

# RECLAMATION

## *Managing Water in the West*

### **Possible LTEMP Experimental and Management Actions for 2019**

*Adaptive Management Workgroup Meeting  
March 6-7, 2019*

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U.S. Department of the Interior  
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# Communication and Consultation Process for Experiments

- Annual Reporting meeting
  - Present learning from previous experiments
  - Use best available science and information
- Meet w/ TWG to discuss experimental actions being contemplated for the year

## 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.

LTEMP ROD, Appendix B

# Experimental Technical Team

- Implementation/planning meetings or calls
- Experimental team strives for consensus recommendation to bring to DOI
- Secretary retains sole discretion

## 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

- With Tribes, AGFD, States, as requested

## **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 Tribes<sup>3</sup> 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.



# Possible LTEMP Experiments 2019

- No experiments
- Bug Flows (May – Aug)
- Trout Management Flows (May – Aug)
- Fall HFE (Oct - Nov)
- Extended duration fall HFE (Oct – Nov)

# 2019 Spring/Summer Experiments

Bug Flows (May – Aug), Trout Management Flows (May – Aug)

## Questions

- Can we do both, or would results be confounding?
- Status of resources?
- What could we learn from these?
- Experimental design considerations?
- Are we prepared to implement? (scientifically, logistically)
- How could resources benefit from one or the other?

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# 2019 Experimental Implementation Process

- Annual Reporting meeting (Feb, March)
  - Learn from past experiments, other new information
- Discussion at TWG of possible 2019 experiments (March)
- Initial notification to Tribes, invitation to consult (March)
- Experimental Tech Team coordination (March →)
  - Evaluate status of resources
  - consider input from Tribes, TWG, AMWG
  - develop recommendation for Leadership team
- Notification to Tribes (minimum 30-days prior)
- Leadership Team recommendation, DOI decision (late April)
- Potential Experiment Implementation (earliest is May)

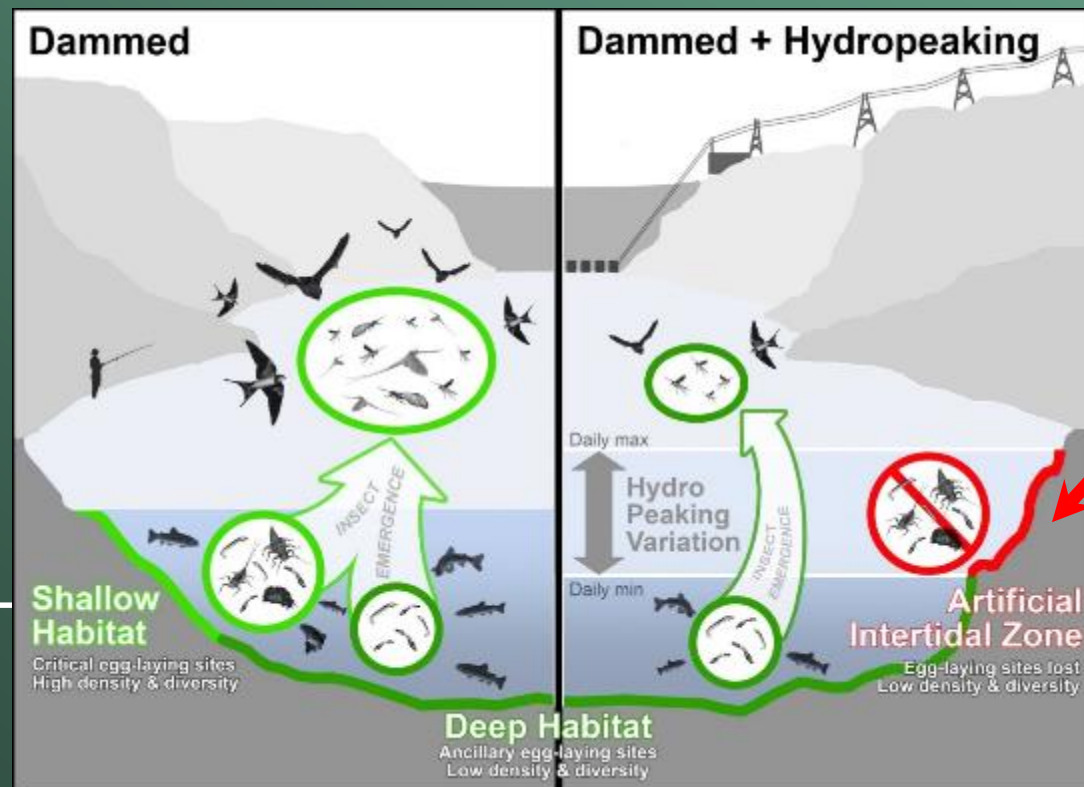
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# Bug Flows

- 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



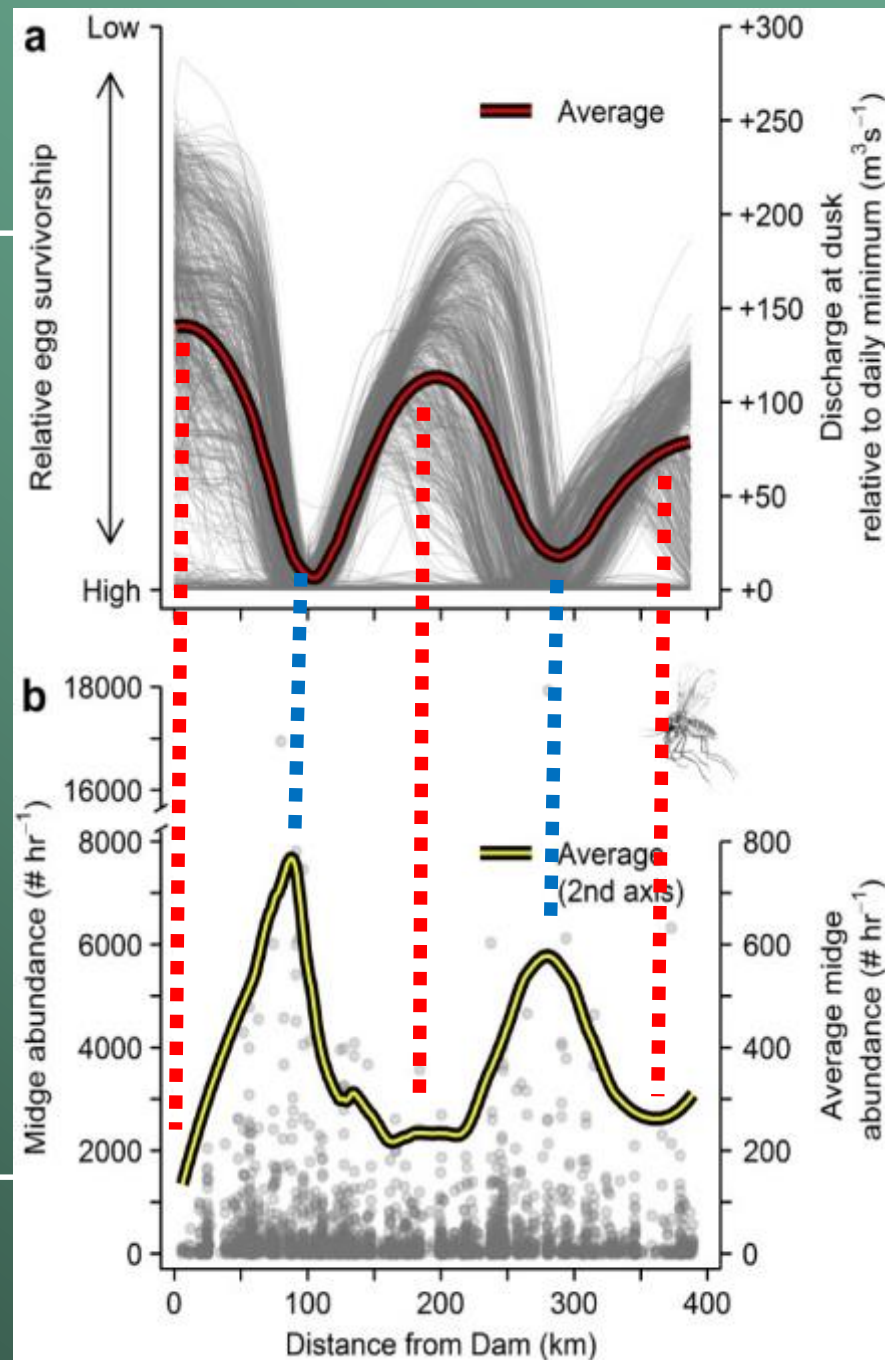
# How do we know?

- 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!



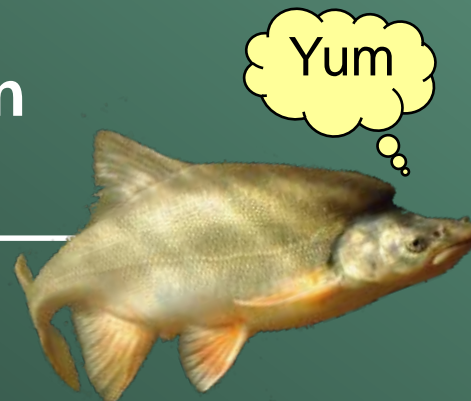
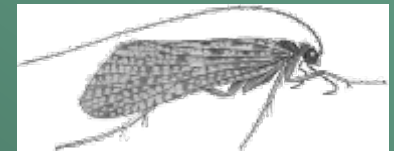
# Goals of Bug flows

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- Improve egg-laying conditions for bugs!

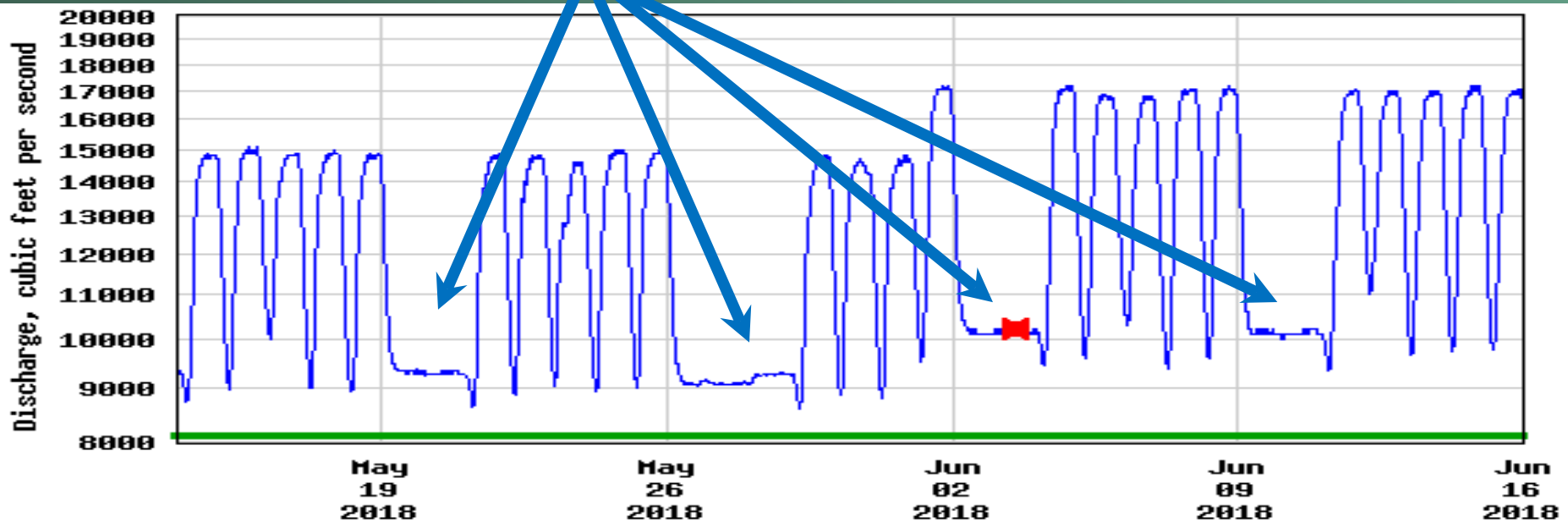
- Thus:

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



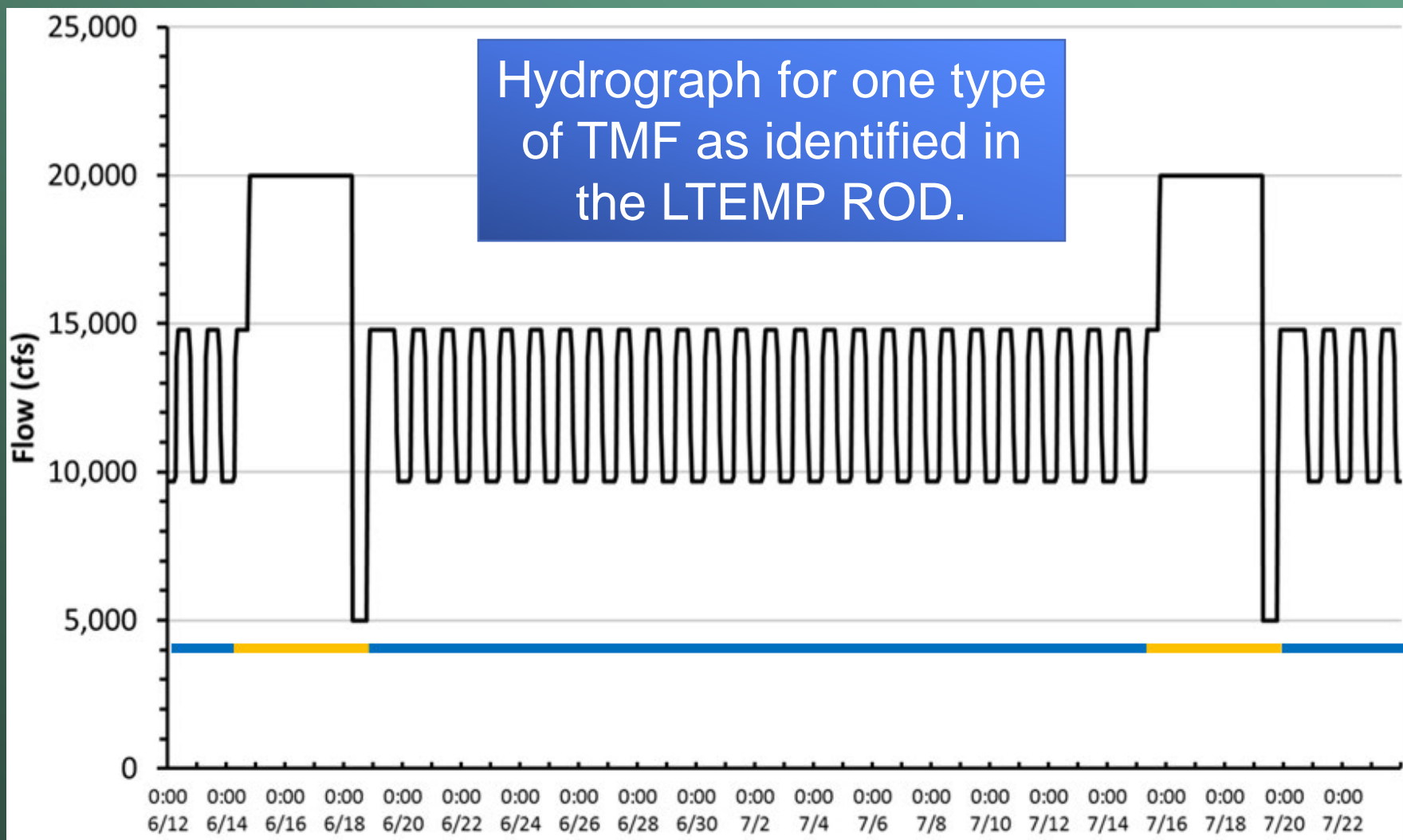
# What is a Bug flow?

- “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.





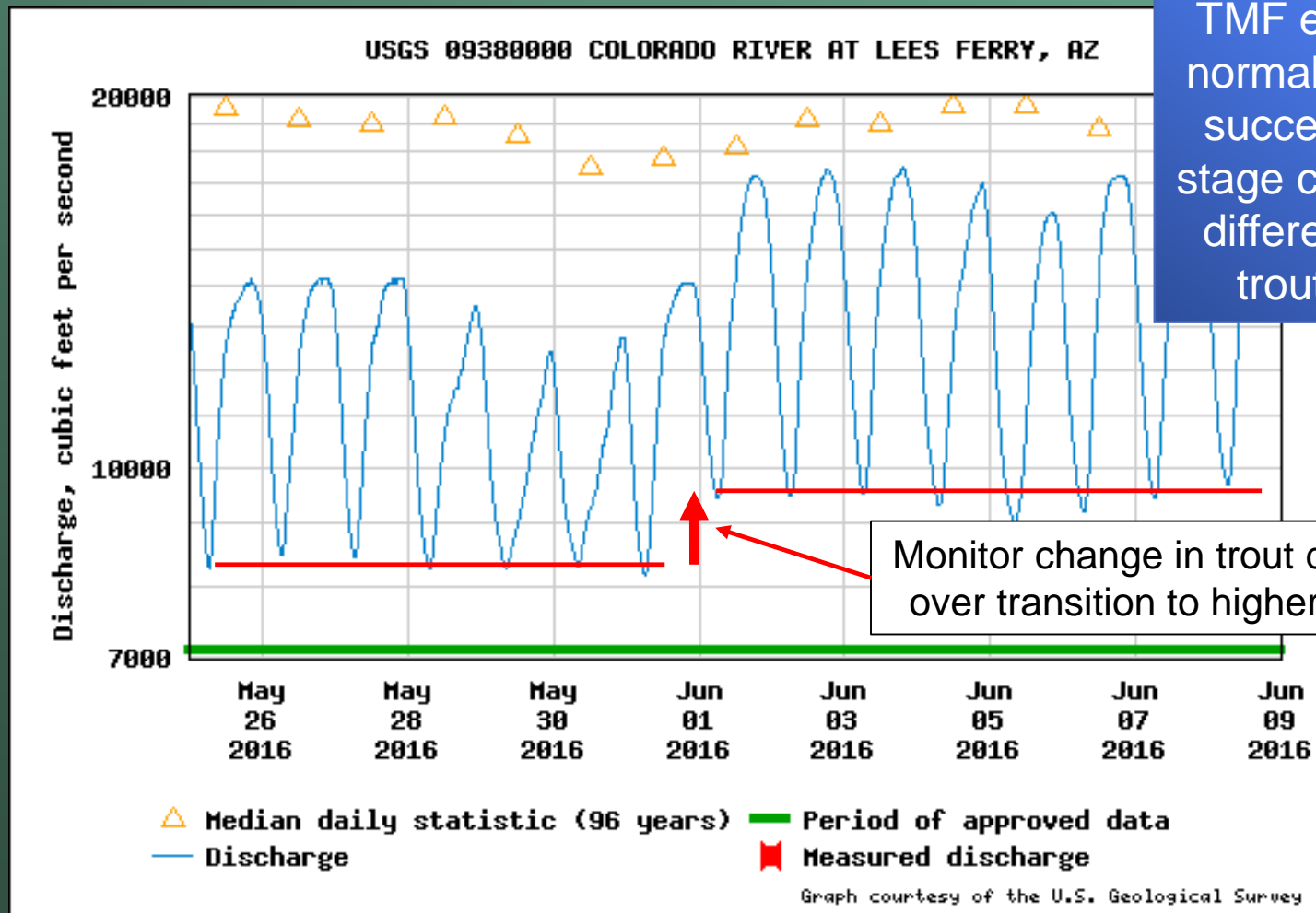
# Trout Management Flow Design & Assessment

- 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.

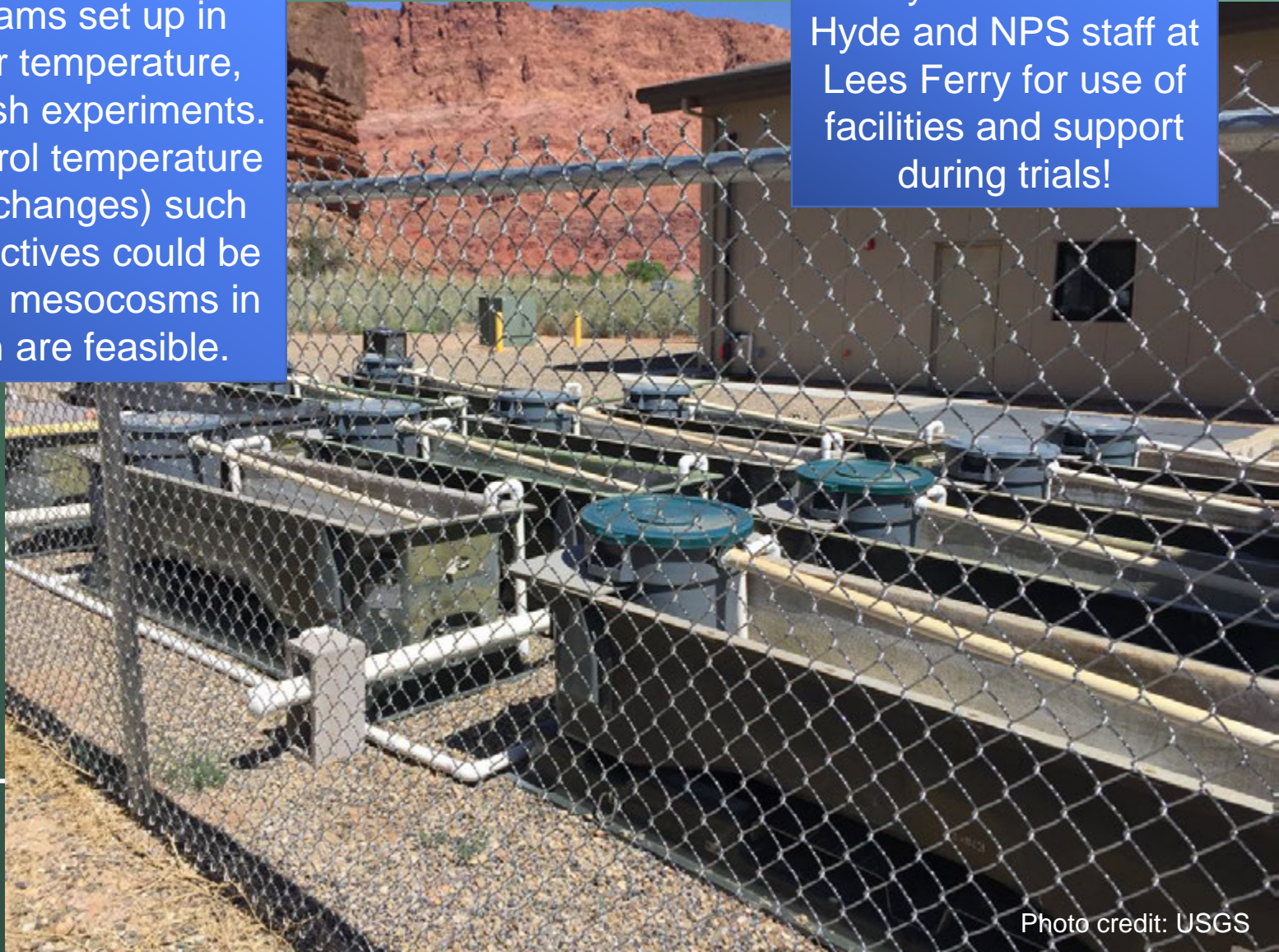
Monitor change in trout distribution over transition to higher releases



# Trout Management Flow Design & Assessment

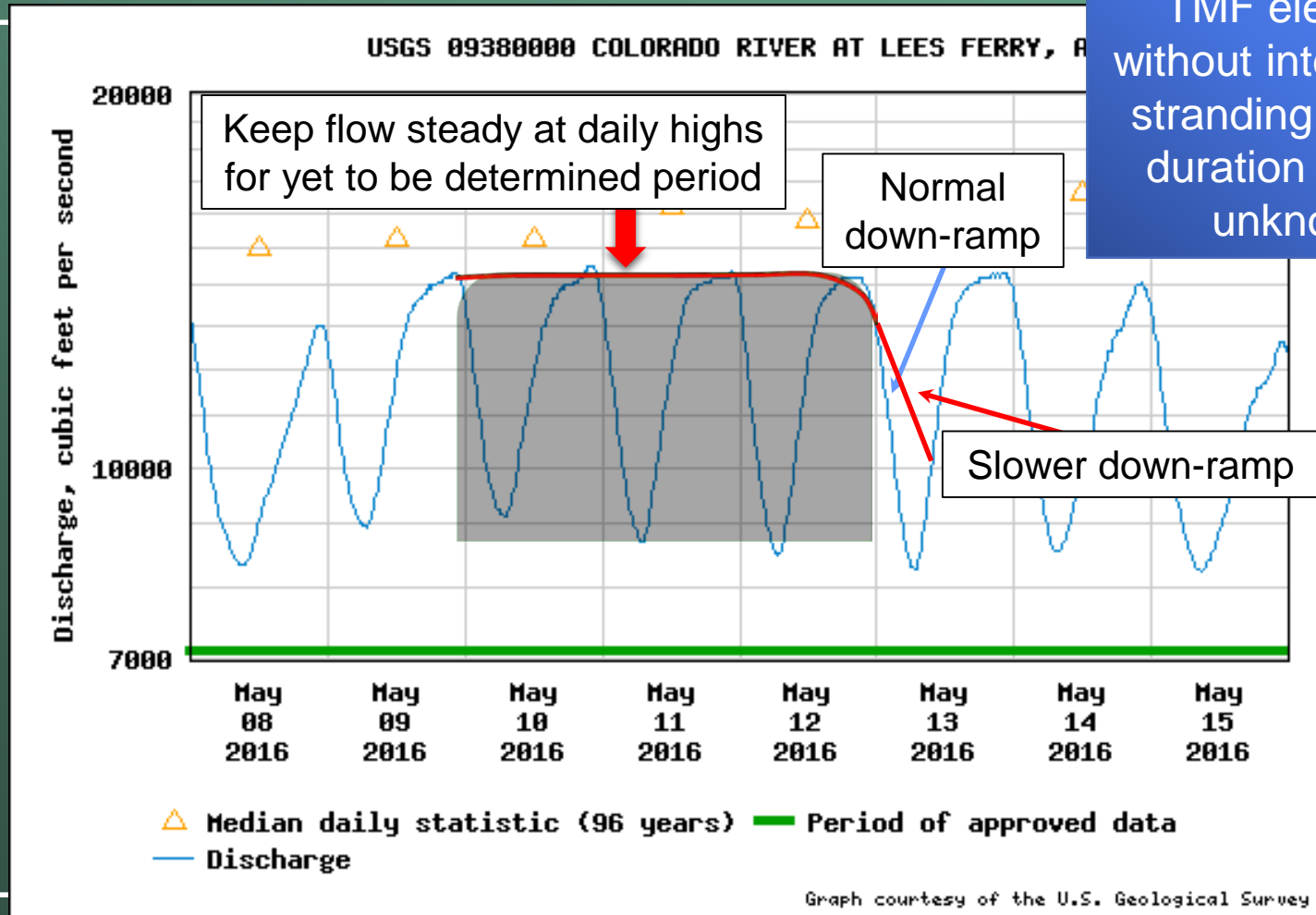
Artificial streams set up in Lees Ferry for temperature, nutrient, and fish experiments. Unable to control temperature ( $> 10\text{ C}$  daily changes) such that study objectives could be met. Unclear if mesocosms in Glen Canyon are feasible.

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.





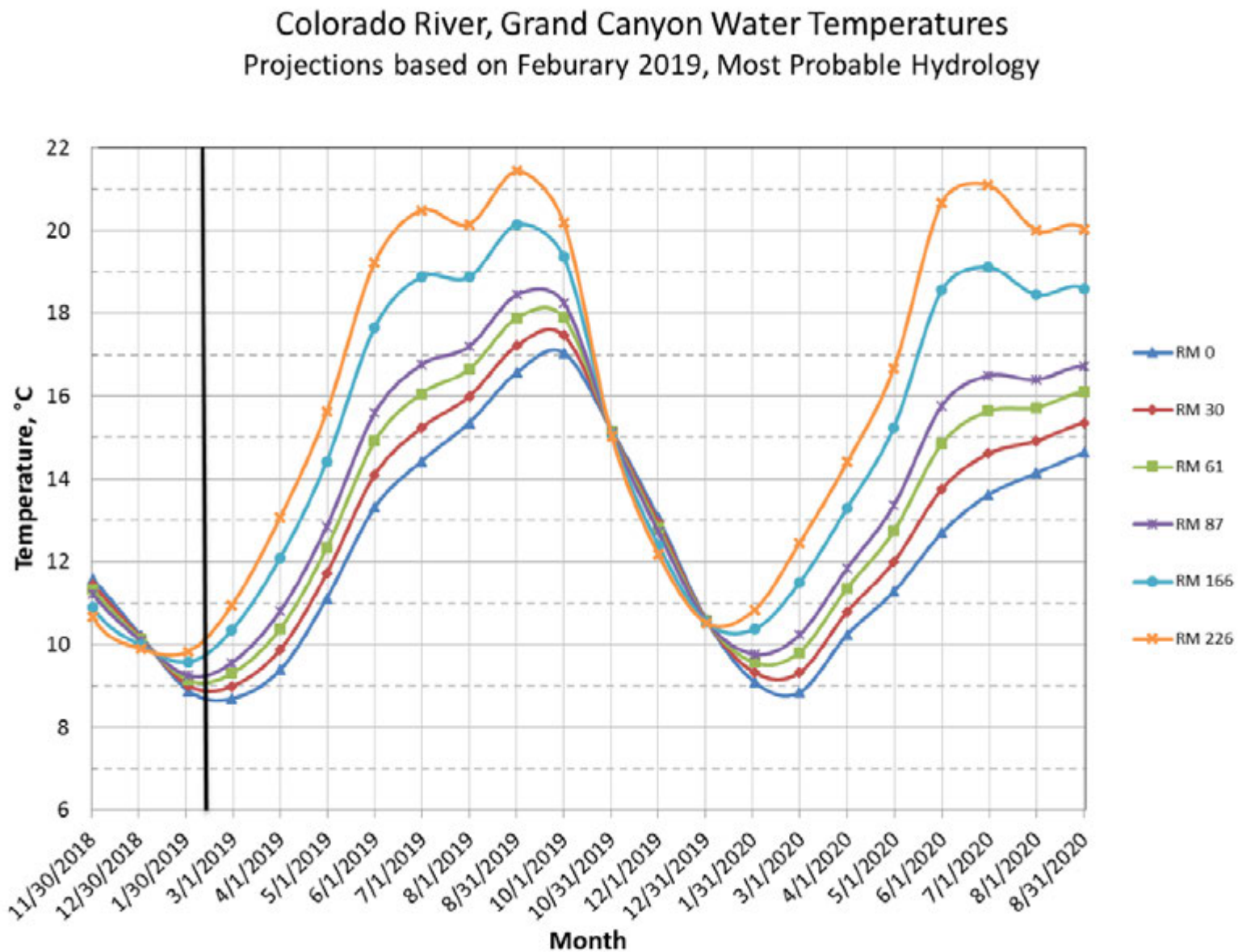
# Fall High Flow Experiments

- 1 to 96 hours
- Up to 192 hours





# Other Experiment-Like Conditions



# Other Experiment-Like Conditions

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- **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**

