

Predicted Spring/Summer Hydrology

Rob Van Kirk, Henry's Fork Foundation
Henry's Fork Watershed Council, April 08, 2025



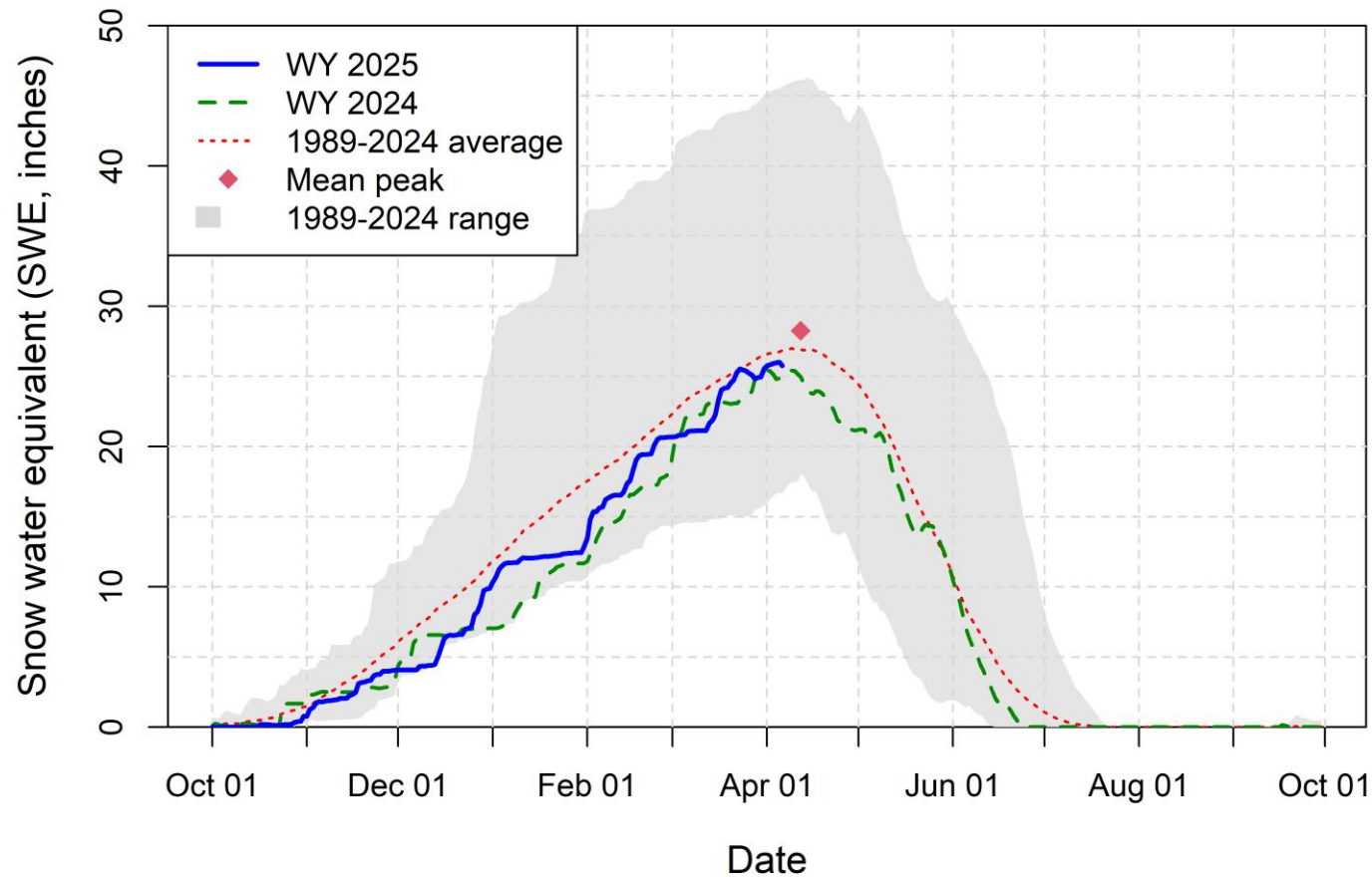
Outline

- Current climate and water-supply conditions
- HFF predictive models
- Natural flow predictions
- Irrigation-season model predictions
- Long-term perspective on water supply

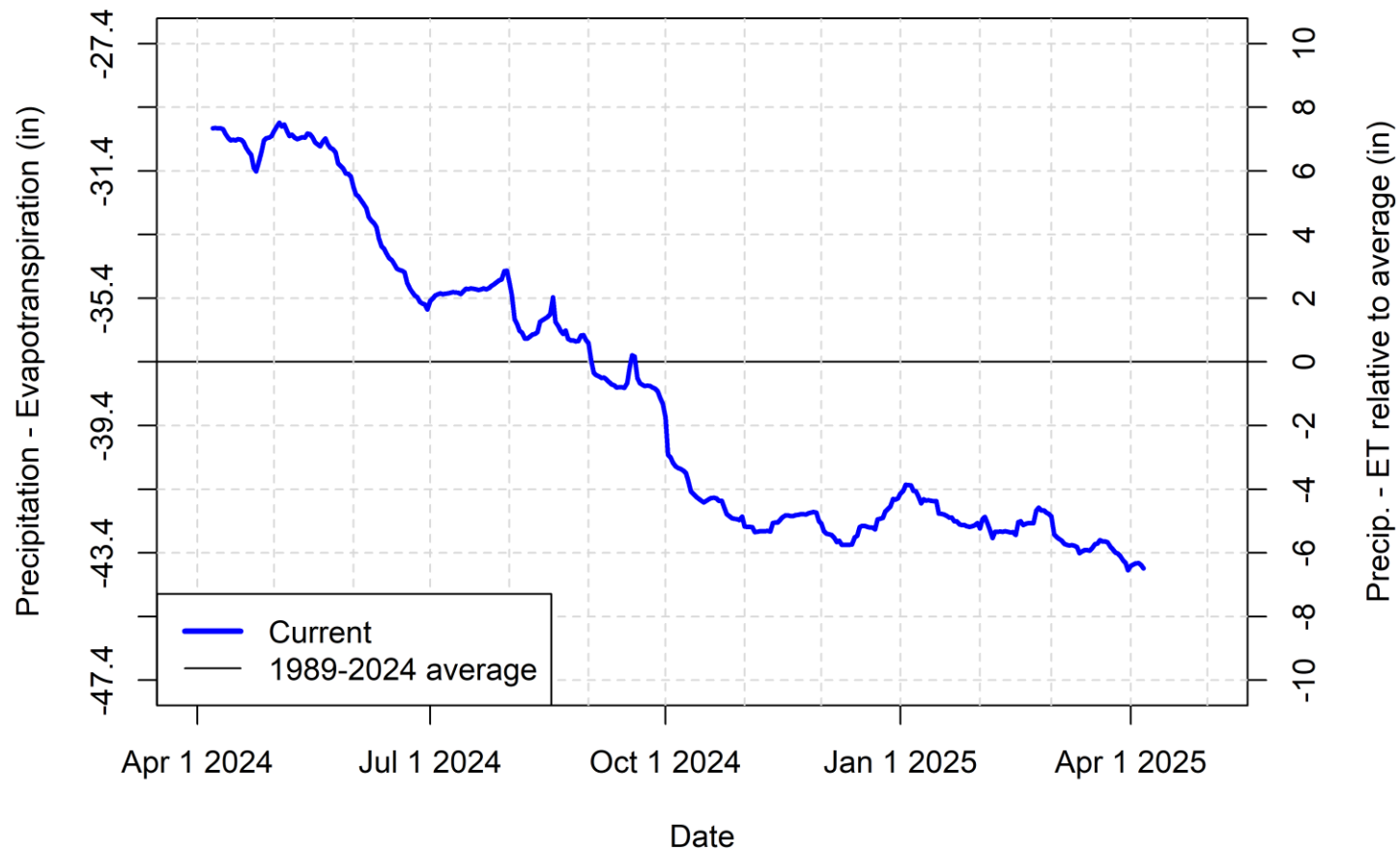
Current conditions

- Warm and dry September – December 2024
- Much cooler and wetter January – March 2025
- Water-year precipitation: ~95% of average
- SWE: Peaked on April 5 @ ~96% of average
- Fall R. & Teton R. much wetter than upper HF
- Large soil moisture deficits basin-wide

Henry's Fork Watershed Mean SWE Accumulation Apr 06 2025



One-year Cumulative Agricultural Moisture Availability



HFF predictive models

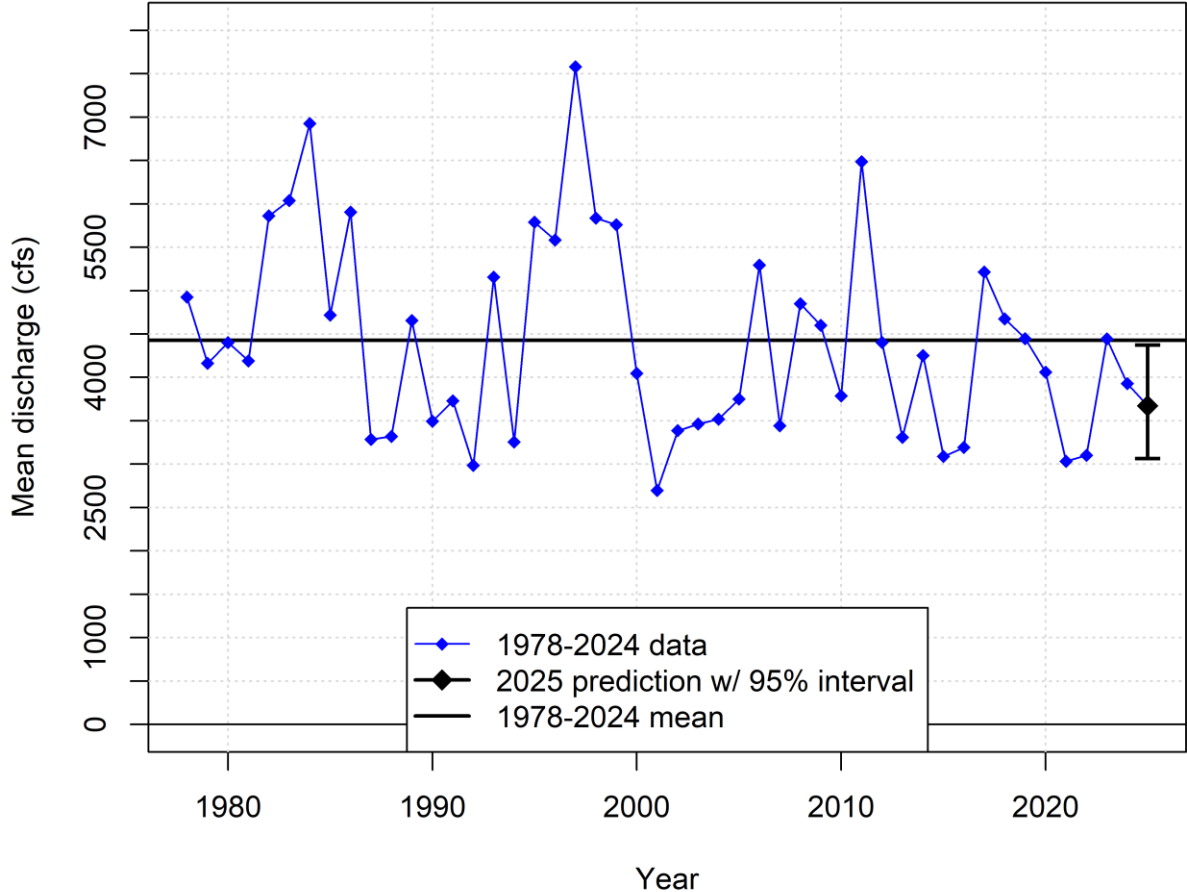
- First developed in 2017
- New this year: 2001 – 2024 modeling period; separate comparison with 1978 – 2000
- Inputs
 - April-1 snow water equivalent (SWE)
 - October – March streamflow (“baseflow”)
 - Moisture (previous graph)
 - Projected spring/summer ET (based on increasing trend)
- Outputs
 - April – Sept streamflow volume
 - Analog years for center of mass (streamflow timing)
 - April – Sept diversion volume
 - Analog years for diversion and reach gains
- Water operations model
 - Irrigation demand
 - Lower-watershed streamflow targets
 - Crosscut Canal delivery
 - Send water to American Falls?
 - Reservoir draft (Henrys, Grassy, Island Park)

Apr – Sept Natural streamflow

Subwatershed	Prediction (mean cfs)	% 1978- 2000 average	% 2001- 2024 average	90% exceedance (mean cfs)	2024 observed (mean cfs)
Upper HF (Ashton)	1,354	65%	83%	1,246	1,500
Fall River	1,190	80%	95%	1,054	1,155
Teton River	1,055	82%	94%	857	1,273
HF Watershed*	3,663	75%	91%	3,270	3,928

*Watershed total is modeled separately from subwatersheds for better precision.

Apr-Sep HF Watershed Natural Flow



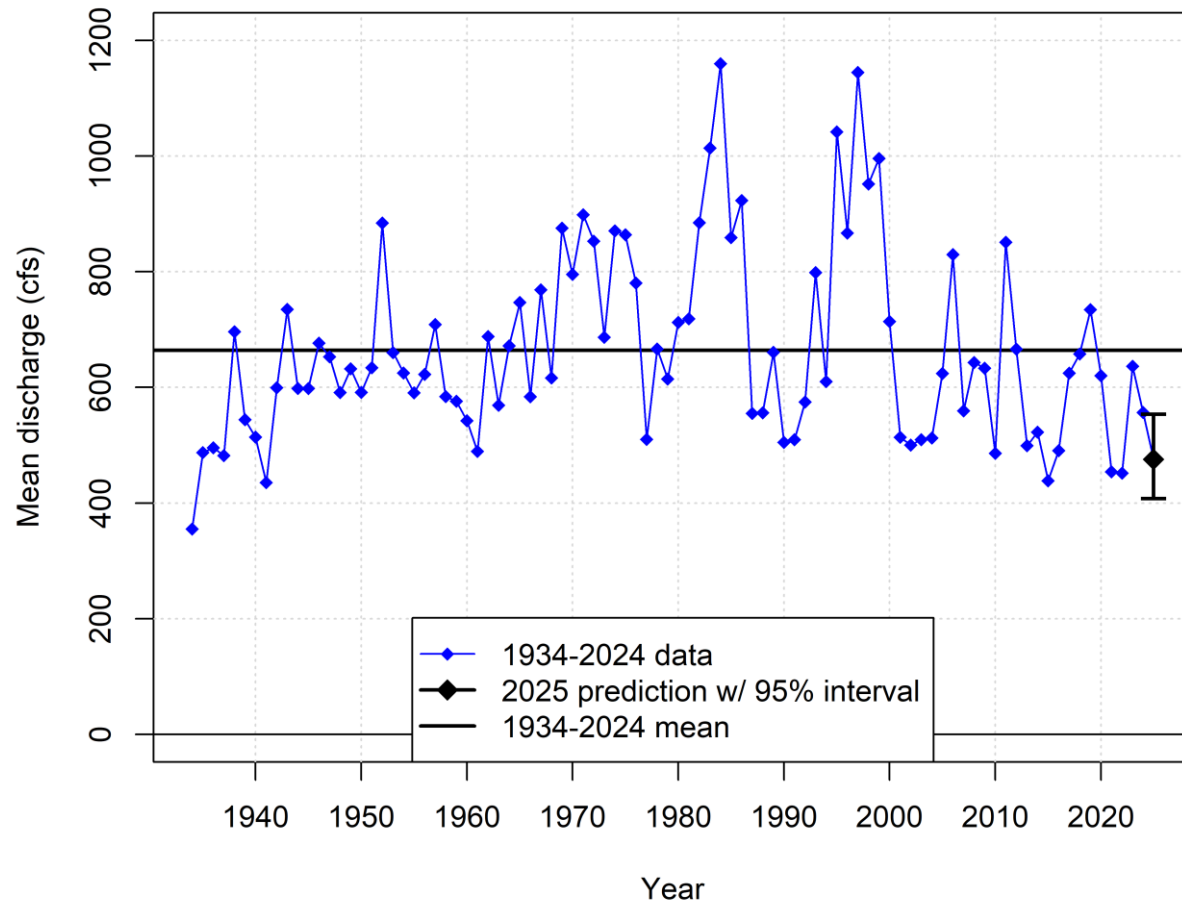
Similar to

- 2024
- 2020
- 2014

Better than

- 2015
- 2016
- 2021
- 2022

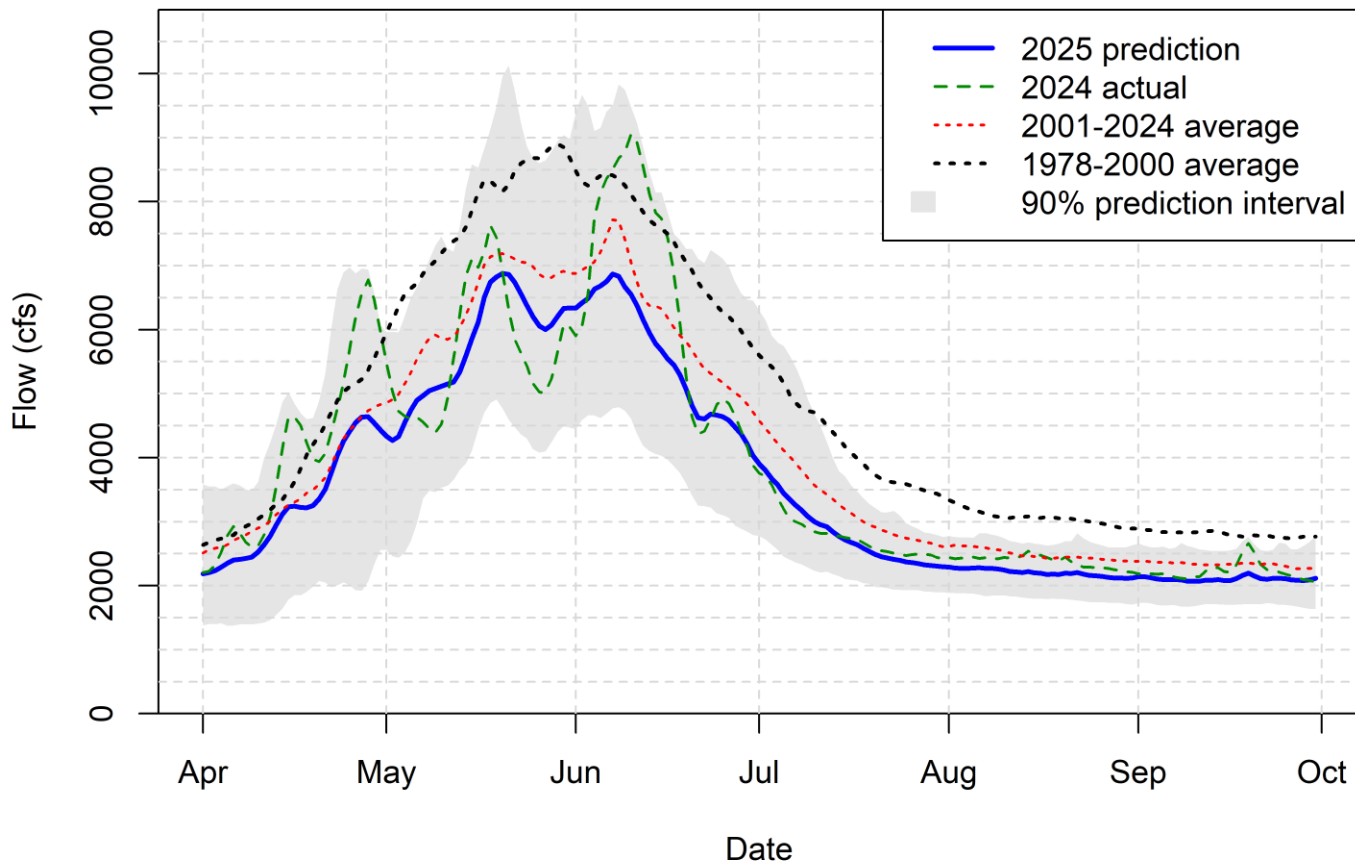
Apr-Sep Natural Inflow between HL and IP



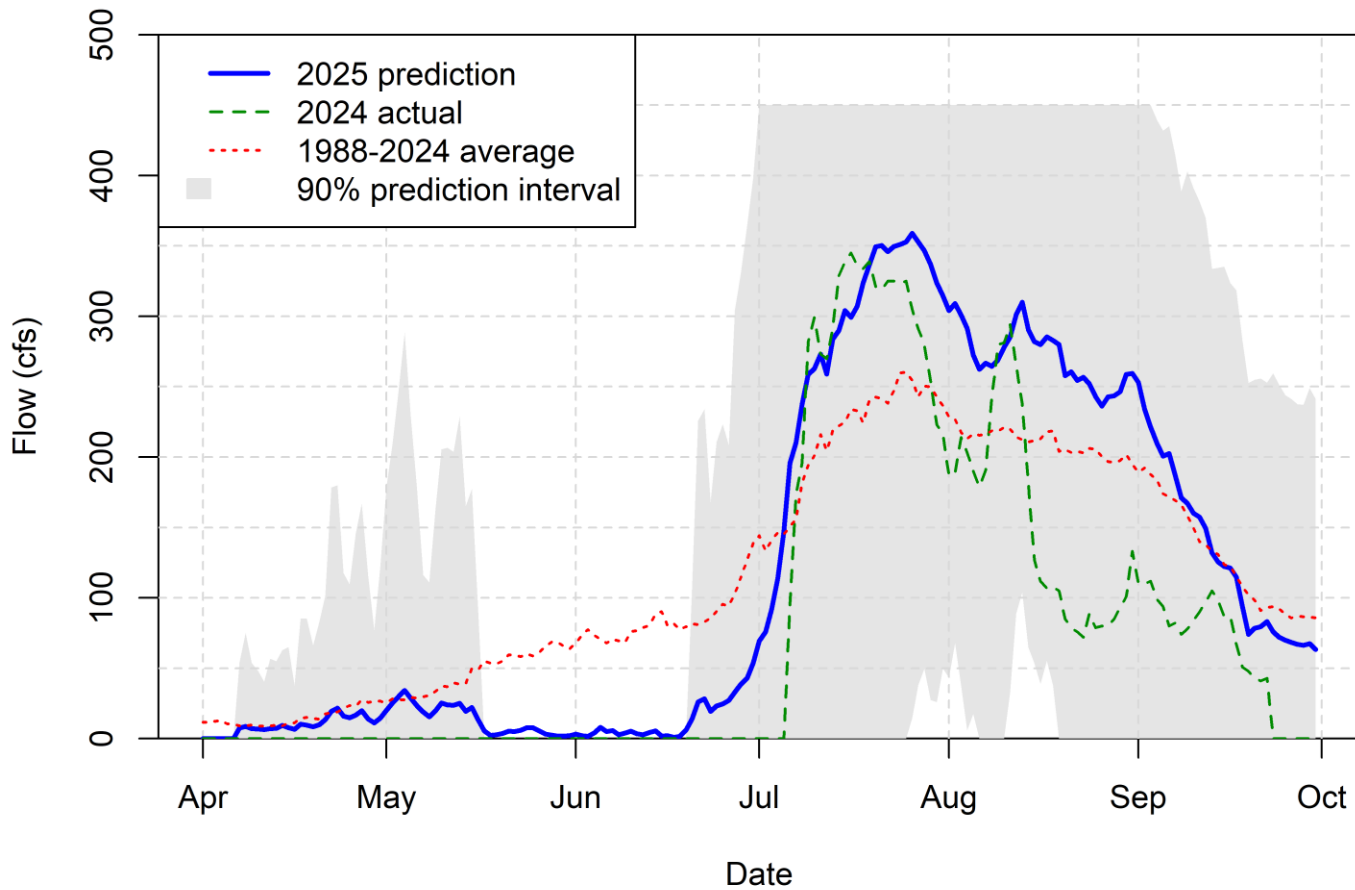
Apr – Sept streamflow timing

Subwatershed	Predicted center mass	1978-2000 average	2001-2024 average	2024 observed
Upper HF (Ashton)	23-Jun	21-Jun	22-Jun	21-Jun
Fall River	13-Jun	17-Jun	15-Jun	14-Jun
Teton River	13-Jun	18-Jun	15-Jun	13-Jun
HF Watershed	17-Jun	19-Jun	18-Jun	16-Jun

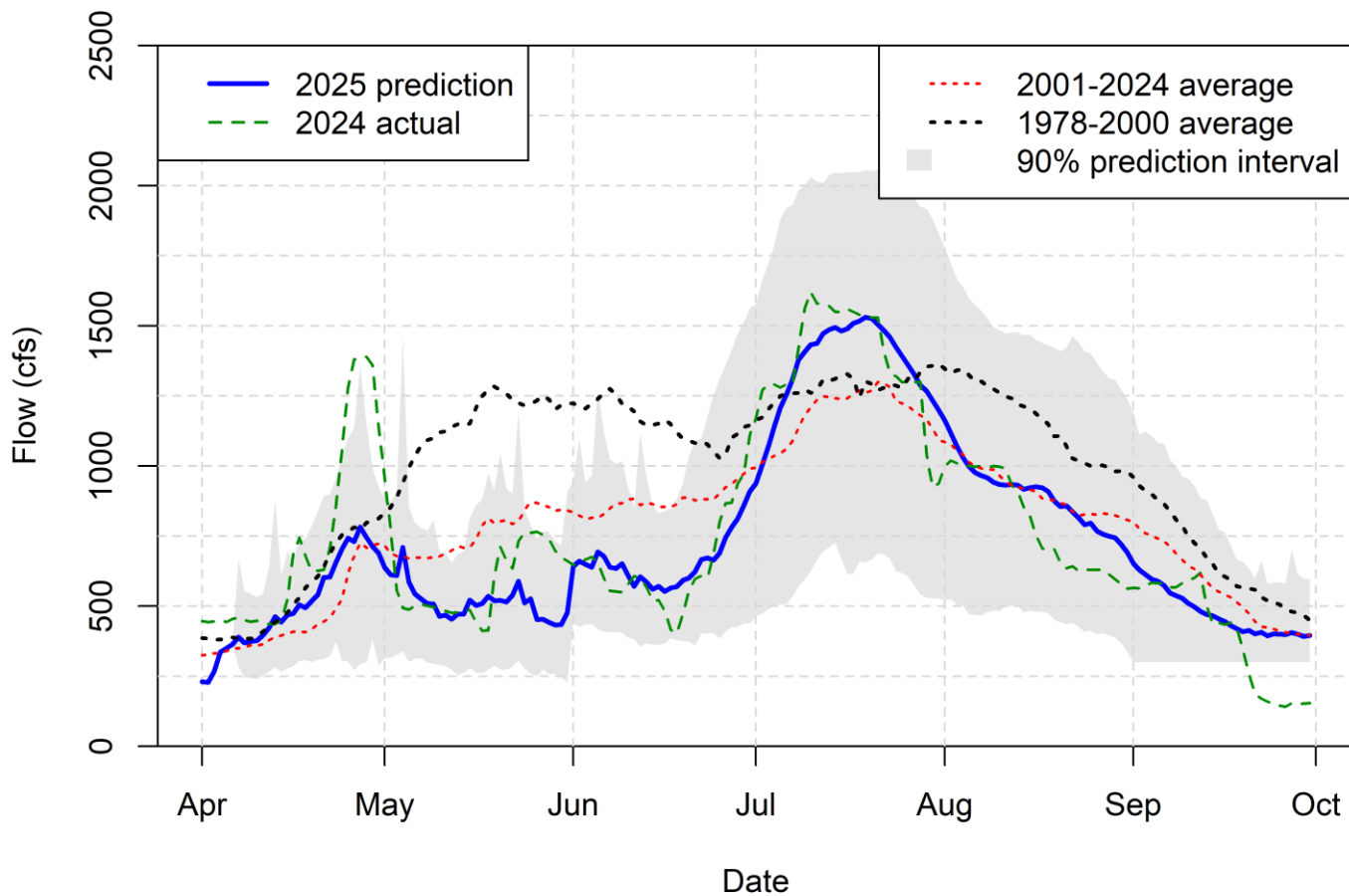
Henry's Fork Watershed Natural Flow



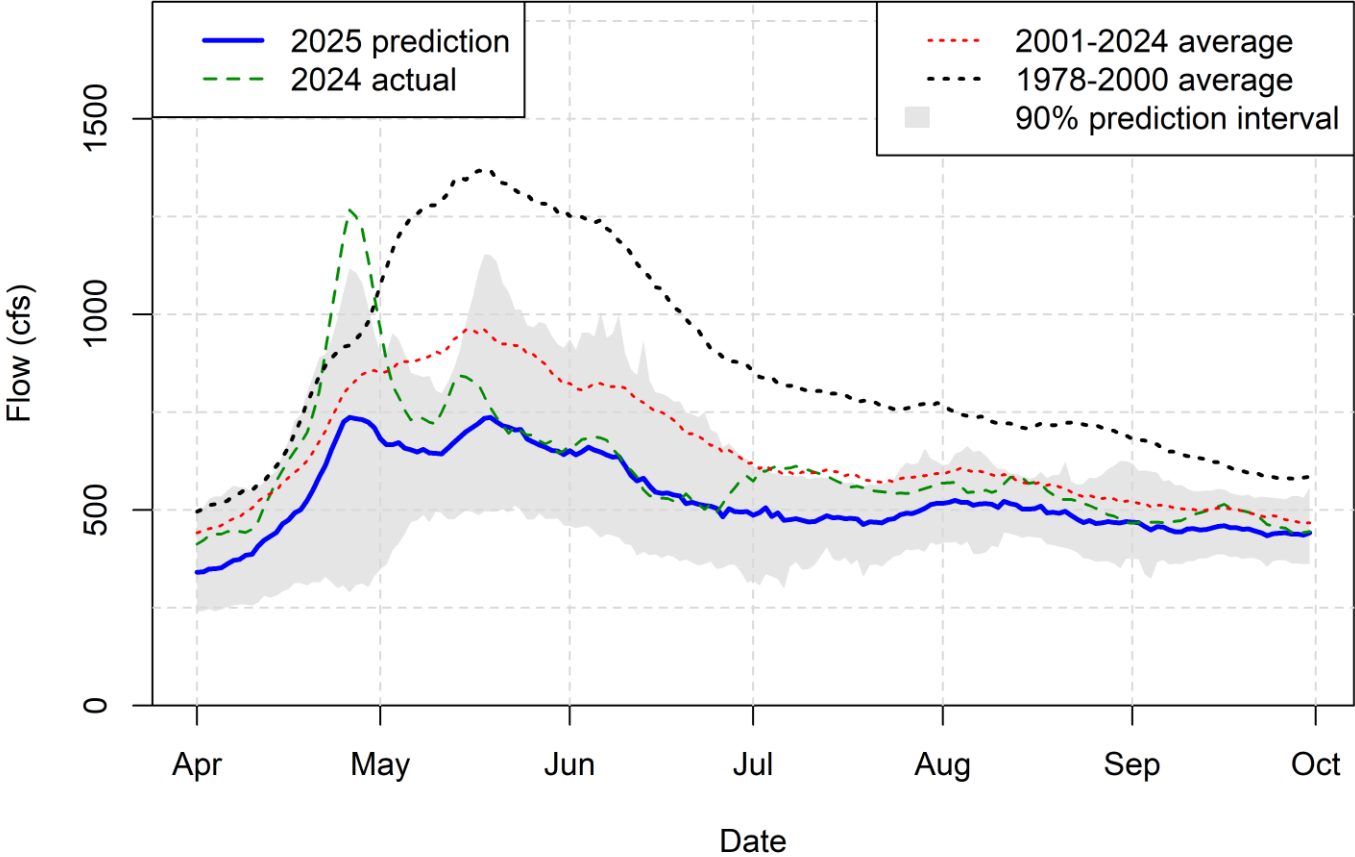
Delivery in Crosscut Canal to Teton R.



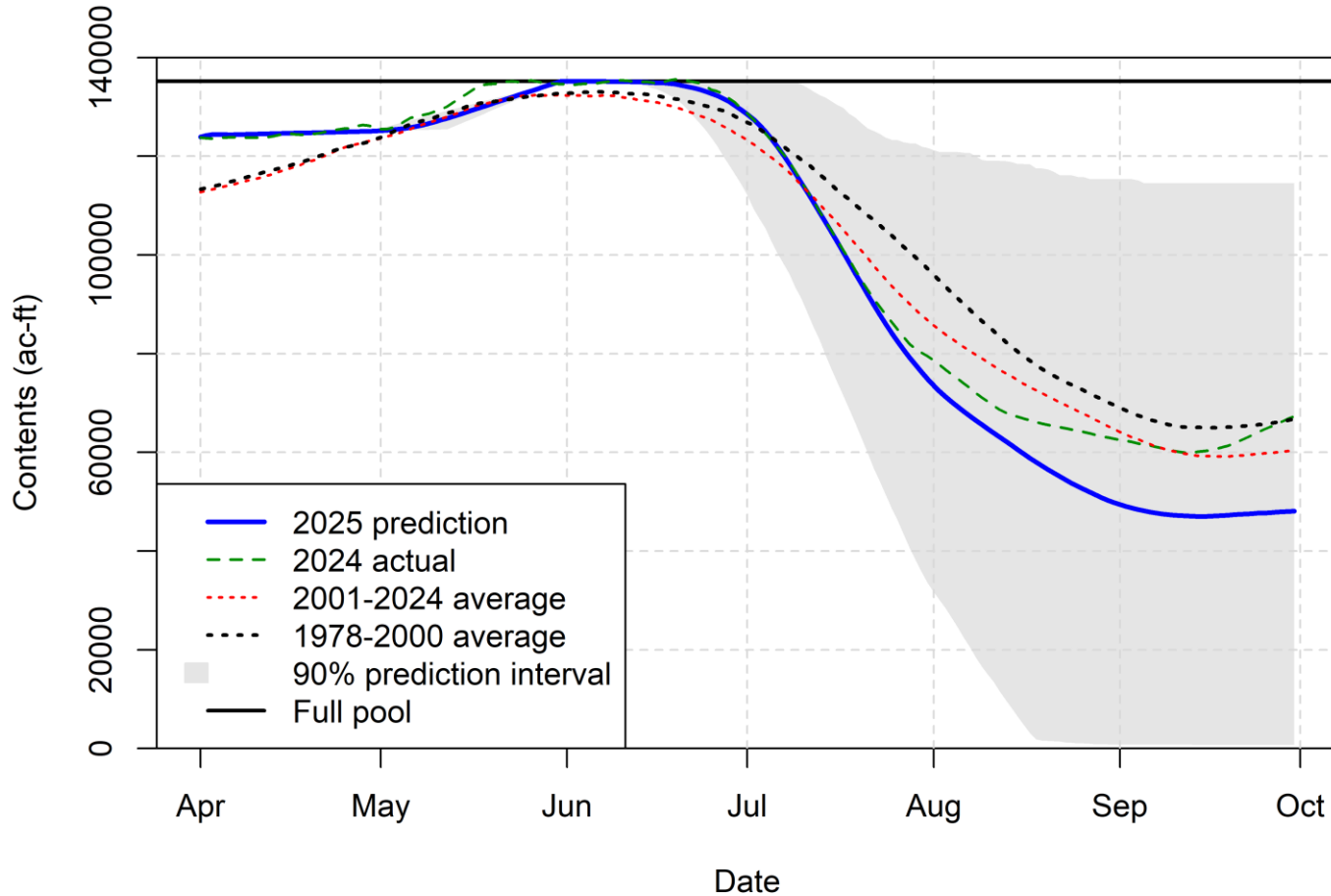
Streamflow in Henry's Fork at Island Park



Inflow to Island Park Reservoir

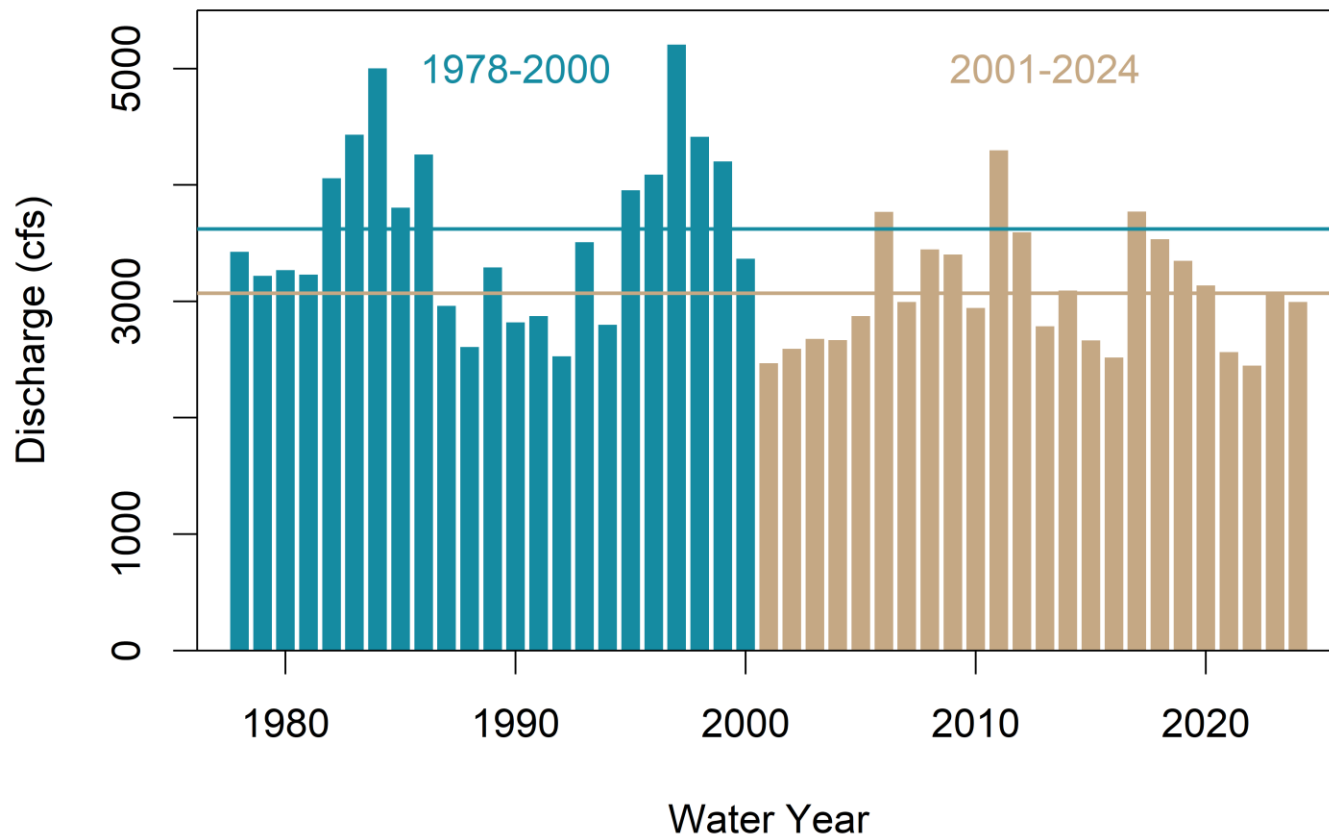


Island Park Reservoir Content

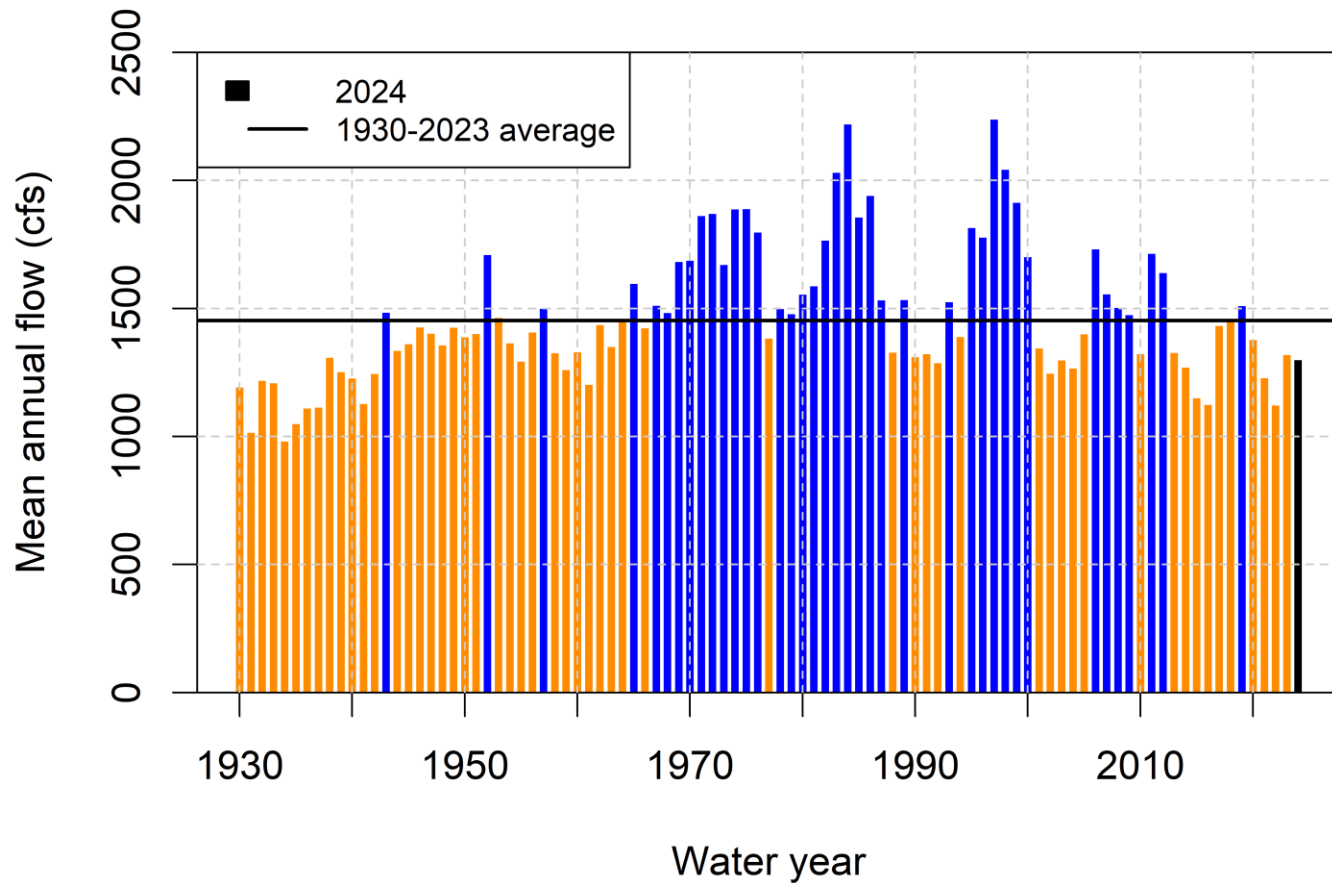


- Earliest draft start: May 31
- Predicted draft start: June 24 (2024: June 20)
- 40% chance IPR > average on Sept. 30
- Very high uncertainty

Average natural flow in the Henry's Fork watershed has decreased by 15% since 2000



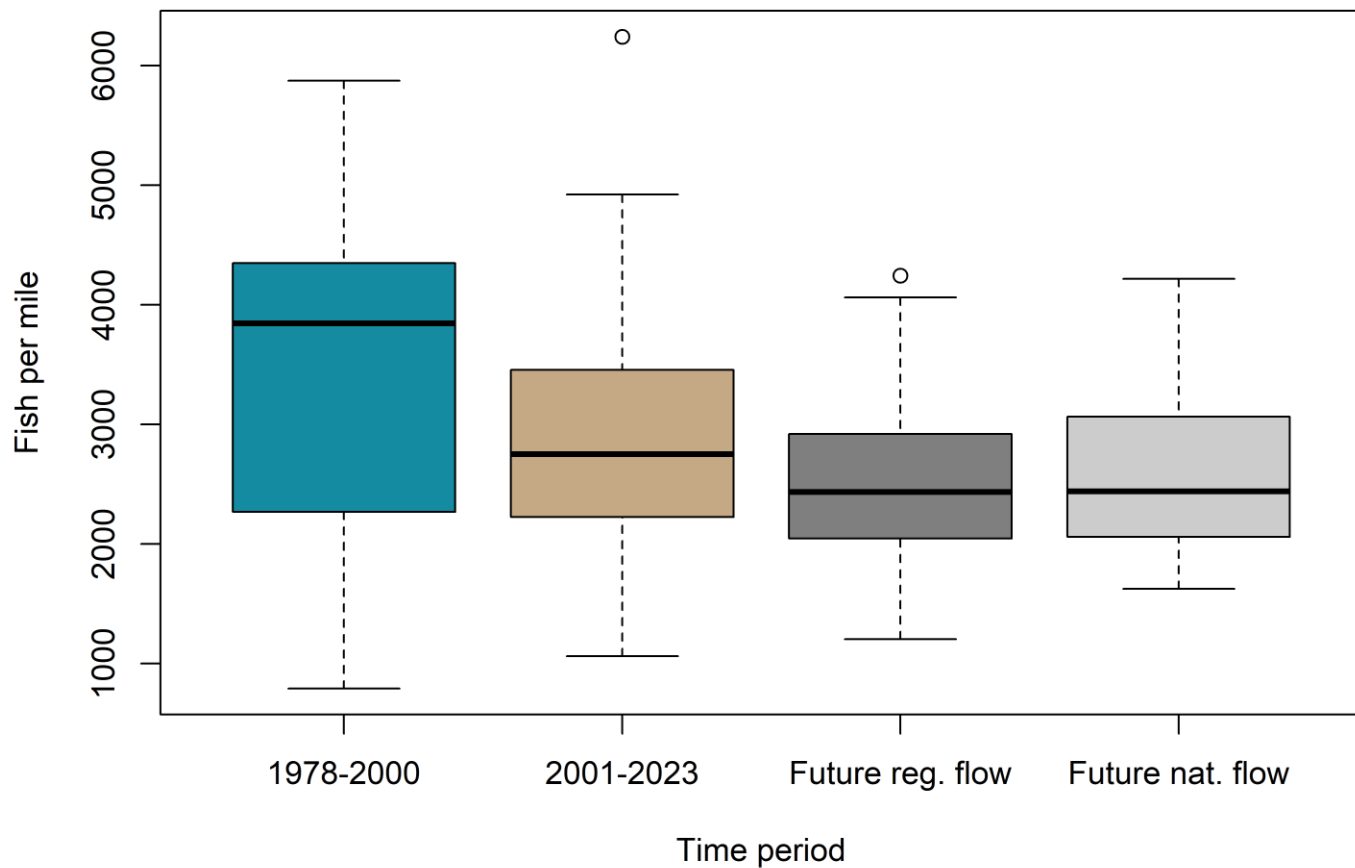
Mean water-year natural inflow: Henry's Lake to Ashton



What does this mean?

- For irrigation supply
 - Reservoirs will fill; little chance of physical water shortage
 - Diversion 23% lower since 2001 than 1978-2024
 - Farmers and irrigation managers have adapted
- For water quality in/downstream of IP Reservoir: lower inflow =
 - warmer temperatures (altered insect hatches)
 - higher probability of Harmful Algal Blooms
 - higher turbidity
- For trout populations above/below IPR: lower inflow =
 - fewer fish survive in reservoir = fewer fish upstream
 - lower winter outflow = lower trout populations downstream

Box Canyon Rainbow Trout Population



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- We can't make more water; can we adapt ecosystems & expectations?