Response to ISRP Comments of 8/2/2002 addressing project 35020:
(Response authored by Stephen L. Katz – Principal Investigator of the proposal 35020.)

The ISRP had the following comments on this proposal:

> The proposal is too brief to allow complete scientific review. For example, the basic ideas are presented elsewhere, but there are no methods in the section f. "Proposal objectives, tasks and methods." Methods should be included for each task, especially with respect to the proposed Task 4: Implement 2-3 pilot studies of effectiveness monitoring. The proposal should be better coordinated with other M&E proposals from the same agency. The proposal does not provide sufficient information to indicate that it can accomplish its objectives. The proposal must have a monitoring and evaluation section. It is not appropriate for one of the most quantitative proposals to monitor project effectiveness to not have a quantitative monitoring and evaluation plan for its own effectiveness.
>
> If funded, Proposal #34008 in the Innovative Solicitation "Use a Multi-Watershed Approach to Increase the Rate of Learning from Columbia Basin Watershed Restoration Projects" would seem to overlap the objectives of this proposal. This is an awkward situation because funding decisions on proposals submitted under the Innovative Solicitation may not be complete.
>
> This proposal may be premature and appears to duplicate some efforts in ongoing projects in other provinces. The proposal should more clearly explain its relationship to the ongoing projects and the overall RME planning activities in proposal #35033 of which the PI's agency is a cooperating member. This project proposal should also linked to others being submitted: e.g., 35016 (A Pilot Study to Test Links Between Land Use / Land Cover Tier 1 Monitoring Data and Tier 2 and 3 Monitoring, Feist); 35019 (Develop and Implement a Pilot Status and Trend Monitoring Program for Salmonids and their Habitat in the Wenatchee and Grande Ronde River Basins); 35048 (NWFWC Salmon Data Management, Analysis and Access for Research, Monitoring and Evaluation Programs). The relationship to these proposals should be more clearly specified, e.g., are any of these projects necessary for the success of this proposal? A primary contribution of this proposal would be to implement 2-3 pilot studies of effectiveness monitoring projects. This seems to overlap the objectives of proposal 35019 from the same agency. The proposals should be coordinated to avoid duplication of effort.

Quite so. The ISRP has commented that this proposal is inadequate with respect to details. This is a reasonable criticism. Indeed, when the author reviewed this proposal for the AER workgroup of the joint NMFS-AA M&E review he made the same comment in recommending rejection of this proposal. Before responding to this critique with a list of details, there is some contextual material that explains the need for the broad scope of the project and why some preliminary, programmatic work will have to occur before a complete Monitoring and Evaluation (M&E) plan can be presented in full detail. In that way the objectives in task 4 are opportunistic and dependant on the success of tasks 1 through 3.

NMFS and the Action Agencies have formed a large framework consisting of workgroups to design, organize/coordinate and implement a Monitoring and Evaluation plan that will satisfy the diverse expectations of the 2000 FCRPS Biological Opinion for the entire Anadromous Zone. The workgroup focusing on Action Effectiveness Research

(Tier 3 monitoring in the context of RPA 183) has worked hard for a year and among other activities has developed a set of guidelines for Action Effectiveness Research -- **Guidelines for Action Effectiveness Research Proposals for FCRPS Offsite Mitigation Habitat Measures**. This set of guidelines, previously reviewed by the ISRP, describes how features of a monitoring program should look for the entire region, with the expectation that interested parties should be able to take that set of guidelines and set up monitoring that will satisfy the various requirements of RPA 183. However, no single part of that set of guidelines, let alone the entire package has undergone any testing or "proof of product". In particular, no one has tested the idea that we can capitalize on existing projects and organize an M&E plan that includes programmatic and technical coordination that will meet the needs of RPA 183, in part or entire. This author very much designed this proposal to be a test of those guidelines on a tractable scale by posing three pilot projects that existed within a coordinating, programmatic framework. Therefore, the description of a coordinating framework and the development and refinement of statistical tools in Tasks 1-3 of the proposal do appear to overlap some of the responsibilities of the AER workgroup. That this need was recognized widely as a priority is evident in the parallels with other proposals such as #34008 in the Innovative Solicitation. Therefore, tasks 1-3 of this proposal were designed to test those ideas within a small set of pilot projects that the AER workgroup could capitalize on as a model as well as a continuing component of the finished product for the entire region.

Although in development, there is currently no RPA 183 implementation plan. Therefore, it is difficult to presage what methods will be available in the near future to facilitate, or indeed replace tasks 1-3 in this proposal. However, some coordinated meetings and workshops will be required to draw together the various parties in the context of each of the three project categories described in task 4 around the following list of sub-tasks:

- Identify the degree to which monitoring is currently being successfully implemented. This includes identifying the gaps in current work in terms of occurance/non-occurance as well as quality. Incomplete or inadequate monitoring programs need to be identified as gaps so that they may be improved or replaced as necessary to achieve a consistently adequate monitoring program.
- Coordinate Action Item 183 monitoring explicitly with implementation plans – project identification and (re)design must happen in the context, and with the participation of, monitoring.
- Identify performance standards for monitoring of mitigation actions.
- Negotiate data ownership issues.
- Identify the methods and protocols for handling, storing, and disseminating the data generated by the monitoring program so that appropriate evaluation can progress.
- Identify strategies for design of evaluation or decision-making and planning tools. The effectiveness monitoring program will generate information in the form of data. That data must be collected, organized and analyzed to inform both recovery planners and to evaluate the progress of the action agencies in meeting their FCRPS BO obligations as defined in the evaluation criteria for the 3,5 and 8 year check ins.

Workshops are anticipated to organize current available data, develop protocols for upcoming field work, review successful field work, and perhaps most important facilitate the cooperation of independent, disparate project sponsors that must work together to produce an acceptable RPA183 project. Much of the budget for this project is allocated for intra-regional travel, support and communications for these workshops. This is a task and associated methodology that are not available in current AER workgroup products.

With respect to task 4, the implementation of pilot projects, the methodological details addressed below are preliminary targets – the way we would like things to be. How things are ultimately implemented will proceed as an opportunistic and flexible process that negotiates preliminary design targets with available monitoring opportunities. The approach to developing the method follows the outline presented in figure 2 of the **Guidelines for Action Effectiveness Research Proposals for FCRPS Offsite Mitigation Habitat Measures**.

Overarching Question: In each case the fundamental hypothesis is:

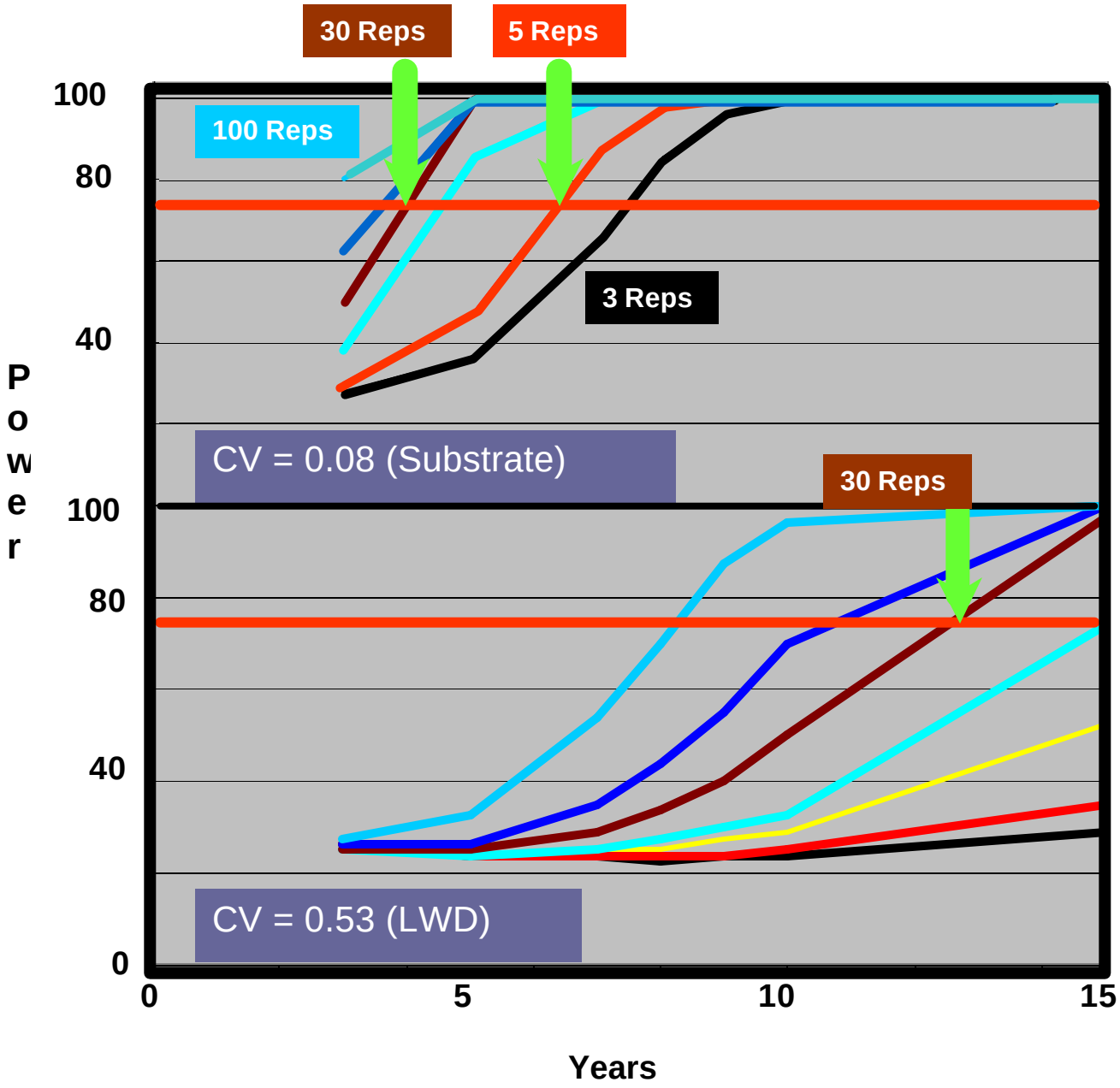
> H_1: the relevant management action (*grazing control, barrier removal, irrigation diversion screen*) **will** affect positive changes in the habitat within the area of impact of the aggregate management project, with the consequence being correlated; observable increases in fish survivorship or abundance as appropriate (see below).

Therefore, the alternative, null hypothesis is:

> H_0: the relevant management action **will not** affect positive changes in the habitat with correlated, observable increases in fish survivorship or abundance as appropriate.

In both cases the stated hypothesis is trivial. To be adequate they need to more specifically address the spatial and temporal scale of the project as well as the current understanding of the mechanistic connection between the management action and the correlated variables. Unfortunately, these specific details will only be available once the negotiations described in task 3 of the proposal have matured. For now there are some things we can address, but the ultimate detail in the hypotheses remains to be clarified as an objective of the outlined work.

The expectation for precision required from the monitoring program is based on a power analysis performed within the following design: *what change in signal over time (difference between regressions of indicator values over time in the treatment vs. control populations) should the monitoring program be able to detect?* This does not place the expectation that the variable "will" change by some amount as a consequence of the management action. Rather it is a way of characterizing the monitoring program performance independent of the management action's performance. Therefore, the effect size of the management action is not specified a priori. What this strategy does mean, however, is that we acknowledge up front that the management action may have a small effect, smaller than we can detect with our monitoring program, and we will fail to detect it.



Power to detect 5%/year change (63% change after 10 yrs)
$\alpha = 0.25$

Figure 1. Results of Power Analysis of habitat indicators to produce preliminary targets for replicate numbers in pilot projects.

Our preliminary target for power to detect 5%/year change or trend (63% change after 10 yrs) in the indicators with an intra-annual CV (Variance/Mean) of .35 with an a = 0.25 and a confidence of (1-ß) of 0.75. A CV of .35 was selected as an intermediate or "average" behavior for habitat indicators (Kauffman et al., 1999). The combination of

5% /year change and confidence of 0.75 result in the potential to eliminate the null hypothesis after 7 years with 30 replicates. Figure 1 is a graphical description of the consequences of these design choices for a variety of replicate numbers. These two example indicators (Large Woody Debris = LWD, and Substrate type) were chosen to express the range of possible indicator behavior around this average of 0.35. We are anticipating an iterative process of review to evaluate the performance of the monitoring program and if these design choices require modification we can implement them as necessary.

30 pairs of treatment and control reaches is an ambitious amount. It was this demand that determined the first three project categories and locations within all the potential combinations expressed in table 1 of the original proposal. Funded proposals were surveyed to determine where this intensity of monitoring was likely to be possible. As an example, a review of grazing control projects in the Blue Mountain Province produced the following information:

Proposal #	Funded (Y/N)	Basin	Miles Fenced	Description	Monitoring?
27001	Y	Asotin	**26 Miles**	Riparian fencing and alternative water developments (BMP's) to reduce direct animal pressure on streams identified with ESA species.	N, Verify CRP / CREP buffers are installed and functioning according to plan
198402500	Y	Grande Ronde	**5.1 Miles**	As part of this year's funding will inspect and maintain 106 miles of riparian fence, which currently protects 62.2 miles of stream and 1,911 acres of riparian habitat.	Stream Temp., photos, biological surveys (salmon), habitat monitoring transects, Rosgen Levels I-IV; streambank stability, undercut banks and overhanging vegetation; inventories of large wood and pools

Table 1. Review of available information on intensity of grazing control projects in the Blue Mountain Province suggesting opportunities for effectiveness monitoring.

It remains to be negotiated with project sponsors if, how and where the projects might be modified to match the remaining monitoring needs. That remains an important part of task 3 of the proposal. However, these projects by themselves present the opportunity to examine 30 miles of treatment areas and this was a principal component in the choice of project categories and locations.

Experimental Design: for all pilot projects the experimental design will be BACI or staircase as the opportunity presents itself based on available treatment and control streams. Choices will be based on some combination of optimal study design, in the

sense of Green (1979), where the choice of study design is based on the answers to the following questions:

1) Has the impact already occurred?
2) Is the "where and when" known *a priori*?
3) Is there a Control area?

The answers to these questions will canalize the choices for experimental design. Currently, there are three common experimental models in use including BACI (or modified BACI), Staircase and some post-treatment observational study. While all have consequences that may make us want *a priori* to choose one above others (e.g. Roni et al., 2002; Keely and Walters, 1994), the final choice is dependant on the opportunities that present themselves in the course of tasks 1-3 of the proposal.

Sampling: within task 4, the choice of project categories and correlated locations (Grazing control in the Snake and Blue Mountain provinces; barrier removal in the Columbia Plateau and Gorge provinces; and irrigation diversion screen placement in the Columbia Plateau province) was based on a preliminary survey of where those activities were being undertaken in CBFWA-funded projects with such an intensity that effectiveness monitoring might be successful and meaningful (see above). It remains to be determined what the distribution of projects is within these provinces. Sampling design, including location choices for treatments and controls, potential for phased in treatment reaches, and sampling frequency, will continue to mature as tasks 1-3 produce the relevant information. Although developed within a status monitoring context, recent work by the EPA and ODFW (Larsen, et al., 2001) provides a strategy for integrating an effective sampling design with a maturing understanding of the behavior of environmental data. This approach will be adopted as a template for sampling design in this proposal where possible based on the independence of protocol parameters such as statistical independence of selected sites.

Indicators: Indicators were actually specified in the guidance document and are listed in table 2. Indicators fall into several large categories, but all are designated in an effort to get a balanced cross-section of all potential indicators that give an effective description of the result of actions. There are two classes of indicators:

- *Direct Indicators* - which are reasonable to measure, tractable, show direct response
- *Stratification Indicators* - which allow evaluation to characterize when and when not to implement actions.

Some of the variables in table 1 are direct indicators (I) principally because they are expected to change as a direct result of the action and so need to be monitored to gauge the progress of the individual action. But there are other regional needs that require monitoring of additional indicators. These additional indicators are classification, or stratification variables (C), because although they are unlikely to change as a consequence of the specific action, they provide information that may allow stratification

		Blockage removal	Diversion Screens	Grazing Control
Geo-morph.	Bailey Ecoregion	C	C	C
	Omernic Ecoregion	C	C	C
	Physiographic Province	C	C	C
	Basin Area	C	C	C
	Basin Relief	C	C	C
	Drainage density	C	C	C
	Valley Bottom Type	C	C	C
	Valley Bottom Width	C	C	C
	Valley Bottom Gradient	C	C	C
	Valley Containment	C	C	C
	Elevation	C	C	C
	Rosgen Channel Type	C	C	C
	Bed-Form Type	C	C	C
	Channel Gradient	C	C	C
	Riparian Cover Group	C	C	C
	Riparian Community Type	C	C	C
	Stream Order	C	C	C
	Linkage of Order/Adjacent Order	C	C	C
Access spp. Indicators	Culvert gradient	I	O	O
	Culvert roughness	I	O	O
Temp.	MDMT	I	O	O
	MWMT	I	C	I
Water Quality	Metals and pollutants	O	O	O
	PH	O	O	O
	DO	C	C	C
	Nitrogen	C	C	I
	Phosphorus	O	O	I
	Conductivity	O	O	I
Water/ sediment	Turbidity	C	C	I
	Depth fines	I	C	I
Sediment	Dominant substrate	C	C	C
	Embeddedness	O	O	O
Bariers	Road crossings	C	C	C
	Number of Obstructions and Dams	I	I	C
	Fishways	I	O	O
Channel Structure	LWD	I	C	I
	Pool frequency	I	C	I
	Pool quality	I	C	C
	Off-channel habitat	I	I	I
	Width/depth	O	O	O
	Stream Wet Width	C	C	C
	Bank Full Width	C	C	C
	Bank stability	O	O	I
Flow	Change in peak Q	I	I	O
	Change in base Q	I	I	O
	Change in Q timing	I	I	O
Riparian Character	Road density	O	O	O
	Riparian-road index	C	C	C
	Number of Bears	O	O	O
	Equivalent clearcut	O	O	O
	Percent veg. altered	O	I	I
	Vegitative cover	O	I	I
	Vegitative structure	O	I	I
Biologicals	Periphyton	O	O	O
	Invertebrate Assemblage	O	O	O
	Vertebrate Assemblage (fish&amphib)	I	I	O
	Juvenile Salmonid Abundance	I	I	I
	Juvenile Salmonid Survivorship	I	I	I
	Adult Salmonid Abundance	I	I	I
	Adult Salmonid Survivorship	I	I	I

Table 2. List of indicators sampled at each treatment and control reach associated with each action category.

post hoc. It is possible that certain recovery actions will work under some circumstances but not under others. These classification variables may allow potential differences to be evaluated in order to find what characteristics of the environment were associated with success or failure. This strategy has clear utility in providing necessary information for future strategic planning of recovery actions.

In the case of those indicators that are neither classification variables nor indicator variables for a specific class of action, the variables are listed as optional (O). Collecting this type of data is not required, but may be collected if the proposal sponsor is prepared and willing to do so. The benefit of collecting these data is that they can contribute to the status (Tier II) monitoring needs of a larger RME program (proposal 35019), and efficiencies in monitoring protocols can be increased. The responsibility for taking that extra step is left up to those sponsors of individual projects.

Field protocols for the collection of the physical and environmental indicators will use the techniques described in Kauffman et al. (1999) Peck et al. (2001) and Hillman and Giorgi (2002). These documents describe field methodologies for defining study site characteristics as well as study site location. Measurement of invertebrate community will adopt protocols described in Hafele and Mulvey (1998). Standard snorkeling and trapping protocols will be used for monitoring adult and juvenile fish (ODFW, 1998 & 2000). Experience indicates that the exclusive use of single methods in any field protocol is commonly questioned on the basis of data quality/data control. Within this program, it will be a continuing task to perform data quality checks by use of multiple techniques (e.g. snorkel surveys, seining and electro-fishing) within a subset of sampled locations. In addition, subsets of samples will be chosen within each project for repeated visits with in a single sampling visit in order to evaluate the consequences for data reliability resulting from inter- and intra-investigator/fieldcrew components of variance.

Figure 2 provides a conceptual framework that justifies this ambitious list of indicators. The evaluation of the effectiveness monitoring program will include the extension of local inferences about project success toward two large-scale questions: inferences about the progress toward regional recovery goals and inferences about the usefulness of classes of projects. Rigid replication of experimental and sampling design will be done to allow regional inferences to be drawn regarding the progress of collections of actions toward population-level goals. At the same time, stratification indicators will be collected to facilitate inferences about classes of projects to be drawn.

One of the significant components of tasks 3 in this proposal is to work with project sponsors to integrate these indicators into their monitoring plans. In many cases, sponsors are collecting some sub-set of these indicators and we are basically asking them to collect additional information. This has the potential to increase their costs. A portion of our budget is allocated to offset those additional expenses where it is reasonable to do so.

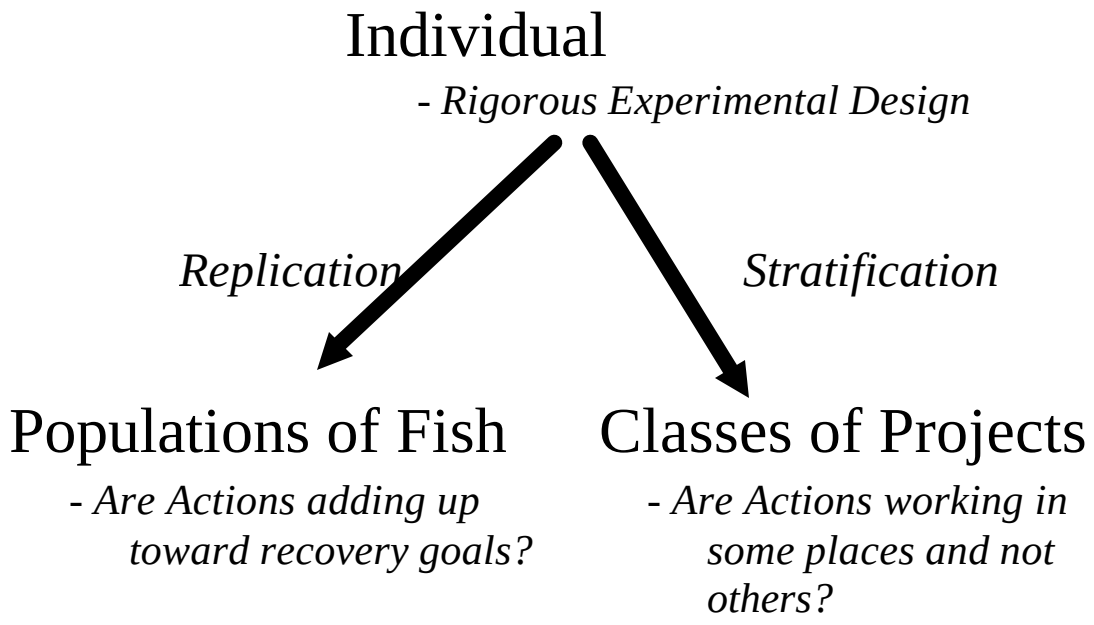


Figure 2. Relationship between individual project design and regional agendae.

Relationship to other programs: The ISRP noted that this project bears a clear similarity to, and potential overlap with several other proposals currently under review. In particular, they singled out proposal numbers:

- 35016 (A Pilot Study to Test Links Between Land Use / Land Cover Tier 1 Monitoring Data and Tier 2 and 3 Monitoring,);
- 35019 (Develop and Implement a Pilot Status and Trend Monitoring Program for Salmonids and their Habitat in the Wenatchee and Grande Ronde River Basins);
- 35048 (NWFWC Salmon Data Management, Analysis and Access for Research, Monitoring and Evaluation Programs).

The author contends that these proposals are actually quite distinct on the basis of the proposed scientific objectives. I will address the relationships between 35016, 35019 and 35020 first, and address the distinctiveness of 25048 and 35033 separately.

Proposals 35016, 35019 & 35020: There are actually clear distinctions between these three proposals and this one (35020). The distinctions made here are the ones we have arrived at in planning the Science Center's monitoring plans. We made these distinctions primarily based on the biological questions being asked in the monitoring activity rather than technical or administrative considerations. These differences are summarized in table 3. It also turns out that this distinction can be made between the sorts of demands that the monitoring activities place on those tasked with developing quantitative monitoring tools. The result is three approaches to monitoring collinear with the three "Tiers" of monitoring described in the federal caucus paper. The three proposals 35016, 35019 and 35020 are designed around Tier I, Tier II and Tier III monitoring respectively.

Each Tier has a discrete scientific agenda, described in detail below, and the proposals are similarly discrete.

Additional information about the Tiers, and therefore relevant to these proposals, was included in the description of recovery goals as laid out in the Viable Salmon Population paper (VSP) – and having been laid out, the recovery goals give indications on what needs to get monitored. Specifically, the VSP paper suggests that recovery goals will have four components: *population abundance, trend in abundance, spatial diversity and genetic diversity.* Taken together, these variables constitute what we have been calling "Population Status" (Tier II). The VSP sets some boundaries on what a monitoring plan will contain – i.e. are we in the position to generate a monitoring strategy that quantifies abundance, productivity and spatial structure of the populations – what we are referring to as **Status Monitoring** (⇒35019). Clearly, the population scale is large enough to prohibit censusing the fish. Therefore, status monitoring is expected to place large demands in the area of probabilistic sampling design. Indeed, returning to the description of Tier 2 monitoring in the Federal Caucus paper (NMFS, 2000) we find:

> *"The monitoring at Tier 2 sites is designed to give a more detailed picture of population status, … Tier 2 data will form the backbone of population status monitoring, as well as environmental status monitoring."*

So at this point Status Monitoring is fairly contained within the distinction "Tier 2 Monitoring". It is precisely this activity, and the programmatic mechanisms related to implementation of status monitoring, that proposal 35019 was designed to test.

We also feel that a monitoring plan must contain tools for monitoring individual recovery actions – what we are calling **Effectiveness Monitoring** (⇒35020). The principal reason for distinguishing status from effectiveness monitoring into the overall monitoring framework is that while recovery goals are set on the population status scale, stakeholders will be implementing recovery actions on a very local scale that affects the fish over a small geographic area for a relatively small period of time in the life of the fish. Those stakeholders will need to be credited with having done something to affect recovery and so the consequences of those actions must therefore be monitored within that specific spatial framework. Right now we are operating on the basis of parsimony – it is parsimonious that if we improve the quality of the habitat, we will be improving things for the fish populations. However, little if any rigorous scientific tests exist to validate that parsimony.

Making a cause-and-effect connection between local actions and overall population status will be technically challenging. However, the best strategy we have for discovering those cause-and-effect connections, or showing definitively that they can't be made, is careful monitoring of individual recovery actions within a rigorous experimental design framework. Proposals 35016 and 35019 are not based on an explicit experimental design framework. In addition, in many cases we must rely on correlated variables to give indications of local population health, but currently those associations are weakly made in the absence of hard data collected within a high-quality experimental design. For all of these reasons we anticipate that effectiveness monitoring undertaken in proposal 35020

will make fewer demands on quantitative resources in the area of sampling design (because of the limited spatial scale and non-randomness of treatment locations), and more demands in the area of experimental design. The opposite is the case in work undertaken in proposal 35019. Reviewers of proposal 35020 and 35019 will recognize this difference manifest in the characterization of monitoring performance in terms of confidence intervals for status monitoring and hypothesis testing for effectiveness monitoring.

Revisiting the Federal Caucus paper again it is clear that this characterization of effectiveness monitoring is still congruent with the distinctiveness of proposal 35020. For example:

> *"Tier 3 monitoring is the most detailed of the monitoring levels. The specific goals on this tier are: a) establishing mechanistic links between management actions and fish population response; and b) determining the relative fitness of hatchery fish. The information gathered at this level will address some of the most fundamental questions necessary for effective management of anadromous salmonids. … Second, by establishing causal and quantitative links between management actions and population responses, monitoring at this tier will contribute to our predictive ability, and therefore to a better understanding of which actions are necessary and sufficient for population recovery."*
>
> And
>
> *"Sampling at the Tier 3 sites used for effectiveness monitoring will be specific to the management action being studied. However, each study must assess age-specific survival appropriate to the management action. … Such individually-based studies are important for identifying the effects of environmental conditions that are realized at later life stages."*

So effectiveness monitoring, as anticipated in proposal 35020 is fairly well contained within Tier 3 monitoring and discriminated from the other proposals.

Going back now to the more general monitoring described in Tier 1 monitoring, addressed in proposal 35016, we found these activities operate in a different quantitative design framework. Tier 1 monitoring is the coarse-grained, qualitative assessment of where the fish are. It is also hoped that as recovery proceeds and fish re-colonize currently under-used parts of the state, Tier 1 monitoring will have to be updated. Since the timetable will be set by the progress of recovery, the frequency of Tier 1 monitoring is thought to be low (a design distinction between proposal 35016 and the others). There was a perceived distinction between the quantitative need to determine how many fish there are and how fast that number is getting bigger or smaller (i.e. 35019), from the qualitative question where in the state are the fish located which would then need application of a given sampling design (i.e. proposal 35016). Therefore, it is perceived

that this sort of monitoring will place relatively fewer demands on the skills of the quantitative resources.

Once again looking at the Federal Caucus paper we find:

> *"Tier 1 sampling is the broadest of the sampling levels, comprising the greatest number of sites, sampled at the lowest frequency…. Specific goals associated with this tier are: a) defining areas currently utilized by adults and juveniles; b) detecting altered status of populations due to range expansion or shrinkage; c) identifying associations between salmon presence and habitat attributes; and d) ground-truthing regional habitat quality data bases."*

So clearly these three proposals are operating on separate, but related intellectual territory and scope. Together they form a significant test of the key components of the comprehensive monitoring program for the anadromous zone.

Proposal 35048: The astute reader will have noticed that none of these proposals has a stand-alone data management mechanism. In the absence of proposal 35048 they should also have found this troubling. By itself, this discriminates 35048 from the others. At the same time, however, it creates a degree of dependence, which is perhaps why the reviewers indicated that some discussion of this was appropriate. Tasks 2 and 3 of this proposal (35020) involve the coordination of and negotiation between numerous potential stakeholders for access to data. On its face this is a huge task, but it also has huge responsibilities. In order for any of these pilot projects to work in addressing the regional agendas displayed in figure 2 of this proposal, the data from all these separate sources must be integrated into a single analytical framework--while still maintaining the rights of the owners. This requires extensive infrastructure support and specialized skills that are outside the scope of proposal 35020. If proposal 35048 fails to achieve funding, project 35020 can continue and succeed, but the probability of successful outcome and the usefulness of the end products will possibly be reduced.

Proposal 35033: The ISRP also noted potential overlap with program 35033 (Collaborative, Systemwide Monitoring and Evaluation Program). 35033 proposes to:

1) Document, integrate and make available existing monitoring data that bear on the problem of evaluating the status of salmon, steelhead, bull trout and other species of regional importance across the U.S. portion of the Columbia Basin (i.e., systemwide);
2) Work collaboratively to critically assess the strengths and weaknesses of *existing* monitoring and evaluation methods for answering key questions regarding both stock status and responses to management actions; and
3) Work collaboratively to design *improved* monitoring and evaluation methods that will fill information gaps and provide better answers to these questions in the future.

Tasks 1 & 2 of that proposal sets out to design a "top-down" mechanism for evaluating current monitoring efforts and planning the future of programs within the entire basin. It was pointed out by the preliminary review that it is unclear how this program would be differentiated from:

1. The NMFS Biological Opinion and the Federal Caucus' Basinwide Salmon Strategy RME Program;
2. NMFS and USFWS TRT Recovery Planning;
3. The NWPPC's Provincial Review Process;
4. Data Protocols and Data Needs Assessment Contracts;
5. Subbasin Planning;
6. The Regional Analytical Advisory Committee;
7. USFS, BLM, and EPA Monitoring Programs;
8. Oregon and Washington State Monitoring Programs;
9. The Lower Columbia River Estuary Program; and
10. The Corps of Engineer's AFEP Program.

Although the distinctiveness of these programs is in doubt, the need for some top-down structure is broadly appreciated.

This description points to two important ways in which this proposal (35020) is discrete from this program (35033): The scale and the scope.

All of these programs, including proposal 35033, are set up to cover the entire Columbia River Basin. 35020 is designed to work on three much smaller components of the basin. As mentioned above, the principal motivation for this scale is that none of the mechanistic features of such a top-down plan have been tested satisfactorily. Our proposal is intended to test these features on a smaller scale where the probabilities of successful outcome are greater and the consequences of failures less catastrophic. It is clear from current policy discussions that the development of a top-down structure for the entire basin, through CBFWA or someone else, will take a significant policy and reconciliation effort, and consequently a large amount of time. The check-ins for the 2000 FCRPS Biological Opinion are fast approaching. When the time is right, whoever is going to manage the basin-wide monitoring program will need to have products very much like those produced by this proposal to incorporate into such a plan. As such, this proposal is not in competition with 35033, but is designed to develop the tools that any program that does that job is designed to do.

The scope of 35033 is also far more ambitious than 35020. 35033 proposes to address all monitoring needs from Tier I-III, including data management. Our proposal was not intended to cover that scope of regional needs, preferring instead to develop the technical tools required to solve the effectiveness monitoring problem only.

	Tier 1/35016	Tier 2/35019	Tier 3/35020
Monitoring Type	Overall Inventory	Status Monitoring	Effectiveness Monitoring
Biological Questions	What part of the state do we need to think about?	How many fish? Numbers increasing/decreasing?	Did recovery action improve population health? (#'s, λ, conditions)
Sampling frequency	Once every 3- 4 Years	Annually	Frequency dependent upon study; minimum annually
Sampling Effort (*By Design*)	Entire State	Determined by Sampling Design	Determined by sample size needs demanded by experimental design applied to each project
Spatial Scale	Largest	State ESU	Local – defined by the scale of recovery action informed by biology of fish
Data type – salmonid population	Presence/ absence	Counts of juveniles and spawners	Dependent on management action; eg. Hatchery spawner reproductive success?
Data type – habitat	General, qualitative – Landscape Scale	Quantitative	Quantitative, dependent on management action

Table 3. Outline of principal distinctions between proposals.

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