Brown Trout in Lees Ferry: Evaluation of Causal Hypotheses and Potential Interventions

Runge MC, Yackulic CB, Bair LS, Ellsworth C, Kennedy TA, Kershner JL, Rogers RS, Trammell MA, Valdez RA, Young KL

25 January 2018
Technical Working Group Meeting
Phoenix, Arizona
Background

• Observed increases in brown trout in Lees Ferry over the period 2013-2016 have led to questions about the causes and potential interventions

• As requested by the AMWG, a workshop was held in September 2017 to investigate these questions

• Following the workshop, a writing team was convened to continue the evaluation in greater depth
Purposes

• To evaluate the potential root causes of the increase in brown trout in Lees Ferry
• To forecast the trajectory of brown trout dynamics under status quo management, and the related effects on other resources (notably, humpback chub and the rainbow trout fishery)
• To evaluate a variety of possible management options to address brown trout, and their effects on several resources of concern
• To discuss monitoring and research considerations related to management of brown trout
Management Outcomes being Evaluated

• Management objectives taken from the LTEMP Resource Goals

• Outcomes being evaluated quantitatively:
  – Brown trout abundance
  – Humpback chub population viability
  – Condition of the rainbow trout fishery
  – Sediment resources
  – Hydropower generation
  – Implementation costs

• Outcomes being evaluated narratively:
  – Tribal perspectives
  – Long-term economic effects on the rainbow trout fishery
Management Strategies being Evaluated

1. **Status quo**
   - As described in the LTEMP Record of Decision

2. **Incentivized take of brown trout**
   - Including outreach elements, a graduated bounty, and prize fish

3. **LTEMP without fall HFEs**
   - Remove fall HFEs; trigger spring HFEs using current criteria

4. **LTEMP with more frequent spring HFEs**
   - Changing the triggering conditions

5. **Brown trout management flows**
   - Add TMFs designed for brown trout to the LTEMP

6. **Mechanical removal in Lees Ferry, targeting brown trout**
   - Nov-Jan removal period
Primary Causal Hypotheses

• Immigration driven
  – Fall HFE
  – Pulse immigration

• Combined immigration and recruitment effects
  – Allee effect with pulse immigration
  – Fall HFE

• Recruitment driven
  – Temperature
  – Interference spawning
  – Fall HFE
Evaluation

• Building a modelling system to forecast the linked effects on:
  – Brown trout
  – Rainbow trout
  – Humpback chub

• As well as investigate how the effects of the different management strategies depend on the alternative causal hypotheses

• Meanwhile, borrowing information from the LTEMP EIS for
  – Effects on sediment resources
  – Effects on hydropower generation
Timeline

• 2017
  – Sep 21-22: Workshop
  – Nov 30-Dec 1: Working meeting

• 2018
  – Jan 25: Update to TWG
  – Jan 30-31: Working meeting, finalize results
  – Feb 14: Present results to AMWG
  – Mar 1: Submit report for peer review
  – Mar 15: Reviews returned
  – Apr 1: USGS Open-File Report published