

## Review of Lees Ferry Recreational Trout Fishery Management Recommendations

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**p. 4 – Recent Declines in Angler Use.** *“In 2014, anglers spent more than 10,000 fishing days at Lees Ferry (Rogowski et al. 2014 citation in prep). In recent years, angler use of the Lees Ferry fishery has declined, ..”* Don’t understand how the authors can conclude that effort has declined as only a few months have elapsed between the end of 2014 and the date when these produced the draft recommendations (April 30). Has angling effort declined?

**p. 5 – EPT.** The primary (first) recommendation is for flows that promote establishment of EPT. While having lots of EPT would likely improve trout growth rates by providing larger food particles available for more months in the year, it seems unlikely that bug flows would lead to establishment of EPT. No EPT were documented after 4 months of steady flows in 2000. As well, there have been periods where flows have been effectively stable over the weekends during the summer and there have been recent steady flows in September. No EPT have been documented from these conditions. I’m not sure if this speculative approach should be the primary recommendation.

**Page 6 – Minimum Flows.** I agree there is a squeeze on trout, and in particular larger trout, in fall, especially in years when fall water temperatures are high and food availability is low. This problem is worsened by low O<sub>2</sub>, which is in part due to reduced saturation at higher water temperatures. Ted Melis has shown that low discharge results in more air being entrained in the turbines, which has the benefit of increasing O<sub>2</sub> concentrations in fall. The problem with low O<sub>2</sub>/high water temperature is driven by the lake level, not the minimum flow. Lowering the minimum flow actually results in a slight increase in O<sub>2</sub> for a given set of turbine intake conditions.

**p. 7 – Spring HFEs.** *“The 2008 spring high flows has been hypothesized to have triggered prolific spawning from the wild population of rainbow trout, enhanced recruitment and survival, and enhancing the food base (Korman et al. 2011; Kennedy and Ralston 2011).”* Actually, the data and publications on the 2008 flood are quite clear about the response of bugs and trout (but recruitment, not spawning), and using the term ‘hypothesis’ underplays our understanding of this event. The 2008 response is perhaps the most clearly documented fish-bug-flow responses below Glen Canyon Dam. I’m OK with considering this a hypothesis, however this wording is not used for many of the other ideas in the

document which are much more speculative. It appears the authors are trying to downplay the observed spring HFE response by using this term. There is little doubt about what happened in 2008, however given a sample size of 1 (or  $n=2$ , as CPE trends showed a response to the 1996 spring HFE), it is uncertain whether future spring HFEs will produce the same response as antecedent conditions could be different. The tone regarding the certainty of spring HFEs on trout response in the second paragraph changes when the authors recommend it. So, we don't have enough information to rule-out doing spring HFEs because we are uncertain whether they are good for trout (paragraph 1), but we do have enough information to recommend doing them because they are good for trout (paragraph 2)? Logic check needed here.

**p. 7 –8 TMF's.** I agree that TMF's should have stringent side-boards, but rules based on electrofishing CPE or the % composition of age-0 fish in the AGF catch don't make any sense. For example, we documented a huge age-0 cohort produced in 2011 from equalization flows. Some of these fish migrated into Marble Canyon and made it the LCR. Many remained in Lees Ferry and high densities led to recent poor condition and low survival. The recommended rules would not have led to a TMF being implemented during summer of 2011 when one was obviously needed. It's much too late to implement TMFs after 3 years when age-0's represent more than 50% of the total abundance (as the rule states). The cat is well out of the bag by then. The authors also recommend only doing TMFs when chub and trout EA control triggers are not met. The authors fail to recognize the lag between when things get bad at the LCR (low juvenile chub survival rates, high trout densities) and the year when trout causing those conditions were born (at least 2-3 years earlier). The logic behind TMF rules in these recommendations needs to be carefully reviewed.

**p. 8 - Equalization.** Why not do TMFs in equalization years, rather than make the suggestion that rules governing equalization should change, which would likely require another EIS? TMFs are more feasible, which is why they are part of the EIS recommendation. I agree with this recommendation, but don't think it is feasible in the short term.

**p. 8 - Mechanical Removal of Young Trout.** We have evaluated the feasibility of this during the non-native EA, and it is very low. It would take months of continuous electrofishing effort over the entire Lees Ferry reach to reduce young of year numbers in a substantive way. TMFs would be a much more efficient way to achieve the same objective.

**p. 9 – Fishing Regulations.** What is meant by “adjust regulations to respond to abundance or quality parameters”? I think the suggestion is for increased harvest rates, which makes much sense. Given the effort estimate from the creel survey and typical catch rates (up to 40 fish a day per angler), a substantial harvest could be achieved, which would remove larger fish, which show the poorest condition at high densities and create the greatest bioenergetics drag on the food base. Of course such a policy would lead to reduced angling catch rates. More clarity on this suggestion is needed.

**p. 9 – Stocking.** There is no scientific rationale for considering stocking of rainbow trout in Lees Ferry. Food availability, which affects growth, is the limit on the population, not recruitment. Excessive recruitment is actually the problem, as it leads to too many larger fish with high energetic requirements that can't be met given food availability. Stocking would simply exacerbate this problem. Translocating trout from below Lees Ferry – really?

**p. 9 and 10 – TCD and Turbidity.** These would be valuable tools. However they were both excluded from the recent EIS so it seems very unlikely they would be reconsidered to aid the Lees Ferry fishery.

**p. 10 - Monitoring.** I'm a bit too close to this to provide an unbiased opinion. I agree with statements about the creel survey, but not about the current electrofishing AGF survey. I really question whether it is telling us what we need to know to manage the fishery and downstream trout-related issues. The indexing program provides zero information on movement or growth. Trends in relative abundance and size structure are highly uncertain and potentially biased because catchability is not constant as the indexing program assumes. Mark-recapture approaches used as part of the Natal Origins program provide much more informative data with respect to the management questions.