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These are some comments concerning the draft management document entitled “Lees Ferry Recreational Trout Fishery Management Recommendations: The voice of Lees Ferry Anglers, Guides and Businesses.”

Lines 17-163. Although the report states that the recommendations came about from a collaborative process with state and Federal agencies, it reads more as a scientific endorsement of the recommendations.

Line 185. Although having a condition factor > 1 for summer is a good human metric of fishing quality, it would be more advisable that fish have a high condition in late fall and winter to maintain the condition of the reproductive stock prior to spring spawn.

Lines 202-247. An increase in the taxonomic diversity of aquatic invertebrates is a very desirable management objective, particularly for the purpose of warding off ecological instability. Secondly, an increase in prey size is likely to increase the visual detection and retention of prey once engulfed. Because of the reduction in energy expenditure per individual prey item, an increase in prey size will sometimes result in increased trout growth as long as the availability of that particular prey item (species or size) isn’t depleted; however, there is no data to suggest that by changing the invertebrate composition will result in an increase in the carrying capacity of the system, unless other unused niches are available. It is much more likely that the establishment of the quagga mussel in Lees Ferry will further reduce the carrying capacity of the system through the removal of organics released from the reservoir. The energy flux into the system is either from autochthonous or allochthonous sources. It is unlikely that a change in invertebrate composition will result in the better utilization of these fixed quantities. The allochthonous sources contributed from the riparian zone are minimal because of the reduced surface area along the channel; therefore, subsidy is much less. We have evidence that terrestrial invertebrate consumption is seasonal and small in proportion to the aquatic sources. Secondly, these invertebrates are mostly small in size.

Lines 231-232. There is much more evidence to suggest that the population dynamics in the Lees Ferry fishery are a result of density-dependent rather than density-independent factors (e.g., fluxes in

temperature, dissolved oxygen, flows, etc.). It is more likely that the trout population increases in response to favorable growing conditions (food availability, successful age-0 recruitment and survival). The intrinsic rate of growth in the population has been shown to be rapid following stable and high flows (Korman et al. 2011); as a result this population will likely increase numerically until it over shoots the carrying capacity of the system. Under these resource limited conditions larger fish will be more energetically compromised resulting in a change in the overall size distribution, one that favors smaller sized fish rather than the desired distribution (line 178). Excess trout will either starve or emigrate from the system; dispersal of these fish will contribute to an increase in trout numbers in the downstream reaches of Grand Canyon. Following these periods, the high trout numbers will increase the likelihood of negative interactions with native fish (completion or predation) (Coggins et al. 2011; Yard et al. 2011). Since abundance of trout downstream is strongly linked to population dynamics in Lees Ferry elevated downstream densities are cyclical as well. The monitoring data would suggest that this fishery has gone through two such cycles, where the boom-bust cycle lengths have ranged between 12 to 10 years. Ecologically, this type of population boom-bust cycle is quite common when population levels over-shoot rather than stabilize below the carrying capacity. Thus it is likely these cycles will continue to repeat into the future, until such a time management actions are implemented to stabilize these population dynamics, through combinations of trout baby killer flows and directed harvesting. There is a great book called “Playing God in Yellowstone” by Agnes Chase, anyway he documents the mismanagement of elk by the NPS, because it was centered on the belief that populations intrinsically manage their own population.

Lines 259-261. Elevated temperatures in the fall will result in a bioenergetic demand that can’t be met when the foodbase has been degraded below a level that can support the existing fish biomass. Even if EPT species were to be introduced successfully into Lees Ferry, populations of these same invertebrates are as likely to be reduced under high trout numbers. Although larger EPT species are more often a larger size prey item (similar in size to *G. lacustris*) there abundance is governed by their own population dynamics. Another good reason to have more invertebrate diversity is the time distributions of different reproductive phenologies. This would likely distribute the periods of vulnerability over time for the different invertebrate species.

Lines 310-318. Using the status of humpback chub as a trigger for implementing TMF’s assumes that the responses of both populations are synchronized, with no time delay. We know there is a considerable lag time between HBC and RBT, and with still some uncertainty on whether or not trout are

having a direct effect on chub. Nevertheless, being late on the draw is not active management. The actions identified for Exp TMF are scientifically supportable, although remain uncertain in their efficacy, hence experimental. Secondly, these flows could actually stabilize the population therefore should not be considered as an unnecessary action the will jeopardize the trout fishery. Maddux et al. (1987) findings indicated that under the pre-MLFF period natural reproduction represented was ca. 29%. It is unlikely that TMF's are going to ruin the fishery irreparably even though a year class was reduced below targeted levels.

Line 323 – Although relocating rainbow trout that have strayed into downstream locations is politically adroit, its implementation is unlikely to be effective in cost, logistics, and desired effect, particularly since these rouge fish have likely dispersed in response to limited resources. This is more of a feel good band-aid approach then trying to realistically fix the actual problem of stabilizing the population level.

Lines 350-356. Attempting to reduce high recruitment events through the use of electrofishing solely is not likely to be effective without exhaustive harvesting of these small size classes. In the fall of 2011, the catch results for age-0 fish was ≈ 12,000 fish. Because of the low capture probability at high trout densities it would require a series of prescriptive passes that would far exceed the NO sampling effort by an order of magnitude (>10 trips) in order to reduce recruit numbers to levels that would stabilize the population.

Lines 358-362. The current fishing regulations are insufficient in scope to actively respond to unstable population levels. This report would be better served by making direct and specific recommendations to the management agency responsible for fishing regulations. Because of limited daily food requirements, when a trout population over shoots its carrying capacity, smaller rather than larger sized fish are much more likely to survive and recruit into the larger size classes. Therefore, the harvesting of larger sized fish, which are vulnerable to anglers is a more effective way to reduce the bioenergetic demand on the food base. This type of approach should be carefully measured to reach biomass targets. Actual number of fish that need to be harvested can be calculated based on known abundance, survival and recruitment. Owing to the "catch and release" philosophy it is unlikely that the current angling community is capable of reducing stock numbers. Therefore, using an effective creel to monitor take and a creative management group to advertise temporary take (narrow window of time) could be very effective for enticing another type of angling community to use this resource. This would be in concert with the stated objective (line 191) to promote and regain angler use to levels > 20K per year.

Lines 381-388. It is likely that an immediate response in stocking following a catastrophic failure in the fishery will result in further delaying the recovery of the fishery, unless the failure is due to density-independent factors (e.g., elevated temperatures, depressed oxygen levels). Currently, there is more evidence to suggest that population declines are due to density-dependent factors (e.g., trout population levels that exceed the carrying capacity); therefore, the addition of more fish biomass will further suppress the aquatic invertebrate populations, preventing their ecological release following reduced prey demand. For example, it is not advisable to restock additional cows, once the original stock has starved to death because of overgrazing.

Lines 389-394. It would be more cost effective to translocate "wild fish" directly from Lees Ferry, by temporarily housing and supporting them in stock ponds for potential release later on when a catastrophic failure occurs due to density-independent factors. There is no evidence that GCD flow release patterns have detrimental consequences on trout growth and abundance. There is more evidence that high trout numbers that exceed carrying capacity have resulted in boom bust cycles.

Lines 492-498. Catch indices derived from the current monitoring program are insufficient in accurately measuring the population dynamics of the Lees Ferry fishery. Because of the concerns regarding the population dynamics effect on the fishery (i.e., economics and intrinsic values) as well as effects on the native fish community due to downstream dispersal, it would be advisable that the monitoring program use stock assessment methods that are more in kind with methods used in other fisheries that are considered valuable economically. Parameters such as abundance, survival, and recruitment are more accurate metrics for assessing population dynamics.

As a last comment, what is lacking in this report is support for determining a specific population level that this group considers as an ideal target for managing. Even though there is considerable uncertainty on what that abundance level is relative to the carrying capacity, the objectives that they identify as population attributes for a quality fishery are unmanageable and will remain so. Managers will be unable to stabilize population dynamics if there is no established upper bound.