



— BUREAU OF —
RECLAMATION

LTEMP Flow Experiments

Technical Work Group Meeting
April 10, 2025

LTEMP Experiments

“The overall approach attempts to strike a balance between identifying specific experiments and providing flexibility to implement those experiments when resource conditions are appropriate.”

“...rather than proposing a prescriptive approach to experimentation, an adaptive management-based approach that is responsive and flexible will be used to adapt to changing environmental and resource conditions...”

--2016 LTEMP ROD, p. B-9



Potential LTEMP Flow Experiments

- Sediment (High Flow Experiments)
 - Spring HFE
 - Proactive spring HFE
 - Fall HFE
 - Fall HFE extended duration (up to 250 hr)
- Aquatic Resource
 - Macroinvertebrate Flow
 - Trout Management Flows
 - Low summer flows (2nd ten years of LTEMP)
- LTEMP SEIS
 - Smallmouth Bass Flows
 - HFE protocol revision



LTEMP Process for Experiments

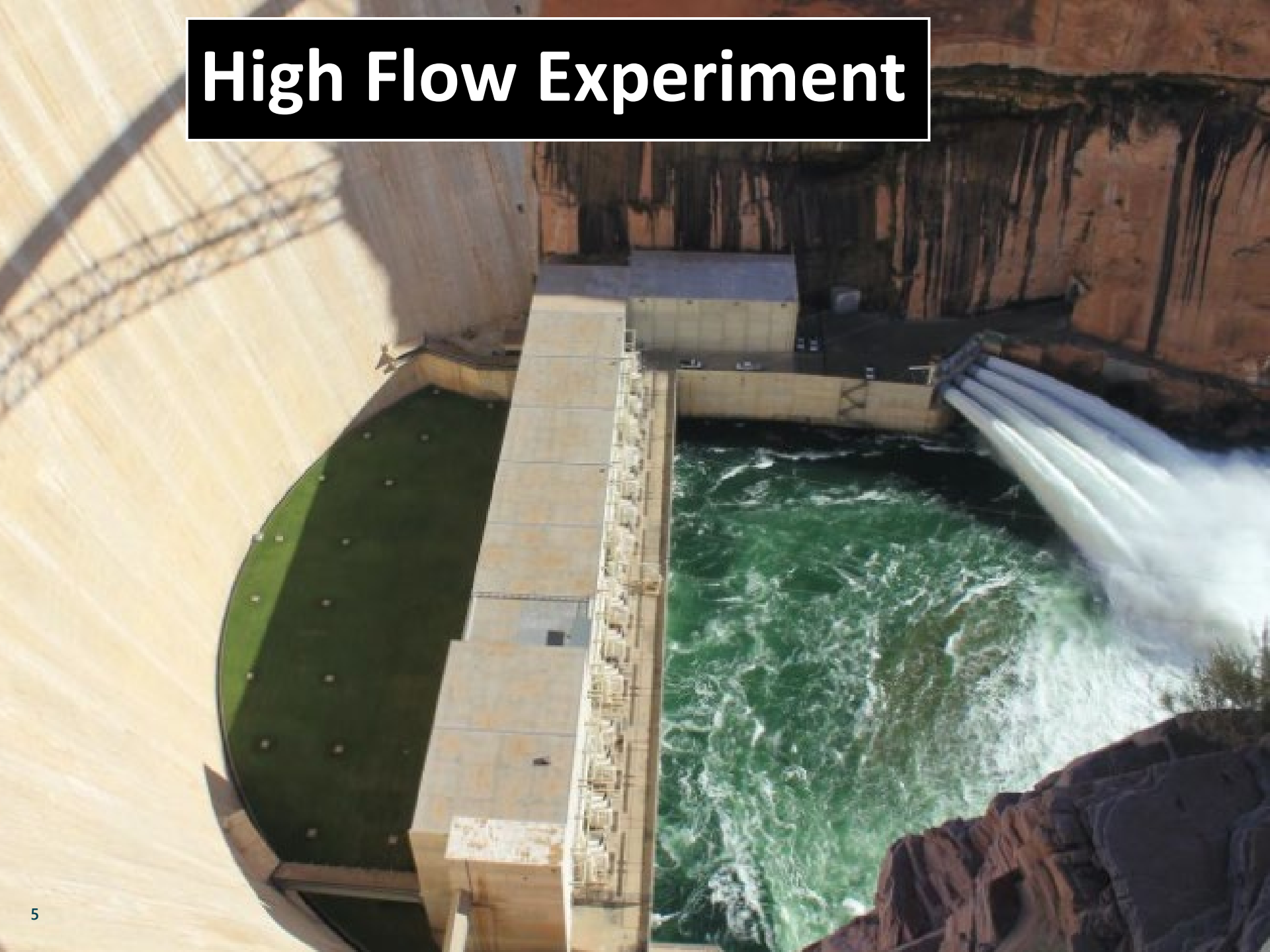
- Annual Reporting and TWG meetings
- Notification and Consultation to Tribes & PA Parties
- Implementation / Planning Team Recommendation
- DOI decision

1.4 COMMUNICATION AND CONSULTATION PROCESS FOR ALTERNATIVE D

To determine whether conditions are suitable for implementing or discontinuing experimental treatments or management actions, the DOI will schedule implementation/planning meetings or calls with the DOI bureaus (USGS, NPS, FWS, BIA, and Reclamation), WAPA, AZGFD, and one liaison from each Basin State and from the UCRC, as needed or requested by the participants. The implementation/planning group will strive to develop a consensus recommendation to bring forth to the DOI regarding resource issues as detailed at the beginning of this section, as well as including WAPA's assessment of the status of the Basin Fund. The Secretary of the Interior will consider the consensus recommendations of the implementation/planning group, but retains sole discretion to decide how best to accomplish operations and experiments in any given year pursuant to the ROD and other binding obligations.



High Flow Experiment



Historical HFEs

TABLE 1 | High-flow experiments (HFEs) implemented from March 1996 to April 2023.

Start date of HFE peak at Lees Ferry	Peak discharge ^a (ft ³ /s)	Duration ^a (h)	Marble Canyon sand mass balance ^b (Mg)			Paria River sand input ^b (Mg)
March 26, 1996	45,000	182	—	—	—	3,80,000
November 4, 1997	30,800	40	—	—	—	1,700,000
May 2, 2000	30,500	72	—	—	—	920,000
September 5, 2000	31,000	72	—	—	—	3700
November 21, 2004	41,700	79	570,000	±	130,000	620,000
March 6, 2008	42,800	80	480,000	±	170,000	860,000
November 19, 2012	44,500	85	710,000	±	120,000	690,000
November 11, 2013	37,000	99	2,000,000	±	320,000	1,900,000
November 10, 2014	38,000	104	1,300,000	±	200,000	1,200,000
November 7, 2016	36,500	99	640,000	±	160,000	840,000
November 5, 2018	39,500	65	560,000	±	150,000	750,000
April 24, 2023	40,000	78	1,700,000	±	290,000	1,700,000

^aDuration computed as period of discharge at or above power plant capacity (this is the period at the indicated peak discharge for the 1997 and 2000 events and the period above 892 m³/s for all other events). Peak discharge and duration for Lees Ferry gage from U.S. Geological Survey (2024a).

^bThe mass balance and Paria River sand inputs reflect the sand supplied to Marble Canyon during the preceding thunderstorm season and are computed for the period from July 1 to the beginning of the ramp up to the HFE peak (1–2 days before the start of the HFE peak at Lees Ferry). Marble Canyon sand mass balance and Paria River sand input from U.S. Geological Survey (2024a) and for 1996 only, from Topping et al. (2010).

Grams, Paul E., et al. "Implementation of controlled floods for sediment management on the Colorado River in Grand Canyon under aridification." *River Research and Applications* 41.2 (2025): 334-348.



LTEMP SEIS ROD Language

- “Planning for HFE releases will follow the planning and implementation process described in Section 7 of the 2016 LTEMP ROD, including close monitoring of all experimental treatments for unacceptable adverse impacts on important resources. Sand budget models will be run throughout the fall to determine whether sufficient sediment is available to conduct an HFE release. If sufficient sediment is available in the fall, the planning and implementation team may recommend conducting the fall HFE release or deferring implementation to the spring implementation window. Prior to the spring implementation window, the planning and implementation process will again be used to provide a recommendation on the duration, magnitude, and timing of the spring HFE release. If the HFE release is conducted, sediment accounting will restart on July 1. If, through the planning and implementation process, the recommendation is not to conduct an HFE release despite sufficient sediment, the remaining mass balance at the end of June will be carried into the new accounting period.”



HFE Timeline

- **Fall 2024 Modelling**

- 72-hr at 40,400 cfs
- 60-hr at 40,400 cfs (spring)

- **October 2024 – PI**

Leadership Team Consensus
Recommendation to defer HFE
until Spring 2025

- **50 kaf of volume
moved from March
into June**

- **Spring 2025
Modelling**

- 60-hr at 41,900 cfs
- 96-hr at 25,000 cfs
- No HFE (522,000 mt rollover)

Unit Number	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025	Sep 2025
1	■	■										■
2	■						■	■				■
3	■	■										
4	■	■										
5						■	■					
6						■	■					
7					■	■						
8					■	■						
ROW 1	■	■										
ROW 2		■	■	■	■							
ROW 3					■	■	■	■				
ROW 4								■	■	■	■	
Units Available	5	6	8	6	6	6	7	7	8	8	8	6
Penstock Capacity (cfs)	16,100/ 4,000 ³	19,700	26,900	19,700	19,700	19,700	23,300	23,300	26,900	26,900	26,900	19,700
Penstock Capacity (kaf/month)	1,200	1,500	1,650	1,580	1,110	1,240	1,380	1,590	1,600	1,650	1,650	1,180
Max (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
Most (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
Min (kaf) ¹	480	500	600	723	639	675	601	599	628	709	758	568
(updated 08-19-2024)												

AUG MOST²

AUG MOST

7.48 maf

7.48 maf

7.48 maf

¹ Projected release, based on August 2024 24MS for the minimum, most probable and the maximum probable 24-Month Study model runs.

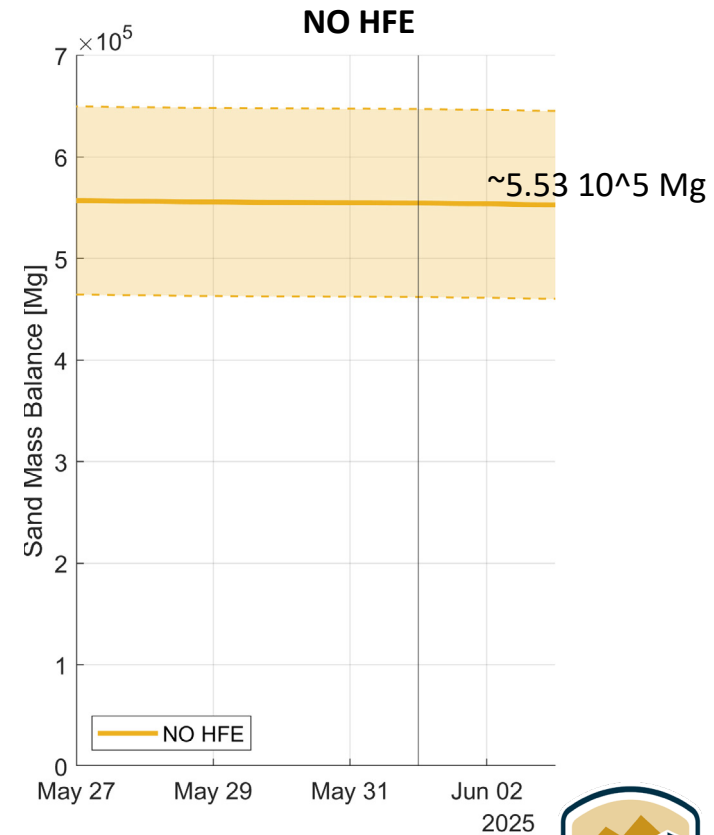
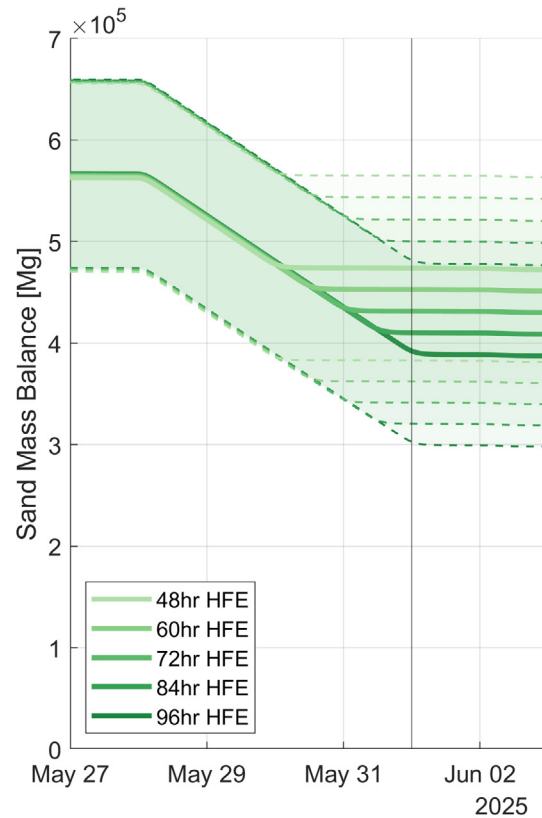
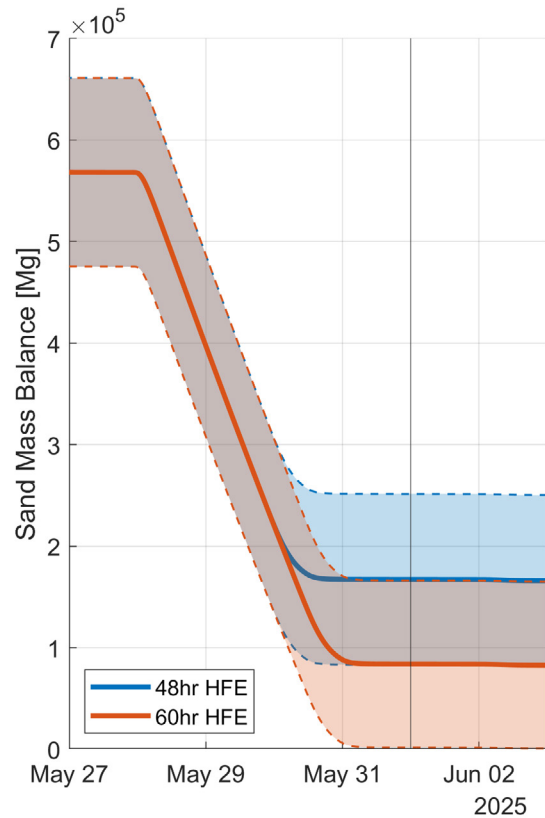
² Dependent upon availability to shift contingency regulation, which will increase capacity by 30-40MW (3%) at current efficiency.

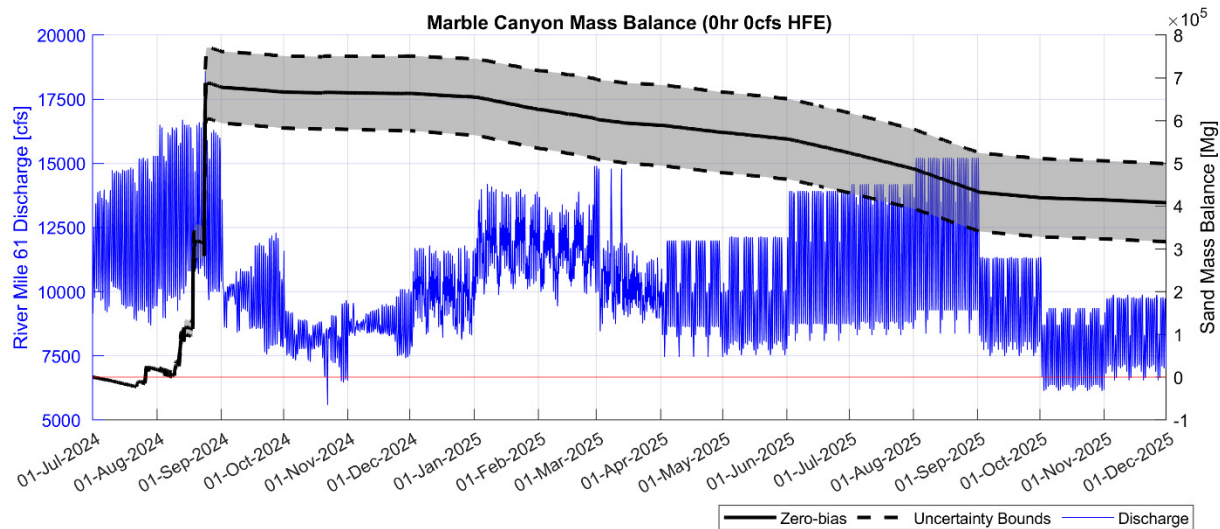
³ Tailwater/Forebay inspection from October 21-24 will require one day at 4,000 cfs, and possibly two if necessary.



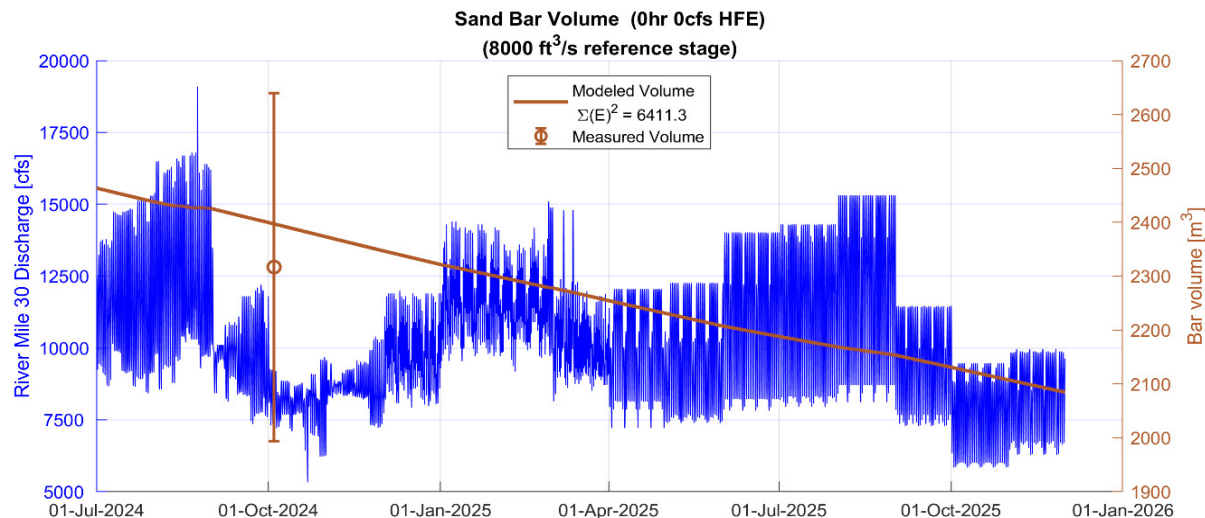
P/I Tech Team Updates

1Mg = 1 metric Ton





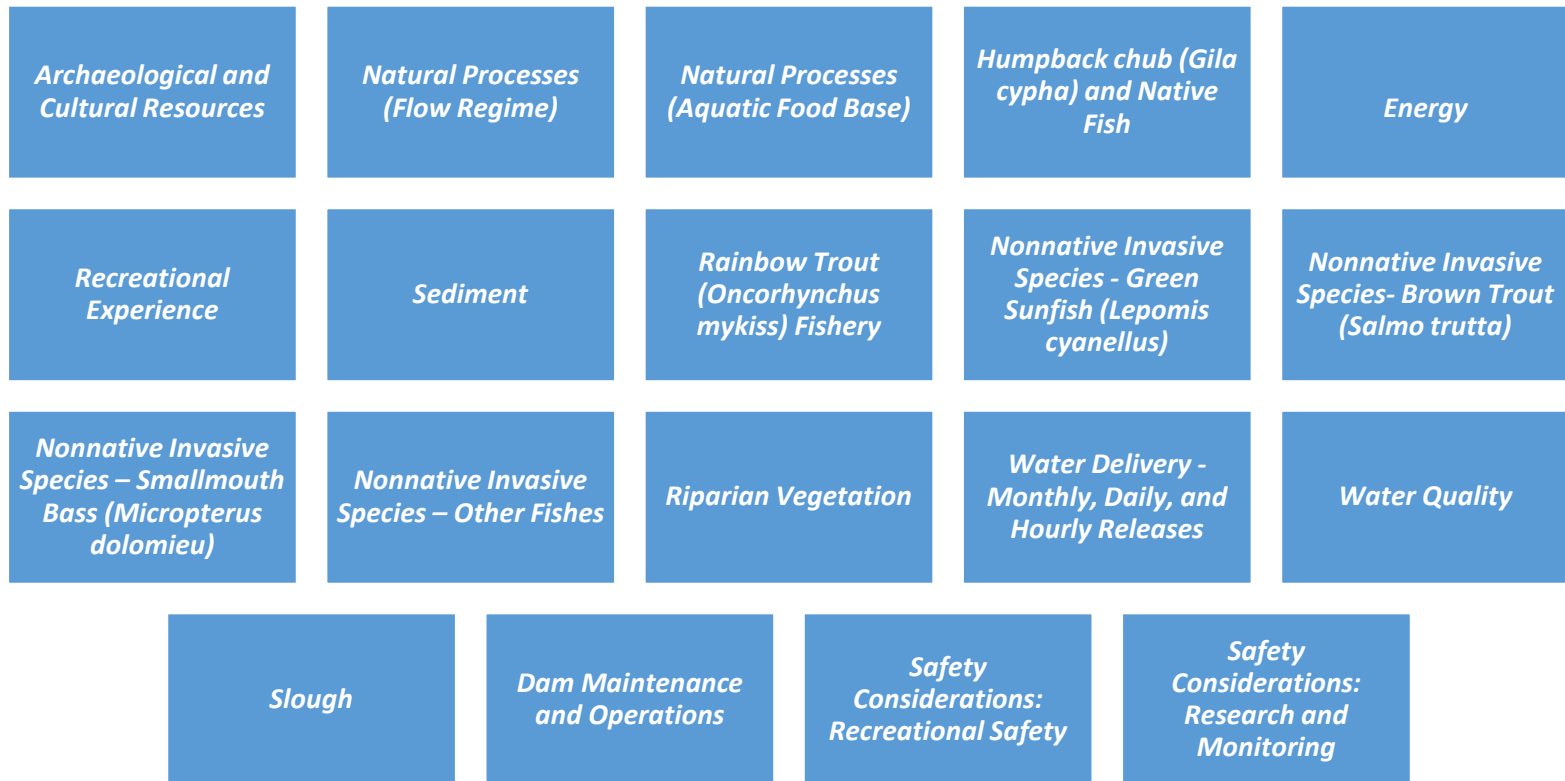
Estimated Sand Mass Balance through December of 2025 if no HFE were conducted. Solid lines represent the median mass balance, shaded areas represent the confidence interval, and the dashed lines show the upper and lower uncertainty bounds. Subject to minor revision.



Estimated Sandbar Volume increase and decrease if no HFE was conducted. Subject to minor revision.

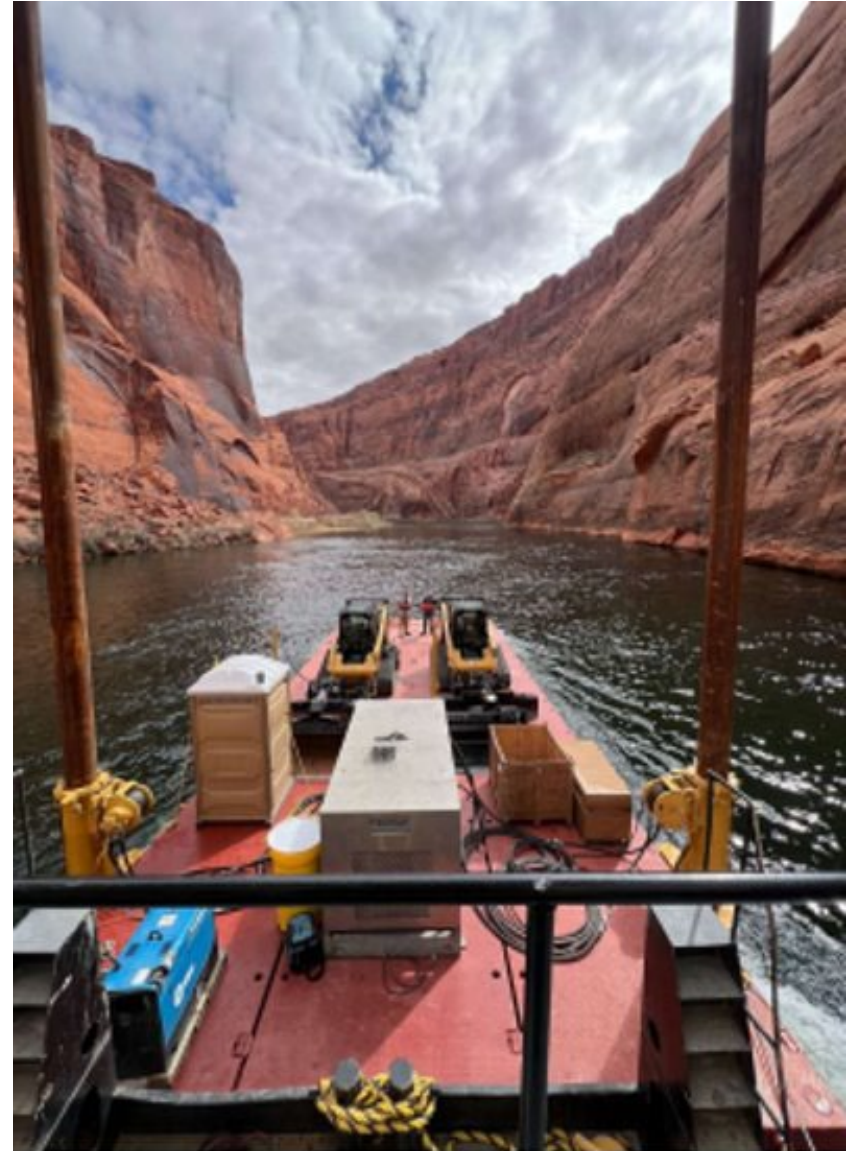


Assessment of Resources



Slough

- Original Plan was to complete by Late Feb/Early March
- Actual start date was March 12.
- Currently estimated to demobilize by end of May.



Slough

Pre-construction



April 3rd



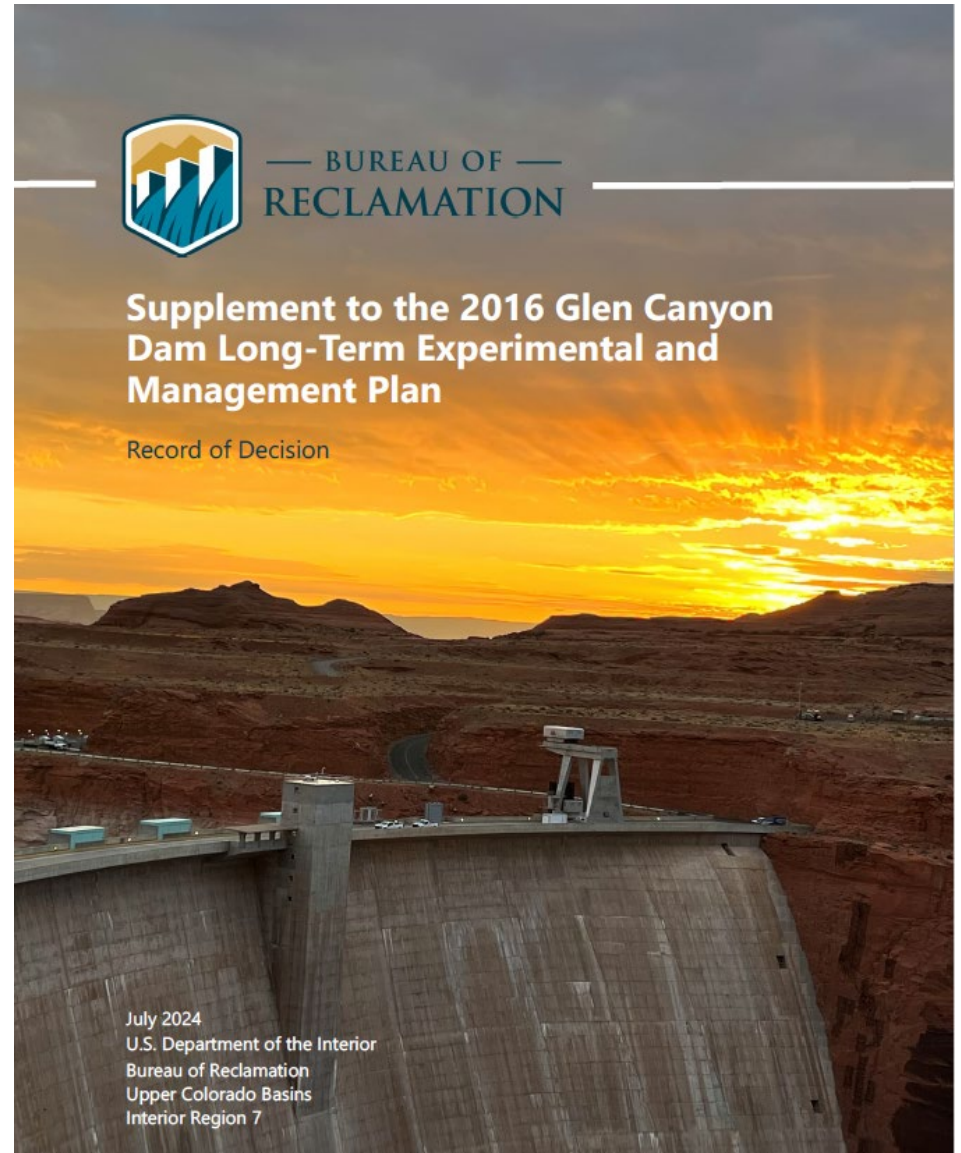
PI Tech Team Recommendation and Next Steps

- Due to timing concerns of the slough modifications, the PI team has recommended to the PI Leadership Team to not conduct a spring HFE.
- Deferment would roll over approximately 522,000 AF of sediment into new accounting window beginning July 1st.
- PI technical team members acknowledge the importance of doing this spring HFE as a vital tool for beach building and other resources.
- TWG presentation and feedback.
- PI Leadership team recommendation.
- Final Decision.

Smallmouth Bass Flows

Record of Decision

- Operational Flows (2024-2027)
 - Cool mix is the preferred alternative for 2024
 - Cool Mix Alternative and the other alternatives possible in 2025-2027 (if needed).



Smallmouth Bass Flows 2024

- 15.5 C down to River Mile 61
- 133 days of bypass (7/9-11/18)
- Avoided bypass during peak hydropower demand hours
- 29 days temps exceed 15.5 C (14 occurred after cool mix started)
- Estimated hydropower cost = ~\$18.9 million



Annual Reporting Take homes

- Without cool mix,
 - There is a high likelihood that Humpback Chub subadults near the LCR would have grown more in length.
 - A moderate likelihood that Rainbow Trout adults in the tailwater would have grown less in weight.
 - A high likelihood that Smallmouth Bass already in the system would have grown more, that a new cohort (2024) would have been produced, and that this (2024) cohort would have smaller individuals than in past years (2022 and 2023).
 - A high likelihood that this new 2024 cohort would be smaller than the 2022 cohort and a moderate likelihood it would be smaller than the 2023 cohort.



2025 Smallmouth Bass Flows

2025–2027

For smallmouth bass flows in 2025–2027, and as described in the preferred alternative, a broader range of smallmouth bass flows analyzed in the 2024 LTEMP SEIS will be considered for implementation, if conditions warrant, beyond the Cool Mix Alternative. Reclamation will consider the same factors described in the 2024 LTEMP SEIS, including any new information from previous years' experiments, to refine the criteria, implementation procedures, and off-ramps. To assess potential smallmouth bass flows to be implemented, Reclamation, in coordination with the Service, will prepare an analysis of current conditions, including the hydrology, water quality, Basin Fund (in coordination with WAPA), and fish populations. Reclamation will coordinate with the planning and implementation team as defined in the 2016 LTEMP ROD to ensure all pertinent resources are analyzed prior to implementing a proposed flow. The implementation process will include formal stakeholder engagement, including consultations with the Tribes.

Implementation of this ROD, relative to the revised HFE protocol, will also follow the planning and implementation process as described in Section 1.3 of the 2016 LTEMP ROD.

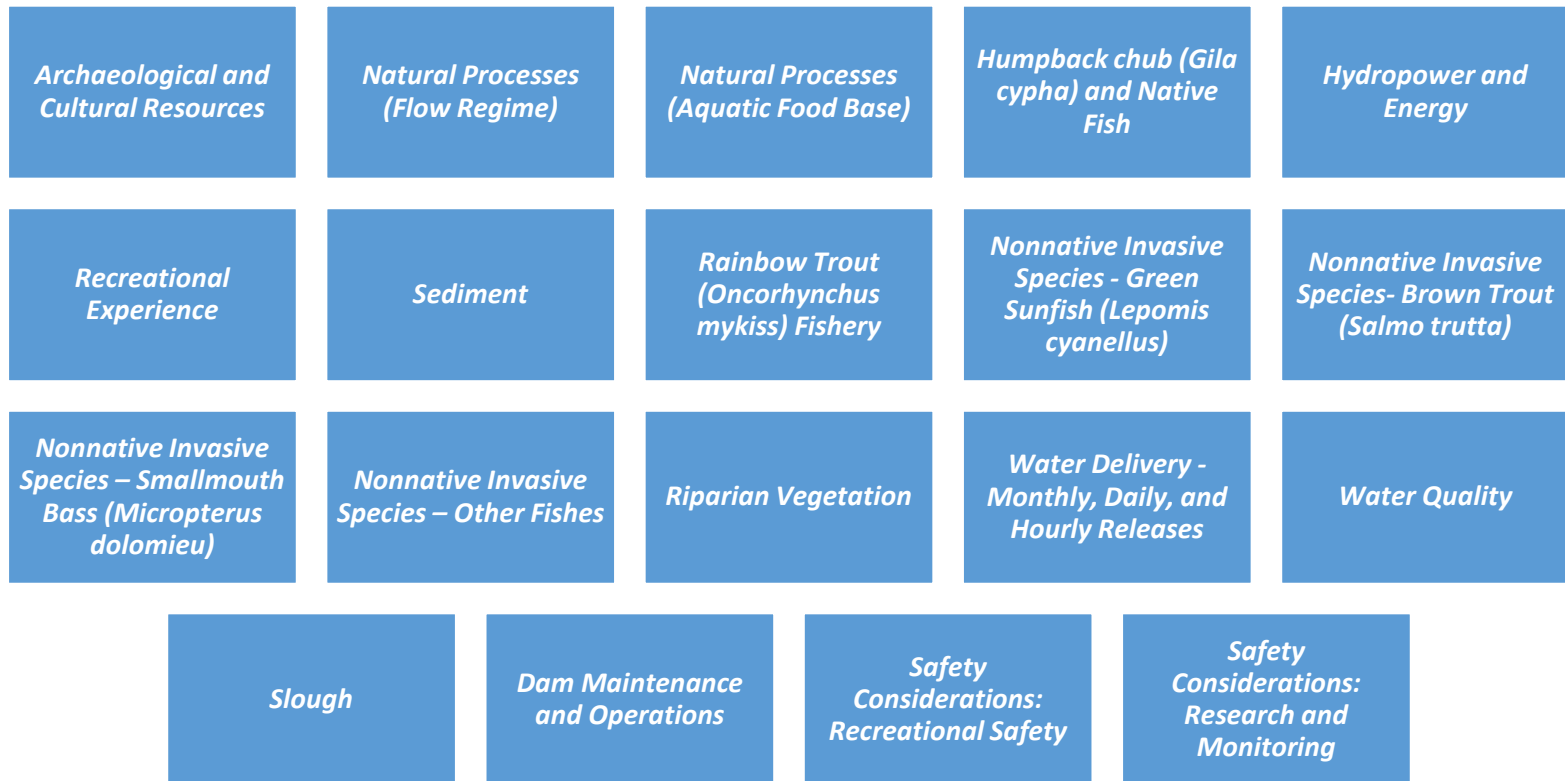


2025 Smallmouth Bass Flow Timeline

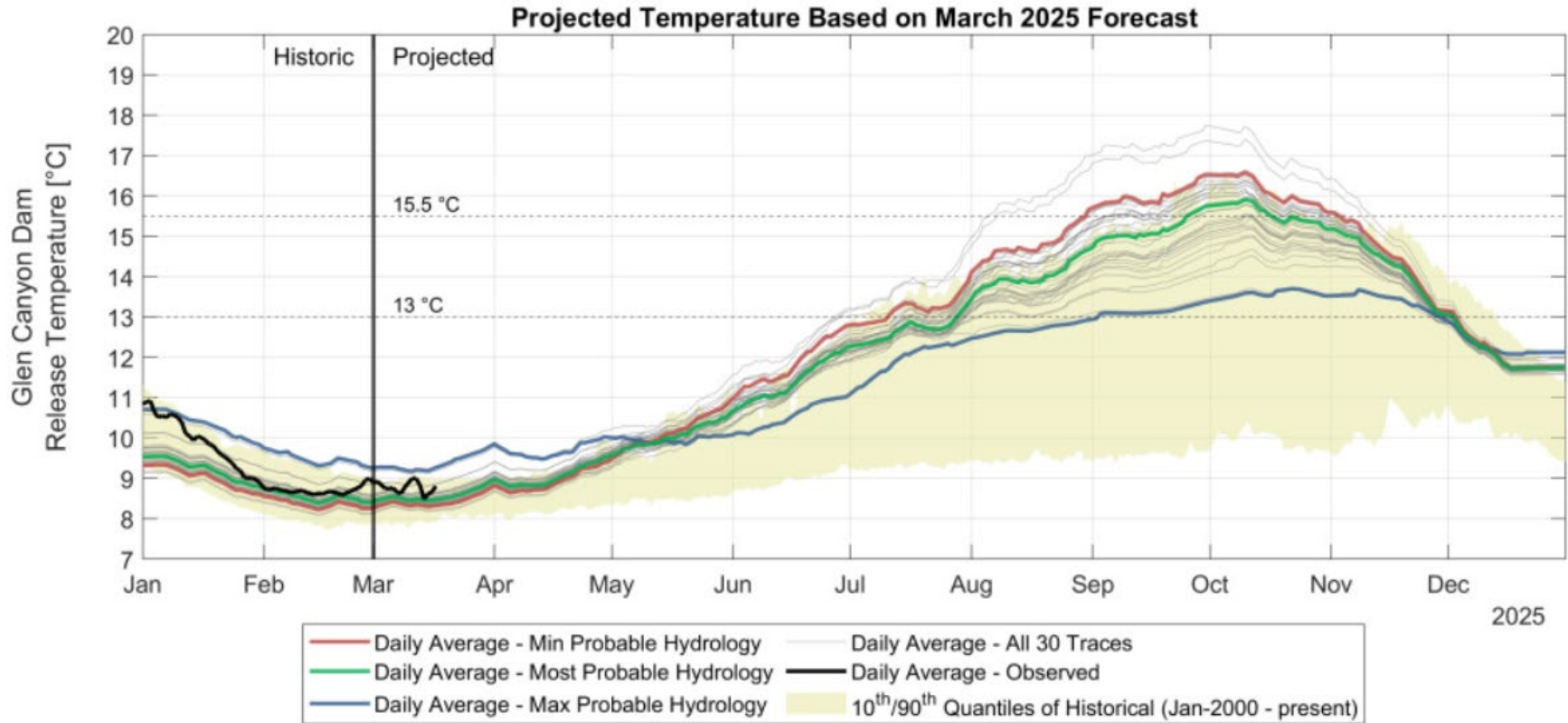
- PI Technical Team will meet to discuss weekly
- Early May: PI Technical recommendation
- May 14-15: Present Information at AMWG
- End of May: PI Leadership recommendation
- What will be considered?
 - Range of flows options (Cool Mix, Cold Shock, Non bypass, No SMB flow)
 - Criteria the flow options (ex. River Mile Targets, off ramp criteria)
- All resources will be considered



Assessment of Resources



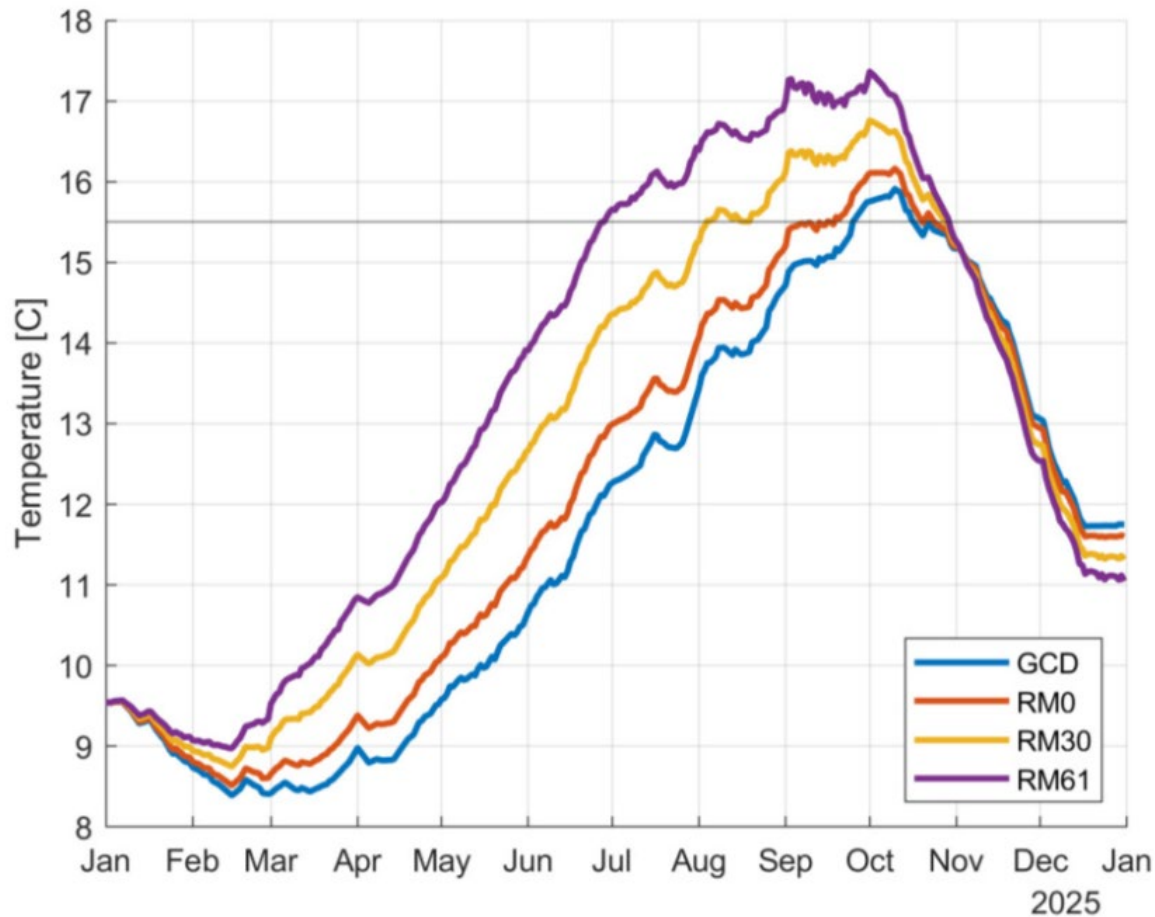
How are things looking?



Release temperature projections at Glen Canyon Dam.



How are things looking?



Temperature projections at various river miles downstream of Glen Canyon Dam for most probable hydrology (March 2025).



Questions?

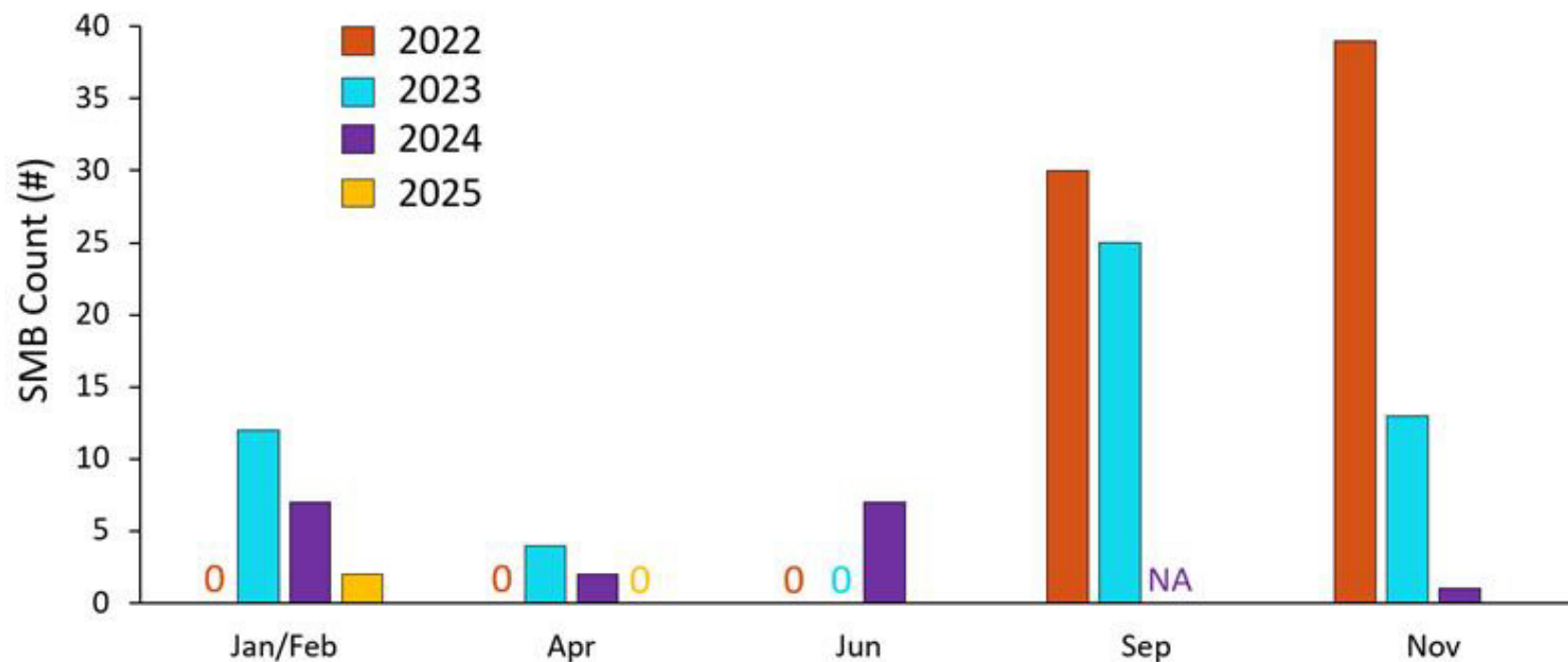


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SMB Catch: Lees Ferry, GCMRC TRGD

Boat electrofishing, fixed sites (near RM -13 and RM -4)



Preliminary data, subject to change, do not cite

*Water temperature is not con

