



Independent Scientific Review Panel
for the Northwest Power Planning Council
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September 18, 2001

MEMORANDUM

TO: Council Members

FROM: Rick Williams, ISRP Chair

SUBJECT: Review of Revised Moses Lake Recreational Fishery Proposal

In its Intermountain provincial review decisions, the Council decided to address the ISRPs "do not fund" recommendation for the Moses Lake Recreational Fishery proposal (see attachment 1 for ISRP FY01 review) by providing the Washington Department of Fish and Wildlife the opportunity to revise the proposal further to address the ISRP's final comments. WDFW committed to review the project design at its state level. On that basis the Council agreed to seek additional ISRP review of the revised proposal. The ISRP's review of WDFW's revised project design is provided below.

Project ID: 199502800

Restore Moses Lake Recreational Fishery

Sponsor: WDFW

Province: Inter-Mountain

Subbasin: Lake Roosevelt

Short Description: Restore/enhance the failed recreational fishery for resident species in Moses Lake, once the premier fishery for resident game fish in the Columbia Basin, in lieu of lost recreational anadromous fisheries.

Sponsor Request FY01: \$213,072

Sponsor Request FY01-03: \$653,676

CBFWA Recommendation: Urgent/High Priority

ISRP Recommendation on Revised Proposal:

The revised proposal is an improvement over the earlier draft. It includes a satisfactory background section. However, taken as a whole, the revised proposal does not describe a technically sound program with clear benefits to fish and wildlife. In particular, the objectives do not clearly follow from the background information that is presented and they do not seem likely to address key factors elaborated in the background. The proposal continues to need a better-focused experimental design with monitoring designed to

address specific hypotheses. It does not include tests of some critical hypotheses but includes several tasks that will not likely result in valuable information to manage the fishery. For example, background material suggests that tasks such as water quality assessment and species interactions, as written, will probably not result in information that will restore a balanced fishery. The proposers should develop an action-oriented, hypothesis-driven proposal that addresses issues touched upon in the background section.

The ISRP cannot recommend funding of specific portions of the proposal because the various field components are substantially intertwined and (more importantly) a revised task-based budget was not submitted. The revised proposal gives significantly more detailed and relevant background material, but does not present a rethinking of objectives and actions to address the now better described biological interactions in the lake. The proponents need to move beyond their past actions and propose an experimentally designed project that will answer the key questions. The budget should be organized by task that matches each hypothesis/special project. This would sharpen their perspective on what is needed and the likely costs, benefits and priorities of parts of the project.

On the positive side, the revised introduction and discussion show better awareness of limnological principles and the pertinent literature. Portions of the revised proposal show evidence that WDFW staff have systematically considered a range of limiting factors and provide an accumulated list of changes in the lake's environment (in the broad sense) that might be depressing panfish production. Prominent on that list are: autumn drawdown, dilution releases since 1976, reduction in sewage and agricultural inputs since the mid-1980's, presence (increasing?) of carp since 1904 especially since commercial fishing for them ceased, and the substantial increase of introduced walleye over the past decade.

A number of "clues" struck reviewers, as they evidently caught the attention of WDFW staff:

- an improvement in water quality during the panfish decline;
- an inability of juvenile rainbow trout to recruit to the fishery, necessitating netpen rearing, apparently because of walleye predation;
- an unexpected increase in nearshore turbidity following addition of dilution water;
- termination of a commercial carp fishery approximately at the time panfish declined;
- and an astounding prey:predator ratio of 0.2 to 0.5 in 1999 and 2000, accompanied by the (correct) assumption that juvenile carp generally are not available as prey.

From these clues reviewers infer that restoring balance to Moses Lake hinges upon an understanding of two fish species – walleye and carp – and how the two interact with panfish by eating them (walleye) and interfering with their ability to reproduce and feed (carp). Further, there appear to be three critical "bottleneck" periods during the course of each year: 1) during panfish spawning in spring, 2) during and after autumn drawdown that restricts panfish to suboptimal habitat with little cover, and 3) during winter when juvenile panfish continue to face predation with minimal cover. We expected the proposal to contain clear, testable hypotheses to enable those assessments that would then suggest management changes. Such management might be easier to achieve for walleye (by manipulating harvest) than for carp. However, discussions of similar problems and

management actions in reservoir fisheries throughout the U.S. were virtually absent from the proposal.

Instead, the work plan proposes the testing of a wide range of hypotheses with a lot of routine and largely undirected basic data collection (e.g., test the effect of pH or alkalinity on panfish recruitment) rather than selecting the key data that would affirm or refute the specific hypotheses discussed in the text. For example, there are words in the text about possible thermal refuges for the trout and other species in summer, but no telemetry to see if such congregations of fish occur seasonally. Fall drawdown is hypothesized to drain panfish from the epilimnion, but there is no sampling of the outlet in the fall to see if these fish are withdrawn. The proposers hypothesize a concentrating effect on fish in the lowered fall-winter lake after drawdown, leading to heavy predation on young-of-year panfish, but their standard surveys are all conducted before drawdown and after refilling in spring when the hypothesized effect would not be seen. Unless the hypotheses and monitoring are better linked and focused, at the close of this funding cycle the project may only increase the quantity of data with little management utility¹ indistinguishable from those gathered previously on Moses Lake projects (and now rejected by the proposal writers because those data were not gathered according to current WDFW standards).

With reference to carp, it seems illogical to take the proposer's position that carp control will only be addressed if there is irrefutable evidence that they are the cause of panfish decline. Experience in reservoir ecology indicates that the presence of large carp populations is undesirable and that point is repeatedly made in portions of the proposal at hand. Reviewers strongly suggest that the project include a specific task to search for the Achilles heel of carp in Moses Lake and to assess if some level of sustained suppression (not "control") of carp might be cost-effective. One possibility is to radio-track a few adult carp at the onset of winter to see if large aggregations form, as they do in some midwestern US reservoirs, possibly making them vulnerable to suppression efforts (targeted capture) during that time period.

Reviewers remain concerned that adequate experienced advice still may not be available to the study participants as they plan and execute this work. Although the revised proposal cites an increased amount of relevant and useful limnological literature, the staff listing does not include a senior aquatic ecologist who would be a long-term partner in the work. The additional WDFW peer review promised by the proposers has apparently stimulated more use of standardized and WDFW-approved protocols, but this emphasis

¹ For instance, on page 32 of the revised proposal we are shown historical water quality data. The data are collected at irregular time intervals, ending in Fall 1988. The Fall 1988 data show a huge increase in mean nitrogen, but this mean is from only 4 measurements as opposed to the usually much larger sample at earlier times. Perhaps an outlier caused this; we cannot tell and are not told? P at the same time, with 6 measurements, does not show a similar outlying mean and it does show a huge 95% CI, suggesting there may have been an outlier or outliers in the data. For the N data, no measure of variance is given, either here or in the plot of the data a few pages later. The plot has a meaningless and inappropriately scaled time axis and a trend line is plotted across this wrongly scaled axis and we are told that the rate of increase of N may be 161.84 microg/l/season. This is nonsense in many ways and this sort of misrepresented, poorly reported, poorly interpreted, and probably poor quality data was a major concern in the initial project reviews.

seems to have inhibited proposing and testing of hypotheses suggested by the information available on the lake. Reviewers were especially concerned that advice from fisheries biologists and managers experienced in walleye and carp effects and management (available outside the basin) apparently was not obtained.

Finally, although at one time Moses Lake was a world class panfish fishery, the proposal does not fully justify why the lake should not be managed primarily as a walleye fishery. Elsewhere, walleye are often the sought-after species. Accepting the dominance of walleye, and including a level of carp suppression, may be the most opportune and effective strategy for a lasting fishery. Presentations and discussions during the site visit made clear that the walleye fishery is popular and valued. At the least, the proposers need to consider carefully whether it is possible to retain both walleye and panfish fisheries simultaneously in the lake (and whether carp influence this); this may in fact be very unlikely. Pursuit of outcomes that are biologically very unlikely or very difficult and expensive to engineer may not be a productive investment.

Attachment 1. ISRP FY01 Comments

ProjectID: 199502800

Restore Moses Lake Recreational Fishery

Sponsor: WDFW

Province: Inter-Mountain

Subbasin: Lake Roosevelt

Short Description: Restore/enhance the failed recreational fishery for resident species in Moses Lake, once the premier fishery for resident game fish in the Columbia Basin, in lieu of lost recreational anadromous fisheries.

Sponsor Request FY01: \$213,072

Sponsor Request FY01-03: \$653,676

CBFWA Recommendation: Urgent/High Priority

ISRP Recommendation Compared with CBFWA's: Disagree, Do Not Fund

ISRP Final Recommendation and Comments:

Do not fund, the response and the original proposal do not demonstrate a scientifically sound project. The project is not adequate to address the tremendously complex situation in Moses Lake. The proposal does not adequately address alternative reasons why the fishery has declined to the current low level. The project sponsors should consult with the Banks Lake project sponsors for approaches to a lake-wide study.

Problems with the scope and conceptual basis for this project remain. That said, the response did show good effort and good progress. It was disconcerting that the researchers requested additional advice as to which tasks should have been deleted, modified, or added. We are concerned that the proposal did not contain evidence of logic and understanding of the situation. There is risk that the project as proposed will gather several years of data that may not help in managing the panfish of Moses Lake.

The proposal and the responses to ISRP comments focus on investigational techniques and clear up details concerning them and various facts about Moses Lake. However, relationships among limnologic, fish community, and fishery processes (at least embodied in the literature concerning appropriate past studies) have not been brought to bear on the problem. Measurement techniques regarding fish populations, fish diet, and limnology that are important for analyzing the perceived problem of decline in Moses Lake's recreational fishery have been described. However, investigational methods are not the only important part of the proposal. The project should build upon the history of the results of previous individual and comprehensive studies of lake and reservoir fishery problems.

Overall guidance from an independent senior investigator may be warranted. Specifically, in response (unnumbered p 5) to our comment that the project would benefit from consultation with a senior scientist specializing in limnology, the sponsor states that a Washington Dept of Ecology limnologist, has been sub-contracted to perform certain measurements. This response speaks only to technical matters (sampling). Project

guidance on overall limnological processes and on relationships to conditions for reproduction, growth, and survival of the fishes (and other, associated organisms) would be even more important.

The original proposal and many of the responses were poorly presented. For example, although tables of statistics provided in the responses help clarify some of the ISRP comments, certain inadequacies in them, such as units of measurement not being shown and the vague dates of measurement, make the information difficult to understand. In response Attachment A, Hypothesis 3 is “Recruitment of panfish is limited by primary productivity.” Immediately following this, the supposedly applicable Task 1.3 reads as follows: “Conduct zooplankton density and species composition study,” and the methods described under that deal with zooplankton. Primary productivity refers to tissue produced in the form of phytoplankton and other plants, not zooplankton

During the Spokane discussion, panel members pointed to the proposal’s lack of reference to past studies concerning effects of carp on lakes and results from reducing carp populations. The response did not followed up on this comment.

The sampling scheme for the creel survey identifies 16 weekdays and 4 weekend days per month for sampling, resulting in a higher sampling rate on week days than weekend days. This may be less efficient than a stratified sampling scheme that would sample in proportion to the expected total catch (which is the parameter of interest). If the sponsors have some estimates of expected fishing rates that support the recommended sampling scheme, those data should be presented.

It would be helpful for the sponsor to discuss the Lake Moses situation in terms of the life history requirements of each fish species involved. It also would be useful to examine the present study of Banks Lake, which the reviewers found better formulated.

The Panel concluded that work on this project should halt until the conceptual approach is improved. Moses Lake and its fishery obviously represent a huge complex of problems. Any attempt to analyze them will require better direction and insight than is evidenced in the proposal and responses.

ISRP Preliminary Recommendation and Comments:

Fundable only if the response adequately addresses the ISRP’s concerns. In the response, sponsors should incorporate material presented at the meeting and revisions should be better focused on the causes of fish species shifts and their potential management, e.g. those actions that have more potential for pay off. The proposal was inadequate, but the presentation cleared up some of the ISRP concerns. There is need for thinning the tasks.

This is a project for conducting research, evaluation, and mitigation to restore a once-productive warm-water panfish fishery in Moses Lake. It is included in the Intermountain subbasin because it receives water from the Columbia River via diversion from Lake Roosevelt through Banks Lake. Management of Moses Lake is considered

substitution/mitigation for loss of anadromous salmonids above Chief Joseph Dam. Although listed as a 1995 project, it has been funded for one year.

The project seems to be off to a good start by compiling past records and monitoring the system. Presentation of this information was informative and interesting. Species composition in terms of numbers does not fully support the suggested trends, although biomass does it better.

However, this is a poorly developed proposal that has problems, although the oral presentation was much better and alleviated many concerns. The proposal seems not founded on a basic understanding of lake processes, thus not directed toward investigating why the ecosystem fails to support the desired fishery—or a suitable substitute for it. It is not clear why the fishery declined. It is imperative to know what the problem is before solutions can be found. The project proposal is concentrated on superficial fishery matters and doesn't get at the underlying habitat system. Some of the deficiencies were identified in last year's review.

The project would benefit from consultation with a senior scientist specializing in limnology. The history of change in the lake's drainage basin (vegetation, soils, land use, other human activities, hydrology, etc.) should be examined, as well as basic change in basic lake characteristics (limnology). Several basic questions need study. What are the lake's depth and wetted basin shape? Thermal stratification? Seasonal dissolved oxygen profiles? Macrophyte types and extent? Ice cover? Do Dissolved Oxygen levels ever become critical? What are the concentrations of toxic chemicals in the lake water? What is the status of reproductive habitat for the various species of fish? What is their reproductive success in different habitats? Where do the trout come from? Were they stocked? Were other fish stocked? The proposal, despite its various tables of data, does not touch adequately on any of these questions.

Various graphs in the proposal are labeled as growth of fish, whereas they are really just length-at-age plots, from which growth rates are difficult even to infer. They were not drawn in such a way as to show growth. Sample sizes and variances are not indicated.

Specific comments relate to certain objectives. The objective for a fish diet study seems too large in scope (includes too many non-critical species). Also, gillnetting is not an effective tool for a feeding study because of regurgitation. The objective to conduct a population estimate (p 21) does not adequately demonstrate how this will be accomplished. The objective of obtaining more age data is not critical to rational management – a good idea of age and growth is already available. The same may be said regarding GIS maps, except as incidental to other tasks. On the whole, this study plan needs modification, largely to trim tasks to a critical few, and re-review.

The population trends look very much like those seen when common carp take over a lake in the eastern United States. This observation is strengthened by the proposal's comment that commercial carp harvest had been curtailed for lack of a market. Fishery management in such cases has been to stimulate carp harvest, either commercial or

through angler incentives (e.g., carp derbies which can be fun for all ages, youth carp fishing days, spearing carp along shore during spawning). Once carp numbers are reduced, other species such as the panfishes may bounce back on their own. An outside advisor familiar with managing such carp lakes could be a benefit to the project.

On further revision of the study plan, the project should have a good benefit for fish, and it meets the consistency criteria.

Attachment 2. FY00 ISRP Response Review Comments

ProjectID: 9502800

Restore Moses Lake Recreational Fishery

Washington Department of Fish and Wildlife

Short Description: Restore/enhance the failed recreational fishery for resident species in Moses Lake, once the premier fishery for resident game fish in the Columbia Basin, in lieu of lost recreational fishery opportunities for anadromous game fish species in the upper Columbia.

CBFWA Funding Rec.: \$234,890 Sponsor Request: \$234,890

ISRP Response Evaluation:

Fund. The project managers have gone to some length to justify the recreational warm-water fishery in Moses Lake and to explain how this is related to the Fish and Wildlife Plan. Overall, they did an adequate job of describing the problem and justifying the approach. Of particular interest are the testable hypotheses for explaining the fishery decline, e.g., the apparent proliferation of carp in the lake.

Some detailed explanation of how much, and what type of, data analyses are really needed to complete Phase I would have been helpful. For example, are there long-term measurements of turbidity or Secchi depth over time to determine if Moses Lake has become progressively more turbid? The reference to harvest being a constant was not adequately substantiated.

FY00 ISRP Recommendation before Response Loop:

Delay funding until they propose testable hypotheses developed from the existing data. There has been inadequate synthesis of existing data. Identify some specific problems, then re-submit the proposal.

Comments:

This clearly presented proposal for an ongoing project would replace recreational fishery losses because of declining anadromous fish populations with warm water game fishes such as crappie, bass, yellow perch and walleye. Accomplishments to date include compilation of a reference library on Moses Lake fishery, collection of water quality and habitat data, and formulation of study plan. The current proposal is for Phase 2, which involves further data collection and development of specific introduction proposals. The sampling procedures should have been described in greater detail. However, additional data collection may not be warranted or of high priority at this time because there has been a lot of data collected on Moses Lake. How much more information do we need about black crappie and smallmouth bass? The proposers should look at the data they have and describe the testable hypotheses, although it is not apparent how such a small group of people would be able to analyze all the data. Phase 2 also includes completion of biological profiles for major fishes and habitat mapping. Presumably, Phase 3 would involve introductions and monitoring. Generally, the project is not designed to meet regional goals in terms of native fishes. Continued reliance on warm water fishes for recreational fishing opportunities may confound public expectations regarding restoration of anadromous fishes to fishable population levels. No cost share is provided in this

project. Why isn't WDFW funding part or all of this? Are there chances for dispersal of introduced fishes?

The proposal does not adequately address the **ISRP's FY99 comments**, Appendix A page 65: "The proposal is for a highly managed non-native harvest fishery and the choice of fish stocks is not biologically justified. The proposal does not adequately ensure that the proposers have sufficient understanding of the reasons for fisheries decline in Moses Lake to restore the fishery. The experimental design is not clearly presented or justified, and the proposal does not adequately describe the methods to be used for some very complicated actions. Additionally, the effects of angling are not well described."

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