Independent Scientific Review Panel
for the Northwest Power Planning Council
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MEMORANDUM February 28, 2003

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

FROM: Lyman McDonald, ISRP, Subcommittee Chair

SUBJECT: ISRP Review of BPA's Draft Request For Proposals for Research, Monitoring and Evaluation (ISRP 2003-4)

At the request of the Bonneville Power Administration and the Council, the Independent Scientific Review Panel reviewed Bonneville's proposed Draft Request For Proposals (RFPs) for Research, Monitoring and Evaluation, dated February 14, 2003. The draft solicitation intends to cover research gaps identified in Reasonable and Prudent Alternatives, Actions 182, 184, and 195, under the National Marine Fisheries Service's (NMFS) 2000 Biological Opinion on the Operation of the Federal Columbia River Power System.

The four proposed RFPs are:

1. Studies to Determine Reproductive Success of Hatchery Spawners
2. Development of an Analytical Approach/Method/Model to Determine the Effects of Hatchery Reforms and Conservation Hatcheries on Extinction Risk and Recovery
3. Reproductive Success of Natural-Origin, Hatchery-Origin, and Reconditioned Kelt Steelhead
4. Extra Mortality

This memo contains the ISRP's comments on each of the proposed RFPs and the solicitation document in general. Our review focuses on whether the solicitation document provides adequate justification for assigning high priority to these four research topics and adequate description to best ensure that the proposals submitted will be sufficient to address the gaps. In addition, given our experience in ISRP project and ISAB programmatic reviews, we considered whether 1) existing or completed studies (or models) already address the gaps or could address the gaps if expanded, or 2) there may be a better way to address the gap than that described in the solicitation document.

Before presenting our review, we reiterate some of the comments we made to you in our February 4, 2003 memo that summarized our interactions with the Action Agency Research Monitoring and Evaluation (RME) Group over the past year. Specifically relevant here was our request to formalize ISRP and RME interactions to ensure that adequate time is provided for ISRP review of RME group products and for the RME group to address ISRP concerns. For example, the ISRP has not formally reviewed the document *Research, Monitoring & Evaluation For the NMFS 2000 FCRPS Biological Opinion, DRAFT 2/03/03* (Draft RME Plan), the document on which the current RFPs are based.

The letters from Sarah McNary and Dan Daly and the RME schedule, with ISRP review incorporated, were a good start towards formalizing our interactions. However, the schedule is at the

tightest margins time-wise to allow for an adequate ISRP review and RME Group response; e.g., the ISRP was given just over a week for this review. It is the ISRP's understanding that the schedule to review the Action Effectiveness and other revised Mainstem and Systemwide proposals will likely be expanded to provide more time for ISRP and RME Group interaction and for Council consideration. The ISRP believes that the importance of the Action Effectiveness issue and the substantial commitment of resources for that effort warrant that the schedule be revisited to allow more time for all involved.

The ISRP raises several general concerns with the solicitation that argue for a formal and deliberate process. There are both equity and allocation problems with a process that asks for funding decisions on an expedited basis while other proposals in the mainstem-systemwide project selection process are still under consideration. The RME Framework document provides some description of how the gaps were identified in the context of the set of mainstem-systemwide proposals that were reviewed as "fundable" by the ISRP, but the solicitation document does not provide adequate information on the gap identification process or links with mainstem-systemwide proposals. There is the appearance of considerable commonality among authors of the RPAs, authors of the RME plan and RFP solicitation, and likely recipients of funding. This leaves the impression that conflicts of interest may arise. The "rush to meet the first check-in" motivation is not a compelling enough reason to dedicate scarce FWP research funds to hastily constructed and reviewed proposals. In addition, the diminished presence of State and Tribal participation and coordination is troubling. Although we are supportive of targeted solicitations in general, the Council and BPA should be cognizant of the threat that special allocations such as these could undermine the legitimacy of the review process and the program that the region has worked so diligently to develop.

Specific ISRP Comments on the Four RFPs Identified in the Solicitation Document

Requirements Specific to Action 182. Studies to Determine Reproductive Success of Hatchery Spawners

Given our experience in the ISRP project reviews over the past few years and ISAB programmatic reviews, we agree with the RME group that this is a gap, a key uncertainty. There are existing studies and proposed studies, some from the NMFS, that address the gaps for some of listed species in some of the ESUs. The ISRP notes that every supplementation program should be collecting data of the nature called for in this RFP.

The solicitation document is only partially sufficient to elicit proposals needed to address the gaps. The studies need to include populations with variable background of hatchery ancestry with "reference populations." That is, the RFP invites biased sampling in that only small listed populations might be studied. The "masking" effect of hatchery fish for the accounting function of calculating lambda may not be uniform from one population to another. The appropriate weighting for hatchery fish may vary, and this needs to be defined. Mean values may not be sufficient. The requirement of the RFP that the evaluation of reproductive output from hatchery-origin spawners is evaluated by production of progeny that produce progeny .....(F_2)..... is quite rigorous. That is, they are not simply identifying that hatchery-origin spawners produce fry or smolts, but that they produce adults that themselves spawn and produce progeny.

An element that could be added is to investigate the reproductive capability of individuals within a population that have different levels of hatchery ancestry. That is do F_1 progeny with h x w parents

differ from h x h progeny in the production of F_2 progeny. The capability to produce F_1 progeny is a measure of both hatchery environmental effects and hatchery genetic effects. The capability to produce F_2 is a measure of hatchery genetic effects.

The reproductive performance of natural-origin recruits that had hatchery-origin parents (which is what the RFP calls for) is also a necessary component of the data gap for RPA 184.

Requirements Specific to Action 184. Development of an Analytical Approach/Method/Model to Determine Effects of Hatchery Reforms and Conservation Hatcheries on Extinction Risk and Recovery

The ISRP believes that this RFP should be substantially rewritten and redirected. Given our experience in the ISRP project reviews over the past few years and ISAB programmatic reviews, we agree there is a need to determine whether or not artificial production programs (conventional or conservation) are contributing to the extinction risk of listed populations and evaluate the efficacy of conservation hatchery activities in contributing to recovery. However, the real need is for increased quantity and quality of data, not more models. Analytical methods and models of supplementation already exist that should be sufficient to assess the efficacy of conservation hatchery activities to contribute to recovery.

The RPA calls for research to assess the efficacy of conservation hatchery activities in contributing to recovery. The RFP for the RPA calls for analytical methods or models for synthesizing the results of hatchery activities in terms of their effects on extinction risk and/or recovery. There are a considerable number of hatchery programs – particularly supplementation, captive rearing, and to a more limited extent reintroduction programs – producing fish that are intended to contribute adults to the naturally spawning population.

In reviewing a number of those programs for the ISAB's supplementation report, it is apparent that the essential data and reference populations are unavailable. Analytical methods and models of supplementation exist and should be sufficient to assess the efficacy of conservation hatchery activities to contribute to recovery. What is needed is data from several projects for analysis by existing models and methods. An RFP whose product is aimed to identify the deficiencies in the data collections for BPA funded and other Columbia River Basin supplementation projects that are now underway, and identifying those that could be rectified through improved data collection protocols, construction of weirs or providing fish trapping facilities etc is likely to be more constructive at this time than additional models.

A primary challenge is to discern whether progeny produced by hatchery-origin salmon spawning naturally are adding to, or simply replacing, salmon because of habitat carrying capacity limits. This will require contrasts of abundance and productivity in reference populations and populations with hatchery-origin spawners.

The "statement of problem (overview)" for RPA 184 clearly articulated that determining the efficacy of "hatchery reforms" in reducing extinction risk and the efficacy of conservation hatchery programs in contributing to recovery are separate recovery issues. In fact, NOAA-Fisheries is unable to provide quantitative assessment of the effects of hatchery programs on listed ESUs. Evaluating the "effects of reforms" when we cannot evaluate the existing programs is not likely. In this regard, standardized field methods and data to assess the extinction risk imposed by hatchery programs would be a most useful contribution.

Requirements Specific to Action 184. Reproductive Success of Natural-Origin, Hatchery-Origin, and Reconditioned Kelt Steelhead

Given our experience in the ISRP project reviews over the past few years and ISAB programmatic reviews, we agree this is an important research need. Proposal 200001700, Kelt Reconditioning: A Research Project to Enhance Iteroparity in Columbia Basin Steelhead (*Oncorhynchus mykiss*), (also called 2000-17), which the ISRP reviewed as part of mainstem and systemwide project selection process, explores many issues related to kelt reconditioning and could potentially be expanded to meet the needs of this RFP.

For this review, the ISRP reread CRITFC's proposal 200001700, Kelt Reconditioning: A Research Project to Enhance Iteroparity in Columbia Basin Steelhead (*Oncorhynchus mykiss*), which the ISRP reviewed as part of mainstem and systemwide project selection process. We strongly recommended the proposal, except for one objective that involved lab work and genetic crosses. That objective was CRITFC's approach to trying to assess the reproductive effects (capacity and viability) of the kelt reconditioning project. The project is primarily concerned with testing the reconditioning of the kelts as it relates to their subsequent ability to transit the hydrosystem and home to natal streams.

The RME Group's RFP, *Reproductive Success of Natural-Origin, Hatchery-Origin, and Reconditioned Kelt Steelhead*, appears to be a logical next step from the CRITFC study, particularly given the ISRP's negative response to Objective 4 in the CRITFC proposal, which was the lab-based effort to assess reproductive success by reconditioned kelts. The RME Group's RFP focuses specifically on calling for a proposal that will determine the relative success of reconditioned steelhead kelts spawning in the wild compared to natural-origin adults, hatchery-origin adults, and cross matings of all three variants. The RFP encourages applicants to employ the use of microsatellite DNA analysis in order to ascertain the pedigree of resulting progeny and subsequent returning adult steelhead. This is a good tool for a diagnostic approach to the question. The RFP also notes the study should include analysis of the potential genetic consequences of repeat-spawning steelhead on small populations. Proposed studies should be directly applicable to one or more of the following listed ESUs: Upper Columbia, Mid-Columbia, and Snake River steelhead. Cost-effectiveness (e.g., the ability to take advantage of existing fish production, research, monitoring or evaluation activities) will be an important consideration in the proposal selection process.

The ISRP believes the RFP is warranted and calls for a state of the art examination of this new and potentially beneficial approach to increasing steelhead numbers and the incidence of iteroparity in upper basin stocks. Previous ISRP reviews during the provincial review process and recent ISRP/ISAB discussions on the topic raised concerns about the genetic consequences of increasing iteroparity, particularly in small populations. Topics that merit consideration by the RME group and respondents to the forthcoming RFP include: how increasing iteroparity might increase inbreeding in the target population, particularly if it is small, how reconditioning kelts might increase domestication selection in the target population, and how the reconditioning program might alter age structure and life history structure in the target population.

Requirements Specific to Action 195. Extra Mortality

The ISRP judges that this RFP is premature. "Extra Mortality" has been hypothesized, but never proven to exist. The NMFS Proposal No. 35047, submitted in response to the Mainstem-Systemwide Solicitation, pointed this out and developed a proposal to test for the existence of "extra mortality." The ISRP recommended funding of that project. A logical research plan and schedule would be to fund and conduct the research called for in No. 35047, before undertaking additional research.

We suggest one new task that we would recommend for funding in the present solicitation. The ISRP believes that successful detection of large numbers of PIT tagged juvenile salmonids migrating inriver and passing via the corner collector at Bonneville No. 2 Dam may provide significantly improved data to help resolve questions associated with "extra mortality", D, delayed differential mortality, etc. We strongly supported the NMFS proposal in the mainstem-systemwide solicitation for development of a high flow PIT tag reader for the corner collector. We believe this is a high priority project and if successful, will lay to rest some of the concerns that have plagued the region concerning D, "extra mortality", delayed mortality, and other issues. Improved data for study of potential causes of the mortalities would be provided. We suggest that an RFP could include an economical task to develop a protocol for design and conduct of studies to estimate and determine causes of hypothesized "extra mortality" in the event that a high flow PIT tag reader is successfully developed and installed in the corner collector at Bonneville No. 2 Dam.

The Draft RME Plan is persuasive that the data gaps related to "extra mortality" are of high priority, if "extra mortality" is real and of an important magnitude. However the current RFP is inadequate in that case. In particular, the RFP and the text of the Action Agency Draft RME Plan are not consistent about what is wanted.

We offer the following comments on the current draft RFP. Section 1.1 requests proposals to "design and implement a research program to resolve the cause(s) of [hypothesized] "Extra Mortality."" This statement implies that the research should identify processes in the hydrosystem above Bonneville Dam that lead to delayed mortalities after smolts pass Bonneville Dam. The draft RFP suggests that the successful research program would eventually determine the relative importance of different causes of the hypothesized extra mortality for each ESU. Further, Section 2.5 of the draft RFP provides more background and detail on the hypothesized existence and cause(s) of extra mortality, suggesting that this is the focus, but does not actually state what is wanted in the RFP. In contrast to the draft RFP, the Draft RME Plan (2-3-03 version) says (page 89) that RPA 195 "directs investigators to determine the geographic zones where post-Bonneville mortality is expressed." This statement implies that the area of interest for this RPA is below Bonneville Dam and the task is to determine where (and presumably how) the smolts actually die. Furthermore, the draft RME Plan states that it is RPA 189 (not 195) that "focuses on establishing cause and effect of particular passage routes on existence and magnitude of extra mortality." This ambiguity between the draft RFP and the background draft RME Plan should be rectified and the true intent of the RFP clarified.

Assuming that the draft RFP is correct in desiring information on the upriver cause(s) of the hypothesized extra mortality, then the draft RFP is not very helpful in suggesting the level of cause(s) that is of interest. Section 2.5 lists four possible causes from PATH documents, one of which is simply the "Lower Snake River dams (hydro hypothesis)." This listing suggests that merely attributing the extra mortality to the dams is sufficient for hydrosystem management. Dam removal

is the only option, presumably. However, it would seem to be a more useful investment of BPA funds to seek the mechanisms arising from dam and reservoir passage that could cause extra mortality. These mechanisms might be alleviated by management actions short of dam removal that are directed at the specific mechanisms. For example, there are several forms of sub-lethal physiological and morphological damage that could be sustained by smolts in passing through dams and reservoirs that could be expressed only days or weeks (perhaps months) after exposure. One example is morphological damage, which might be long-lasting and reduce predator detection or avoidance capabilities of the smolts below Bonneville Dam. Another might be long-lasting physiological change due to accumulated stresses or more rapid energy use in migration, which might also affect vulnerability of smolts in the estuary or ocean to predation. The RFP would be better if it solicited ideas and research designs that could identify such mechanistic detail and point to specific remedial actions (at dams or elsewhere) that could be tested (e.g., minimize turbine blade strikes or pressure changes in bypass piping).

The definitions of delayed mortality, extra mortality, "D", and perhaps related terminology, are confusing. This is especially true when a potential applicant seeks guidance from PATH and other documents. It might be helpful if the RFP were to either clarify the different definitions and their sources (which actually might be more confusing). A better approach might be to state the problem in its general form, explicitly stating that the PATH and other definitions are just special-case definitions (often for purposes of accounting in models) of a hypothesized delayed mortality in the hydrosystem that the RFP seeks research to clarify. In other words, let's not get hung up on old definitions; let's figure out if extra (delayed) mortality is real, and if it is, what causes it.

The gap analysis in the draft RME Plan is important background for the RFP, and some of it might be included in the RFP. For instance, the gap assessment gives the impression that it is the combination of RPAs 188, 198, and 195 that, in their aggregate, result in the need for information (the general case, noted in comments above). Then the draft Plan finds the existing projects and the NMFS proposal wanting compared to the expectations of the RPAs. Rather that the despair that the draft Plan expresses for ever attaining the expectations of the RPAs, the RFP boldly asks for the best research ideas. Assuming that "extra mortality" exists, the ISRP agrees with the positive logic of the RPA, but the reasoning of the draft Plan might be laid out to encourage and focus new ideas (including, perhaps, a revised proposal from NMFS).

ATTACHMENT

Relationship between the CBFWA Collaborative RME Process and the Federal RME Process

The CBFWA Collaborative Proposal does not describe the relationship between the Federal RME Process and the CBFWA Collaborative Process because the Federal RME Process was not yet determined at the time the CBFWA proposal was written. This is intended to describe the relationship between these two processes.

The CBFWA Collaborative Proposal establishes work teams for each work product and contemplates participation by the federal action agencies on these work teams. The Federal RME Plan relies upon six workgroups that have been formed to address the principle RME components and sub-components of the RME Proposal and contemplates participation by the fish and wildlife managers on these workgroups.

Many of the objectives of the federal RME plan Framework are also components of the CBFWA Collaborative Proposal, though the CBFWA Proposal has a broader scope, in geographic, thematic and ecological dimensions. This broader scope is one of the key reasons why the ISRP recommended that many other projects[1] be integrated into the CBFWA Collaborative Proposal. The broader scope and staff resources of the CBFWA Proposal also offers an opportunity for NMFS and the Action Agencies to better meet their M&E obligations under RPA180 of the NMFS 2000 FCRPS Biological Opinion, and to concurrently meet other obligations (e.g. USFWS Biological Opinion, NWPCC Fish and Wildlife Program).

BPA was concerned about the potential for duplication of effort. There is a very real potential for two concurrent M&E programs to duplicate their efforts unless they are closely coordinated. We therefore recommend that a Joint RME Planning Group be created to direct both programs and ensure that there is no duplication of effort. This Joint Planning Group would essentially meld the responsibilities of the Core Group outlined in CBFWA's original project proposal with responsibilities of the Federal RME Technical / Policy Oversight Group. They would ensure that quarterly work plans are developed and implemented, in a cost-effective, integrated manner. We further recommend that membership in Federal RME workgroups include CBFWA members, and that membership in CBFWA workgroups include NMFS / Action Agency members. Since these workgroups will have distinct, complementary tasks, there will be no duplication of effort. However, since these tasks ultimately need to be integrated together to address key questions (see CSMEP Draft Work Plan, Dec, 5, 2003), there must also be frequent

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[1] These projects include StreamNet (#198810804), Smolt Monitoring (#198712700), PTAGIS (#199008000), Fish Passage Center (#199403300), Comparative Survival Study (#199602000), NMFS' Pilot Status and Trend Monitoring Program in the Wenatchee and Grande Ronde (#35019), and parts of other NMFS proposals (#35016, #35020, #35048). See ISRP 2002-14 Final Review of FY2003 Mainstem and Systemwide Proposals. November 5, 2002.

interaction and exchange. The joint planning and overlapping membership will ensure that this integration permeates each work product.

To assure adequate participation in the Federal RME Process CBFWA will designate a representative and alternate for each of the Federal RME workgroups. Any member will be free to participate on any workgroup in addition to the designated representatives. The CBFWA designated representative will be responsible for introducing draft work products from the CBFWA work teams to the appropriate federal workgroup for review. The CBFWA designated representative will also be responsible for keeping the full CBFWA membership fully informed of federal workgroup activities. We recommend that the Federal RME Process adopt an analogous procedure.