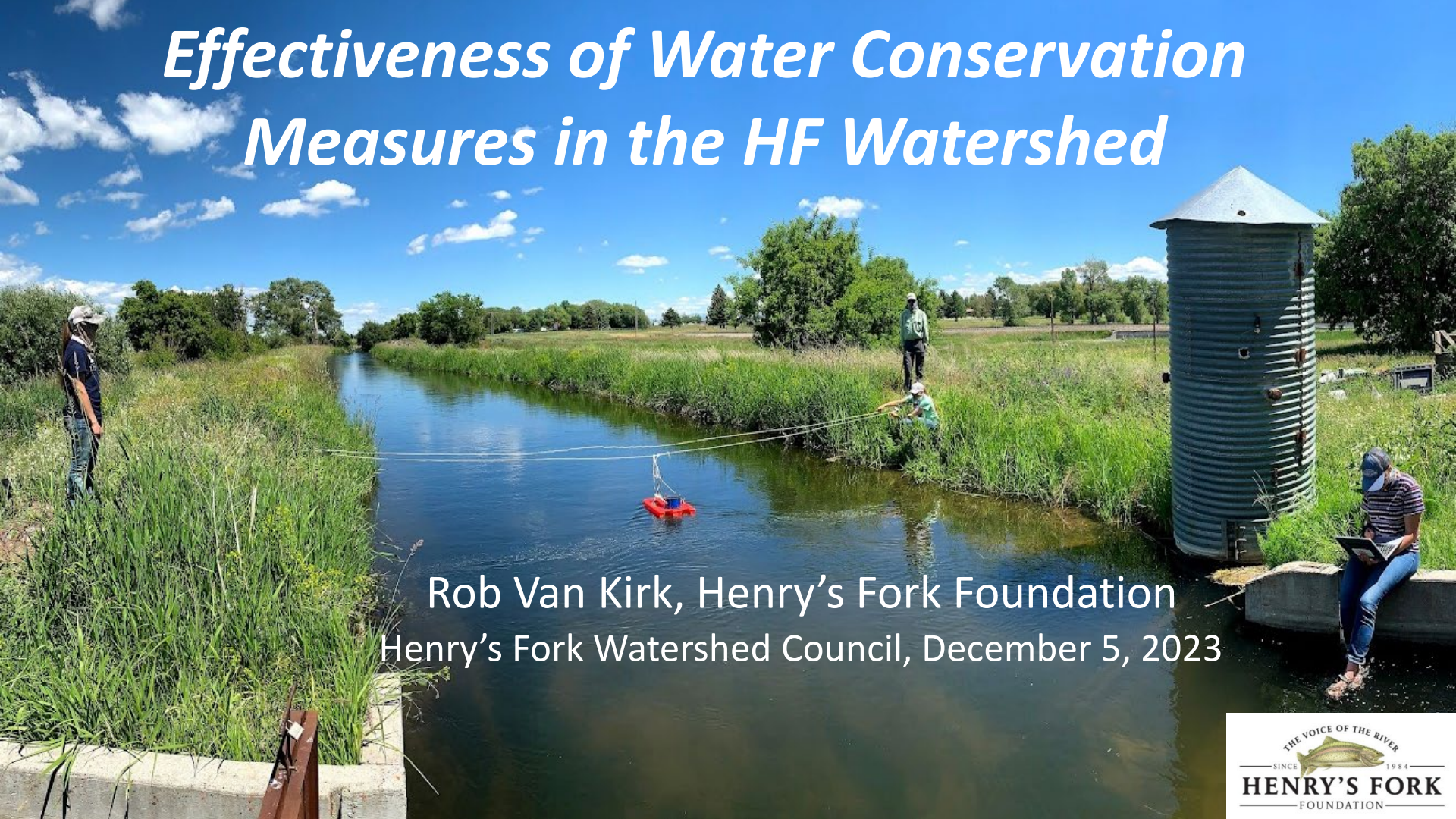
Effectiveness of Water Conservation Measures in the HF Watershed



Rob Van Kirk, Henry's Fork Foundation

Henry's Fork Watershed Council, December 5, 2023

THE VOICE OF THE RIVER
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FOUNDATION

Outline

- Why save water in Island Park Reservoir?
- Conservation measures since 2018
- Assessing effectiveness: two methods
- Results
- Whose water did we “save”, Peter’s or Paul’s?

Goal: Keep more water in IP Reservoir

WHY?

- More management flexibility
- Higher winter outflow = larger trout population
- More trout and kokanee in reservoir/upper HF
- More hydroelectric production
- Better water quality in reservoir
- Better water quality downstream
- More certainty for water users

Conservation Methods

Actors

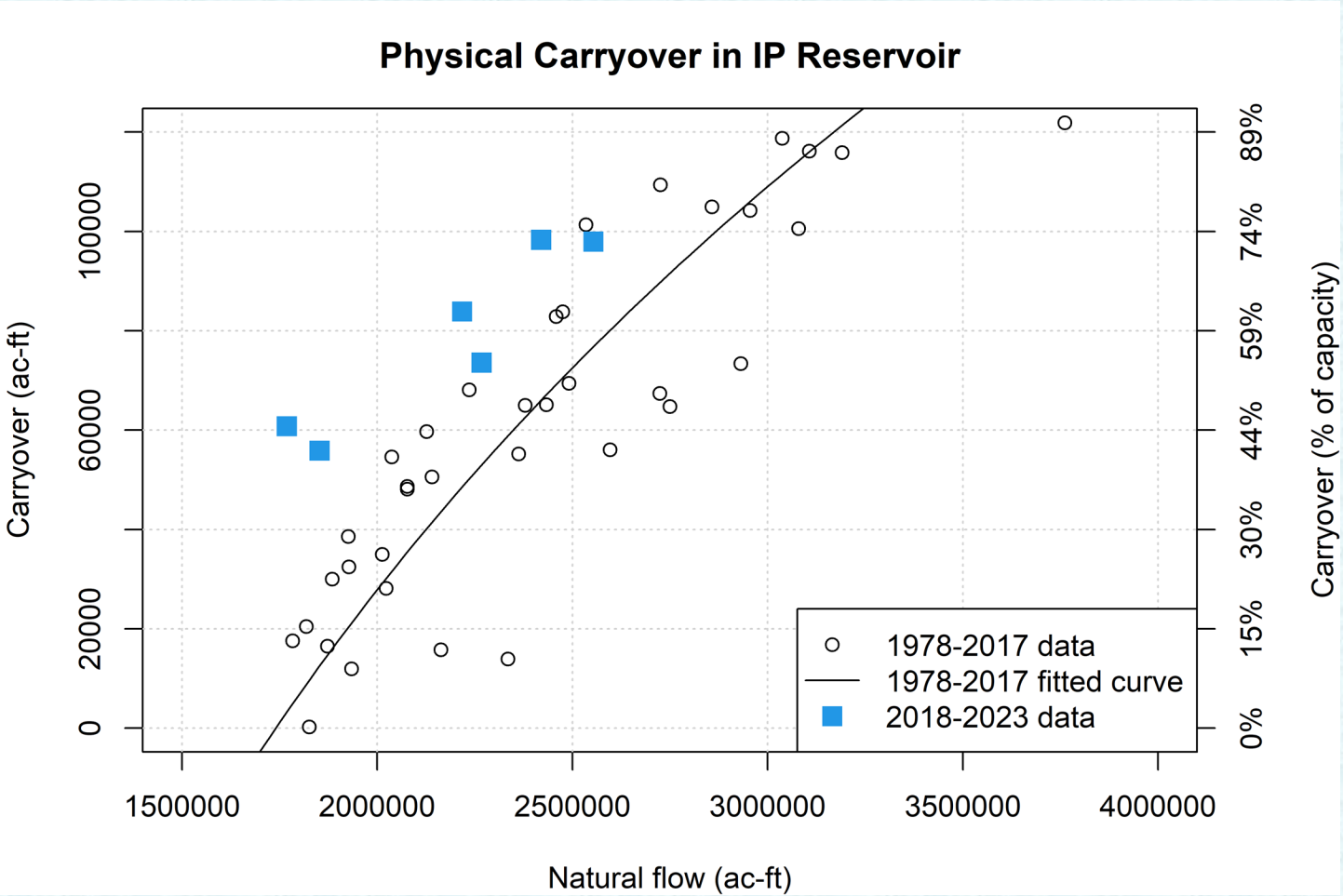
- Water managers/agencies
- Irrigation entities
- Agricultural producers
- Conservation NGOs

Conservation Actions

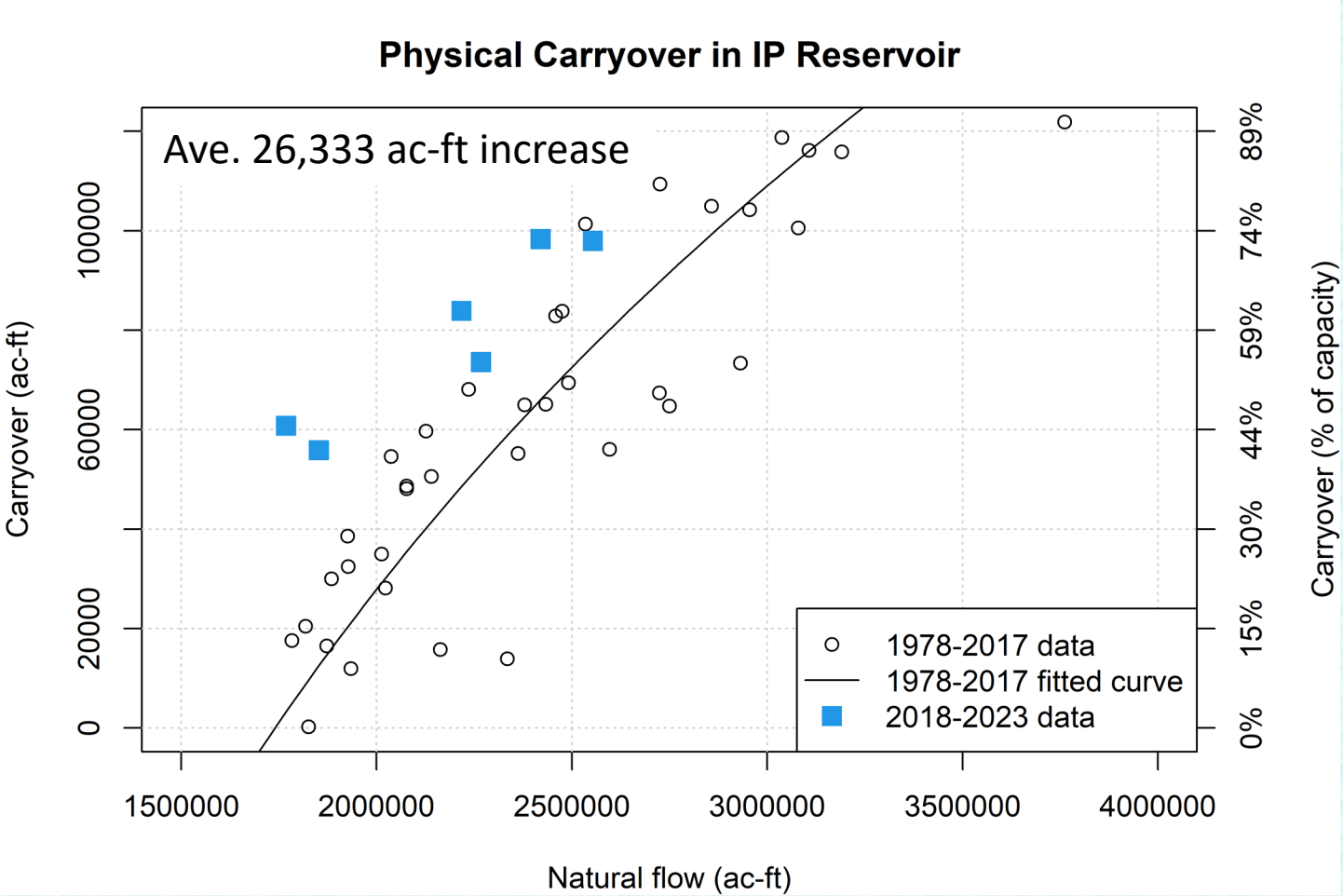
- Real-time data, predictive models, fine-scale daily information
- Improved irrigation infrastructure
- Precise lower-watershed streamflow targets
- Voluntary on-farm measures (alternative crop rotations, irrigation technology, soil health)

Initial implementation in 2018

Assessment 1: 2018-2023 outcomes vs. 1978-2017 expectation based on water supply



Assessment 1: 2018-2023 outcomes vs. 1978-2017 expectation based on water supply



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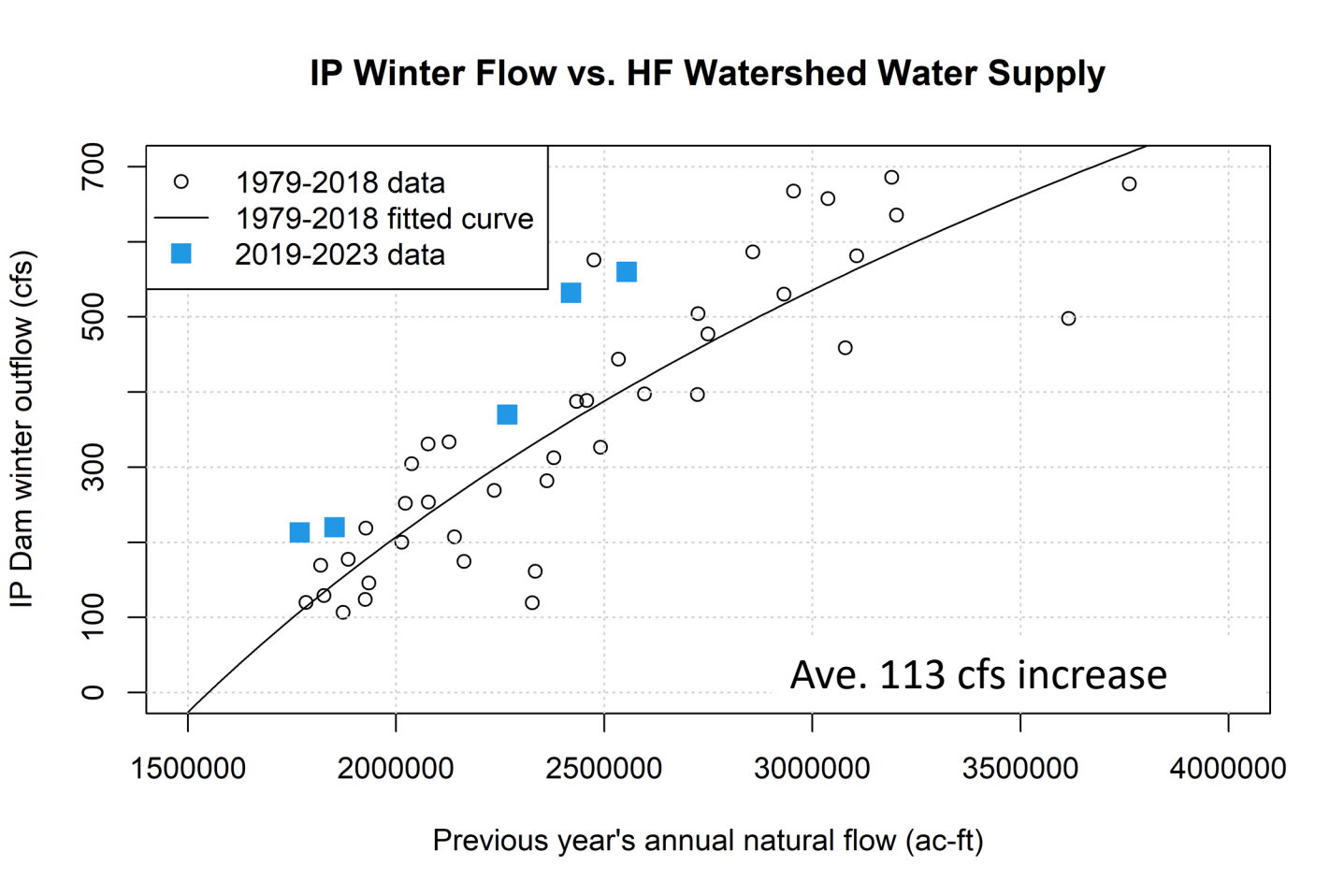
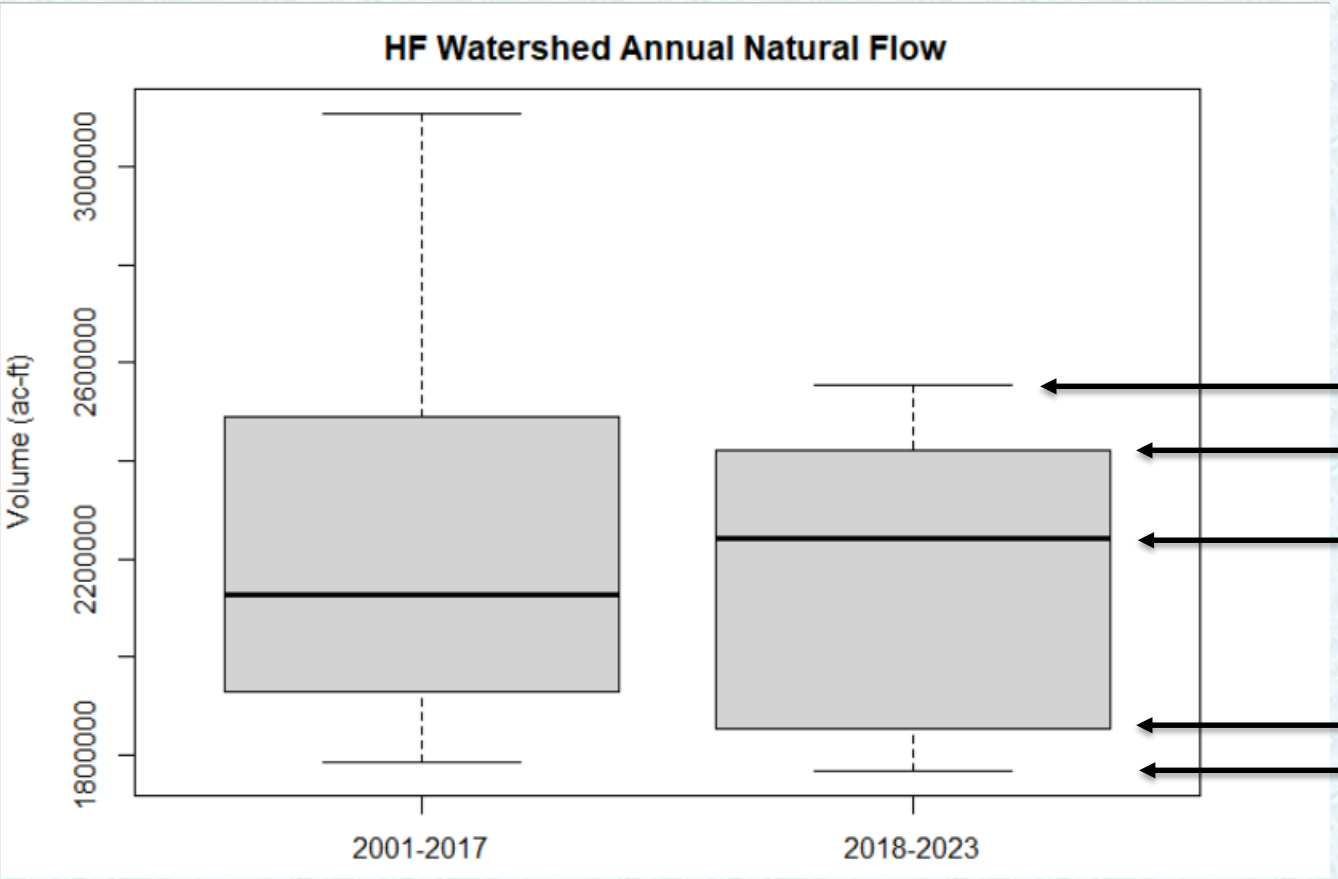


Assessment 2: Straight-up comparison of 2018-2023 vs. 2001-2017



- No difference in water supply
- No difference in irrigation methods (Morrisett et al. 2023)
- No difference in dam infrastructure

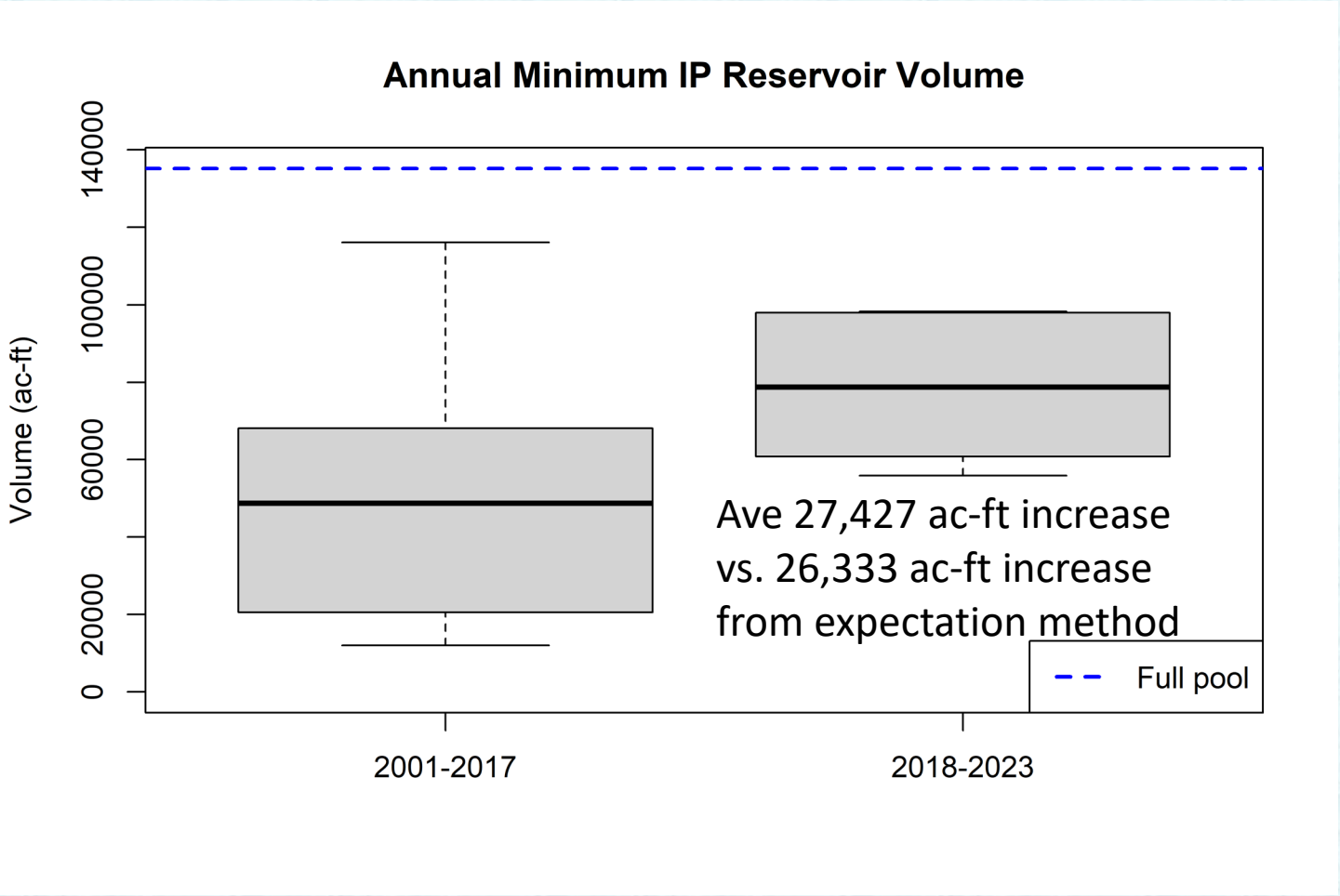
Maximum

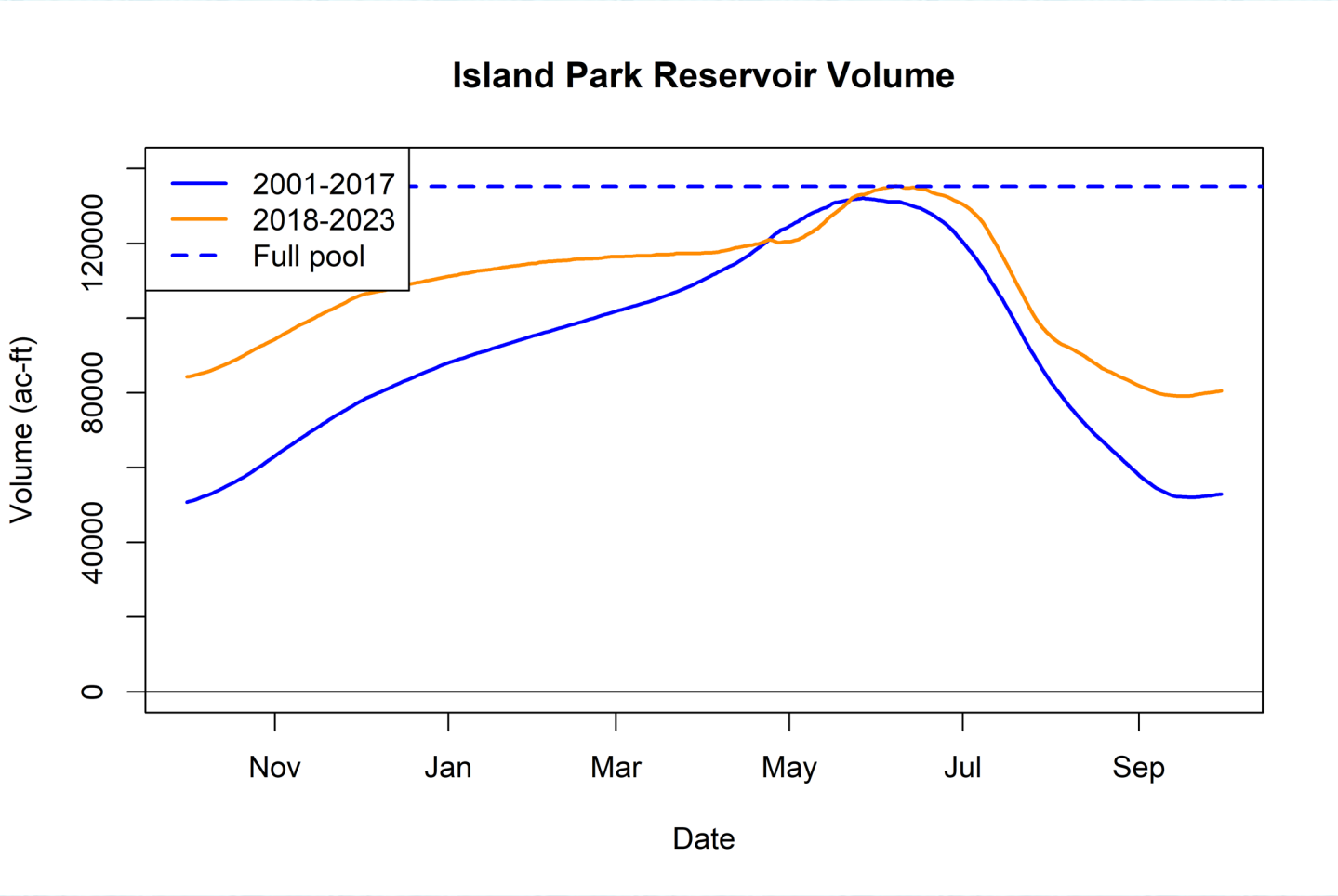
75th percentile

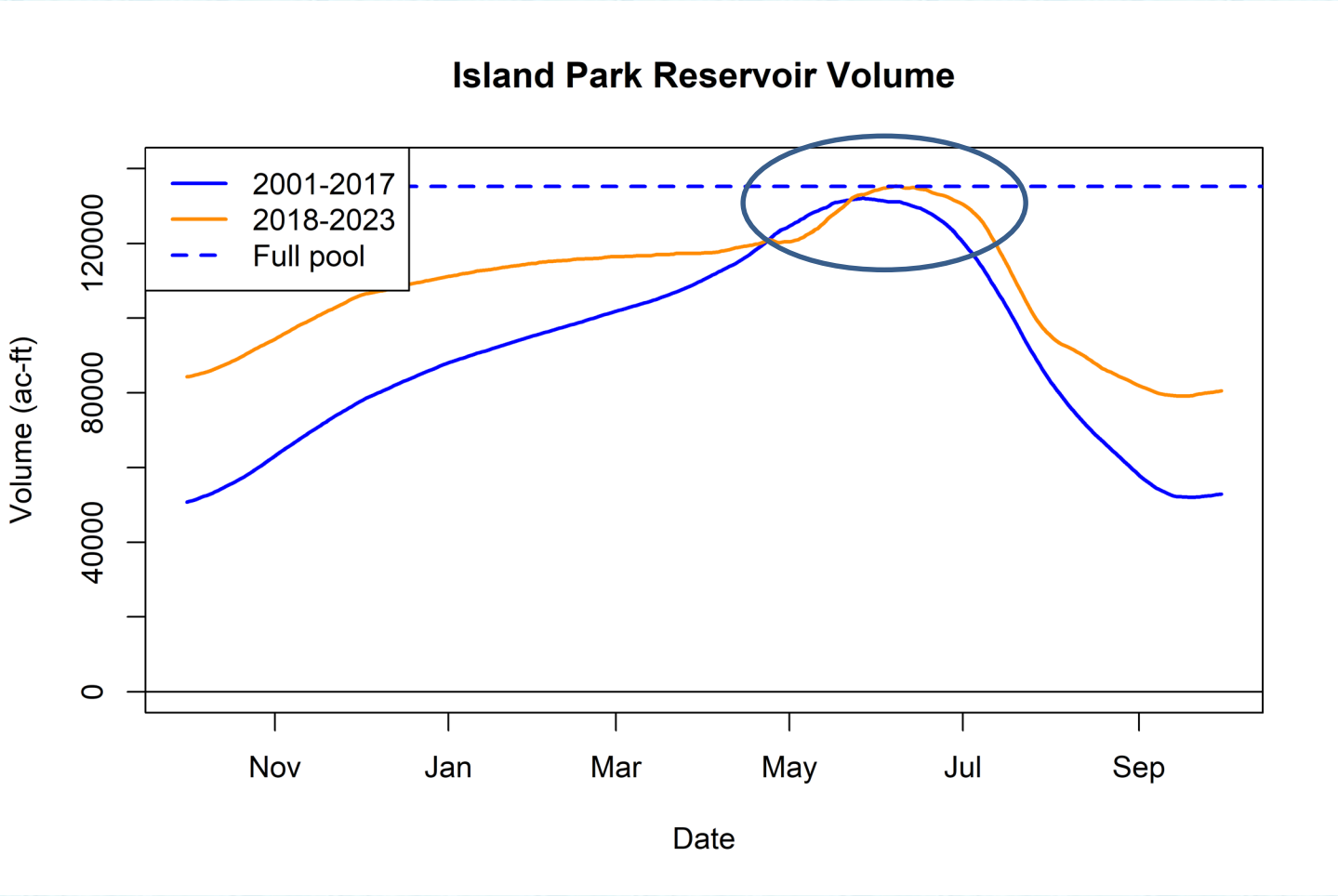
Median

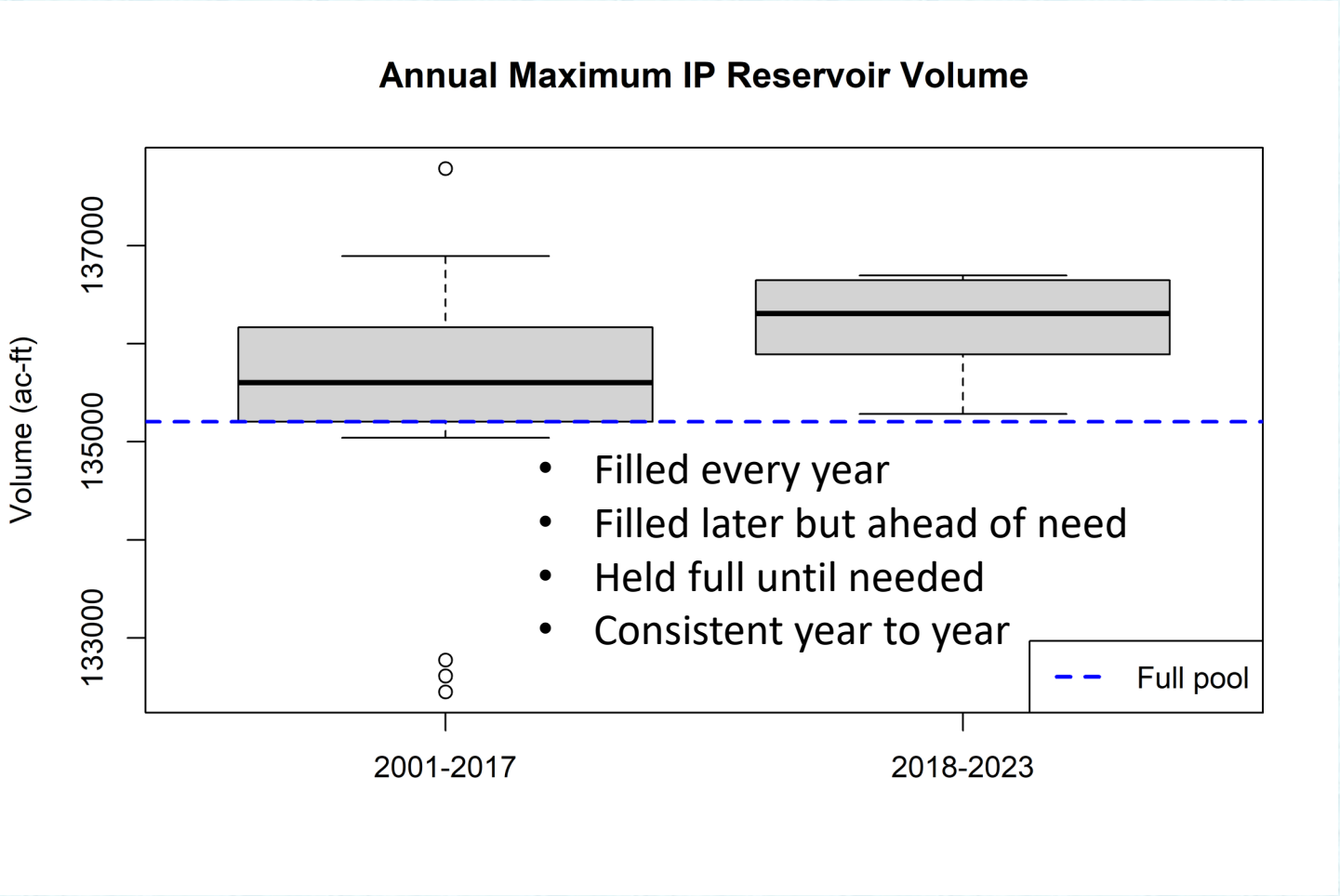
25th percentile

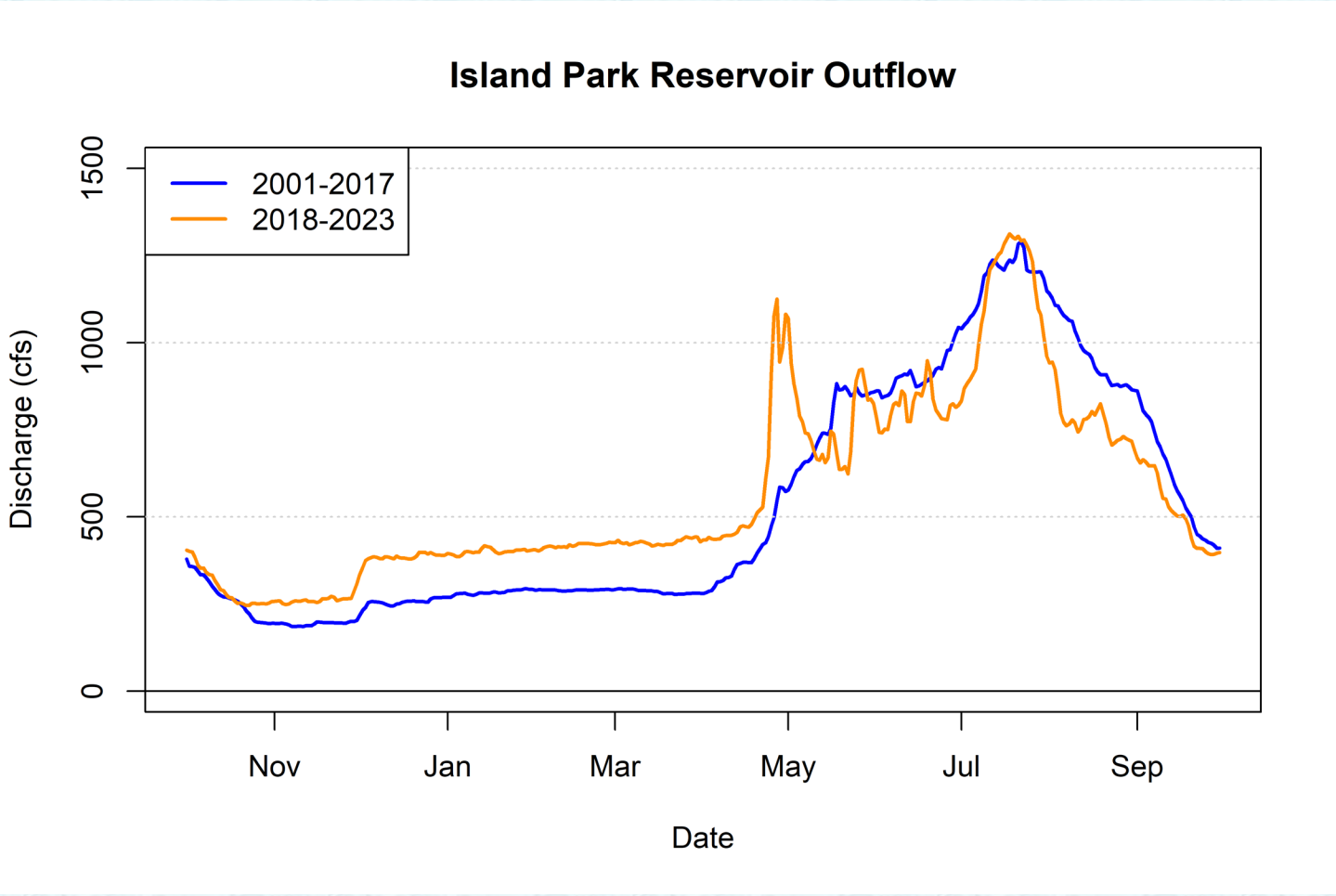
Minimum

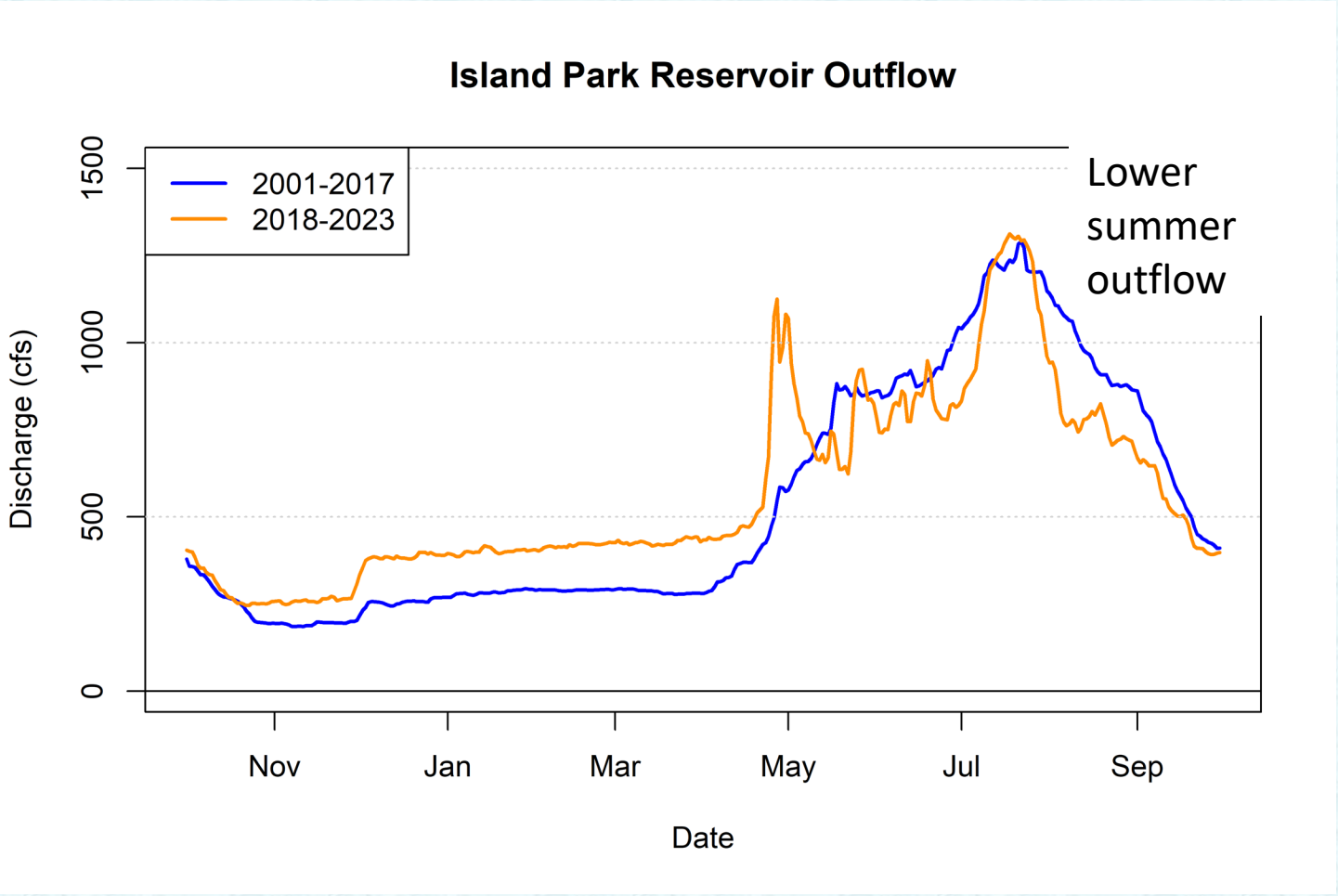

Annual Minimum IP Reservoir Volume
Volume (ac-ft)
0
20000
60000
100000
140000
2001-2017
2018-2023
Ave 27,427 ac-ft increase
vs. 26,333 ac-ft increase
from expectation method
Full pool

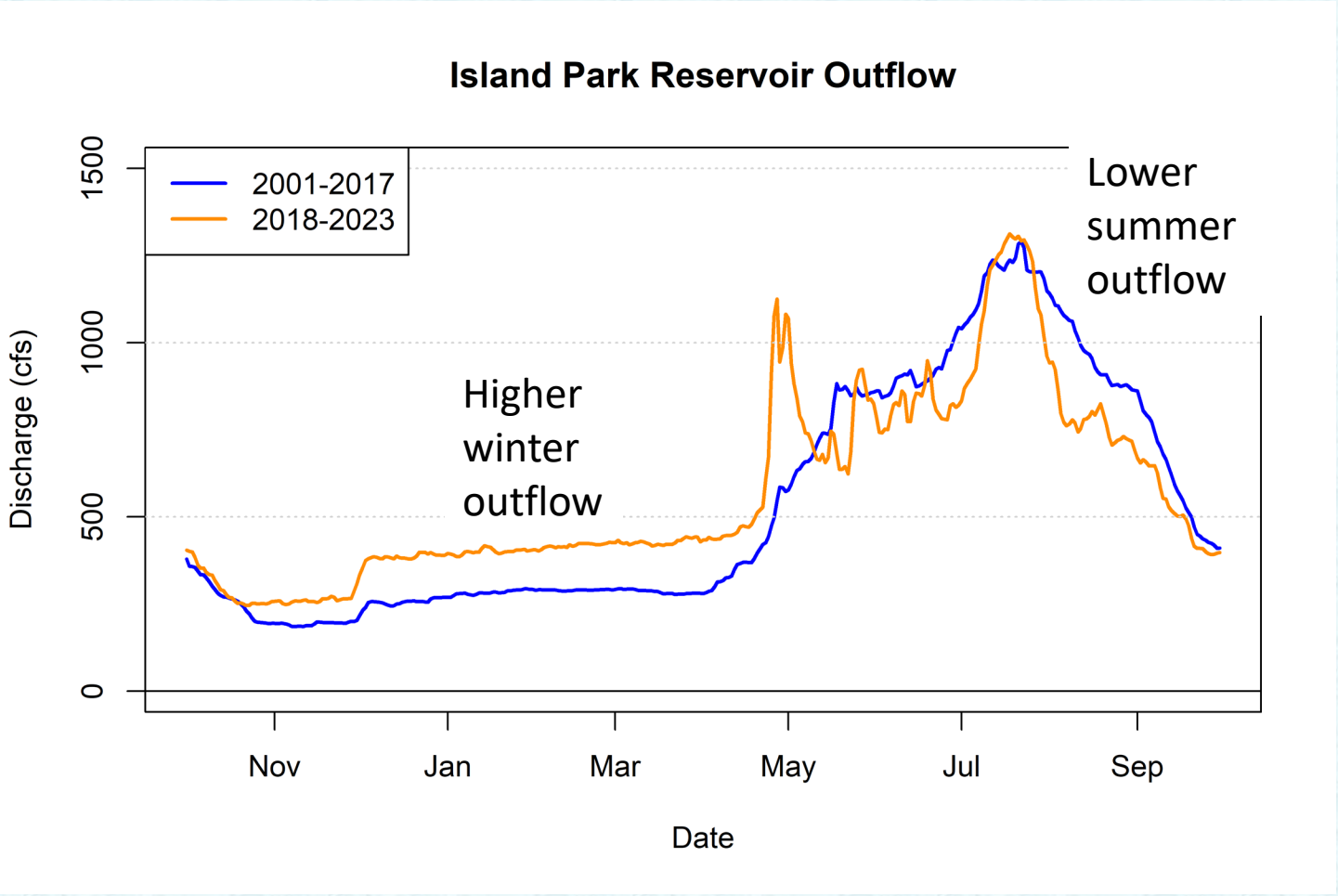

Island Park Reservoir Volume
2001-2017
2018-2023
Full pool
Volume (ac-ft)
0
40000
80000
120000
Nov
Jan
Mar
May
Jul
Sep
Date

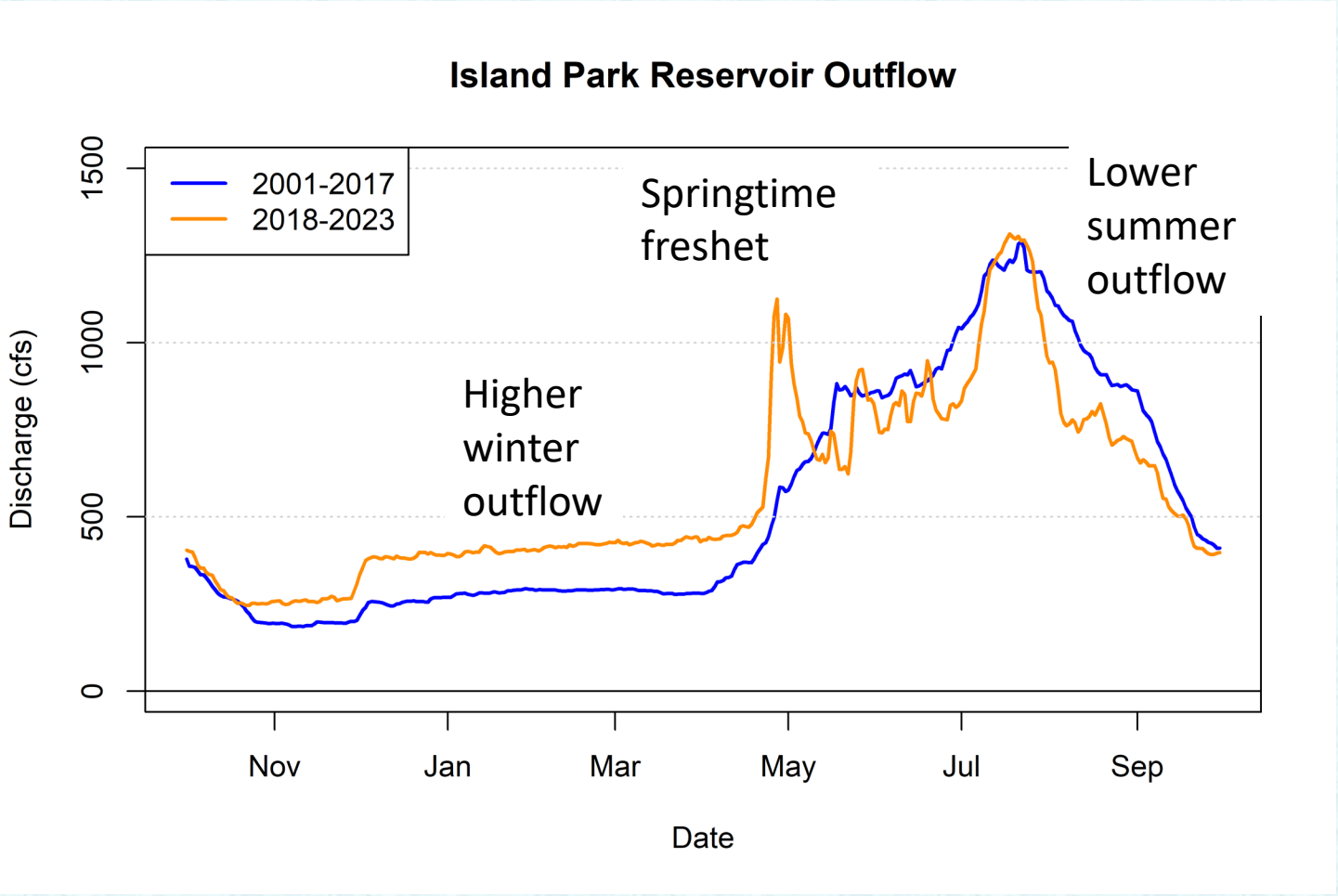

Island Park Reservoir Volume
2001-2017
2018-2023
Full pool
Volume (ac-ft)
0
40000
80000
120000
Nov
Jan
Mar
May
Jul
Sep
Date

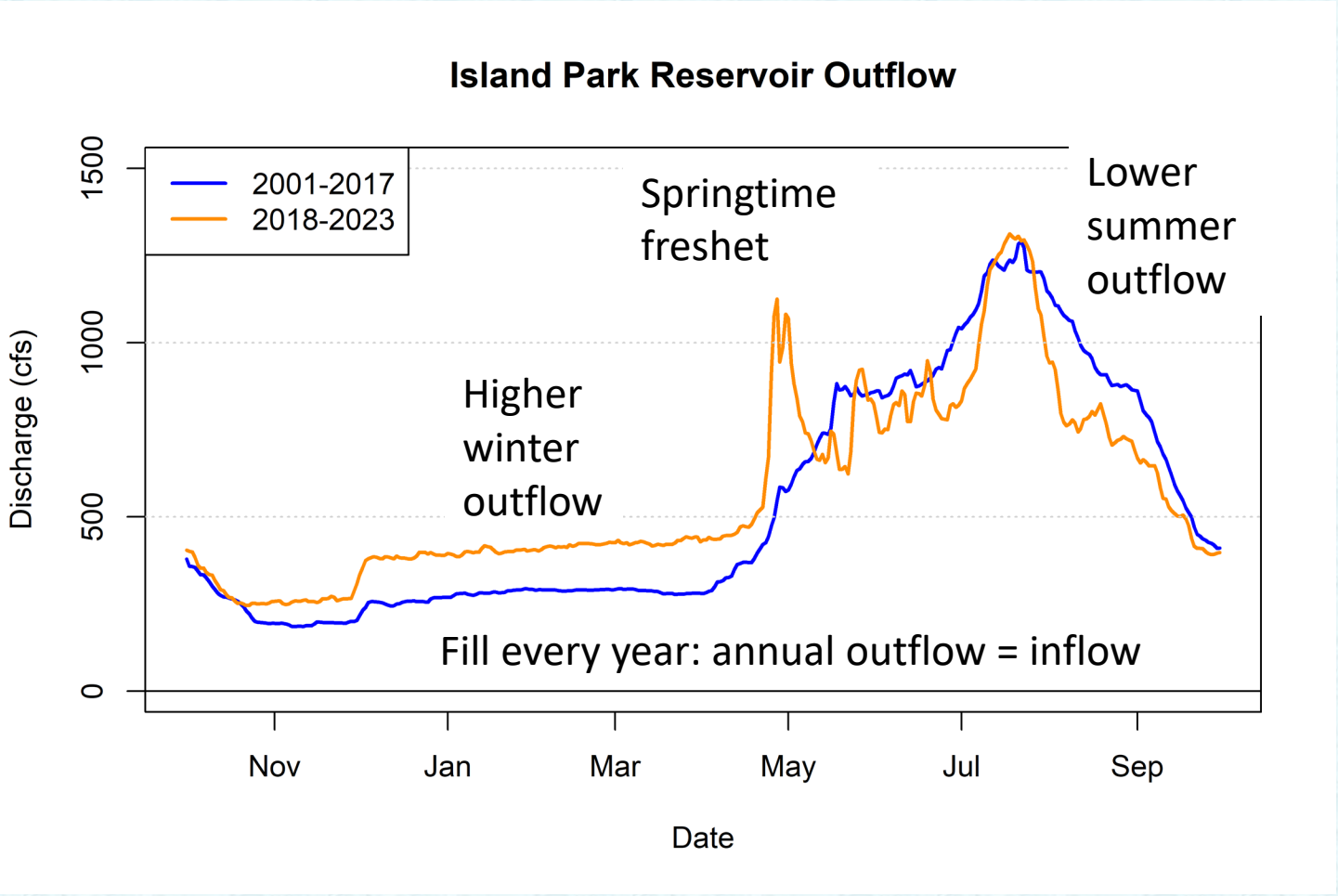

Annual Maximum IP Reservoir Volume
Volume (ac-ft)
133000
135000
137000
2001-2017
2018-2023
• Filled every year
• Filled later but ahead of need
• Held full until needed
• Consistent year to year
Full pool

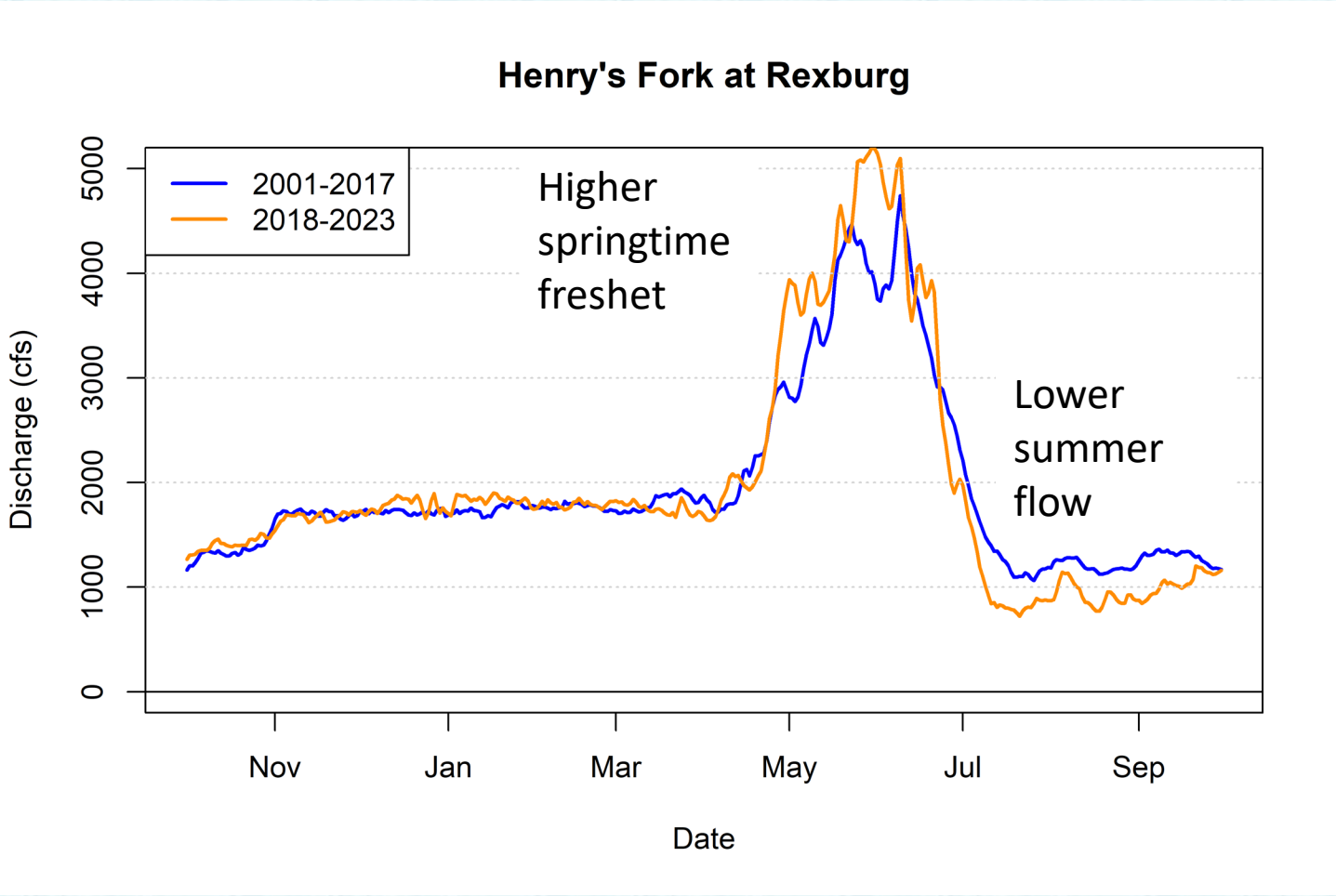

Island Park Reservoir Outflow
2001-2017
2018-2023
Discharge (cfs)
0
500
1000
1500
Nov
Jan
Mar
May
Jul
Sep
Date

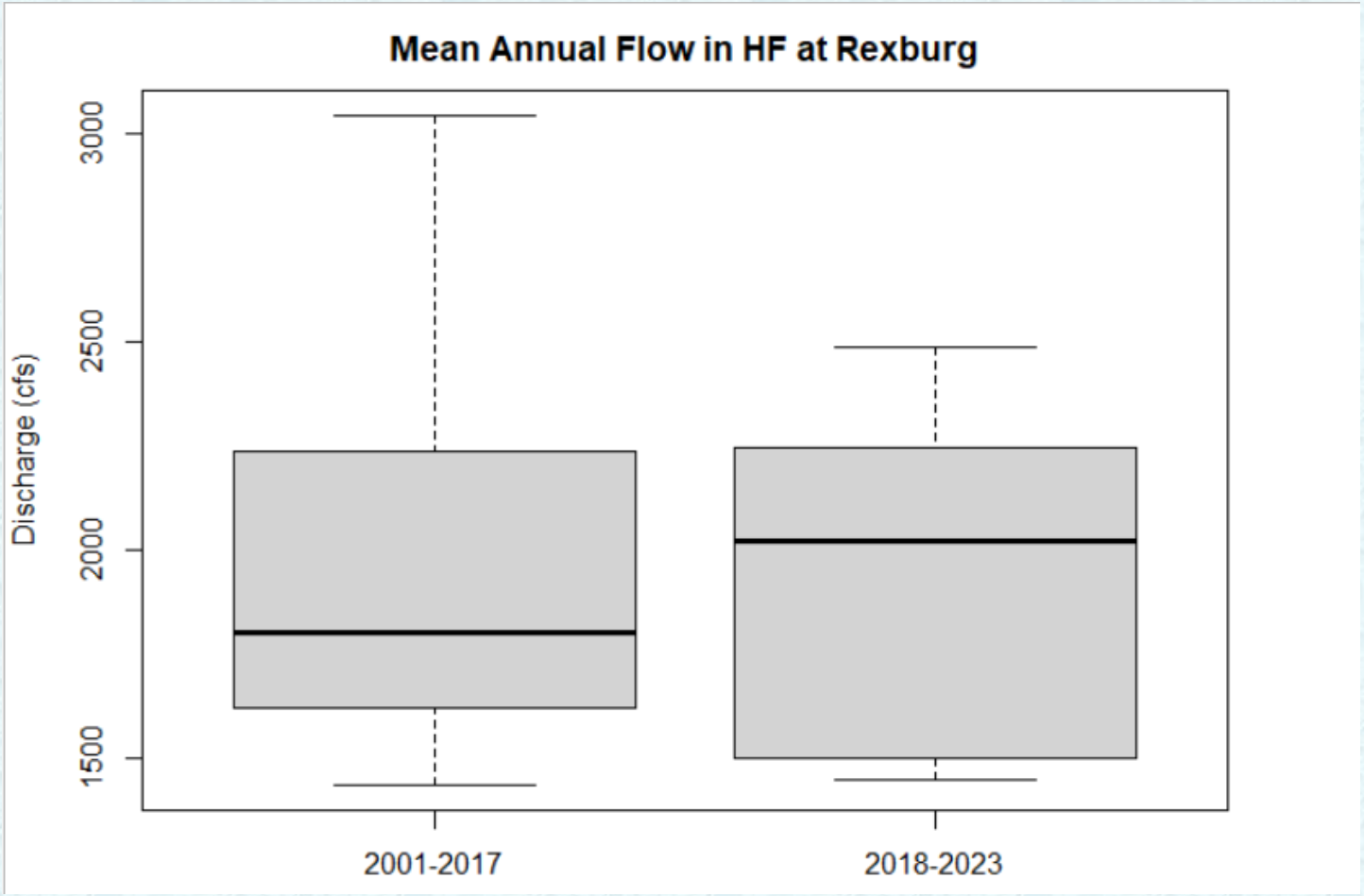

Island Park Reservoir Outflow
2001-2017
2018-2023
Lower summer outflow
Discharge (cfs)
0
500
1000
1500
Nov
Jan
Mar
May
Jul
Sep
Date


Island Park Reservoir Outflow
2001-2017
2018-2023
Lower summer outflow
Higher winter outflow
Discharge (cfs)
0
500
1000
1500
Nov
Jan
Mar
May
Jul
Sep
Date


Island Park Reservoir Outflow
2001-2017
2018-2023
Springtime freshet
Lower summer outflow
Higher winter outflow
Discharge (cfs)
0
500
1000
1500
Nov
Jan
Mar
May
Jul
Sep
Date


Island Park Reservoir Outflow
2001-2017
2018-2023
Springtime freshet
Lower summer outflow
Higher winter outflow
Fill every year: annual outflow = inflow
Discharge (cfs)
0
500
1000
1500
Nov
Jan
Mar
May
Jul
Sep
Date


Henry's Fork at Rexburg
2001-2017
2018-2023
Higher springtime freshet
Lower summer flow
Discharge (cfs)
0
1000
2000
3000
4000
5000
Nov
Jan
Mar
May
Jul
Sep
Date



No difference in watershed outflow to rest of system.

Admin. Irrig. Yrs. 2018-2022 vs. 2001-2017

Direct comparison

	Difference (ac-ft)	Difference (%)
Natural flow	-71,838	-3.2%
Diversion	-29,860	-3.4%
Shoulder-season GW recharge (inc. & mgd.)	-3,005	-2.3%
Net gain from reservoir precip. less evap.	+3,001	+36.8%
Physical HFW reservoir carryover	+27,792	+18.5%
NFR/FMID administrative carryover	+22,642	+24.2%
Crosscut delivery to Teton River	-9,749	-25.4%
Exchange well pumping	-6,236	-31.5%

Conclusions

1. Small water budget changes (~2-3%)
2. Much higher IP Reservoir draft and winter outflow (~30-40%)
3. Only timing of watershed outflow changed
   - Water held (“saved”) in HFW reservoirs July-September
   - Difference flowed out of watershed April-June
4. Majority of savings was NFR/FMID administrative storage
5. Administrative and Teton River delivery savings ~25-30%
6. IPR managed more precisely year-round to everyone’s benefit

Questions?

Contact: rob@henrysfork.org

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