

Summary of Findings: TWG Tabletop Exercise

Tabletop Exercise Purpose

- Help the Technical Work Group (TWG) identify areas of potential importance to the Adaptive Management Work Group (AMWG), concerning:
 - (a) agency responsibilities for monitoring and responding to new events,
 - (b) possible ways in which agencies may respond to new events and ways in which these actions may affect the river and its canyons and biota, and
 - (c) possible roles for the AMWG and its TWG in the decision-making process for such actions.
- Facilitated by Sound Science, GCDAMP Science Advisor.

Process:

- Tabletop exercises such as the one conducted during the April 2022 TWG virtual meeting typically present the participants with a hypothetical but plausible scenario.
- Such exercises are intended to help the participants:
 - (1) clarify roles and responsibilities,
 - (2) explore additional information and management preparedness levels and needs, and
 - (3) document program plans, procedures, and capabilities as well as logistical hurdles and overall program deficiencies.
- 2-day, 3-part exercise with breakout rooms for small group discussion.

Framing Scenario

- *It's April 12, 2023. AZGFD has captured 12 reproductive-age adult smallmouth bass in Glen Canyon and 25 adult and juvenile green sunfish in the lower slough at RM 12 and observed additional green sunfish in both the upper and lower sloughs. Lake elevation at the dam is 3,510' where it has stood for five weeks; and mid-channel water temperature at Lees Ferry is 10 °C.*



Discussion Topics

- a) plans for monitoring for unwanted biotic or water quality conditions in Lake Powell forebay and/or in Glen and Marble Canyons and alerting decision-makers of findings;
- (b) plans for remediation responses to unwanted biotic or water quality conditions in Glen and Marble Canyons; and
- (c) plans for how decisions will be made for responding to these unwanted conditions in Glen and Marble Canyons.

Questions Posed

1. What issues or concerns are the highest priorities for individual stakeholders and for the TWG, including matters that may be missing in current agency plans for monitoring and response?
2. What information gaps does the TWG see affecting understanding of the situation, and what solutions might it propose to close these gaps?
3. What potential gaps does the TWG perceive in plans and assignments of responsibilities for monitoring, response actions, and decision making, including the openness of decision making to input from the AMWG and its members?
4. What potential gaps does the TWG perceive in the resources (funds, equipment, staffing, logistics) likely available for monitoring and for response actions?
5. What are TWG concerns about potential unacceptable actions or effects to the canyons, ecosystem, species, and other conditions and values of importance to AMWG members?

Participant Concerns Included:

- Agency **capabilities to detect and report on non-native fish abundances** and activity both above and below the dam quickly enough to guide management
- The **identification of levels of abundance and patterns of activity that should be treated as triggering thresholds** for reporting warnings or taking other management actions
- The **processes through which federal agencies will make decisions on preventing or responding to escapements**, or make decisions on water distribution and hydropower generation among the reservoirs in the Upper and Lower Colorado River Basins that in turn will affect the potential for escapements through Glen Canyon Dam
- The **extent to which the federal agencies will consult with the AMWG and its TWG** as parts of these decision-making processes

Participant Concerns Cont.

- **Funding limitations** at both the state and federal levels affecting monitoring efforts, potential actions to prevent escapements, and potential actions to respond to escapements
- The **extent to which federal agencies will be able to consult meaningfully with the tribes** on planned actions in the face of potentially urgent needs to respond to escapements
- Limitations at both the state and federal levels in the **availability of equipment, personnel, and logistical capabilities** for responding to escapements
- Limitations on the **applicability and effectiveness of available mechanical and chemical methods for capturing/removing** or killing/removing non-native fishes
- A need to **prioritize prevention over detection** and reaction to escapements.

Specific Concerns about Warning Systems

The Tabletop Exercise identified concerns that:

- The existing monitoring programs below the dam are not designed for or capable of detecting “all” or even a large fraction of any non-native fishes with diminishing capabilities downstream of Lees Ferry and in tribs;
- These existing programs are not designed for or capable of reliably detecting all life stages of these fishes with equal probability;
- These existing programs are not designed for or capable of reliably detecting spawning or nesting activity throughout the potential reproductive season;
- Difficulty extrapolating detection with population estimates (e.g., if you detect 2 fish, hard to say how big pop is).
- It is not clear what levels of detection (numbers captured by reach) or statistical estimates of abundance or spawning/nesting activity would be high enough to warrant a “threat alert” or trigger a response; and
- It is not clear how, or how quickly, detection data from Glen, Marble, or Grand Canyon or their tributaries can be assimilated among the agencies involved in the monitoring, to identify high-risk situations.

Takeaway Points

- Participants repeatedly identified *prevention* as the top priority for addressing the threat of non-native fish escapements through the dam.
- Participants identified concerns about **the state of planning** for responses to escapements below the dam.

Takeaway Points Cont.

- Participants identified concerns about the **specific methods** for killing and/or mechanically removing non-native fish species such as smallmouth bass, including:
 - (1) the potential costs of such labor-intensive methods,
 - (2) the difficulty of marshaling the interagency logistical resources for such efforts fast enough,
 - (3) the difficulty of obtaining permits for such efforts;
 - (4) the complexity of obtaining prior consent and consultation from tribes,
 - (5) the ethics of killing and removing some fish species in order to conserve others, including the ethics of going against the clearly expressed traditional values of some of the sovereign tribes that are parties to the GCDAMP.
- TWG members throughout the exercise asked about the **possible role(s) of the TWG and AMWG** in decision making concerning actions being contemplated to prevent escapements, use specialized flow releases to disrupt smallmouth bass reproduction below the dam, or intentionally remove non-native fishes below the dam.

Post Exercise Survey

- Survey was distributed asking a variety of questions about the exercise to solicit feedback outside of the group and breakout setting.
- The survey responses to questions about agency plans for monitoring and mitigation (Survey Part I; Table 1) were unanimous in
 - (a) their level of concern about the possibility that non-native fishes or altered water quality conditions in lower Lake Powell could affect the Grand Canyon ecosystem, and in
 - (b) their prioritizing prevention over detection and reaction to such events.

Survey Results – Plans for Monitoring and Mitigation

Part 1 – Plans for Monitoring and Mitigation	Yes	No	Uncertain
1. My nation, community, or agency is concerned about the possibility that non-native fishes or altered water quality conditions in lower Lake Powell could affect the Grand Canyon ecosystem.	12	0	0
2. My nation, community, or agency would prefer that greater priority be given to preventing the passage of problematic water temperatures, water chemistries, and/or non-native fishes through the dam, versus detecting and reacting to such events after the fact.	12	0	0
3. The agencies responsible for managing conditions in lower Lake Powell have adequate plans for preventing the passage of problematic water temperatures, water chemistries, and/or non-native fishes through the dam and are moving quickly to implement these plans.	0	9	3
4. Unless smallmouth bass can be prevented almost completely from passing through Glen Canyon Dam, detecting and removing and/or preventing the reproduction of this species below the dam—in Glen, Marble, or Grand Canyon and their tributaries—will be too costly and/or physically impossible to accomplish.	6	0	6

5. The agencies responsible for monitoring water temperatures, water chemistries, and/or non-native fishes above and below Glen Canyon Dam have adequate resources for conducting this monitoring.	5	2	5
6. The timing and spatial design for monitoring water temperatures, water chemistries, and/or non-native fishes above and below Glen Canyon Dam is appropriate to the need to respond promptly and accurately to potentially problematic conditions.	3	4	5
7. The agencies responsible for monitoring water temperatures, water chemistries, and/or non-native fishes above and below Glen Canyon Dam have adequate plans for alerting the AMWG when potentially problematic conditions are detected.	5	1	6
8. The agencies responsible for mitigating potentially problematic water temperatures, water chemistries, and/or non-native fishes below the dam have adequate plans for deciding how and when to respond, including consulting with the AMWG.	4	6	2

9. The agencies responsible for mitigating potentially problematic water temperatures, water chemistries, and/or non-native fishes below the dam have adequate resources for mitigation responses, including for monitoring outcomes for adaptive management.	1	8	3
10. There appear to be important gaps in knowledge gaps that could affect decision making concerning the potentially problematic water temperatures, water chemistries, and/or non-native fishes below the dam.	4	3	5
11. The mitigation responses under consideration respect the values of my nation, community, or agency with respect to the river, canyons, and its biota.	7	3	2
12. The plans for mitigation responses take into account the possibility of unwanted effects that may require additional attention, including consulting with the AMWG.	5	0	6
13. The plans for mitigation responses take into account the possibility of failures.	4	1	7
14. The agency plans for mitigating potentially problematic water temperatures, water chemistries, and/or non-native fishes below the dam adequately to take into account the need to address possible effects of the agency actions on other aspects of dam operations including water storage and hydropower management.	4	2	6

Survey Results – Exercise Utility

Part 2 – Tabletop Exercise Review	Yes	No	Uncertain
1. The exercise was a useful way to help me understand the potential for altered water temperatures, water chemistries, and/or non-native fishes introductions below the dam.	11	0	1
2. The exercise was a useful way to help me understand agency plans for monitoring and responding to the potential for altered water temperatures, water chemistries, and/or non-native fishes introductions below the dam.	8	1	3
3. The exercise gave me ample, respectful opportunities to express my views and listen to others’.	11	0	1
4. I would be interested in using this (or a similar) “tabletop exercise” approach to look into other topics of interest to the TWG.	12	0	0

