Northwest Power and Conservation Council

July 5, 2005

MEMORANDUM

TO: Council

FROM: John Shurts
Bruce Suzumoto

SUBJECT: Biological objectives at the ecological province level of the program

At the April and May meetings we discussed with the Council the idea of developing and adopting quantified biological objectives into the program at the ecological province level. For the May meeting in particular we presented a detailed proposal for this initiative -- the what, how and when of this type of amendment process and the key issues the Council will face as it moves through this effort. A copy of the memorandum for the May meeting is attached to this memorandum, as the staff is continuing to now to work off this plan.

At the June meeting we organized presentations from the Washington and Oregon state agencies involved in monitoring and reporting on high-level indicators for salmon recovery and watershed conditions, and from NOAA on the work involved in developing population viability and delisting criteria for recovery planning. We believe learning about and coordinating with these efforts is important preparation for the Council in deciding whether and how to shape a program amendment process to adopt biological objectives, and how such objectives might be used to monitor and evaluate the program's progress and help resolve difficult policy issues.

We promised to return at the next meeting with displays and a discussion of example biological objectives. This is the purpose of the agenda item on biological objectives for the July meeting. We are still working on organizing the appropriate information and presentation. We will send what we develop to you as soon as we can. The information presented will include showing what kinds of results and displays we expect from the technical effort now underway (the AHA method), and how the Council might use these same or similar categories for population and habitat biological objectives for the program. We hope this will be more than just a staff presentation -- we are looking for a working session atmosphere with the Council with lots of questions and criticism and feedback.

The ultimate goal is a decision by the Council in the fall as to whether to call for recommendations to amend the program by adding biological objectives at the provincial level.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Northwest Power and Conservation Council

May 3, 2005

MEMORANDUM

TO: Council Members

FROM: John Shurts

SUBJECT: Plan for an amendment process to add biological objectives to the Council's fish and wildlife program at the ecological province level

At the April meeting we talked to the Council briefly about the subject of an amendment process to add biological objectives for the ecological provinces to the fish and wildlife program. That discussion focused on the purpose or the reason why the Council might take on this effort. We promised to return at the May meeting with a detailed plan for this initiative. That is the purpose of this memorandum -- to propose the what, how and when of this amendment process, and to expose you to key issues the Council will face as we move through this effort.

We are not asking the Council for a formal decision on this proposed plan of action. The Council never formally commits to a program amendment process until it decides to send out the request for recommendations for amendments under Section 4h of the Power Act. The plan here would not have the Council issue that request for recommendations until November 2005, for reasons explained below.

We do need guidance from the Council in response to what is described here, either that the staff should proceed for now as proposed, or that the staff needs to reshape parts or all of this proposal an its work over the next few months.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Part 1: The What

As you may already be tired of hearing me say, adopting quantitative biological objectives into the program would be the last contemplated step in the comprehensive revision of the Fish and Wildlife Program. The Council began that wholesale revision in the 2000 program amendments with a complete reorganization of the program framework. The mainstem and subbasin plans have then been a monumental step along that road, but they are not the finale.

As contemplated in the 2000 Program, with an insight that still has relevance as indicated by the consensus comments we have received on this topic, the Council and others need now to stand back and assess what is the meaning of all this mass of plans and information that we have caused to be developed and adopted into the program. Combined with other activities and conditions in the basin that affect the same animals, these need to be added or rolled up in terms of what the Council, the program and the region are really trying to accomplish. Adopting into the program quantitative biological objectives for population performance and associated habitat improvements should function to:

- provide benchmarks for measuring and evaluating fish and wildlife program performance
- provide a framework for a more efficient monitoring and evaluation program
- provide insights and context to resource allocation decisions and broad policy decisions (such as on artificial production policy)
- provide guidance over time for necessary revisions of the other parts of the program, at the basin and subbasin levels

The point I emphasized last month, but which bears repeating, is the *purpose* -- the reason why the Council would do this: To provide useful objectives or benchmarks or indicators for measuring the performance of the fish and wildlife *program* (not just individual projects or subbasins), with all that implies for improving decisions over the long run based on the performance information. Objectives are especially needed to fit into the population- and program-scale efforts at monitoring and evaluation that Steve Waste and others are developing.

As you will also tire of hearing me say: The Council's program has many virtues, especially at the broadest scale (the program framework and overarching principles) and the lowest (sound subbasin plans and individual projects). Yet the program lacks the right kind of biological objectives at the right geographic scale in-between, and a cost-effective method to evaluate progress toward those objectives, to be able to say with confidence (other than anecdotal) that a collective body of very good work is adding up to the results the Council desires. The time is now ripe to close this gap, in large part because the subbasin planning process, the APRE and other efforts have left us with an amount and organization of technical information that is without precedent. Another reason the time is ripe is that the Council would not be doing this in isolation, but instead at the collaborative cutting edge of what appears to be a trend in large-scale biological restoration programs. The Council will be able to tap into and feed off, collaborate with, and provide leadership to parallel efforts across the basin, from the PNAMP protocols, to NMFS' efforts to define population recovery targets, to the Washington Salmon Recovery Office's efforts to develop a small set of indicators of watershed health (the "dials" approach), and more.

The following display and the notes that follow will guide the discussion as to what it is the staff proposes as possible categories of biological objectives for inclusion into the program for anadromous fish and, at least, resident salmonids in the ecological provinces:

Species Population Objectives

The population characteristics desired for a particular fish species in that province.

-- adult abundance contributions to spawning, harvest and broodstock*
-- ratio of natural to artificial production*
-- life history diversity/population structure*
-- population productivity

Values are likely to be expressed in probabilities and averages or ranges -- e.g., an x% probability of achieving and maintaining an average population size of y adult spring chinook in the Columbia Plateau province over a certain number of years.

Species Habitat Potential

The desired change in the potential of the habitat to support the biological performance of the particular species, measured as improvements in:

-- habitat productivity*
-- habitat capacity*

Environmental Objectives

Changes in key physical characteristics important for achieving the desired habitat condition, so as to support the population objectives. A small set of high-level indicators of desired change, such as:

-- increases in streamflow
-- improvements in water quality/water quality index
-- improvements in channel structure and complexity/removal of barriers

See Notes on next page

NOTES

1. The purpose of the display is both to depict the possible categories of biological objectives for the program *and* to depict the relationships between these categories:

- *population objectives* for a particular species (adult abundance, etc.), which are the ultimate objectives the program is trying to achieve; and then
- as a measure or overall benchmark for the habitat work the program is engaged in to help get to the population objectives*, habitat potential objectives* for the same species, expressed in terms of desired improvements in capacity and productivity; and
- *environmental objectives*, depicting desired changes in physical conditions -- the improvements in water quantity, water quality; channel characteristics, etc. -- that the actual work on the ground is trying to achieve in order to increase the habitat productivity and capacity.

These relationships are embedded in the program framework adopted into the 2000 Program. *See* 2000 Program pages 9-10, 16-18, Appendix D. There is a famous diagram that is useful for depicting this basic program framework. The diagram did not make it into the final 2000 program amendments, but the concepts did in the words. I have included the diagram and an explanation as an appendix to this memo.

2. I have marked five of the categories with an *. These indicate the categories that seem both most likely to be possible and most useful, and which we should be on the path to provide technical support for through the All H integration work described below, at least for anadromous fish. I am leaving the other categories in for now, however. This includes the entire subject of the environmental objectives. Trying to fill those in with numbers at the province level may not be doable right now, or as useful at that scale as the others, but I may be wrong. Objectives of this type might turn out to be as or more important that the habitat potential objectives. We would like to continue considering this category for now.

3. At the same level as the habitat potential objectives, the Council could also include objectives or explicit expectations or assumptions for artificial production, for harvest rates, for hydrosystem improvements, and/or for ocean survival values, as each of these contribute to the ultimate populations objectives.

4. The Council may not, in the end, be able to or desire to adopt objectives in all of these categories, even the ones with the asterisks. It may make sense instead to define certain categories into the program as potential objectives, fill in with numbers those categories that we are able to or that we clearly see as having value, while putting in place an initiative to complete the other objectives over time as the information and time allows and the need demands. That will be one of the issues for the Council to consider and resolve as we move towards the amendment process itself -- precisely what categories to aim for in adopting biological objectives into the program.

Part 2: The How and When

As we have noted a number of times before, the effort to add biological objectives of this type and scale to the program will be successful only if we engage in some technical preparation first. It is necessary to understand what current actions and plans appear to add or roll up to before we initiate the policy process of determining what our objectives ought to be. We need help to understand better what "is," to give us the necessary insight for making informed judgments as to what "ought" to be. This section describes first the technical preparation and expected results we have in mind, and then the steps in the amendment or policymaking process -- and the expected time lines for both.

Technical preparation (through September 2005)

The purpose of the technical work will be to organize, integrate, aggregate and then assess the information developed in the last few years on conditions, objectives and actions across the life-cycle of anadromous fish, both current and planned. At the last meeting the Council approved the contract for this "All H" analysis. This analytical effort is intended to integrate and aggregate habitat assessment information and objectives (from the subbasin plans), artificial production objectives and activities (from subbasin plans, the APRE data base, production master plans, etc.), harvest information from the harvest forums, hydro impacts from the Biological Opinion work and elsewhere, and ocean effects. Especially with the development of the subbasin plan technical assessments (mostly focused on habitat conditions) and the APRE data base, we have the information available to do this type of integration and aggregation as never before.

The end result will be one efficient way (we hope) of displaying, in a relatively rough but transparent way, what population and habitat objectives the region and the program appear to be aiming at by default through the cumulative impact of the separate activities we are all doing and planning. We expect this technical work to take from now until the middle or end of September 2005. The work has a number of elements, but the plan right now is to have the following completed by the end of this period:

- The All H analytical tool will be "populated" with the necessary data for more than 200 "stocks" of salmon and steelhead that make use of the 37 anadromous subbasins and the mainstem reaches of the Columbia. This means input values for each stock as to current and planned conditions and objectives for habitat, artificial production, harvest, and hydrosystem effects, as well as the range of possible ocean survival effects.

- Data will be taken directly from existing sources -- subbasin assessments and plans, APRE, harvest forums, BiOp, etc. -- whenever possible. If the information is not in the right form for input into the model -- for example, if a subbasin plan described a set of qualitative objectives and actions to improve habitat over the life of the plan, but did not include a quantitative value for the desired increase in habitat capacity (which is necessary for the analysis); or if the information on a particular hatchery in the APRE data base and relevant subbasin plan does not include quantitative values for clearly planned changes in the operation of that hatchery -- then the staff and the contractors will work directly with the relevant personnel (subbasin planners; hatchery operators) to

identify or estimate the appropriate values. The analysis will document the source of *all* data inputs, as well as the analytical method.

- The contractors and staff will vet -- display and explain and discuss and, where necessary, confirm -- as much of this information, both inputs and outputs, as we can during the contract period for the technical work. This will happen in workshops in a few subbasins, less formal meetings in many others, requests for and exchanges of information, etc. We do not expect to be able to vet the entire analytical effort in this way during this period. We also do not consider that to be a problem, as our responsibility to make people aware of and understand the analysis -- the inputs and outputs and the integration method -- simply continues as a staff and Council function as the process transitions from the technical to the policy side.

- The analytical effort will then integrate and aggregate the information. Our plan is to produce outputs or results at the end of this technical effort that include, for each of the more than 200 stocks, and then aggregated to the province level for each anadromous species in that province, in current and planned values for:
  -- expected adult abundance contributions to spawning, broodstock and harvest
  -- ratio of natural to artificial production
  -- some sort of display of population structure or diversity
  -- habitat productivity
  -- habitat capacity

Amendment process

The technical effort should provide the information necessary to initiate the amendment process -- the policymaking effort intended to actually result in the setting of program objectives. Here are the steps and timelines we envision at this point:

- **Develop Guidance Document (November 2005).** The staff will develop for Council approval what we are calling the Guidance Document. This should be nothing more (or less) than a clear explanation of the purpose and scope of the upcoming amendment process to add biological objectives to the program and then a clear, transparent display and explanation of the results of the All-H analysis from the technical work above. The point will be to expose people to the kinds derived objectives that result from this way of integrating and aggregating the various information and efforts we are engaged in across the different "Hs."

  Stated another way, our expectations for the Guidance Document is that it will: (1) explain what function the province-level biological objectives will serve in the adopted program; (2) explain how the subbasin plan and other information has been and should be being used to develop the province objectives; (3) establish a common vocabulary for the amendment process; (4) describe what assumptions have been made for habitat, hydro, harvest and hatchery interactions or effects and how those will be considered as objectives are set, and then; (5) sets out the derived or example population and habitat objectives for anadromous fish, and possible example objectives for resident salmonids. The Guidance Document will not be a set of draft or provisional objectives endorsed by

the Council -- it will not be that formal. Rather, its purpose would be to describe the approach to the technical work and results, how the Council intends to take the next step to develop the objectives, a suite of transparent assumptions about "the four H's" and the relationships between habitat and biological performance; and, finally, the derived objectives that those assumptions and analytical work have yielded. The document should provide all interested parties a common point of reference as they develop recommendations for the formal amendment process.

We expect that developing the Guidance Document will take a couple of months following the completion of the technical work. We will be working to synthesize and organize the technical results and display them in a manner useful as guidance in the policy exercise. This will also be a time for staff to continue vetting the information developed in the technical exercise with the region.

- **Issue request for recommendations for program amendments, with attached Guidance Document (November 2005).** The next step will be for the Council to issue the request for program amendment recommendations as required by Section 4h of the Power Act, calling for quantitative biological objectives at the province level in whatever objective categories we settle on by that time. Our idea is to attach the Guidance Document to the request for recommendations, rather explicitly asking people: "Do the derived objectives that resulted from the integration exercise actually represent, in your view, what the biological objectives of the program should be? Or, do you recommend that the program adopt different biological objectives for particular species in particular provinces?" Entities that recommend different biological objectives should explain and support with information why they believe the Council should adopt these different objectives into the program, and at least what some of the larger policy implications of the difference might be.

- **Deadline for submitting recommendations (February 2006).** The Power Act requires that the Council allow at least 90 days for entities to submit recommendations. Prior to the Council issuing the formal call for recommendations, we anticipate working with and making our progress known to many people through the technical work and the work on the Guidance Document. For that reason, 90 days following the formal request ought to be sufficient.

- **Public review of recommendations; staff and Council review of recommendations and comments on recommendations (through April 2006).** The Power Act requires that the Council release program amendment recommendations for public review and comment before proceeding to amendments. The Act does not specify a time for this review, but we try to allow at least 60 days -- more for complex situations. The staff then also needs time to summarize and synthesize the recommendations and comments, and prepare draft amendments.

- **Release draft program amendments for public review (May 2006).** This would be the document in which the Council proposes to adopt into the program a set of quantitative biological objectives at the ecological province level.

- **Public review of draft program amendments; staff and Council review of comments (through July 2006).** No time line is specified in the Act or the APA for public review of draft amendments. Two months is the basic minimum, with additional time to summarize and synthesize the comments and prepare final amendments.

- **Final adoption into the program of biological objectives at the province level, with findings and responses to comments (August or September 2006).**

I well imagine the Council's concern that this effort cannot be concluded before the fall of 2006. I am open to suggestions for how we might do it more quickly. At the same time, adopting biological objectives of this type is both a difficult enterprise and has long-term value and purpose, and not just (or even primarily) immediate value. It is worth taking the time to do it right.

Part 3: Key Issues to Consider

There are a number of issues to consider and work through as we engage in the technical work and prepare for the amendment process. Some are mentioned above, but not all. Here is a summary list of ten key issues. Those that are not self-evident I will explain in the Council discussion. I have phrased the issues as questions. That is not to say that I am lacking for answers, but you will see why they remain open issues:

- Given the range of possible population and habitat objectives, in which categories do we decide in the end to adopt biological objectives for the program?

- Should the biological objectives should have a time frame, and if so, what time frame?

- The technical work focuses exclusively on anadromous fish. The concept in the program is to adopt biological objectives for key resident fish and wildlife species, too. The staff proposal is to seek recommendations for objectives for key resident salmonids, too, and to defer objectives for wildlife and other resident fish to other times and plans. Is this the right approach? Is there preparation work to do for resident salmonid objectives?

- What is the relationship of the province-level biological objectives envisioned here to Bonneville's protection and mitigation obligations under the Power Act?

- What is the relationship of this effort to ESA recovery planning? We need to make sure the two efforts complement and not conflict with each other.

- What is the relationship of this effort to other activities, such as the development and implementation of a harvest and production management agreement in *US v. Oregon*? Again, we need to make sure these efforts complement and not conflict with each other.

- What is the relationship of this effort to on-going work to develop effective approaches to monitoring and evaluation of populations and the program as a whole? Any objectives the Council adopts should fit with and not be at cross purposes to, m&e developments.

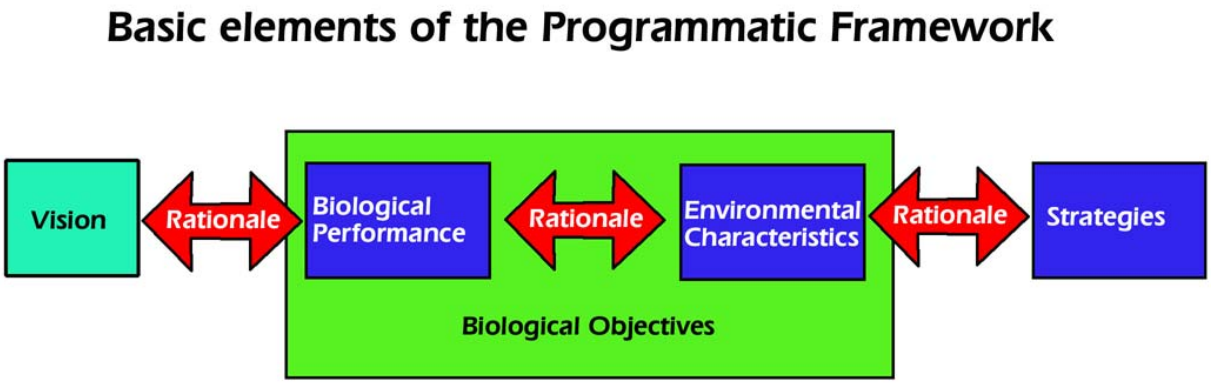
- There is the distinct possibility the Council will receive recommendations for more than province-level biological objectives, especially recommendations for specific implementation plans or actions related to the subbasin plans and/or province objectives. What should the Council do with these recommendations?

- How and when will we deal with the implications of province-level biological objectives for other parts of the program, at both the basin or program level and the subbasin level. And how to best understand the related implications of the objectives for project selection and resource allocations?

- How do we make sure we maintain and are able to continue making use of the All-H data sets, outputs and analytical tool?

Appendix

The relationships between the different types of population and habitat objectives are embedded in the program framework adopted into the 2000 Program. *See* 2000 Program pages 9-10, 16-18, Appendix D. There is a famous diagram that is useful for depicting this basic program framework. The diagram did not make it into the final 2000 program amendments, but it is a perfect display of the concepts that are in the words:



As then explained in the 2000 Program:

- The vision describes what the program is trying to accomplish with regard to fish and wildlife and other desired benefits from the river.
- The biological objectives describe the physical and biological changes needed to achieve the vision, based on the information we now have. Biological objectives have two components: (1) biological performance, describing responses of populations to habitat conditions, described in terms of capacity, abundance, productivity and life history diversity, and (2) environmental characteristics, which describe the environmental conditions or changes sought to achieve the desired population characteristics. Where possible, biological objectives are intended to be empirically measurable and based on an explicit scientific rationale. Objectives at the basin level are more qualitative, but objectives should become increasingly quantitative and measurable at the province and subbasin levels. Biological objectives should also help determine the cost effectiveness of program strategies, and provide a basis for monitoring, evaluation and accountability.
- The implementation strategies, procedures and guidelines, guide or describe the actions leading to the desired ecological conditions.

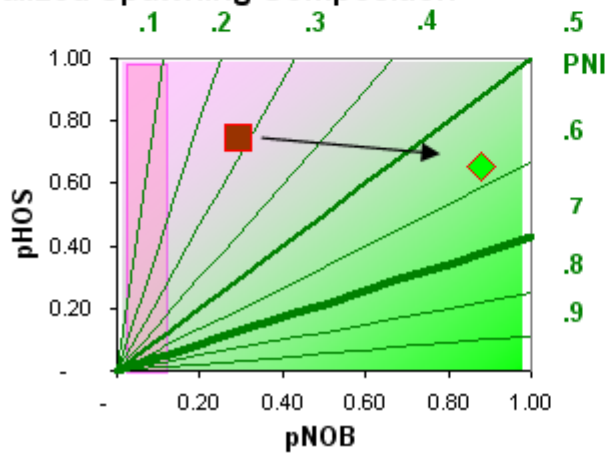
The relationships go both ways: The vision implies the biological objectives, which then guide the selection of strategies. In turn, strategies address biological objectives and fulfill the vision. An explicit set of scientific principles and relationships link and define the components of the framework, explaining why the Council believes or hypothesizes that certain kinds of management actions will result in particular physical habitat conditions, and why these habitat or ecological conditions will affect fish and wildlife populations or communities in the desired way.

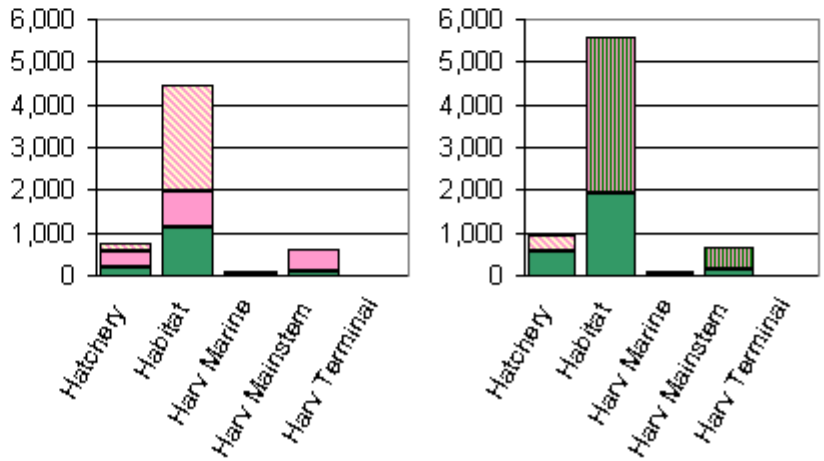
These relationships replicate at the different levels of the program -- basin or program-wide; ecological provinces; subbasins. But different levels demand different emphases. The basin or program level has been the appropriate place for broad, mostly qualitative, objectives, strategies, policies and priorities. The subbasin level has been appropriate for great detail about the limiting conditions in each subbasin and the vast array of objectives and strategies possible to address those factors. Neither level has been appropriate for developing the type of quantitative objectives that will allow the Council and others to express in finite terms what the program is trying to accomplish, and then evaluate what it is in fact accomplishing. That is why we are emphasizing only the biological objective component of the program framework at the ecological province level.

AHA – All H-Analyzer

Stock Name:	Wenatchee Spring Chinook	Current		Planned Condition	
Habitat:	**Baseline Productivity** | **Capacity**	4.40	2,059	5.00	3,144
Hydro	Passage Surv [**Juv.** | **Adult**]	0.65	0.9	0.67	0.9
Harvest:	**Harv.Rate** -Marine [**NORs**|**HORs**]	0.0134	0.0134	0.0134	0.0134
	-Mainstem [**NORs**|**HORs**]	0.0562	0.1162	0.0562	0.1162
	-Terminal [**NORs**|**HORs**]				
Hatchery	**Broodstock Composition**	pNOB	pHOS	pNOB	pHOS
	Goal	33%	42%	100%	100%
	Realized	29%	74%	88%	66%
	Broodstock Origin	Local | Import		Local | Import	
	[**Broodstock** | **Smolt Release**]	550	978,478	550	978,478
	HOR Destination [**Hat** | **River**]	15%	85%	10%	90%
	[**Recruits/Spawner** | **Fitness Loss?**]	8.2	y	8.2	y

Realized Spawning Composition



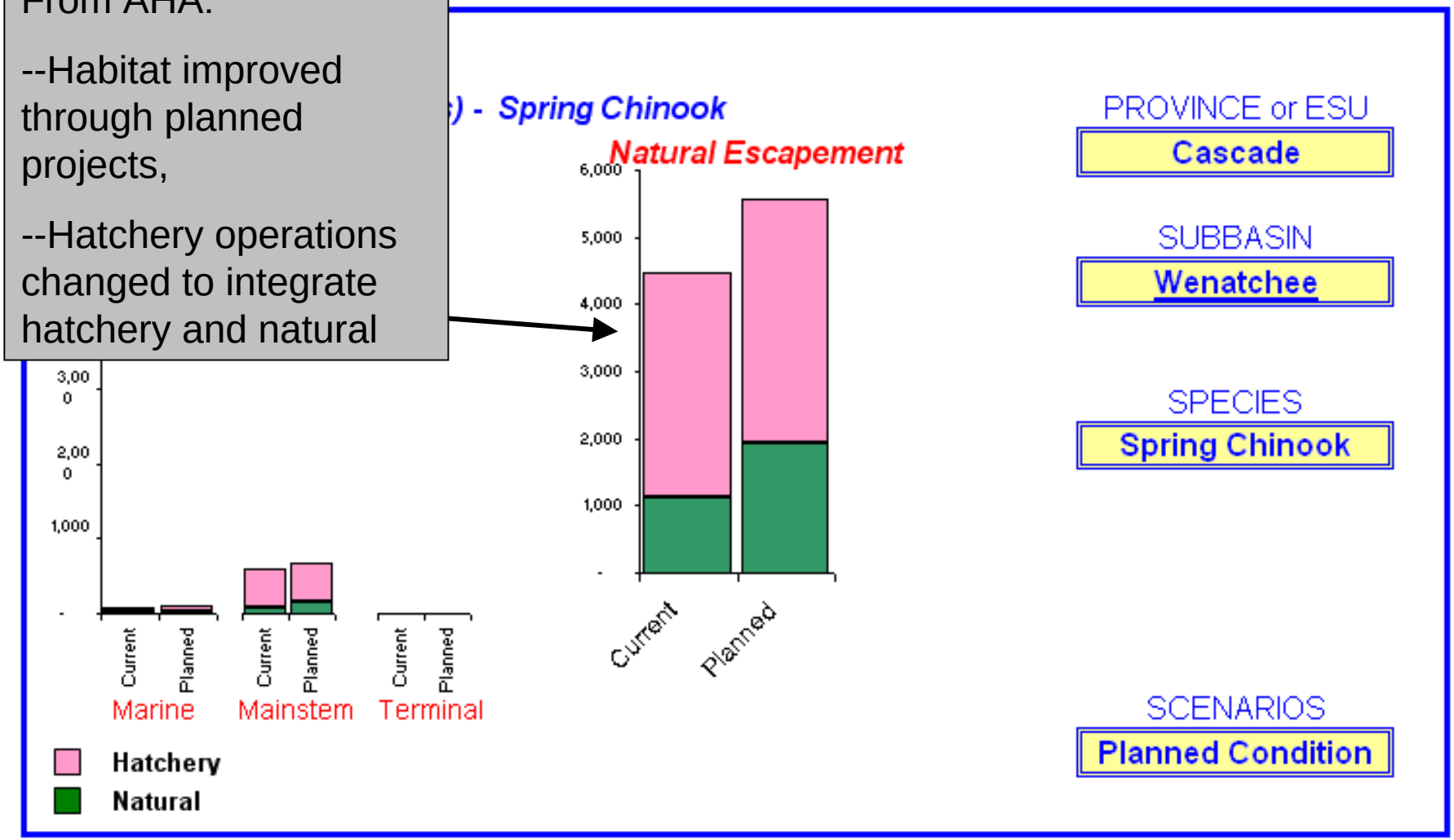


Stock - Subbasin – Province Roll-up

From AHA:

--Habitat improved through planned projects,

--Hatchery operations changed to integrate hatchery and natural



Improve habitat

Integrate hatchery

ee

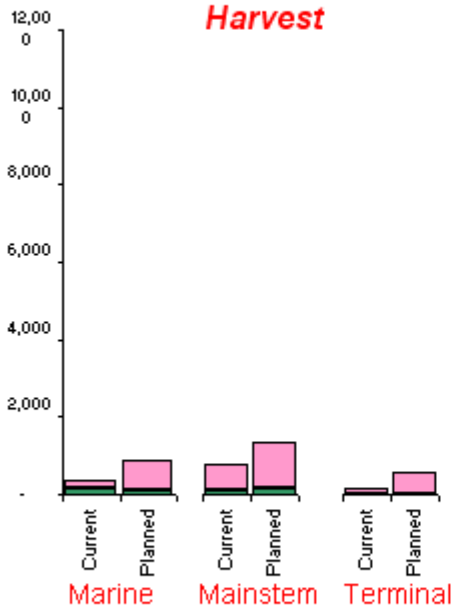
Entiat

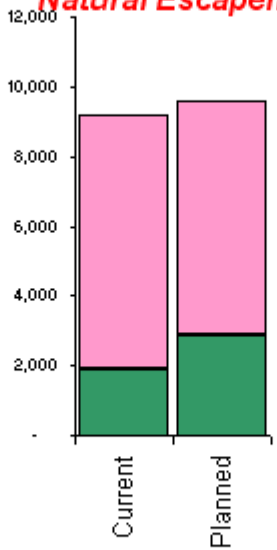
All-Cascade Spring Chinook Roll-up

Improve habitat

Cascade Province

All Cascade Subbasin(s) - Spring Chinook





PROVINCE or ESU

Cascade

SUBBASIN

All Cascade

SPECIES

Spring Chinook

SCENARIOS

Planned Condition

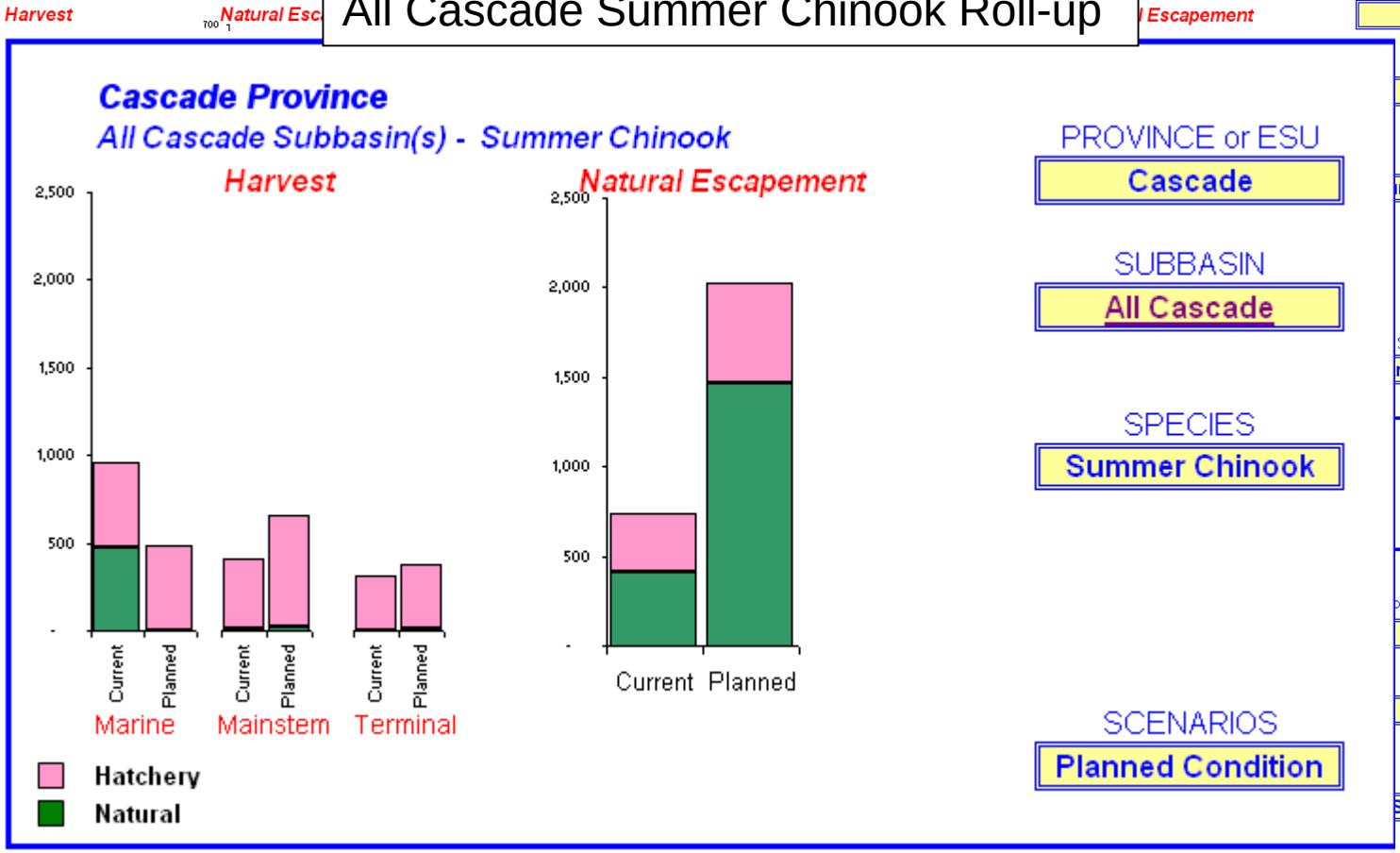
Decrease size of hatchery and integrate

Open up and improve habitat

Wenatchee

Entiat

All Cascade Summer Chinook Roll-up



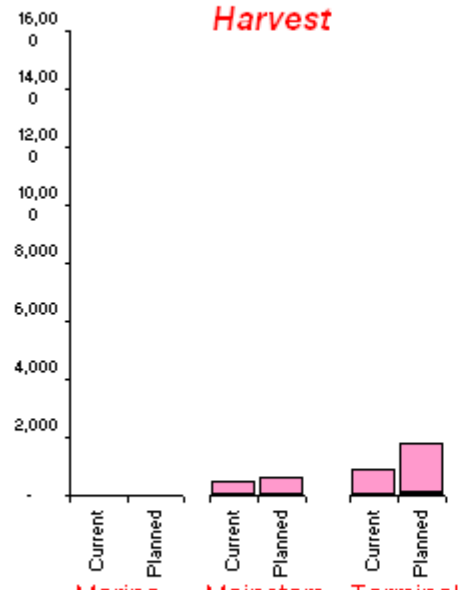
Wenatchee

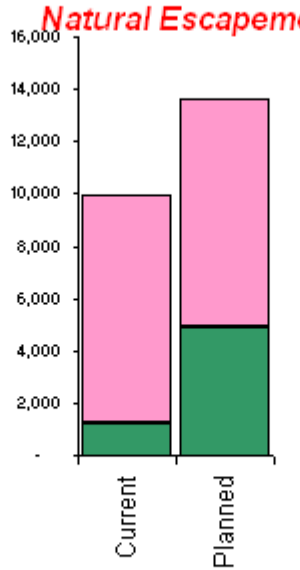
Entiat

All Cascade Steelhead Roll-up

Cascade Province

All Cascade Subbasin(s) - Steelhead





PROVINCE or ESU

Cascade

SUBBASIN

All Cascade

SPECIES

Steelhead

SCENARIOS

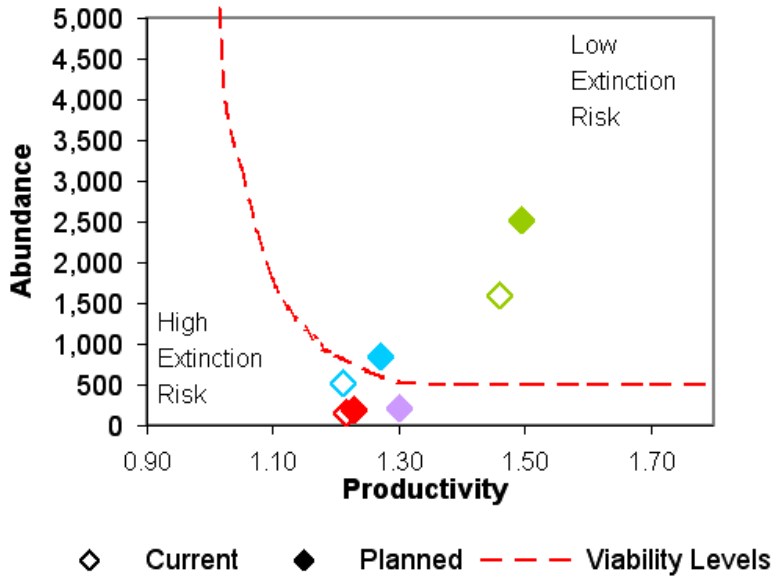
Planned Condition

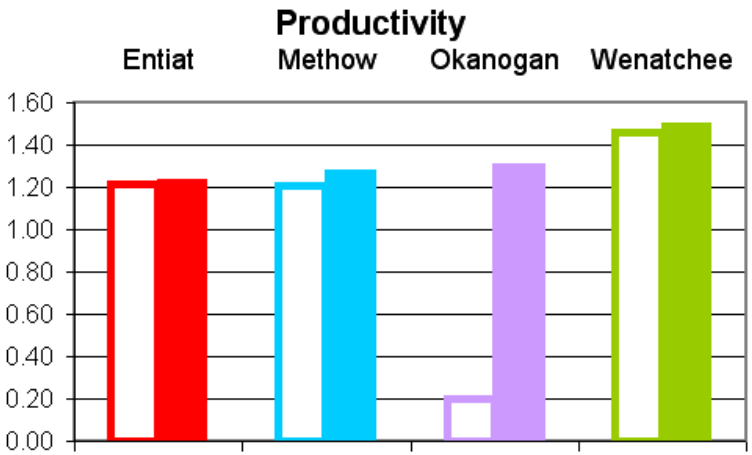
Province/ESU

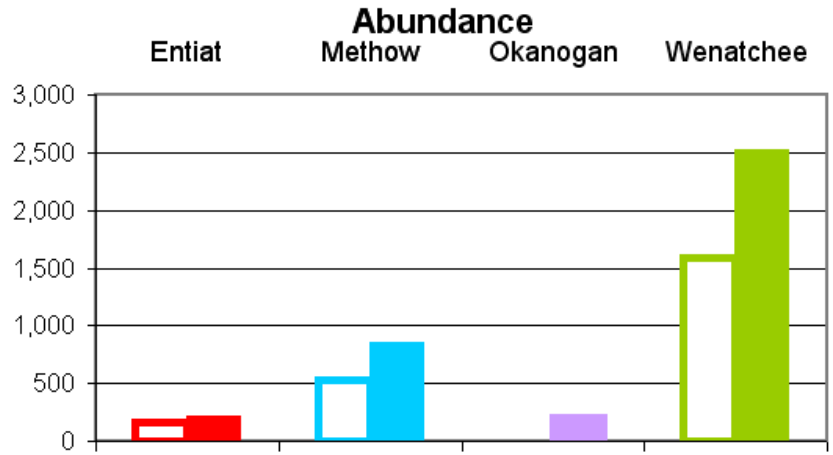
Cascade Province

SPECIES

Spring Chinook





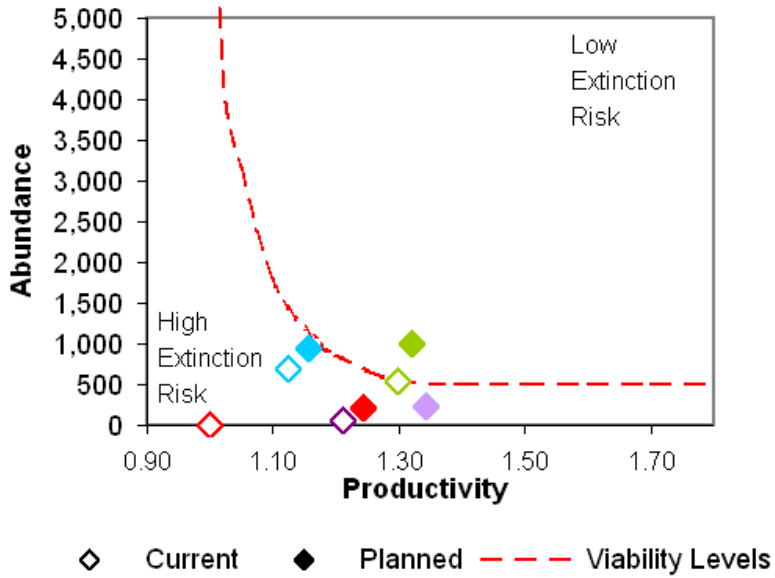


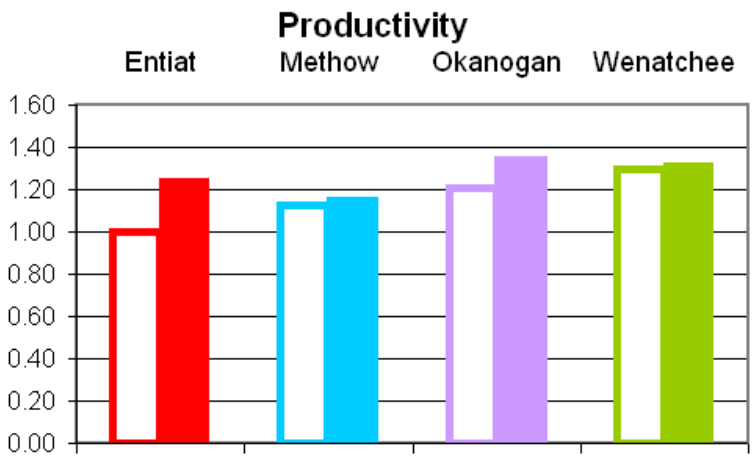
Province/ESU

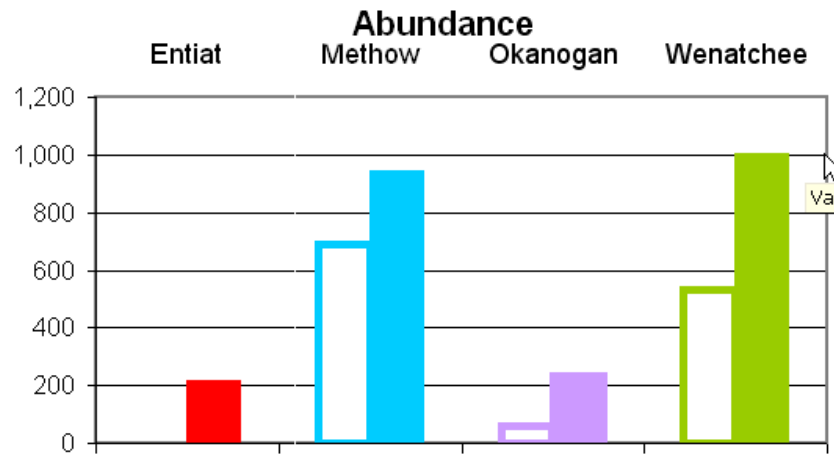
Cascade Province

SPECIES

Summer Steelhead







AHA – All H-Analyzer

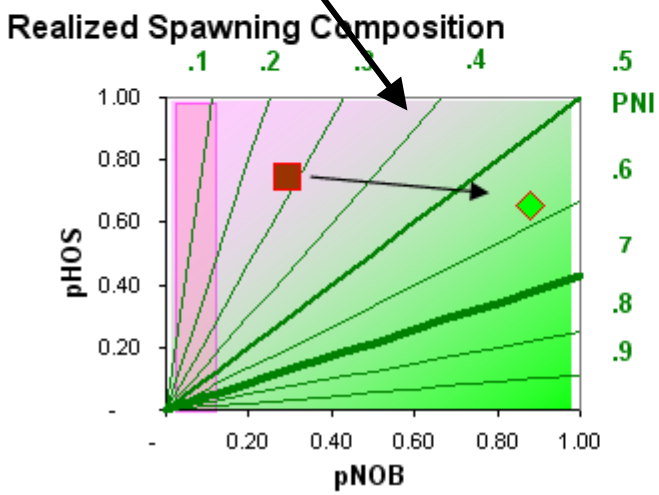
Stock Name:	Wenatchee Spring Chinook	Current		Planned Condition	
Habitat:	Baseline Productivity | Capacity	4.40	2,059	5.00	3,144
Hydro	Passage Surv		0.9	0.67	0.9
Harvest:	Harv.Rate -M				0134
	-N				1162
	Broodstock Con				
					66%
				mport	
	lt Release]	550	978,478	550	978,478
	Hat | River]	15%	85%	10%	90%
	ess Loss?]	8.2	y	8.2	y

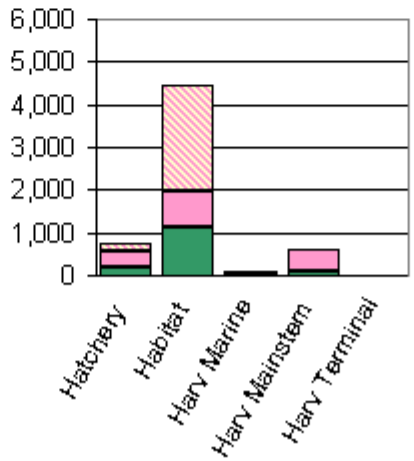
Analysis of a group of fish and a hatchery program in a subbasin

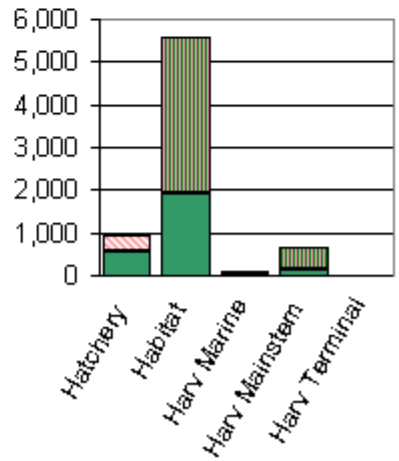
Alternative scenarios compared

Marine, Col. R., and subbasin harvest rates from managers

Average adults produced. Hatchery (pink) and Natural (green).







Proportion of hatchery fish spawning naturally (pHOS) vs.