

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



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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

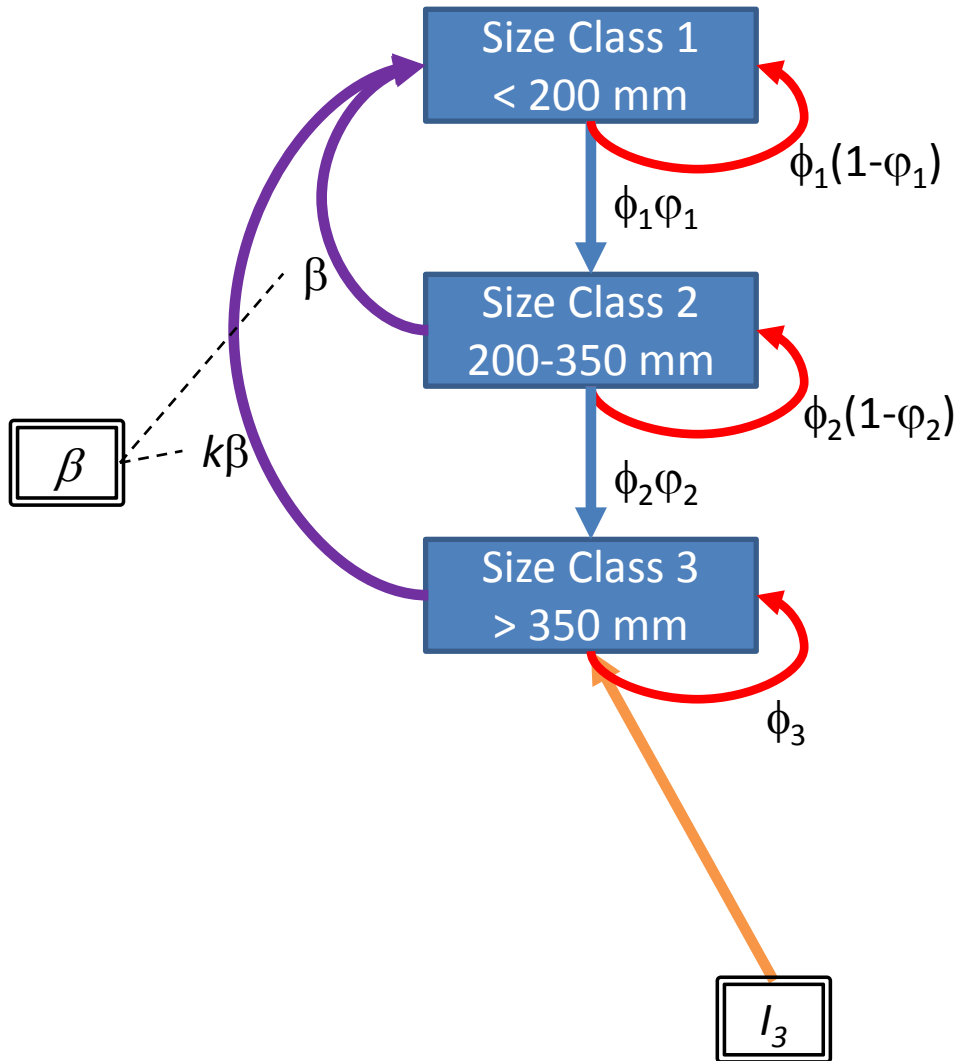


Evaluation

- 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



Brown Trout Population Model





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