

Communication and Consultation Process for Experiments

1.4 COMMUNICATION AND CONSULTATION PROCESS FOR ALTERNATIVE D

In implementing the processes described in Section 1.3 and the associated decision process shown in Figures 4 and 5, the DOI will exercise a formal process of stakeholder engagement to ensure decisions are made with sufficient information regarding the condition and potential effects on important resources. As an initial platform to discuss potential future experimental actions, the DOI will hold GCDAMP annual reporting meetings for all interested stakeholders; these meetings will present the best available scientific information and learning from previously implemented experiments and ongoing monitoring of resources. As a follow-up to this process, the DOI will meet with the TWG to discuss the experimental actions being contemplated for the year.

Experimental Technical Team

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.

Consultation

1.4 COMMUNICATION AND CONSULTATION PROCESS FOR ALTERNATIVE D

DOI will also continue separate consultation meetings with the Tribes, AZGFD, the Basin States, and UCRC upon request, or as required under existing RODs.

LTEMP Commitments to Tribes

6.5 Commitments to Tribes

- Traditionally Associated Tribes³ shall be notified at least 30 days in advance of planned experimental flows (including HFEs, TMFs, MPFs, and LSFs).
- The DOI is committed to finding beneficial uses with Traditionally Associated Tribes for nonnative fish that are mechanically removed as part of the LTEMP actions to the extent practicable.
- The DOI recognizes the opportunities for cooperative and collaborative partnerships with tribes in the management of Federal lands and resources related to the LTEMP as stated in Secretarial Order No. 3342.

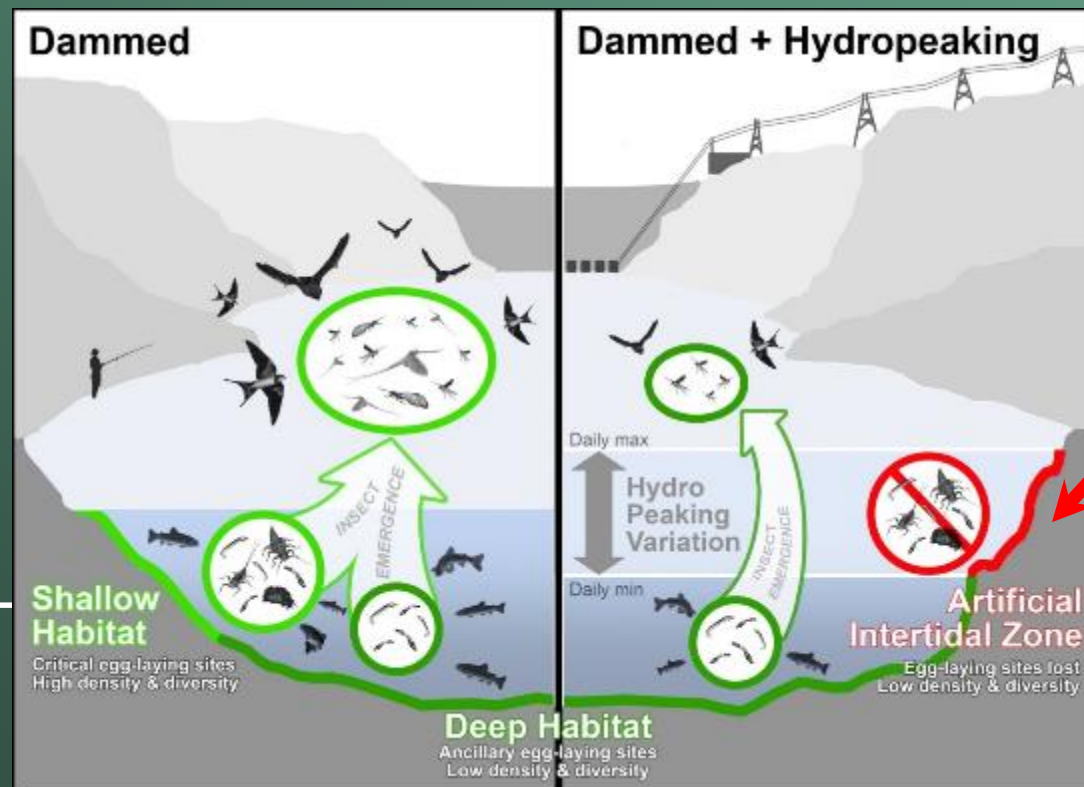
2019 Experimental Implementation Process



Bug Flows

- Daily hydropower flows create “tides”
- Insects lay eggs at water line at dusk
- When tide drops, eggs dry, die

Want to avoid artificial tides due to negative effects on insect eggs



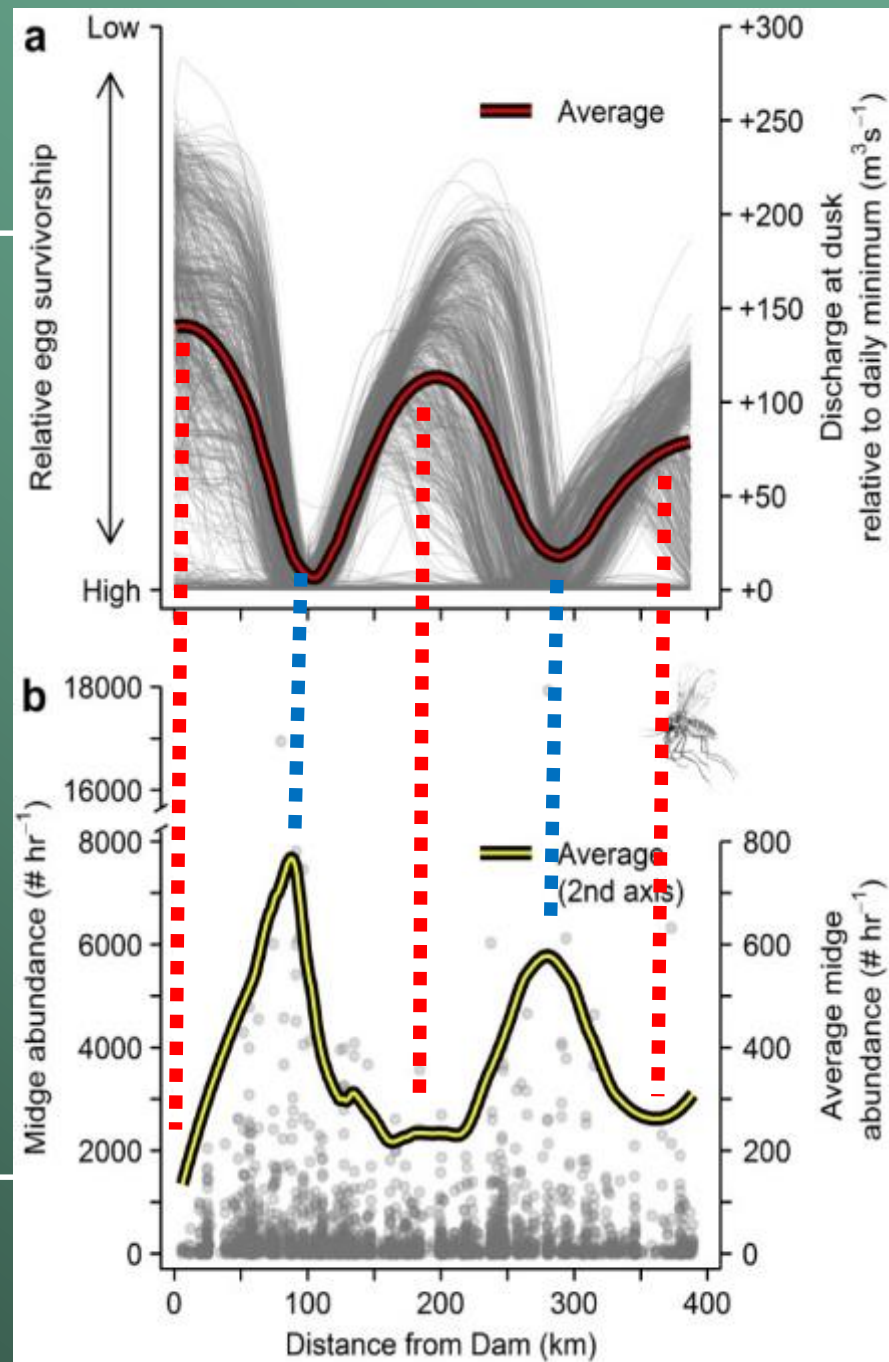
How do we know?

- Water moves slowly through Canyon
- Some places high water at dusk
- Other places low water at dusk

Kennedy et al.
2016 *BioScience*



Midges track
these patterns!

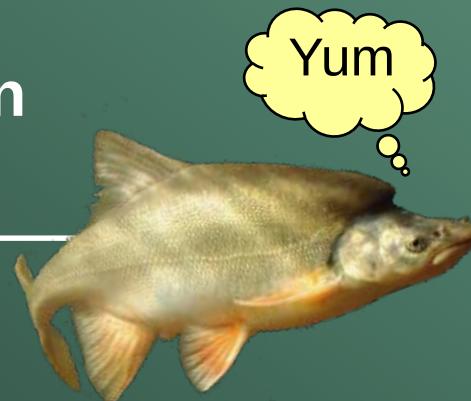
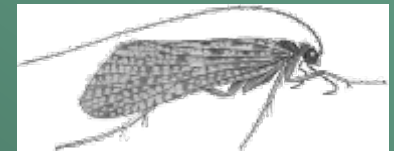


Goals of Bug flows

- Improve egg-laying conditions for bugs!

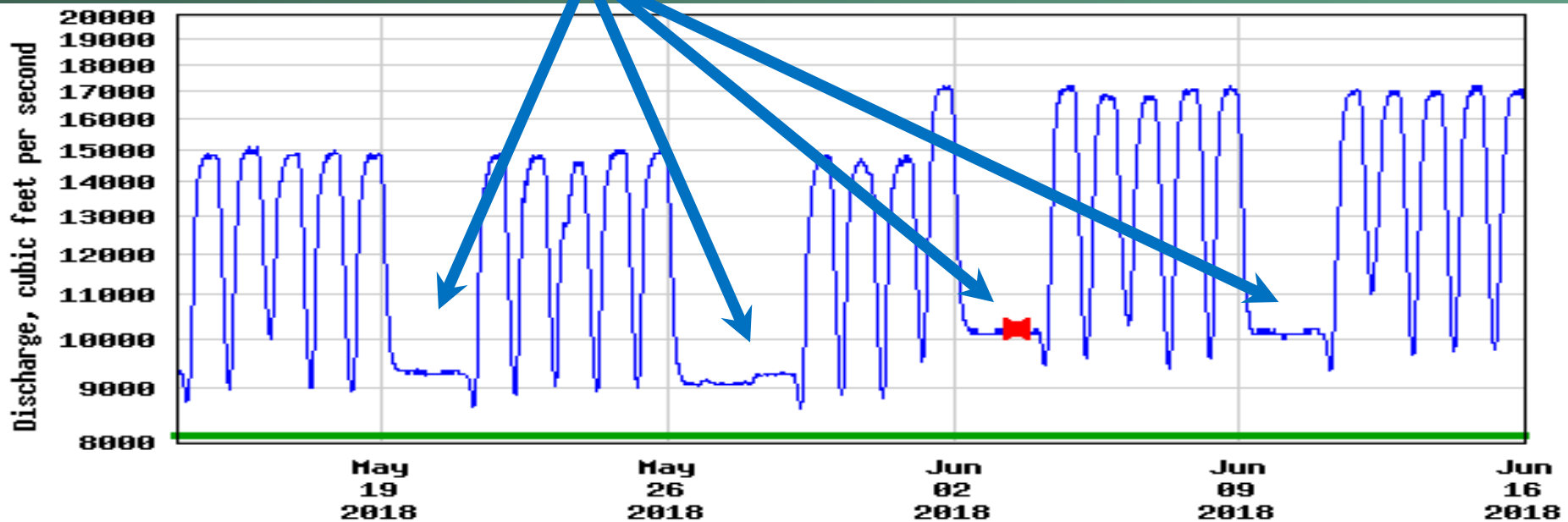
- Thus:

- Increase abundance of midges
- Increase abundance/diversity of EPT
 - (mayflies, stoneflies, caddisflies)
- Improve fish condition



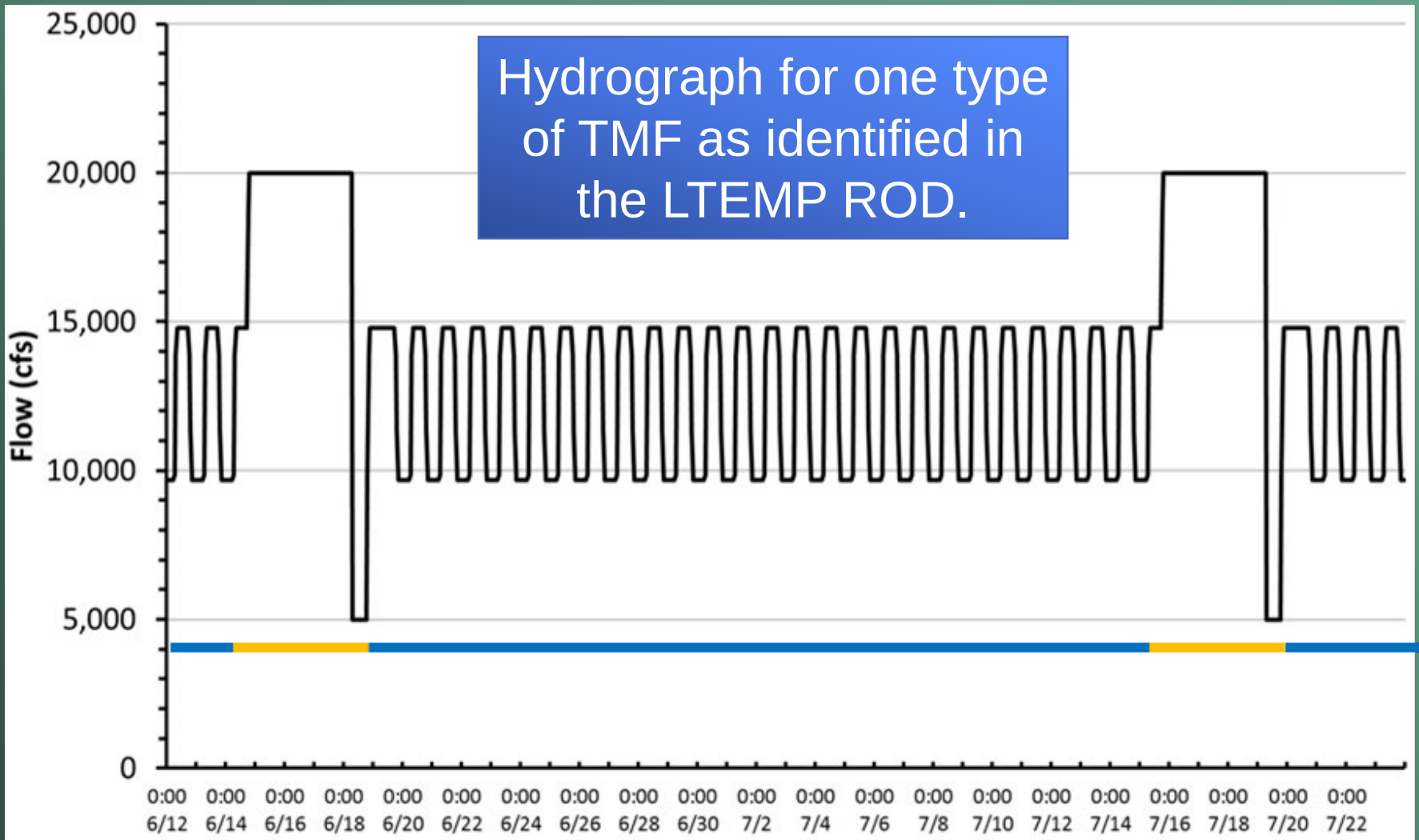
What is a Bug flow?

- “Give bugs the weekends off”
- Weekend stable low flows from May-August
- Eggs laid on weekends never dry



Trout Management Flows (TMF)

Hydrograph for one type of TMF as identified in the LTEMP ROD.



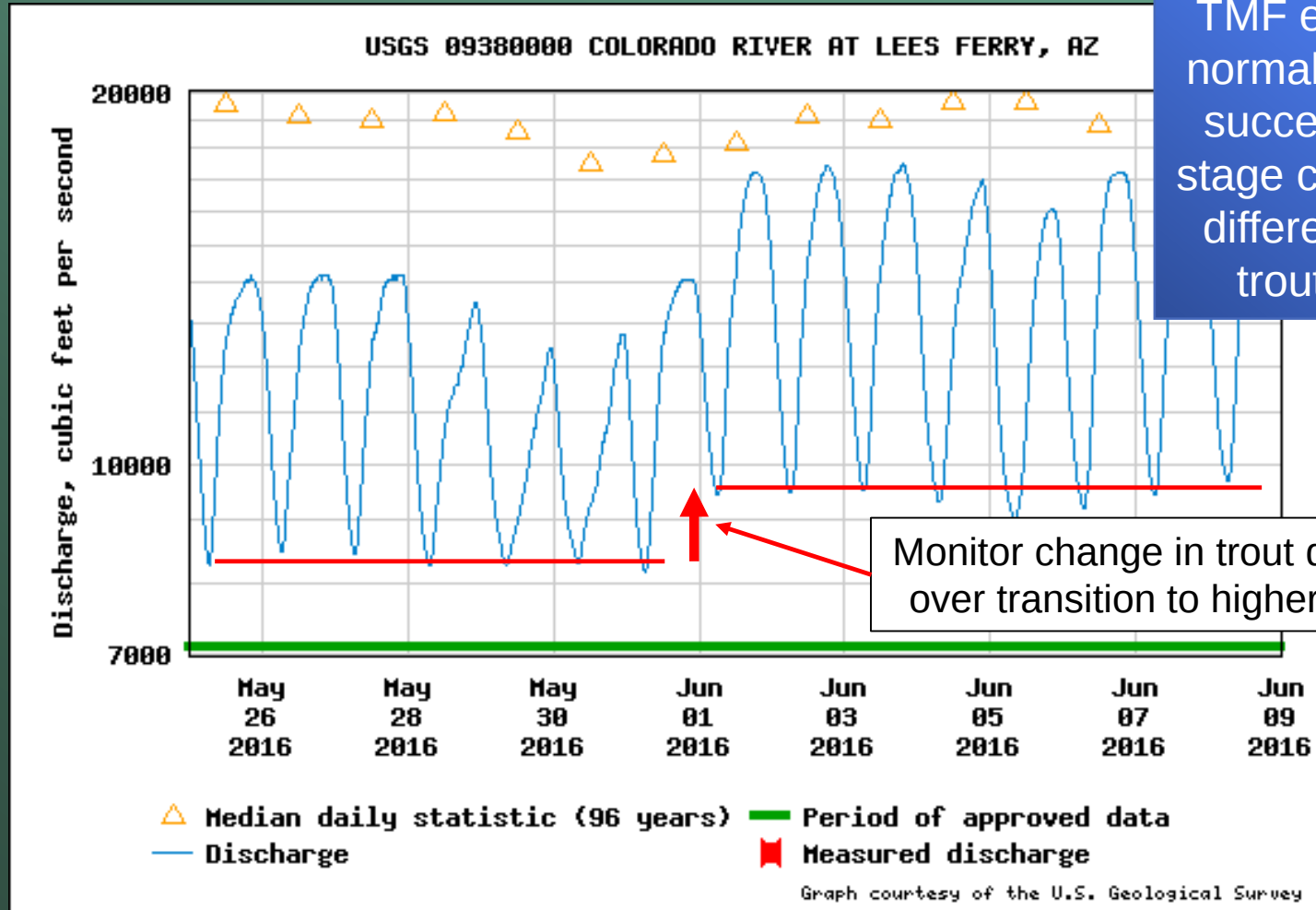
Trout Management Flow Design & Assessment

- Literature review
- Optimization of flow design
 - Bathymetry data
 - GIS analysis
- Field experiments
 - Mesocosm experiments
 - Field studies to evaluate TMFs or TMF elements
 - Study to assess annual recruitment of YOY (Project H)

Delayed due to
contracting issues

Slow progress due
to unanticipated
challenges

Trout Management Flow Design & Assessment

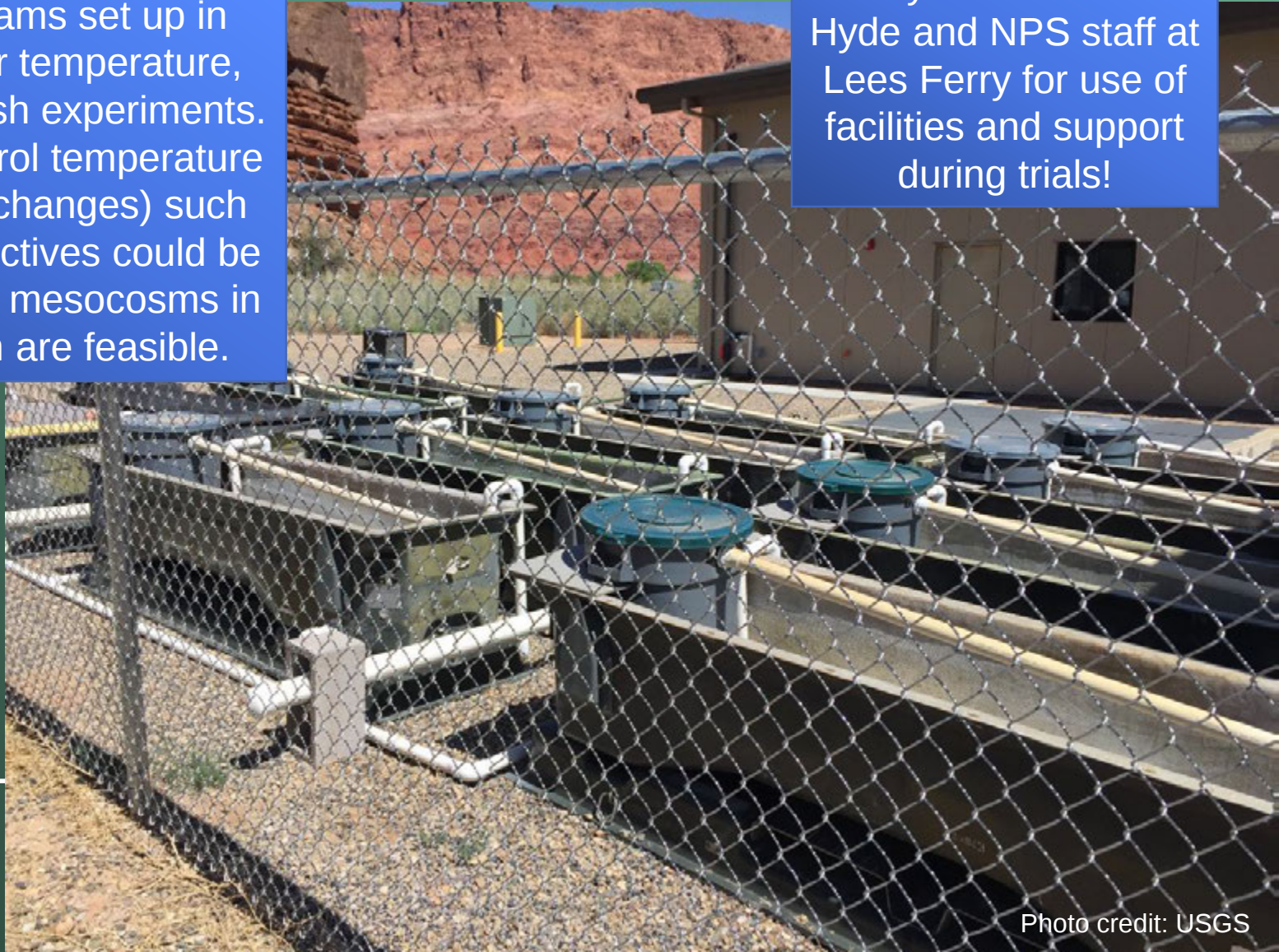


Efforts to evaluate TMF elements under normal operations not successful. Too little stage change to detect differences in young trout distribution.

Trout Management Flow Design & Assessment

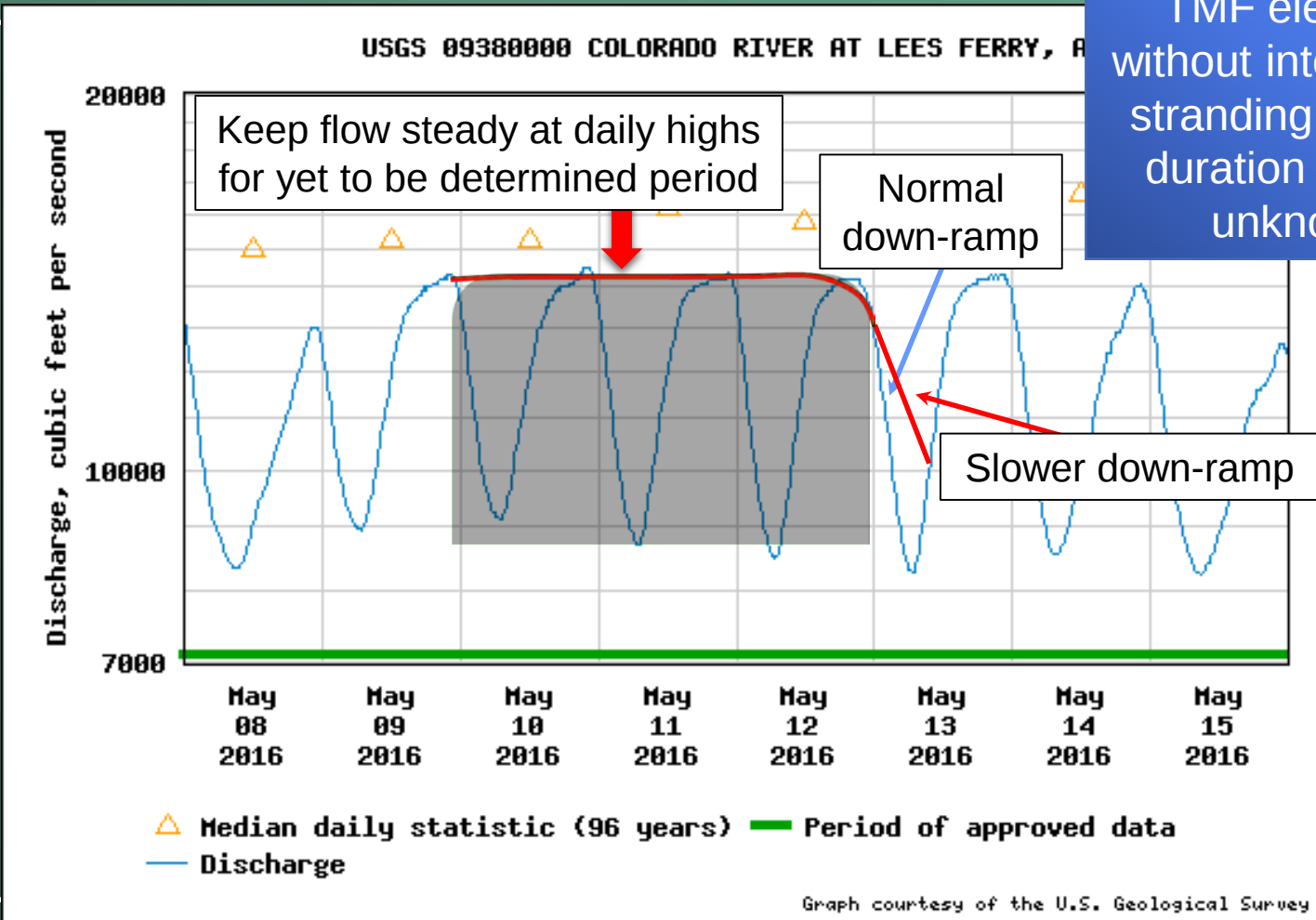
Artificial streams set up in Lees Ferry for temperature, nutrient, and fish experiments. Unable to control temperature ($> 10\text{ C}$ daily changes) such that study objectives could be met. Unclear if mesocosms in Glen Canyon are feasible.

Many thanks to Ken Hyde and NPS staff at Lees Ferry for use of facilities and support during trials!



Trout Management Flow Design & Assessment

Possible to evaluate TMF elements without intentionally stranding fish, but duration needed unknown.

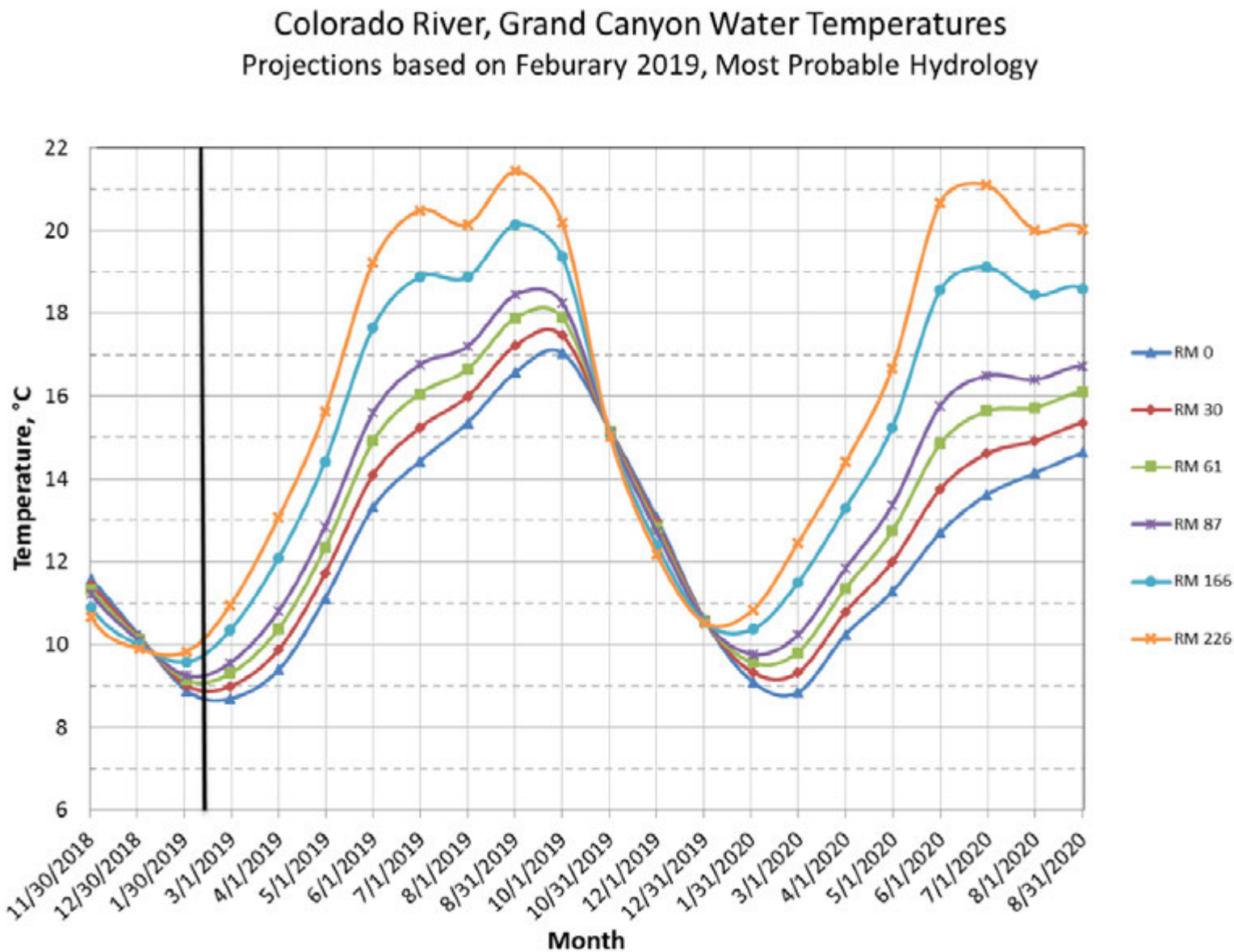


Fall High Flow Experiments

- 1 to 96 hours
- Up to 192 hours



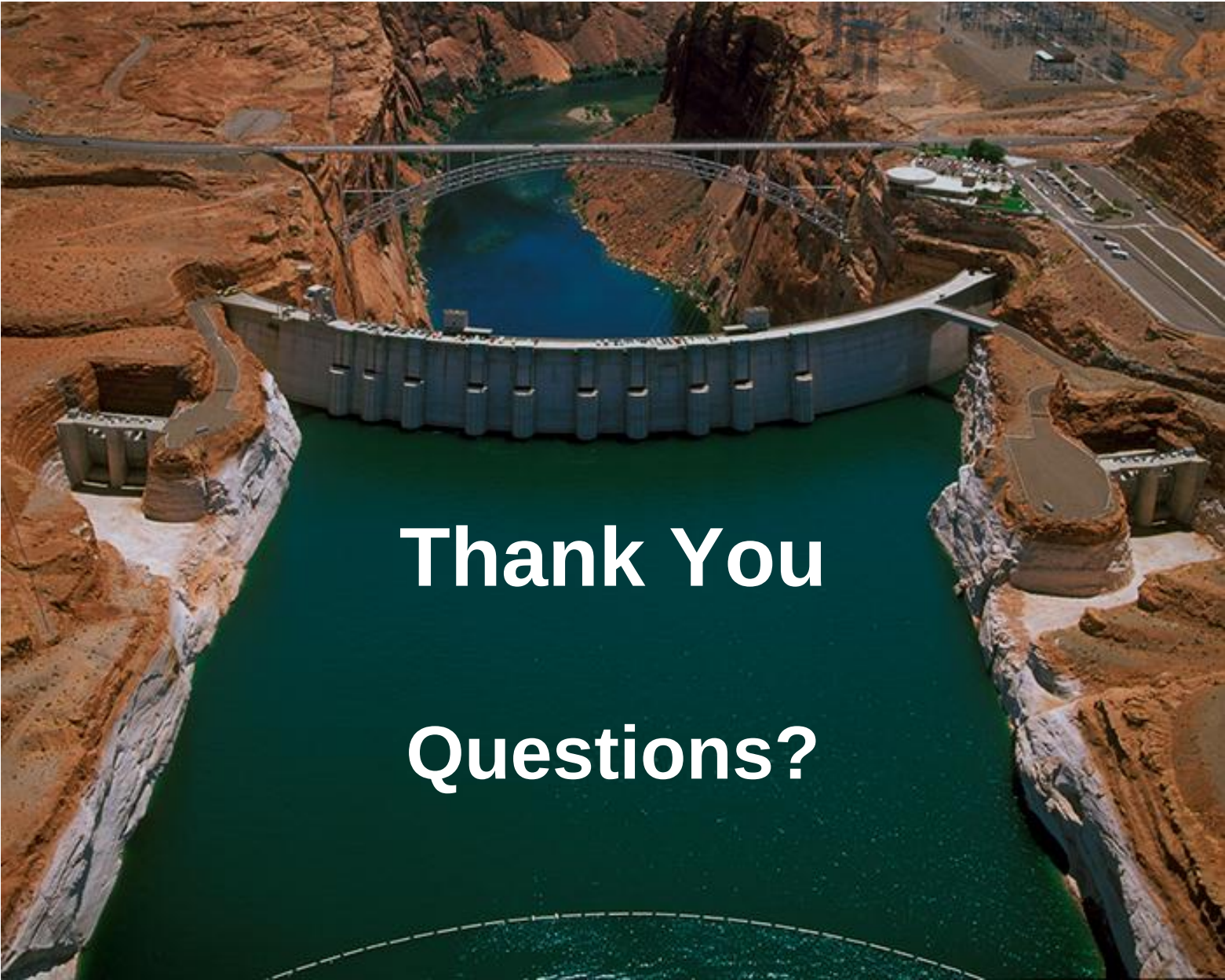
Other Experiment-Like Conditions



Other Experiment-Like Conditions

- **Monitoring**

- **Project E: Nutrients and Temperature as Ecosystem Drivers**
- **Project F: Aquatic Invertebrate Ecology (Food Base)**
- **Project G: Humpback Chub Population Dynamics Throughout the Colorado River Ecosystem**
- **Project H: Salmonid Research and Monitoring**
- **Project I: Warm-Water Native and Non-Native Fish Research and Monitoring**

An aerial photograph of the Hoover Dam, a large concrete arch-gravity dam, spanning the Colorado River. The dam is surrounded by steep, reddish-brown desert cliffs. Behind the dam is the vast Lake Mead, which has a deep blue-green hue. A highway bridge is visible in the upper left, and a road with some buildings is on the right. The text "Thank You Questions?" is overlaid in white on the lake.

**Thank You
Questions?**