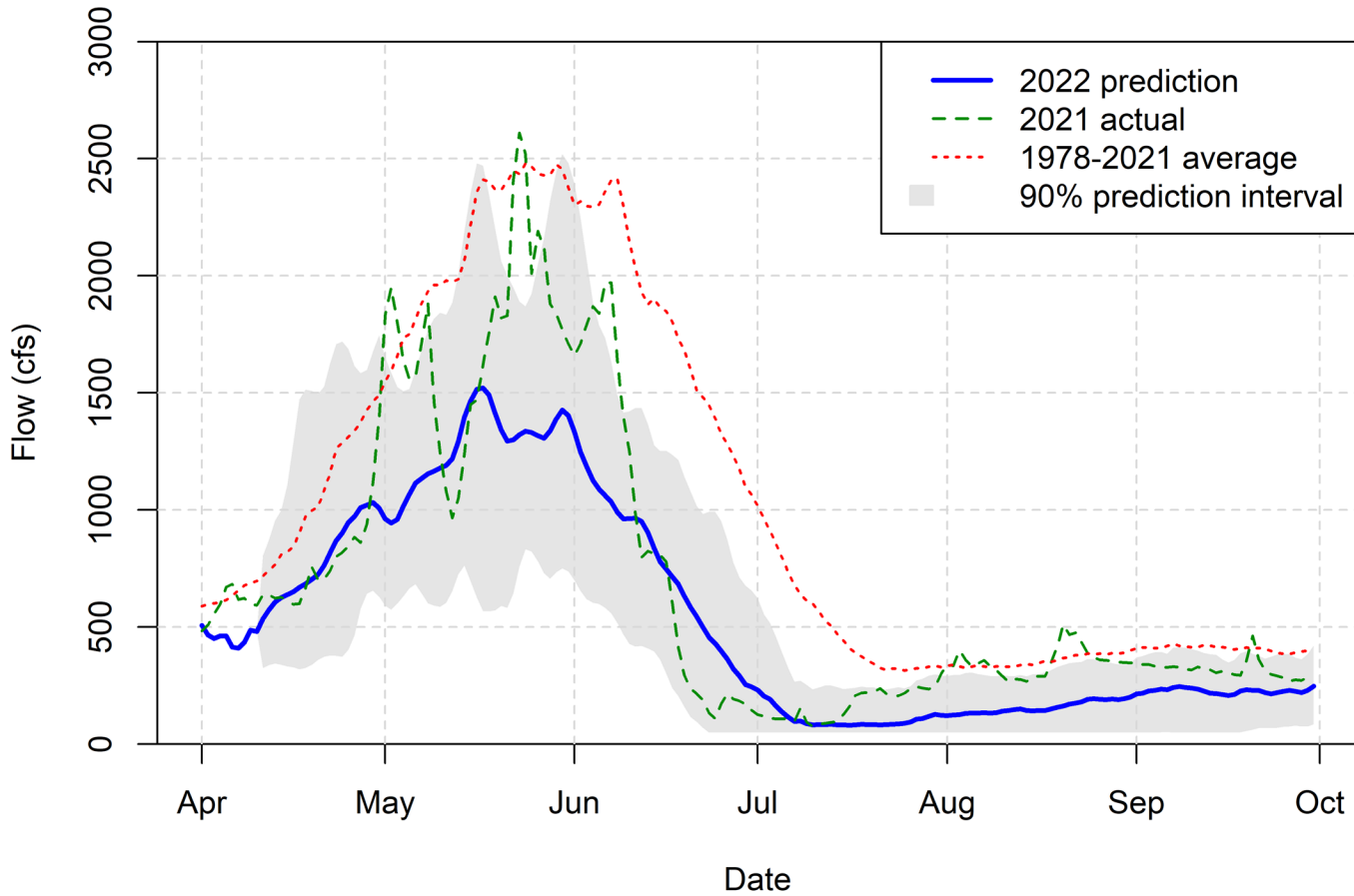
Henrys Lake Contents



Grassy Lake Contents

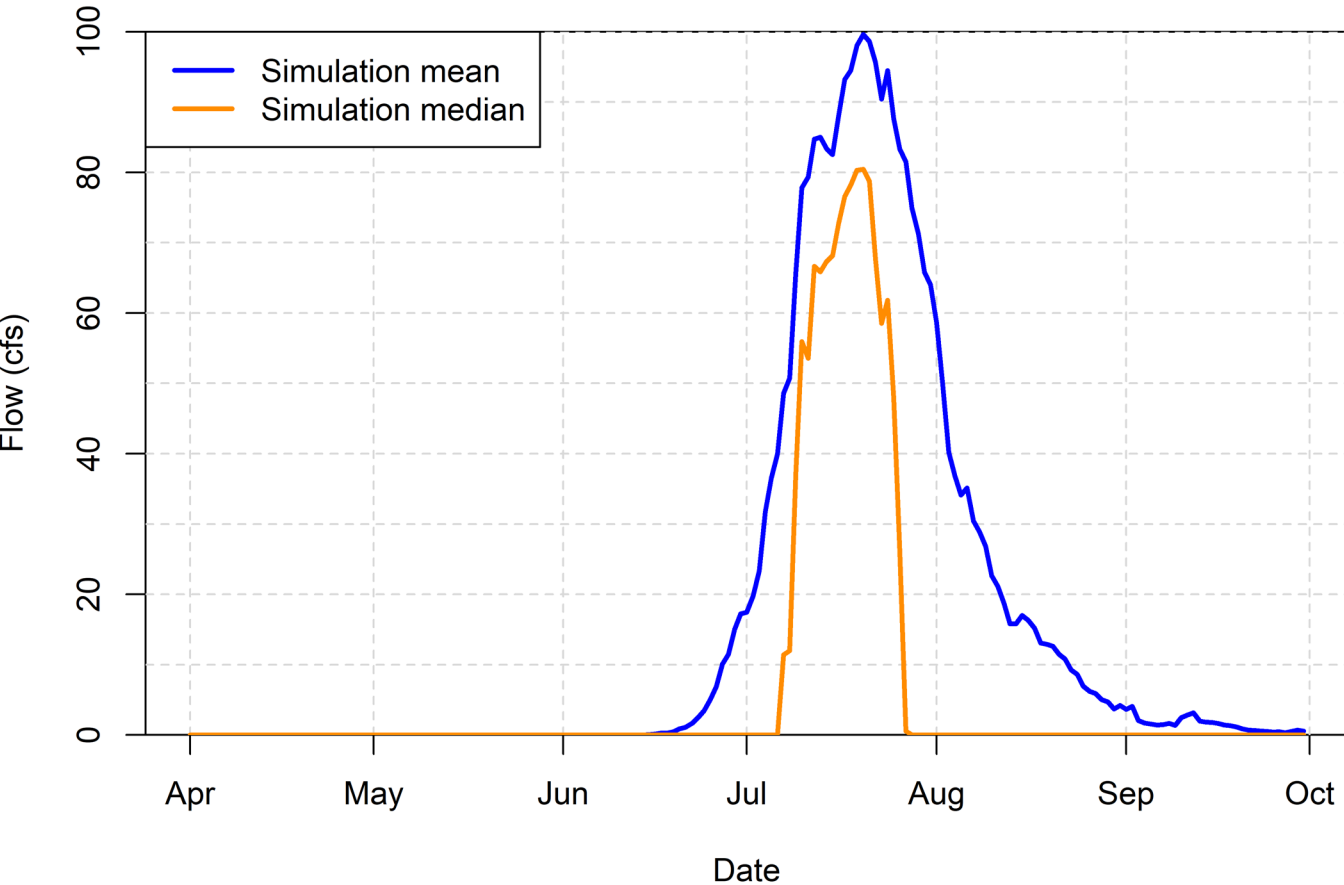


Streamflow in Fall River at Chester



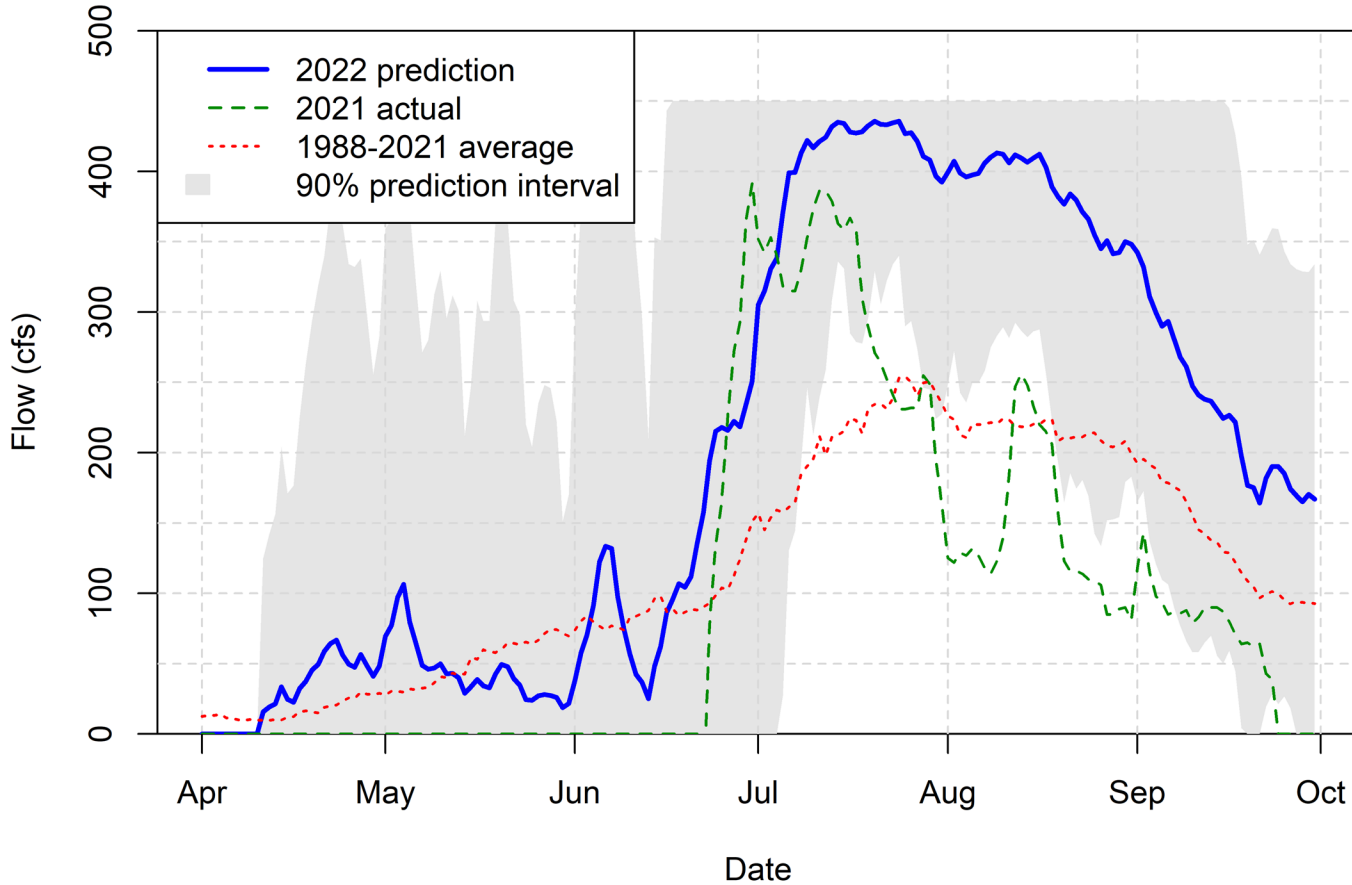
- 81% chance
Fall River flow
 ≤ 50 cfs

Shortage in Fall River Diversion



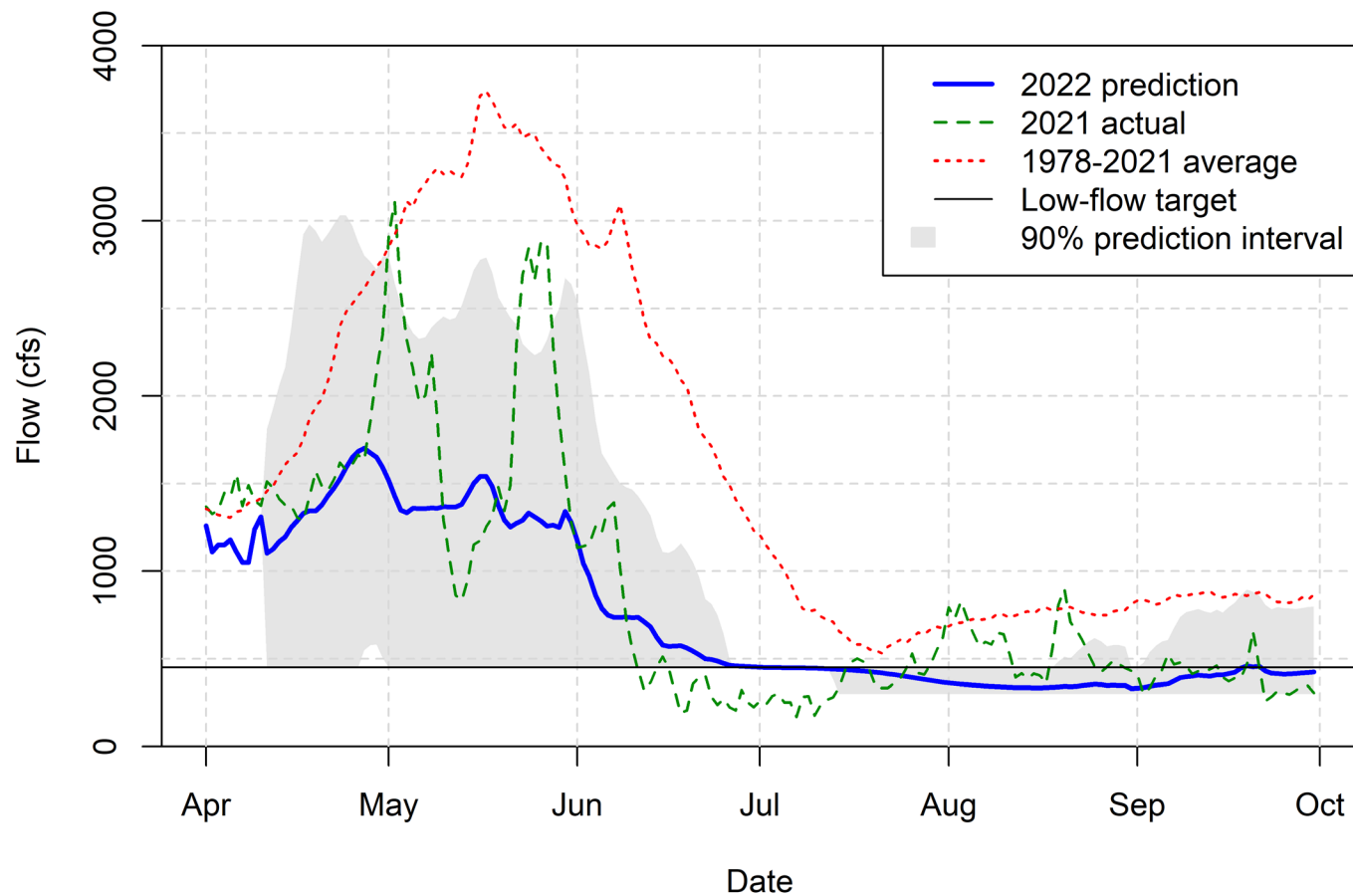
- 50% chance
Fall River
diversion short
by ≥ 3500 ac-ft
(3.8% of ave.)

Delivery in Crosscut Canal to Teton R.

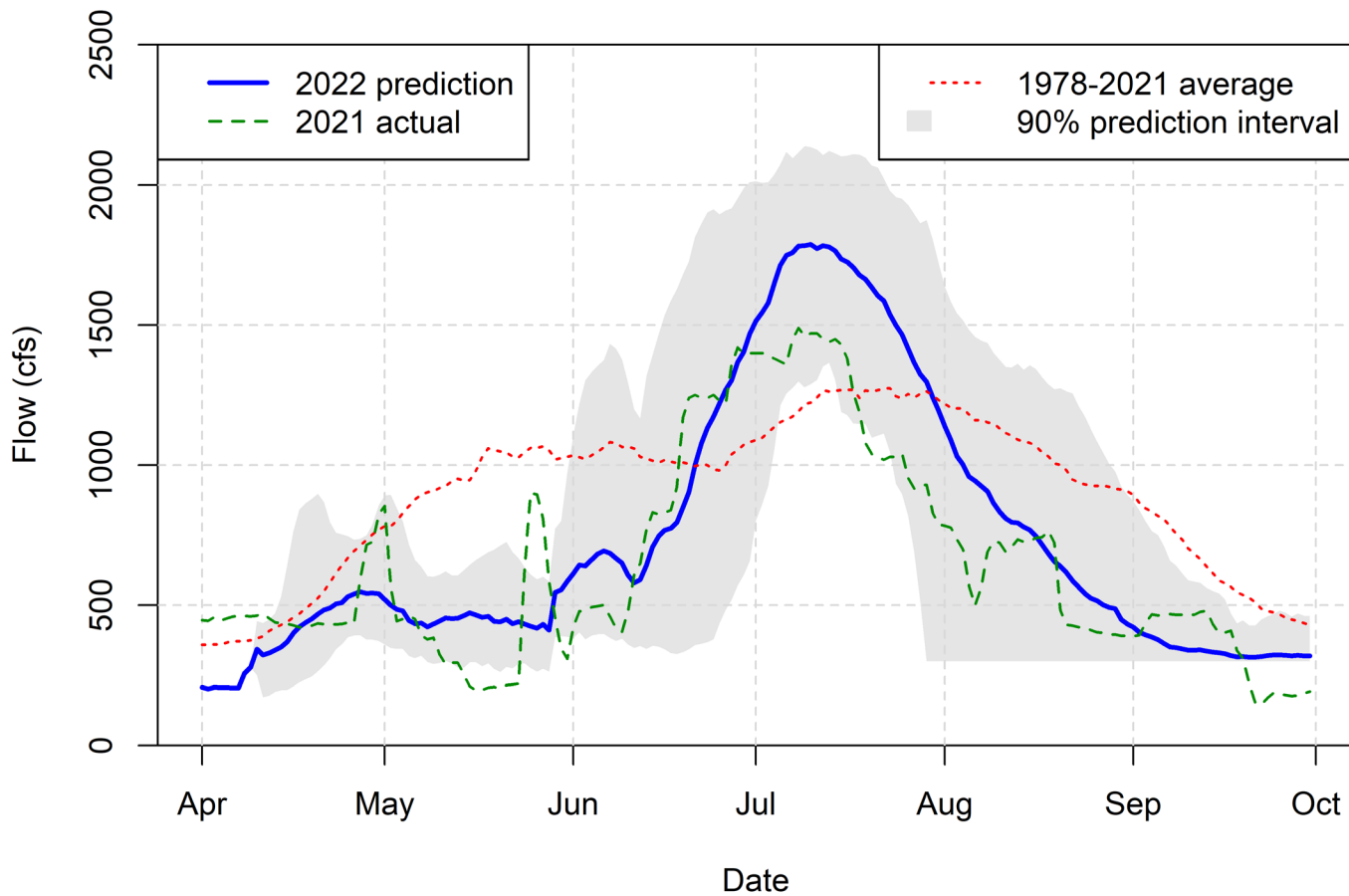


- 50% chance exchange pumping > 12,500 ac-ft

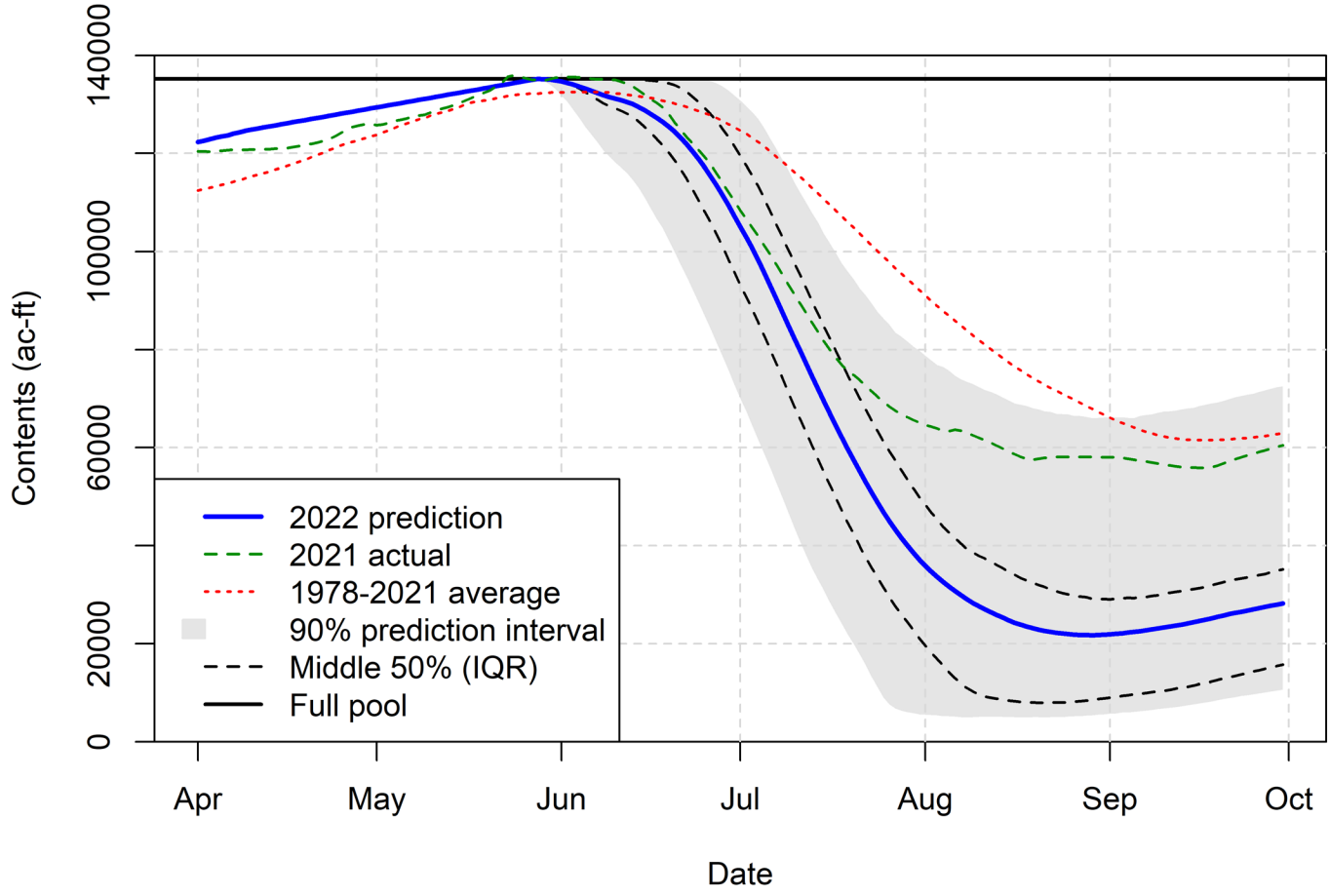
Nominal Streamflow in Henry's Fork at Parker



Streamflow in Henry's Fork at Island Park



Island Park Reservoir Content

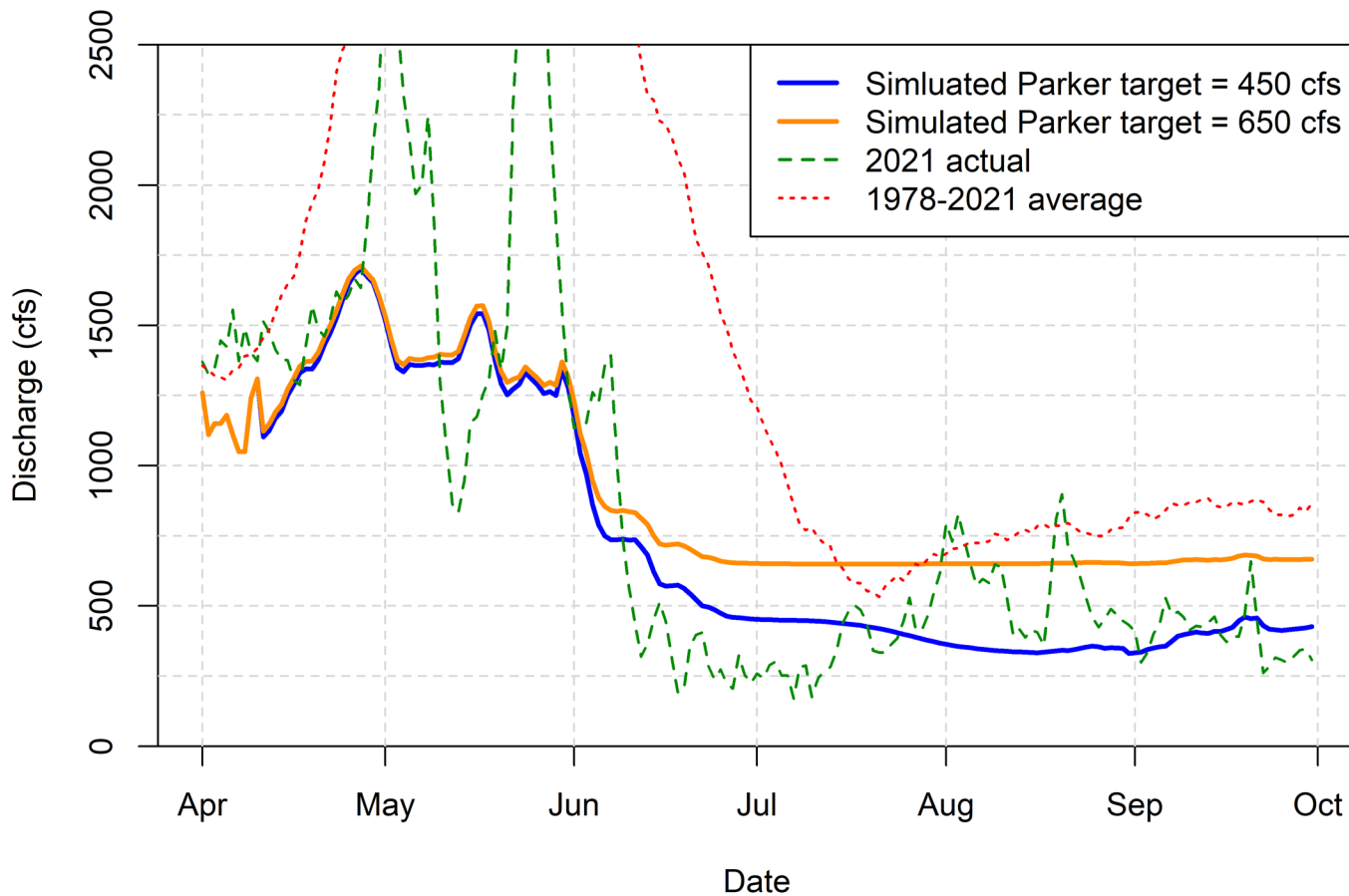


Management scenario: “HFW on its own”

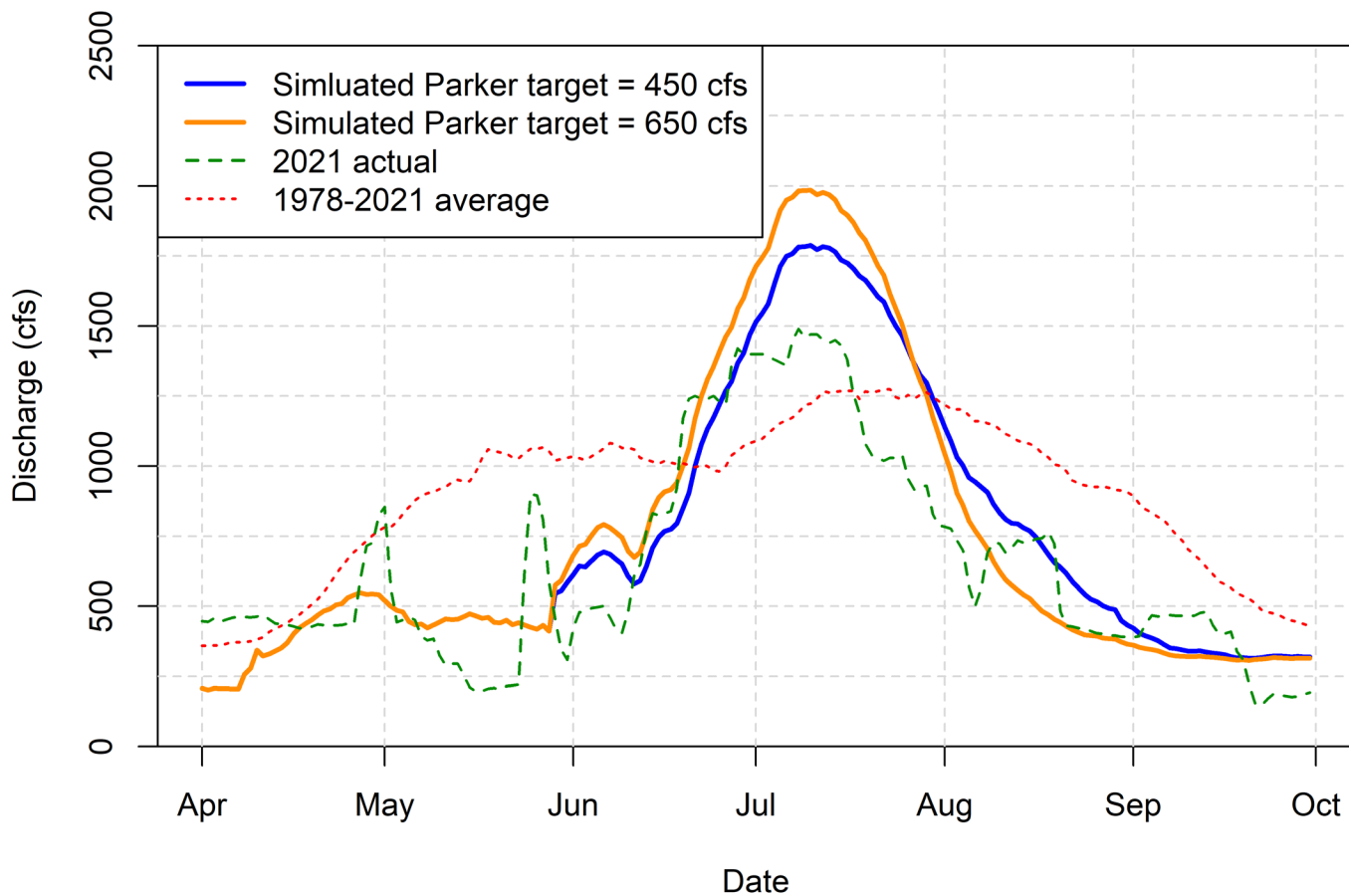
(Comparison: “Send American Falls its water”)

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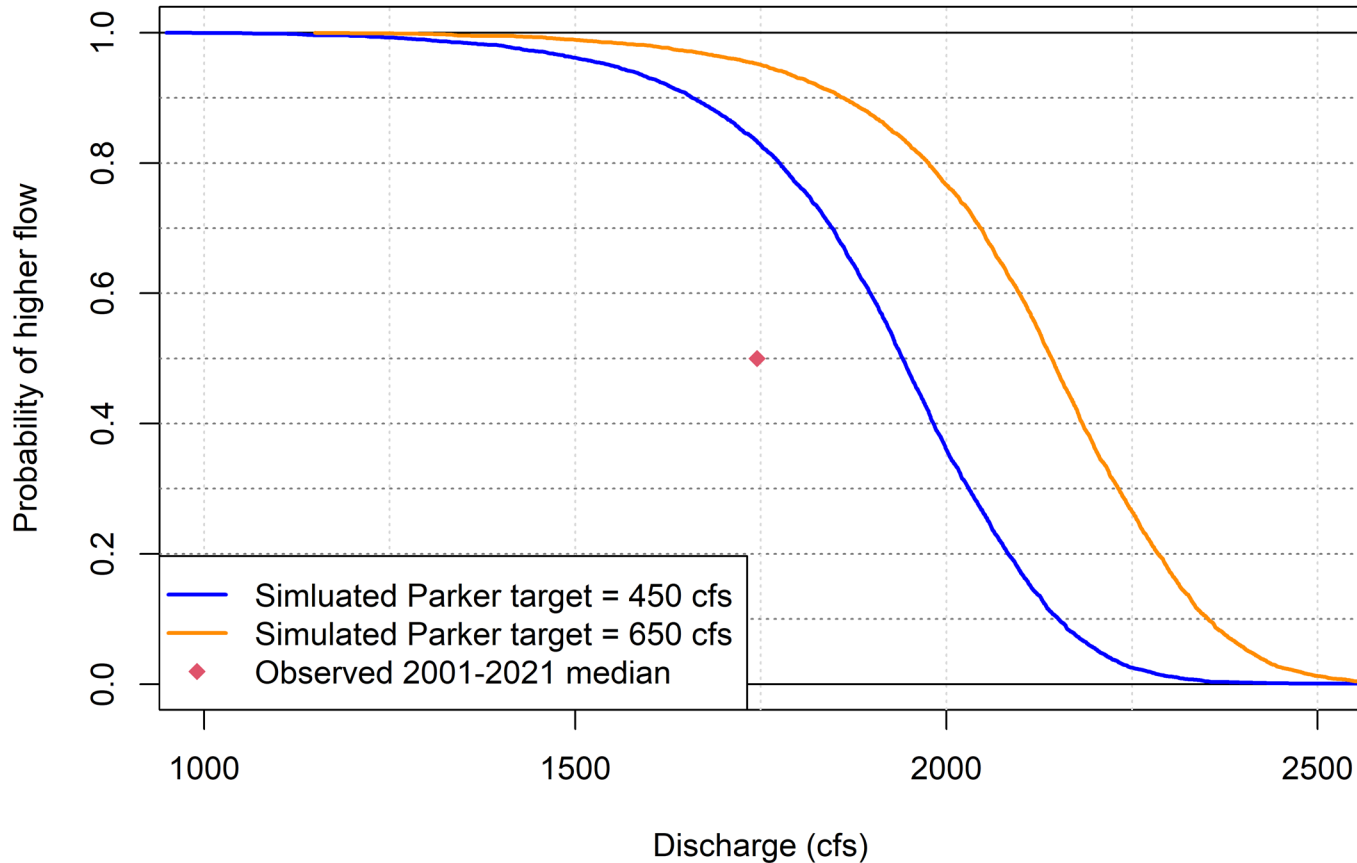
Henry's Fork at Parker



Henry's Fork at Island Park

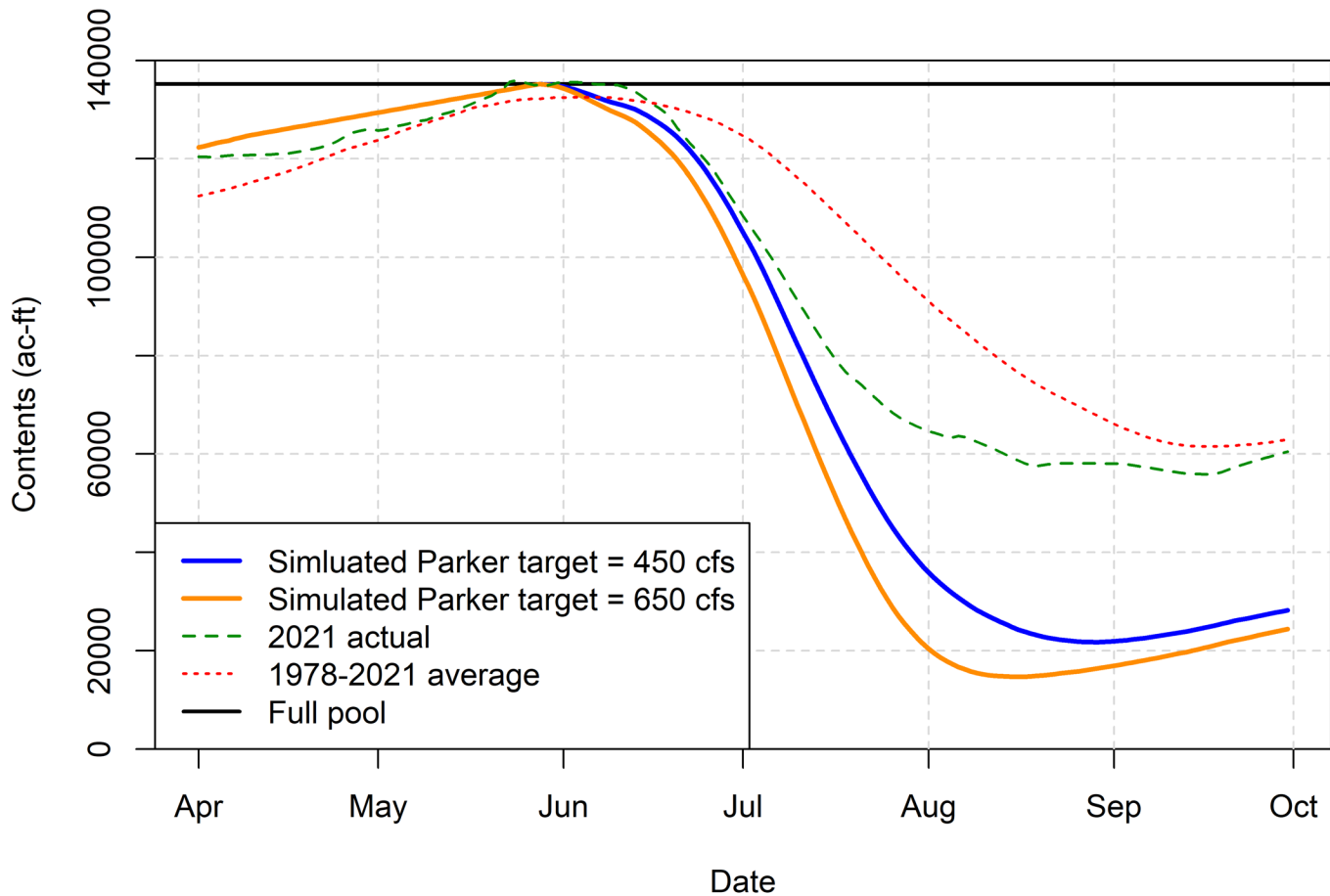


Maximum Annual Outflow From I.P. Dam

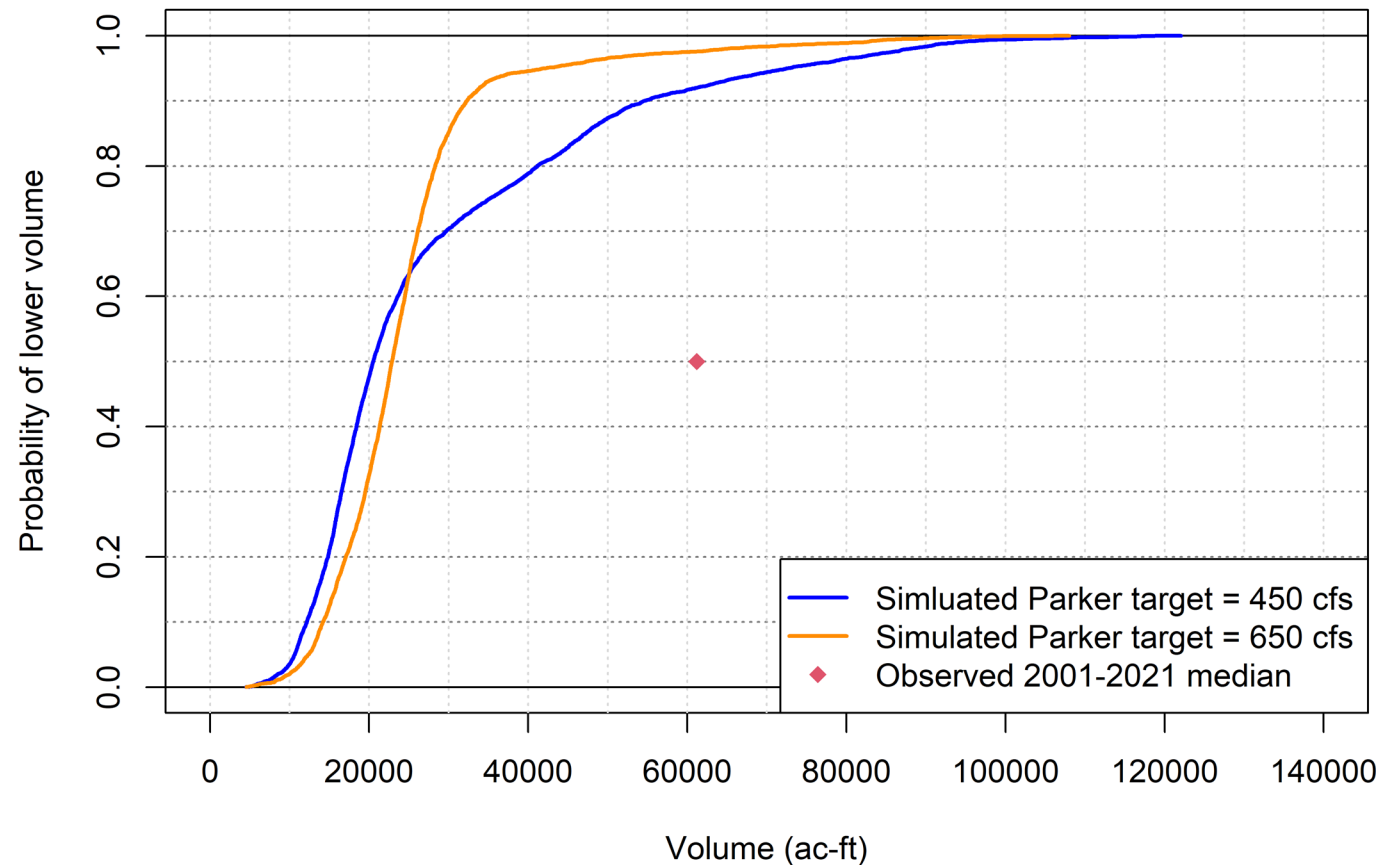


50% exceedance
increases by 200
cfs

Island Park Reservoir Content

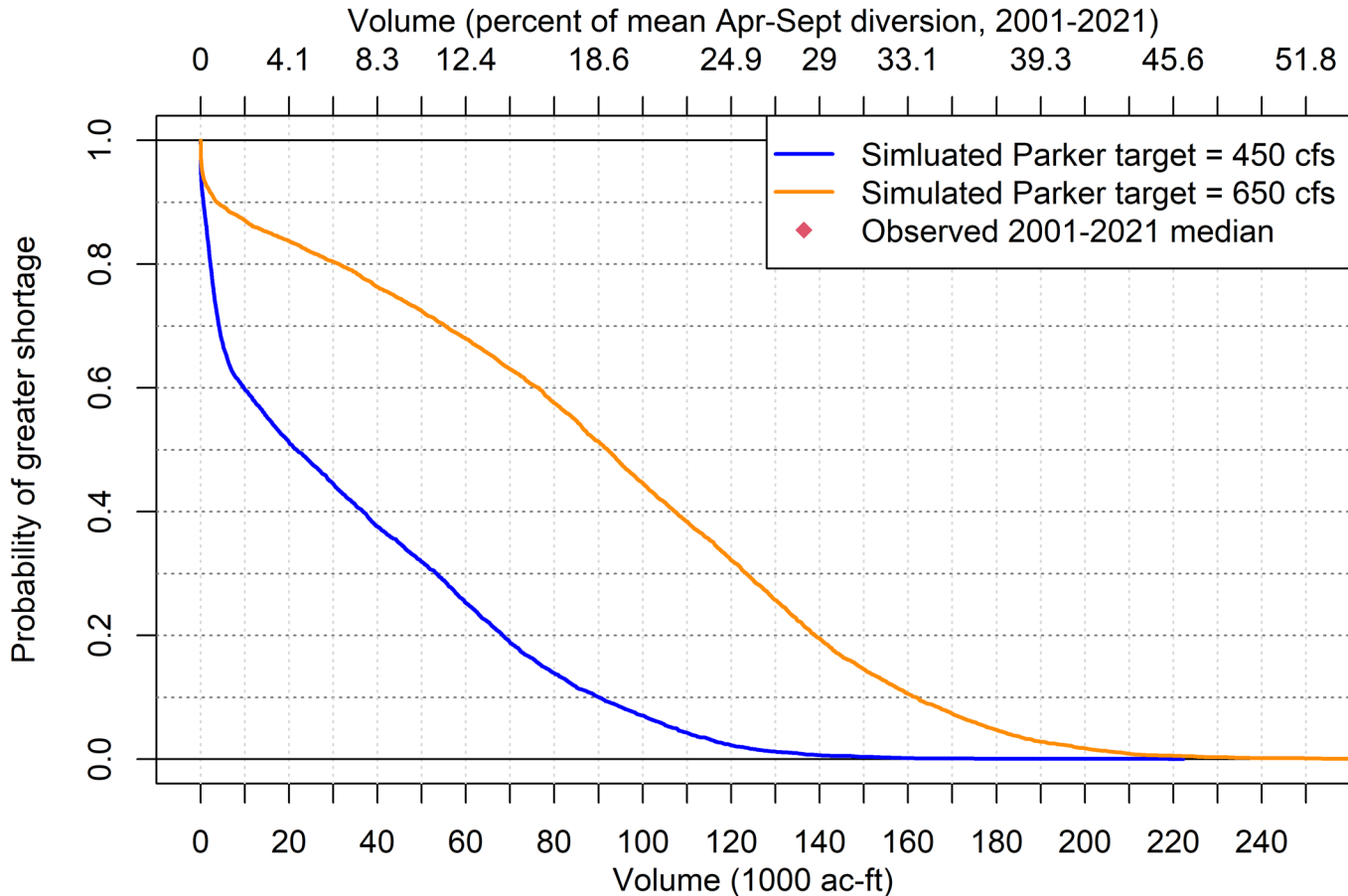


September-30 Island Park Reservoir content



Probability of
40,00 ac-ft
carryover (30%
full) decreases
from 20% to 6%

Shortage of Physical Water to Meet Irrigation Demand in Henry's Fork



Shortage/need for
more exchange
pumping increases
by 40-70K ac-ft

Conclusions

- 2001 is a likely outcome
- 1935 is not, but...
- 1935 coming next year?
- IP Reservoir carryover likely $< 15\%$ full (~2016)
- System-wide constraints may affect HFW management options, or...
- Hope for rain