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Rainbow Trout Fishery: July 2024 Status Update

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Technical Workgroup Meeting
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U.S. Department of the Interior
U.S. Geological Survey

For more information: https://www.usgs.gov/centers/southwest biological science center/science/rainbow trout colorado river grand canyon

Background & Outline

- Angler reports of low catch rates – perception of Rainbow Trout fishery collapse
- Are we meeting the Long-term Experimental and Management Plan (LTEMP) goal?
  - *"Achieve a healthy high-quality recreational Rainbow Trout fishery in Glen Canyon National Recreation Area…"*
- Review recent trends (through June 2024):
  - Arizona Game and Fish Department (AZGFD) angler catch rates (creel)
  - Trout Recruitment and Growth Dynamics (TRGD) data:
    - Trends in Rainbow Trout condition, growth, abundance, survival
- Potential next steps

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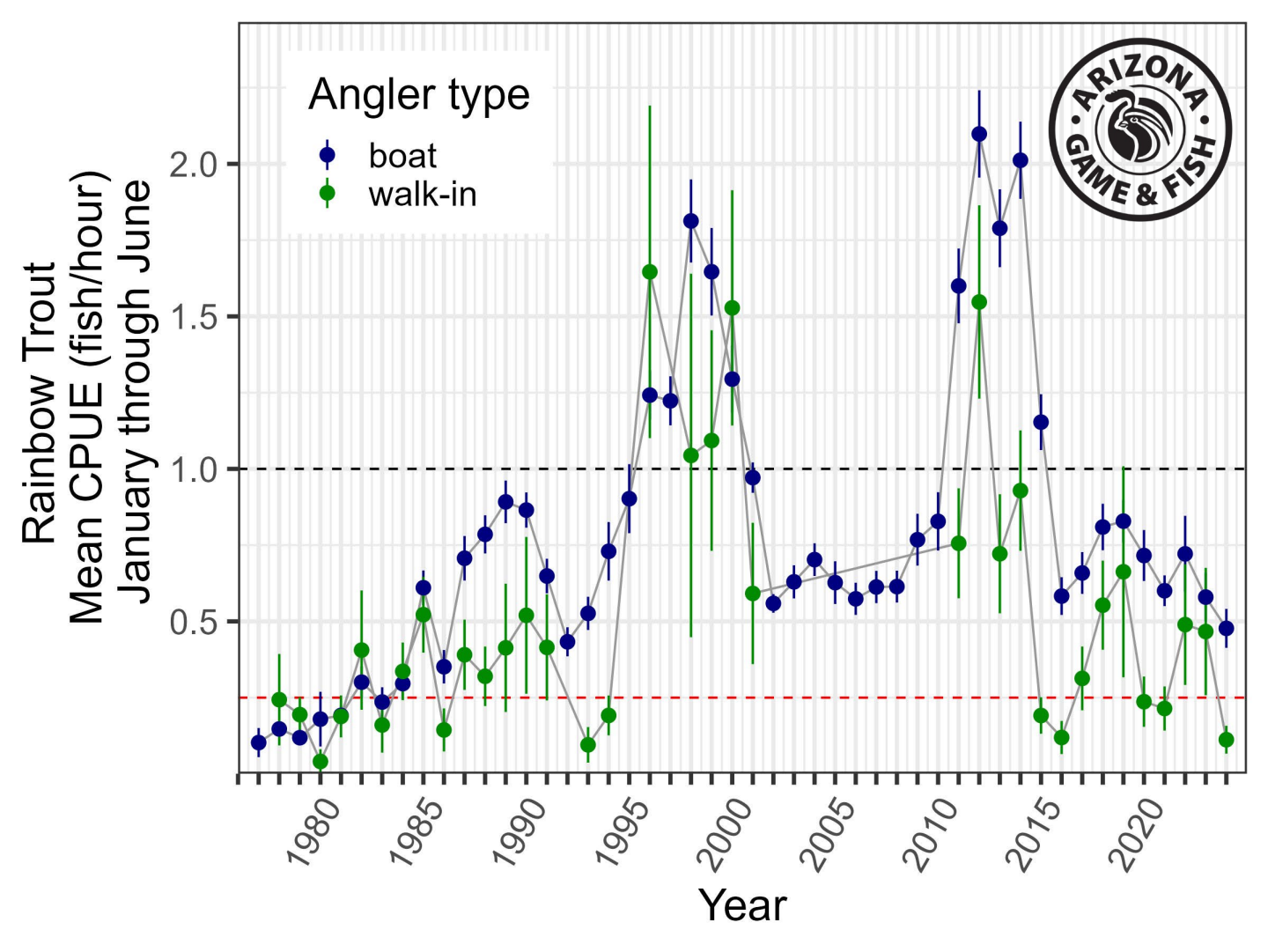
Angler Survey Data
(1977-2024)



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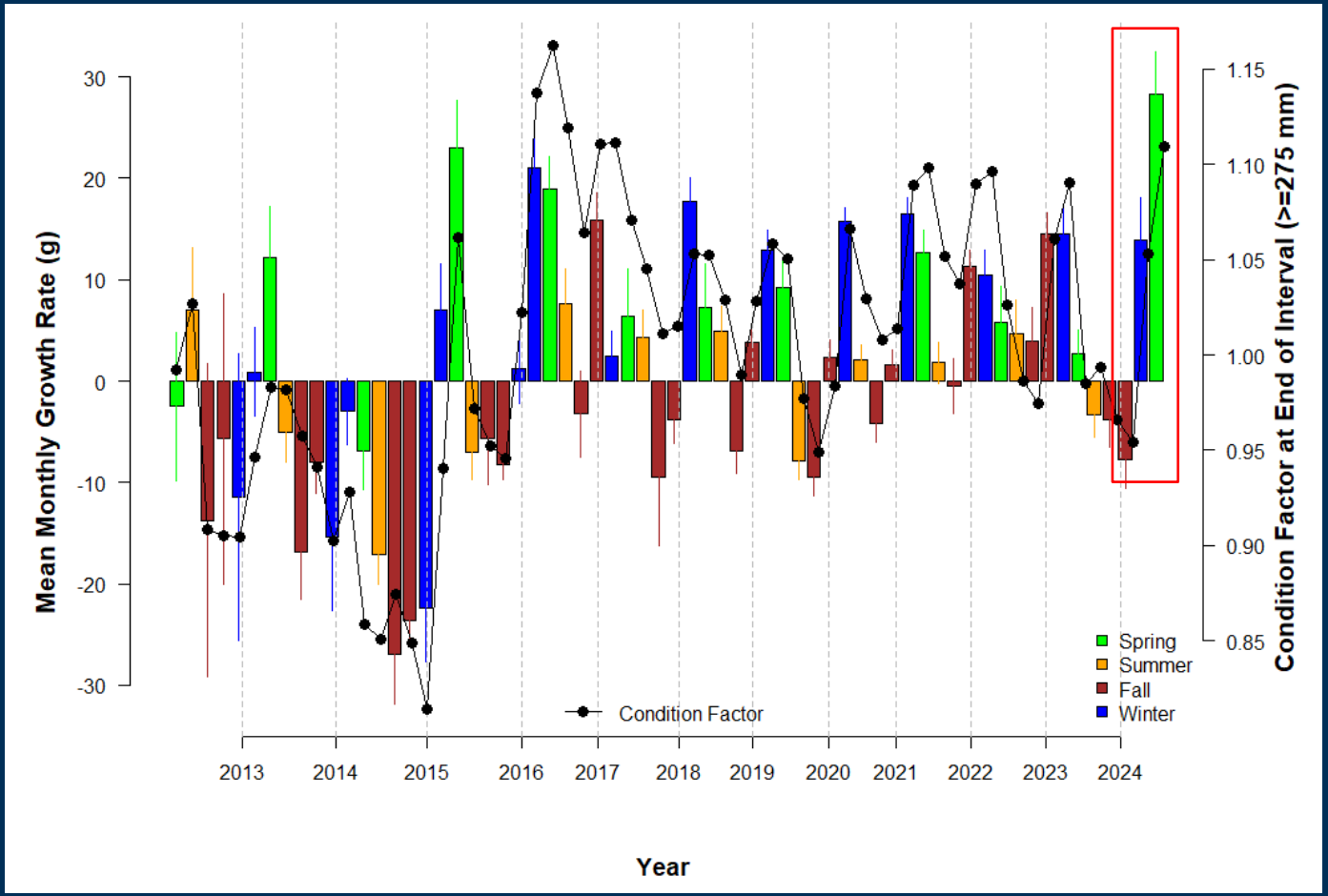
Preliminary unpublished data, do not cite

Growth and Condition

- **Rainbow Trout: through June 2024 (TRGD)**



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Condition

- Rainbow and Brown Trout

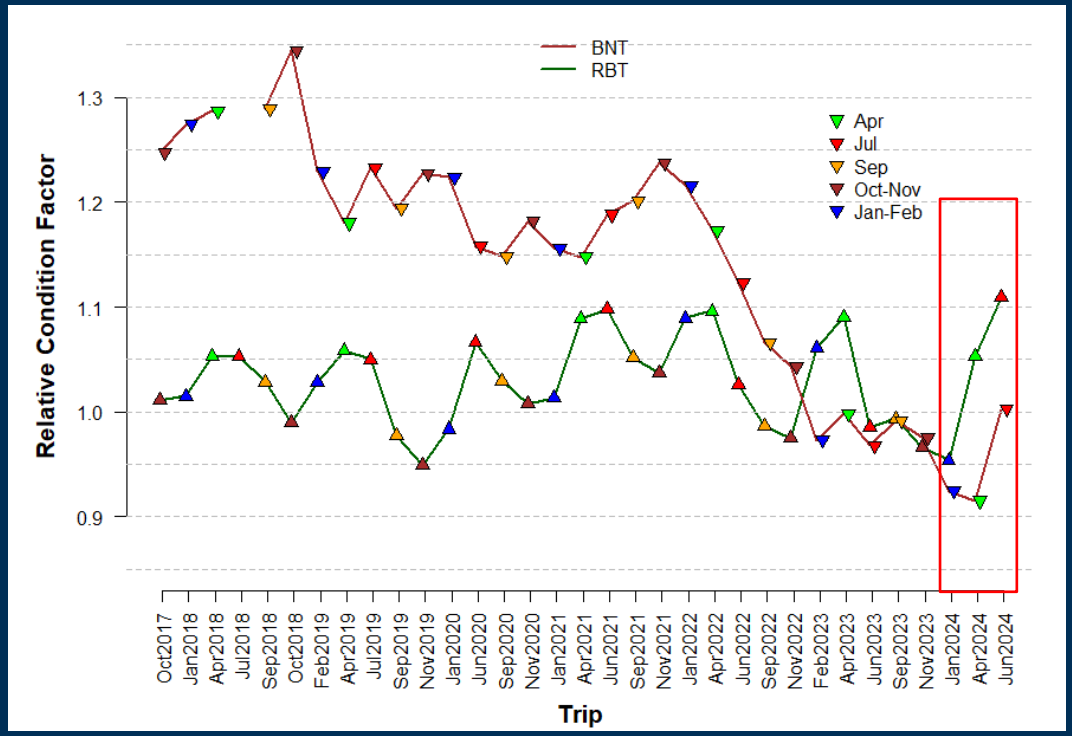

Photo Credits: USGS

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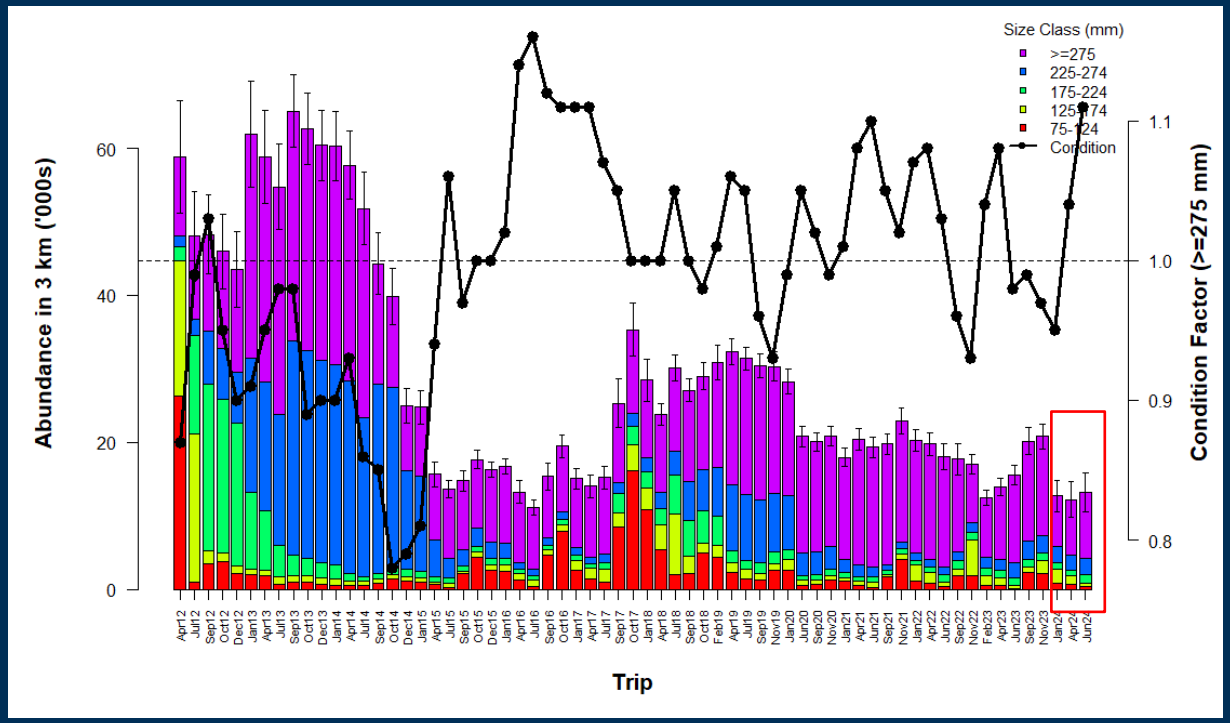
Preliminary unpublished data, do not cite

Trends in Abundance

Rainbow Trout abundance

- TRGD mark-recapture abundance estimates through June 2024
  - Limited recruitment – more evident during fall trips (red bars)
  - Abundance reflecting declines in larger fish



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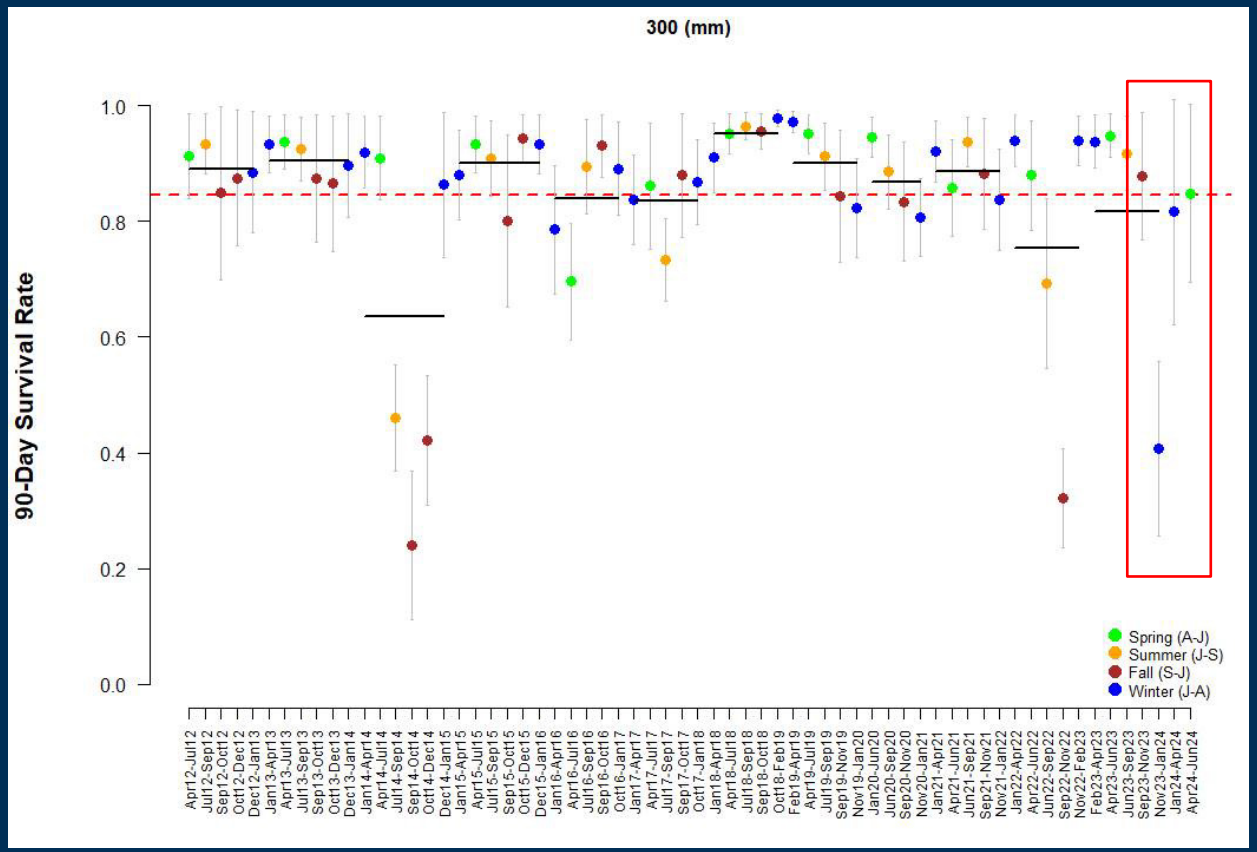
Survival

Rainbow Trout survival (larger fish)

- Reduced winter survival November 2023 – January 2024
- Similar to 2014-15?



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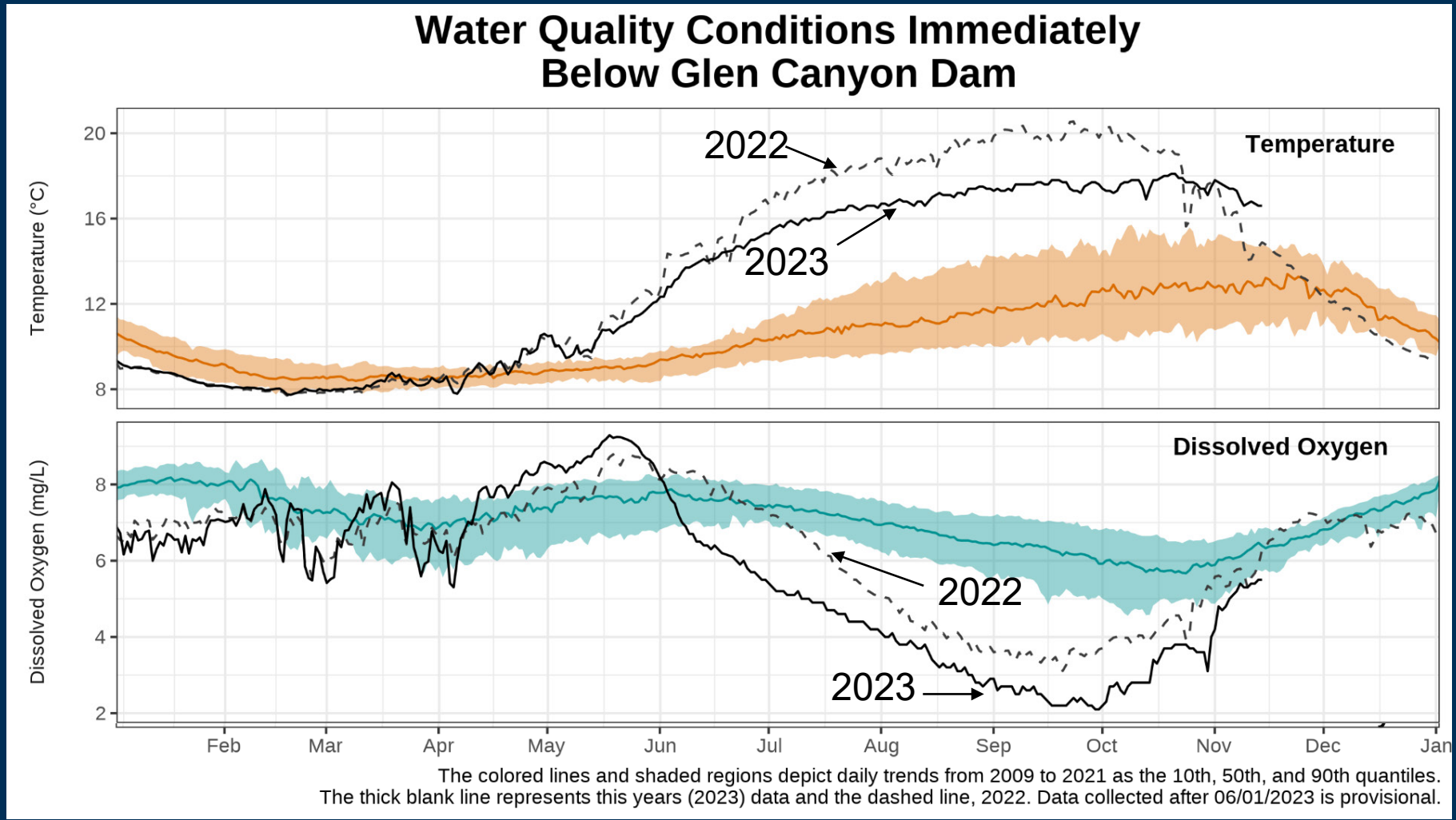
Water Quality



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Summary

- Angler catch rates below AZGFD objective
- Abundance low, recent declines in survival observed
  - Suggests unprecedented, extended periods of low dissolved oxygen were a driver (differs from 2014)
- Spring 2024 growth and condition data suggest a rebound is possible
- Uncertainties in drivers of population growth
  - Dependent upon river conditions (e.g., temperature, dissolved oxygen), and biotic factors (food, competitors, predators)

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Next Steps

- Assess causes of decline to inform management and decision-making
  - Continue AZGFD creel survey (TWP element H.1), TRGD mark-recapture (H.2), and dissolved oxygen monitoring
  - Modeling and analysis (H.3)
  - Structured decision-making (SDM)?
    - To inform Rainbow Trout management
    - Rapid prototyping – Multi-criteria decision analysis
      - Recognizing multiple values
      - Time constraints
    - History of SDM use in the Adaptive Management Program

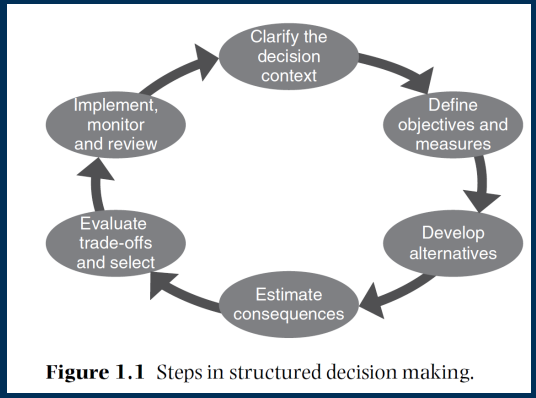

Figure 1.1 Steps in structured decision making.

Gregory et al. 2012

Additional SDM Discussion or Questions?

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Extra Slides

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Background

- Natural resource decision-making is difficult:
  - Due to tradeoffs between values
  - Uncertainty in predictions increases difficulty in decision-making

Photo: Bureau of Reclamation

Photo: Bill Hatcher, Nat Geo images

Photo: Michael Chow/The Republic

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Background

- **Glen Canyon Dam Adaptive Management Program SDM history:**
  - Runge, M. C., E. Bean, D. R. Smith, and S. Kokos. 2011. Non-native fish control below Glen Canyon Dam—report from a structured decision-making project, Open-File Report 2011–1012
  - Runge, M. C., and others. 2015. Decision Analysis to Support Development of the Glen Canyon Dam Long-Term Experimental and Management Plan. U.S. Geological Survey Scientific Investigations Report 2015-5176
  - Runge, M. C., and others. 2018. Brown trout in the Lees Ferry reach of the Colorado River—evaluation of causal hypotheses and potential interventions. U.S. Geological Survey Open-File Report 2018-1069

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Photo: Bill Hatcher, Nat Geo images

Photo: Michael Chow/The Republic

Structured Decision-making

- **Value-focused thinking:**
  - **Incorporates values (objectives) important to decision-makers or groups of stakeholders**
- **Process (PrOACT):**
  - **Problem statement**
  - **Objectives**
  - **Alternatives**
  - **Consequences**
  - **Tradeoffs**

  (value of information)

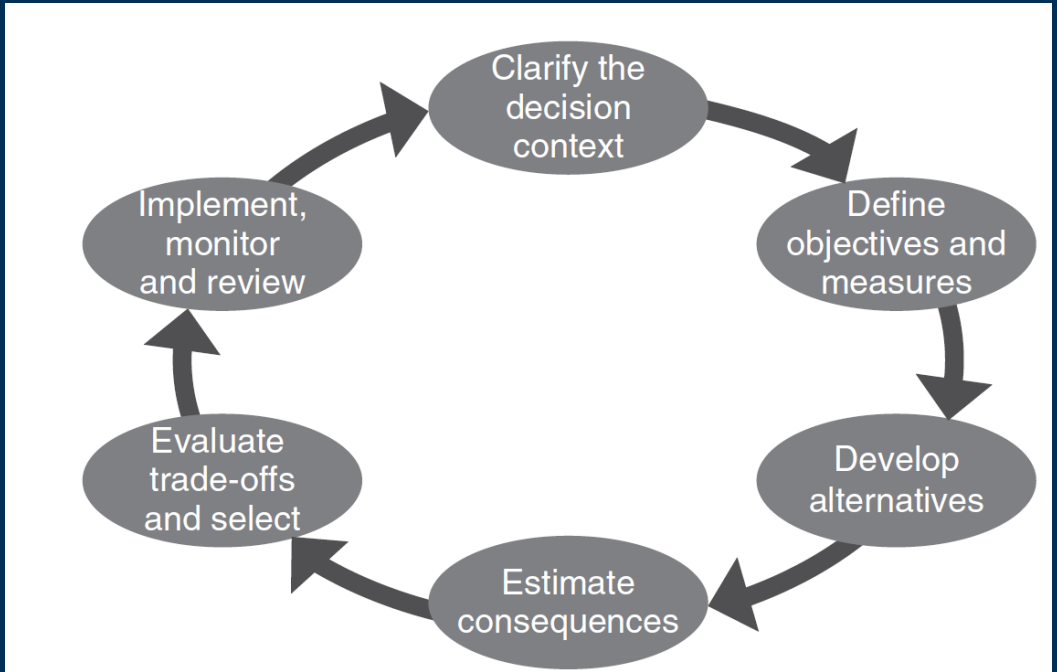

Figure 1.1 Steps in structured decision making.

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Gregory et al. 2012