



Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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MEMORANDUM

ISRP 2004-17: December 3, 2004

TO: Doug Marker, Fish and Wildlife Division Director, Northwest Power and Conservation Council

FROM: Rick Williams, ISRP Chair, and ISRP/PRG Subcommittee of Lyman McDonald, Chuck Coutant, Dick Whitney, and Jack McIntyre

SUBJECT: Review of the final review draft “Comprehensive Research, Monitoring, and Evaluation Plan for Umatilla Subbasin Summer Steelhead and Chinook Salmon” (for projects 199000500 and 199000501)

Background

As requested by the Council on October 5, 2004, the ISRP reviewed the final review draft “Comprehensive Research, Monitoring, and Evaluation Plan for Umatilla Subbasin Summer Steelhead and Chinook Salmon.” The draft plan is a culmination of a collaborative effort between the Oregon Department of Fish and Wildlife (ODFW) and the Confederated Tribes of the Umatilla Indian Reservations (CTUIR). It describes the proposed future research, monitoring and evaluation (RM&E) needed to assess Umatilla Subbasin salmonid management activities. Specifically, the purpose of the Umatilla Salmonid RM&E program is to monitor the status and trends of natural and hatchery salmonids and their ecosystems, research the factors that influence salmonid population viability, assess the effectiveness of management actions, and provide information to resolve critical uncertainties using sound adaptive management application. The comprehensive RM&E plan encompasses several projects, including the Umatilla Salmonid Outmigration and Survival project (BPA project #198902401), Umatilla Hatchery Monitoring and Evaluation Project (BPA project #199000500), Umatilla Salmonid Natural Production Project (BPA project #199000501), Umatilla Fish Passage, Umatilla Flow Enhancement, and Umatilla Fish Health Monitoring projects.

The draft plan is the final piece in an iterative loop of project sponsor proposals, ISRP reviews, Council decisions and sponsor responses that began in the Columbia Plateau Provincial Review for Fiscal Years 2002 through 2004. The ISRP final report for the provincial review (ISRP Document 2001-8, August 10, 2001)¹ provided a “not fundable” recommendation, though the ISRP indicated that the monitoring should continue. The ISRP needed additional information on the process and development of the experimental design and data collected to assess the goals of the project.

¹ See ISRP 2001-8 and ISRP 2001-8 Addendum 199000500: www.nwcouncil.org/library/isrp/isrp2001-8.htm

The Council concluded that the ISRP's concerns were severe enough that before making future commitments to the program, the Council needed to ensure that the stated purpose, goals, and objectives of the artificial production initiative could be assessed under the current study designs. A key element of the Council's decision was encapsulated in a January 11, 2002 Council memorandum to the project sponsors, the Council recommended that:

“[a] determination is needed to ensure that the stated purpose for the artificial production initiative and specific goal and objectives can be assessed under the current study designs... This review needs to address not only the overarching goal of the assessment, but also the specific questions in the ISRP review... In addition, the long-term outcome from the evaluation as it relates to the artificial production initiative being monitored needs to be addressed.”

This statement reflected a concern expressed by the ISRP that the original study plan focused on internal operations of the hatchery, whereas achievement of the goal of the hatchery initiative will require focus upon restoration of salmon and steelhead populations measured in the river. The ISRP provided clarification of their comments in a March 5, 2002 memo. The ISRP recommendations from that memo (elevated to requirements by the Council), upon which this response is based, emphasized the need for "...a progress report with an evaluation of the reintroduction and supplementation efforts in the Umatilla River..." and ...“a study plan to describe a redirection of effort out and away from the hatchery and into the field...”, that would move the focus of hatchery evaluation from an internal focus on hatchery operations, to a focus on external effects on fish populations returning to the river.

On May 7, 2003 the ODFW submitted a draft report titled, *A Comprehensive Assessment of Salmonid Reintroduction and Enhancement Efforts in the Umatilla River Basin*, which was intended to address the Council's conditions related to producing a “progress report.” The submittal did not address the “evaluation process” (i.e. study plan) as the Council requested due to the array of philosophical, policy, and management issues that the request would raise in context to the original master plan associated with the projects in the Umatilla Basin.

On July 1, 2003 the ISRP completed its review of the submittal (Document ISRP 2003-10).² The ISRP found the draft progress report to be an impressive document and the sort of forthright technical analysis the ISRP envisioned. The progress report was a major step in the right direction for evaluation of the Umatilla hatchery initiative and pointed to a shift in emphasis on monitoring and evaluation from hatchery operations to the impacts on fish populations in the Umatilla subbasin. The ISRP also stated that the co-managers should continue the assessments started in the draft report and revise the study design to address uncertainties evident from the data contained within the progress report.

² Review of the Umatilla Fish Hatchery Monitoring and Evaluation Project (199000500) document, "Comprehensive Assessment of Salmonid Restoration and Enhancement Efforts in the Umatilla River Basin": www.nwcouncil.org/library/isrp/isrp2003-10.htm

On August 6, 2003, in response to the progress report and ISRP review, the Council found that ODFW's report partially addressed the conditional approval the project received during the provincial review but requested that the project sponsors submit a study design. The Council noted that although the ISRP was generally supportive in their review, the ISRP provided issues and comments. The Council requested that the sponsors address these issues in the study design, specifically the general and specific comments as provided in the ISRP review under the General Summary and Comments heading (pages 4 and 5, Document ISRP-2003-10). The Council further recommended that funding for the project would be maintained until the efficacy of the artificial production initiatives are defined in the subbasin planning effort.

Review Summary

We compliment the many contributors to the document. An excellent effort has been made with respect to the ISRP recommendation that the RM&E Plan shift from an internal evaluation of hatchery operations to include field sampling and surveys where the emphasis should be on fish and fisheries. The document is well organized, informative, and nearly comprehensive. In general, we support the Plan and judge that the Plan substantially satisfies the Council's conditions associated with funding the Umatilla Hatchery Monitoring and Evaluation Project (#199000500), with the exception of M&E of "Flow Augmentation" (see specific comments below) and prioritization of RM&E activities. Also, we judge that this Plan is adequate to satisfy RM&E needs for steelhead and Chinook salmon in the Umatilla Basin Natural Production Monitoring and Evaluation Project (#199000501), again with reservations concerning M&E for flow augmentation and prioritization of activities. The Umatilla RM&E Plan shares with the Umatilla Subbasin Plan, the problem that priorities for RM&E activities have not been set.

The Plan does a good job of outlining an RM&E program that will provide the information necessary to evaluate the hatchery program, the resulting natural spawning, supplementation, and some habitat improvement measures. It provides a logical, scientifically sound procedure for establishing a monitoring program in the Umatilla Subbasin and as such is fundable. The ISRP expressed a number of serious concerns about the proposal in its previous review. In general, most of the concerns have been addressed reasonably well. However, the ISRP makes several recommendations to improve the plan that should be addressed as the plan moves to implementation.

Specific Comments on the Umatilla RM&E Plan

Prioritization of tasks

The Plan identifies the current status of RM&E activities as ongoing or proposed, and provides suggestions for criteria that could be used in the prioritization process. The sponsors propose a process for prioritization of M&E activities and funding that will be undertaken by co-managers and funding agencies. This strategy does not permit an assessment as to whether the primary monitoring data to assess the program in the Umatilla will be first on their "to do" list. Primary monitoring data include gaining answers to the following questions:

- a) Is the hatchery program providing the predicted harvest number at an acceptable cost?
- b) Are habitat manipulations increasing habitat productivity for these fish?
- c) Is the ecosystem changing unacceptably since the fish program was initiated?

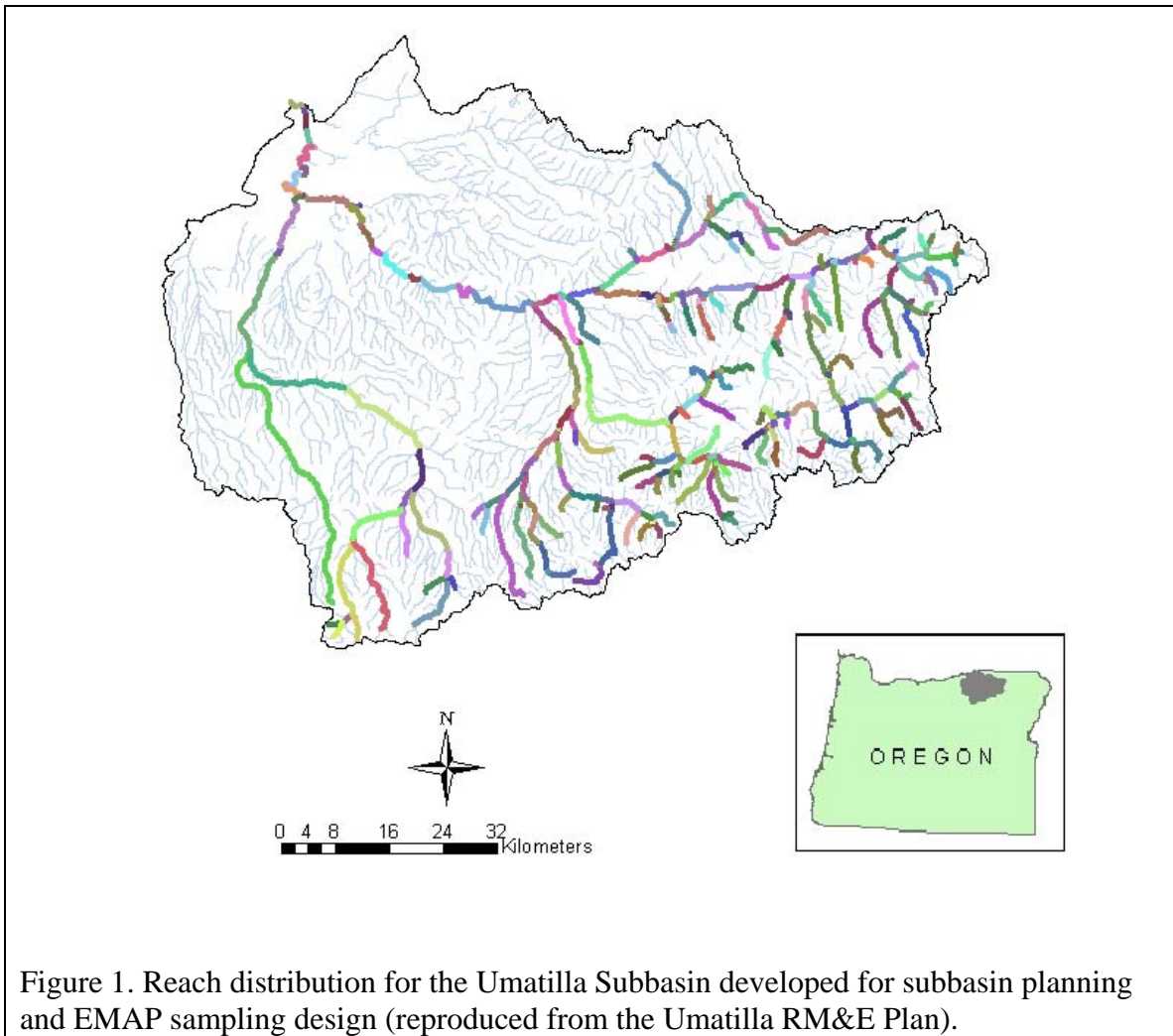
The sponsors need to be sure that monitoring provides reliable data to show that what they are doing is producing more fish and making efficient use of the hatchery and natural capacities available to them, while causing no irreversible harm to non-target organisms in the system. Their primary attention in the immediate future should be directed to meeting these needs. We recognize that prioritization of activities is at the same stage of development as in the overall Umatilla Subbasin Plan, but must reinforce the conclusion that these parts of the plans are incomplete and must continue to undergo review as they are implemented.

It is very likely that the number of objectives and measurement of indicator variables must be limited to a subset of those mentioned to create an economical plan that can be funded for, say, the next 50 years. The ISRP was impressed by the commitment of the RME plan to coordinate aquatic activities among subbasins and wish to encourage the effort.

Site selection for status and trend monitoring

Although the designs for selection of study sites are reasonably described in this draft, the ISRP has a number of technical concerns.

The ISRP has a problem with the sampling designs for long term status and trend monitoring of habitat and target salmonids in the Umatilla Subbasin. For example, it is stated that the "EMAP sampling design will be used to quantify the abundance of juvenile salmonids at the reach scale. The sampling universe for juvenile surveys will be the 331 reaches developed for subbasin planning and in-situ sampling designs (Figure 1). We will use these reaches and watershed delineations to allocate sampling evenly across the subbasin."



The problem the ISRP illustrates in this example, is that potential rearing habitat for juvenile salmonids will not remain fixed for the next 25 to 50 years. We expect that habitat subjected to management actions and other protected habitat will change. The universe of 331 reaches may be adequate to detect decreases in distribution of juvenile salmonids, but hopefully is not adequate for survey of abundance and distribution of juveniles in 2055. The universe of reaches can be expanded in the future and the EMAP method used to select additional sites, but we would be more comfortable with a formal recognition of the likely expansion of salmonids into other reaches. We recommend that the universe of reaches be expanded to include the entire subbasin and the EMAP procedure used to designate sample sites at this time, or at least the protocols be established for selection of additional sites at a later time. The ISRP does not have a problem with stating that there is missing data from the sites that the sponsors elect to not sample in the immediate future.

One technical recommendation is that the sponsors consider use of spatially balanced sampling sites selected by the EPA-EMAP generalized random tessellation stratified design (GRTS) in all of the “EMAP” sampling. This may be the case, but was not clear

in the Plan. Use of this design should meet the objectives with a state-of-the-art site selection procedure.

Sampling sites should be collocated between the various components of the plan when possible, i.e., collocated for habitat monitoring, water quality, fish counting, etc. There are limits to the amount of collocation of sampling activity that can be conducted without having undesirable effects on sites, but the collection of field data on different parameters associated with a given site eliminates much of the difficulty of modeling relationships between habitat and salmon abundance or presence or absence of salmon in a habitat.

The proposal implies that reach sampling sites will be distributed randomly (according to the EMAP procedures, we assume) where possible, but will conform to landowner requests and trespassing laws. The implicit conclusion is that all sites will be selected in “accessible” areas. Without more detail on expected difficulties in obtaining access, it is hard to know whether this is a realistic concern. Regardless, the sponsors should rethink their plans in dealing with inaccessible sample sites. In general, inaccessible sites introduce missing data into a sampling design and the statistical inferences are limited to accessible sites. We strongly recommend that the sponsors maintain their basic sampling design even if access is limited on some sites and the data are reported as “missing.” However, sample size could be increased in the “accessible” stratum to improve precision in that part of the subbasin. Estimation of the missing values using remotely sensed data or other information might be a reasonable, but the estimates are derived data, not a substitute for primary data collection.

Methods of Analysis

It is critical in a long term status and trend monitoring program to establish that sufficient data and information on methods are available to estimate the intended parameters by simple “design based” methods, e.g., descriptive methods based on finite sampling theory. We have nothing against proposing to also analyze data with the latest and best “model based” methods and accompanying assumptions, e.g. the geostatistical and time series methods proposed in some sections of the Plan. Additional analysis of the same data with different models (assumptions) cannot decrease our knowledge. However, these status and trend data should have a useful life of at least 50 years, and it is very unlikely that the same models and assumptions will be in vogue in 2055.

RM&E of Flow Augmentation

The issue was stated very well on page 82:

"Considerable effort and resources are put towards flow restoration in the Umatilla. Umatilla flow management programs are considered a Columbia Basin success story due to the cooperative efforts between CTUIR, BLM, and the various water-rights managers in the subbasin. However, some of the direct benefits to fish have not been quantified. ...the relationship between increased flow and increased spawning and rearing has not been directly studied. ...[with Phase III coming] Baseline effectiveness monitoring is needed to understand the added benefits to fish that these future flow programs would bring to the subbasin." We would add Phase I & II retrospectively, too.

Reviewing the document, which discusses flow augmentation as one of the external effects on fish, brings up the question, “To what extent has the flow augmentation measure contributed and will it continue to contribute to the welfare of reestablished chinook and supplemented steelhead populations?” There is a need to carry this discussion further in the RM&E Plan in order to be able to respond to this question. The RM&E Plan should be enlarged to include a significant section on RM&E of water flows as supplemented by the pumping from the Columbia River, so that proper separation can be made of BPA’s costs to benefit fish, as distinguished from costs to benefit irrigation. In particular, this will require detailed monitoring of volumes of water pumped, diverted, stored, and/or released, and the resulting effects on fish passage, rearing, and survival, along with effects on irrigation removals and interactions with fish. At present, the Plan considers this element from a perspective that is too broad to produce the necessary information.

Some background information may be appropriate here. It is the ISRP’s understanding that Phases I and II, the flow augmentation measures, were approved by Congress as a budget item submitted by the Bureau of Reclamation. Facilities were built by the BOR to pump water from the Columbia River to supplement flows in the Umatilla River, where available water has been over-allocated to holders of water rights for irrigation. While the congressional appropriation covered construction of the facilities necessary for pumping, the operational costs (recommended FY 2005 budget of \$1,000,000) are passed to BPA. Thus, the project has become a part of the Council’s Fish and Wildlife Program and is included by BPA as part of the total expenditures for fish and wildlife in the Columbia Basin. Therefore, the flow augmentation (Power Repay) aspects of fisheries management in the Umatilla Basin are significant elements calling for RM&E. The question is “To what extent have the predicted benefits to fish, that were used to justify the flow augmentation project been realized?”

The efficacy of flow augmentation should be tested as part of the RM&E Plan, as well as the efficacy of the hatchery program, supplementation, etc. To provide adequate monitoring and evaluation, the Umatilla RM&E Plan needs to include collection of information that can be used to evaluate the relative benefits of water added by pumping. Benefits ought to be assignable both to fish and to irrigation. The relative benefits to each are pertinent to determining what portion of the pumping costs ought to be charged to BPA, and what portion charged to BOR as part of their subsidy of irrigation.

As one approach to evaluation, the text of the plan in several places compares some fish counts in years before and after flow augmentation. This may be an appropriate comparison for effects that are large and obvious, but there is an interest expressed in the Plan in effects on habitat utilization by adults and juveniles, and this probably will require monitoring of water flows over shorter intervals of time and space. Furthermore, if Phase III is to be justified, some prediction of expected benefits to fish will require more rigorous evaluation.

Experience has shown us that habitat available to juveniles, especially, but to some extent adults as well, will vary widely as a result of variations in flow that take place over short

time periods, such as hourly, with load following in the mainstem Snake River, in the Hanford Reach, and below Bonneville Dam. Intuitively, it seems likely that irrigation removals may vary with time of day. This is especially true for owners of senior versus junior water rights. The result might also be a shift in locations of removals, and this could affect availability and suitability of fish habitat. On page 81 it is indicated that RM 27 is the uppermost location where effects of flow enhancement might be seen. Reviewers need to understand why that is true. Do irrigation removals downstream of that point negate the effects of water releases that presumably are designated for the benefit of fish? Again, this speaks to the need for the RM&E Plan to include monitoring and evaluation of the strictly water aspects of the pumping project.

On page 82 of the Plan, it is proposed that available habitat would be monitored “annually”, though the subsequent discussion indicates measurement would occur more frequently. It should be recognized that some time frames might be too coarse to detect changes that could occur over shorter time intervals. The same question arises on page 84 with respect to effects on smolt passage resulting from pumping operations. It would be desirable to take a close look at operating schedules for pumping, and for timing and shifts in location of diversions, to gain a better view of possible effects on fish. We realize the situation is quite complex, with water being pumped to and stored at a number of places for later release. But that is just the point. The complexity has to be revealed in order to be able to interpret the results.

In the context of Phase III, we recall that the Umatilla Subbasin Plan listed “Purchase of Water Rights” as a possible means of enhancing flows as an alternative or supplement to Phase III pumping from the Columbia River. Perhaps this deserves discussion in the RM&E Plan with respect to how monitoring and evaluation might be accomplished, should the measure be adopted.

Other Comments/Questions

A weakness in the M&E is the discrepancy between rack counts and upstream accounting of chinook salmon. The spawning population estimates remain in doubt until a reliable accounting is available

We find no evidence that any of the results obtained to date by the Umatilla team have been published and subjected to peer review. Do such publications exist?

Several of the proposed elements of the Plan are directed to assessing questions regarding stocking to supplement natural production, genetic effects of program actions, alterations of the food web, and species' interactions. These questions may be more appropriately addressed in the Council's Fish and Wildlife Program, and some are being addressed in that program at present.