Review of Public Comments Received from January 19 through March 21, 2005: 10 HGMPs from Lower and Mid-Columbia Regions

WDFW provided 10 draft Hatchery Genetic and Management Plans (HGMPs) covering Lower and Middle Columbia Region programs for public comment from January 19, 2005 through March 21, 2005.

Klickitat Upriver Bright (URB) Fall Chinook
Ringold Springs Fall Chinook
Ringold Springs Spring Chinook
Fish First Coho
Fish First "Wild" Coho
Washougal Hatchery Cooperative Projects
Big White Salmon Summer Steelhead (Skamania Outplant)
Elochoman Hatchery Summer Steelhead
Ringold Springs Summer Steelhead
South Fork Toutle River Summer Steelhead

Four of these programs are operated in cooperation with local citizen organizations (Fish First and the Cowlitz Game and Anglers) or the Clark Public Utility in Clark County. The HGMP for each program describes, in a format prescribed by NOAA Fisheries, the operation of the hatchery programs, including the source for broodstock, rearing and release protocols, and risk aversion measures.

A total of 6 individuals and organizations subsequently provided comments to WDFW on the HGMPs. Comments ranged from short paragraphs to extensive reviews, all of which are available in their entirety on the WDFW website at the following address: http://www.wa.gov/wdfw/hat/hgmp/.

Public comments and the WDFW response are provided below.

Comment 1, Doug Fricke. In response to the review of the Lower Columbia HGMP's, please keep in mind that the Washington Ocean salmon fisheries depend on the middle and lower Columbia salmon hatcheries to provide the backbone or biggest component of our allowed harvest. I don't claim to be a salmon hatchery authority, but any reduction in the production of that complex of hatcheries or reprogramming to upriver stocks is going to reduce the availability of salmon for the ocean fisheries to harvest and reduce the ability of the businesses that depend on those salmon to survive. Please kept this concept in mind when analyzing the proper mix and production of those hatcheries for the future. - thanks, Doug Fricke - Commercial Ocean Salmon Fisherman.

WDFW Response: WDFW recognizes that several of these programs provide substantial harvest benefits and mitigate for losses in natural production associated with construction of the hydropower system on the Columbia River. Potential impacts to fisheries have been and will continue to be carefully evaluated prior to implementation of any program modifications. Additional public comment on the cumulative fishery impacts resulting from potential changes in all Mitchell Act programs will be solicited during the National Environmental Policy Act (NEPA) process initiated by NOAA Fisheries in the fall of 2004.

Comment 2, Kathleen Peters. I think the Hatchery Genetic Management Plans are a waste of time for the competent biologists at the Dept. of Fish and Wildlife. I realize that it (the HGMP) is currently a required part of the process for protecting threatened and endangered populations of salmon and steelhead, as determined by the US Endangered Species Act. It was developed by NOAA Fisheries staff to address their legal requirement to document the fact that they are monitoring state and tribal hatchery operations. However, one HGMP is required for each hatchery program, as opposed to one for each facility or each region or each agency. As a result, there are thousand of pages of HGMPs for fishery and hatchery biologists to write, follow, and update. It is my opinion that the time and money associated with this paperwork would be more wisely used on hatcheries and in their associated watersheds.

The salmon and steelhead managers at both the Department of Fish and Wildlife and NOAA Fisheries should be allowed to clearly articulate the goals of their hatchery programs on a regional or watershed basis. They should be expected to monitor and assess both the benefits and the risks associated with those programs. I would welcome the opportunity to comment on goals, benefits, and risks of regional hatchery programs if it were presented as such to the public for comment.

Please work together to eliminate the cumbersome HGMP process.

Kathleen Peters
Bainbridge Island

WDFW Response: WDFW and NOAA Fisheries seek public comment on hatchery programs at multiple points during the ESA permitting process. Opportunities for comment range from the program-specific details documented in an HGMP to the broad analysis of effects required by NEPA. WDFW agrees that the development of HGMPs requires substantive staff time. However, we believe that this detailed description is necessary to accurately assess program benefits and risks and to provide transparent documentation of program operation. When permitting of the hatchery programs has been completed, WDFW anticipates that maintenance of the HGMPs will require limited staff time, and our efforts will be redirected toward monitoring implementation and program performance.

Comment 3, Simon Sampson. hello, i am from the yakama nation and approve of raising our wild and hatchery salmon separate from each other. this will allow the salmon to be in their own environment and will increase their survival rates for all fihermen to enjoy. we need to keep up the cooperative work amoung all parties on salmon. their needs to open discussion and all parties at the same table with equal voice and power to provide more salmon in all rivers. i hope we can accomplish these simple solutions to a very complex set of tribal, state and federal laws, keep up the good work and if i may be of any assistance, feel free to contact me anytime, as i am very interested in seeing more salmon come back to our rivers,

thanks,

simon sampson
yakama nation member since 1948

WDFW Response: WDFW is committed to working with the Yakama Nation, NOAA Fisheries, and other comanagers to implement hatchery programs that maximize harvest opportunity for recreational, commercial, ceremonial and subsistence fishers and provide for the recovery of listed species. Through federally sponsored processes such as the Hatchery Scientific Review Group (HSRG) and the Northwest Planning Power Council's Artificial Production Review and Evaluation (APRE), we are developing improved hatchery programs that are tailored to watershed specific goals and constraints. In some watersheds, WDFW has proposed an integrated hatchery strategy to meet conservation and harvest goals. Implementation of this strategy requires the incorporation of adults of natural-origin in the hatchery broodstock in each year to reduce the of deleterious genetic differences arising between fish spawning naturally and in the hatchery. Additional information on integrated hatchery programs can be found on the HSRG website at:

http://www.lltk.org/pdf/Integrated_Hatchery_Programs_Jul04.pdf.

Comment 4, Washington Trout. Washington Trout (WT) provided a 22-page document discussing general concerns with the HGMPs provided for public comment. To preserve formatting and pagination of the WT document, it is included in its entirety in Appendix A.

The WT document identifies five general areas of concern with the HGMPs: 1) inadequate performance standards and monitoring; 2) erroneous and/or unsupported assumptions; 3) failure to quantify take of listed salmon; 4) failure to describe or reconcile inconsistencies with WDFW's Wild Salmonid Policy; and 5) lack of identified alternatives to current programs. WDFW will use a similar structure in responding to WT's comments.

Comment 4a. WT expressed concern that "In general, the HGMPs fail to adequately describe clear performance standards and indicators, or adequately detailed monitoring and evaluation protocols or timetables."

WDFW Response. WDFW agrees that performance standards and indicators are an important component of each HGMP. Since receiving public comments on Puget Sound HGMPs in 2003, we have replaced the previous performance standards and indicators with a substantially improved approach. Consistent with HGMP template requirements, the new standards are "generally measurable, realistic, and time specific". Also as suggested in the HGMP template, we have used the examples of performance indicators provided in the "Artificial Production Review" (APR) to help guide the development of improved performance indicators for WDFW programs. Several examples are provided below to illustrate the new performance standards and indicators.

1) WT states that the performance standard "Assure that hatchery operations support Columbia River fish Mgt. Plan (*US v Oregon*) production and harvest objectives" "adequately correspond(s)" to an example provided in the APR report. However, WT expresses concern that the performance indicators "do not meet the level of specificity of the APR examples".

   WDFW is unsure of the basis for this assertion. The new performance indicators specifically identify the expected contribution of the hatchery program to fishery harvests. For example, the performance indicator for the Elochoman Hatchery Summer Steelhead program is a "10-year average of 213 fish harvested". The Klickitat URB Fall Chinook program identifies a "10-year average of .3384%" for the contribution rate to fishery harvest.

2) WT states that the performance standard "Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish" "corresponds adequately to a relevant sample from the APR." However, WT expresses concern that performance indicators "do not consistently identify" specific parameters to be monitored or provide measurable metrics that can be used to determine if the standard has been met.

   WDFW is unsure of the basis for this assertion. For example, the performance indicator for the Klickitat URB Fall Chinook program is to clip the adipose fin and coded-wire tag

650,000 juveniles. All four of the summer steelhead HGMPS (Elochoman Hatchery Summer Steelhead, South Fork Toutle River Summer Steelhead, Ringold Springs Summer Steelhead and Big White Salmon Summer Steelhead) require 100% marking of releases by clipping of the adipose fin.

Despite the substantive improvements in the performance standards and indicators, WDFW acknowledges that further refinement and enhancement could strengthen the HGMPs. As noted in the WT comments, for example, performance standards and indicators related to the incidence of hatchery-origin adults in naturally spawning areas would be a valuable addition to the HGMPs. WDFW expects to continue to improve the performance indicators and standards as the HGMPs are augmented during the iterative, ongoing review leading to the distribution of the Final Environmental Impact Statement.

Comment 4b. WT expressed concern that "A number of erroneous and/or unsupported assumptions run throughout the HGMPs".

WDFW Response. WDFW's review of the supporting information for this comment identified five primary areas of concern. WT expressed concern that the HGMPs fail to:

i) "acknowledge or address the likelihood of hatchery juveniles interacting with rearing juveniles of other listed species/populations, including populations that employ life-history strategies that include multi-year freshwater rearing";
ii) incorporate results from a study conducted in Skagit Bay in 2002;
iii) identify "the potential for encounters with listed juveniles of other ESUs that may be rearing and/or migrating in the mainstem Columbia or its estuary" and the "relative body size of listed" species in the lower mainstem Columbia or its estuary;
iv) "specify the expected distribution of sizes of released hatchery smolts and of wild listed juveniles that may be affected by the released smolts study results from information";
v) "specify the expected number of rearing and migrating listed juveniles and capacity of the river basin for rearing listed juveniles".

Each of these concerns will be discussed below.

<u>Comment 4b(i)</u>. WT cites data on the timing of wild juvenile Chinook outmigration from mid-Puget Sound rivers and concludes that "migration generally occurs over a protracted period of time ranging from February to July…This suggests that it would be extremely unlikely that hatchery smolt releases can be scheduled to temporally segregate them from all wild emigration unless hatchery releases occur in late August or early September. The [HGMP] response generally fails to acknowledge or address the likelihood of hatchery juveniles interacting with rearing juveniles of other listed species/populations, including populations that employ life-history strategies that include multi-year freshwater rearing".

WDFW agrees that juvenile Chinook salmon in Puget Sound rivers are often present in freshwater over an extended period of time. WDFW presented this information in the HGMPs for Puget Sound Chinook hatchery programs provided for public comment in 2003. Perhaps more relevant to the HGMPs currently under review is the residence of steelhead, chum, and

Chinook in lower and mid-Columbia watersheds. Here again, WDFW is fully aware of the emergence and outmigration timing of juveniles and has provided several types of information, including: a) the migration timing of juvenile chum salmon from Duncan Creek (Elochoman Hatchery Summer Steelhead HGMP; and b) steelhead spawn and emergence windows (South Fork Toutle Summer Steelhead and Big White Salmon Summer Steelhead HGMPs). Inclusion of additional information, particularly on the outmigration timing of juvenile Chinook, would further strengthen the HGMPs and will be incorporated during the iterative, ongoing review leading to the distribution of the Final Environmental Impact Statement.

Given the broad range of residence and outmigration timings for the multiple listed species in these watersheds, WDFW agrees that it would be difficult to achieve complete temporal separation between juvenile salmon of hatchery and natural origin. Rather, WDFW implements risk aversion measures to reduce temporal overlap and reduce the likelihood of predation.

1) Temporal Overlap. Reduce the proportion of juvenile natural-origin chum and Chinook salmon potentially exposed to deleterious ecological interactions by:
    a. delaying the release time of juvenile coho and steelhead; and
    b. releasing juveniles at a time and physiological status that promotes rapid outmigration to marine waters.
2) Predation Potential. Reduce the proportion of natural-origin chum and Chinook salmon of a size potentially susceptible to predation by delaying the release of juvenile coho and steelhead.

<u>Comment 4b(ii)</u>. WT cites a personal communication with Casey Rice (NOAA Fisheries) regarding a study in Skagit Bay and expressed concern that "these data should warrant some discussion and analysis".

WDFW has been unable to locate a publication describing the results from the study cited by WT. If WDFW is able to locate information on the Skagit Bay study and finds it relevant to the lower and mid-Columbia HGMPs, it will be will be incorporated during the iterative, ongoing review leading to the distribution of the Final Environmental Impact Statement.

<u>Comment 4b(iii)</u>. WT expressed concern that the HGMPs fail to identify "the potential for encounters with listed juveniles of other ESUs that may be rearing and/or migrating in the mainstem Columbia or its estuary" and the "relative body size of listed" species in the lower mainstem Columbia or its estuary.

WDFW agrees that the potential ecological interactions of juvenile salmonids in the mainstem and estuary of the Columbia River are a relevant topic. Accordingly, each of the HGMPs includes a section entitled "*Migration Corridor/Ocean*". The Klickitat URB Fall Chinook HMGP, for example, includes the following text:

> "*Migration Corridor/Ocean:* The Columbia River hatchery production ceiling, called for in the Proposed Recovery Plan for Snake River Salmon of approximately 197.4 million fish (1994 release levels), has been incorporated by NOAA-Fisheries into their recent hatchery biological opinions to address potential mainstem corridor and ocean effects, as

> well as other potential ecological effects from hatchery fish. Although hatchery releases occur throughout the year, approximately 80 percent occur from April to June (NMFS 1999) and Columbia River mainstem out-migration occurs primarily from April through August. It is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor. Once in the mainstem, Witty et al. (1995) has concluded that predation by hatchery production on wild salmonids does not significantly impact naturally produced fish survival in the Columbia River migration corridor. In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively. There appear to be no studies demonstrating that large numbers of Columbia system smolts emigrating to the ocean affect the survival rates of juveniles in the ocean in part because of the dynamics of fish rearing conditions in the ocean."

WDFW agrees that inclusion of information on the length of fish in the mainstem Columbia and estuary would strengthen the HGMPs and will endeavor to incorporate it during the iterative, ongoing review leading to the distribution of the Final Environmental Impact Statement.

Comment 4b(iv). WT expressed concern that the HGMPs fail to "specify the expected distribution of sizes of released hatchery smolts and of wild listed juveniles that may be affected by the released smolts study results from information".

WDFW frequently provided information in these HGMPs on the average size and growth of natural-origin juveniles during freshwater residence. For example, the Elochoman Hatchery Summer Steelhead HGMP includes the following information:

> "A May first date, also gives additional time for Chinook fry and fingerlings growth. Chinook growth by week from 26 sampling sites on the Kalama River by week indicate fish growth from 46 mm fl on May 3, to 56 mm fl on May 11 and reach 62 mm fl on May 16 (Pettit 1990). Fork lengths from Cedar Creek (tributary to the N.F. Lewis River) indicate that average Chinook lengths reach approximately 50 mm fl between the weeks of April 12 and April 19, 2004, and are growing rapidly with fish 55-60 mm fl by April 26 and May 3, 2004 (pers. comm.. Dan Rawding)."

WDFW agrees that inclusion of information on the distribution of the length of fish would strengthen the HGMPs and will endeavor to incorporate it during the iterative, ongoing review leading to the distribution of the Final Environmental Impact Statement.

Comment 4b(v). WT expressed concern that the HGMPs fail to "specify the expected number of rearing and migrating listed juveniles and capacity of the river basin for rearing listed juveniles".

The expected numbers of rearing and migrating juveniles and the capacity of the watershed varies substantially between years and within a year. This variation results from the interaction of many factors, including spawners, flow, abundance of other species, water temperature, and time of the year. WDFW is unaware of any broadly applicable analytical tools that provide the

fine-scale temporal resolution and resource partitioning algorithms (interspecific, intraspecific, and hatchery versus natural-origin) necessary to address this concern.

Comment 4c. WT expressed concern that "There is a consistent failure to quantify, as required, the estimated take of listed salmon and steelhead."

WDFW Response. The conventions used by WDFW for providing information on projected take are consistent with those of other permitted programs and the information request stated within the HGMP template. Section 2.2.3, part 3 of the HGMP states: "Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) (underline added) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take." WDFW provides estimates of projected take associated with broodstock capture, handling, or other actions that lead to a direct, quantifiable take. As described in the HGMPs, the indirect effects of hatchery production, such as predation and competition, are highly uncertain. Although the HGMPs discuss our current understanding of the potential effects of these indirect factors, it is not currently feasible to quantify the associated take.

A review of other approved permits on the NOAA Fisheries web site indicates that this approach is not unique to WDFW HGMPs. For example, the biological opinion for the "10 Categories of Forest Service and Bureau of Land Management Programmatic Activities in Northwestern Oregon" (NMFS 2003) states:

> "Effects of actions such as these are largely unquantifiable because take is in the form of habitat modification. Quantifying take associated with habitat modification is problematic because of the complexity of cause and effect relationships. Therefore, even though NOAA Fisheries expects some low level of incidental take to occur due to the actions covered by this opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species. In instances such as these, NOAA Fisheries designates the expected level of take in terms of the extent of take allowed. Allowed take is limited to take resulting from the actions as proposed (including project design criteria), that occurs within the action area. Take that occurs from actions that exceed the range of effects analyzed in the BA, that do not follow the PDCs, or that extends beyond the action areas is not authorized by this Opinion."

Comment 4d. WT expressed concern that "The HGMPs fail to describe or reconcile inconsistencies between individual programs and WDFW's Wild Salmonid Policy."

WDFW Response. WDFW is unsure of the relevance of this concern to permitting under the ESA. More generally, the stated goal of the Wild Salmonid Policy (WSP) is to "protect, restore, and enhance the productivity, production, and diversity of wild salmonids and their ecosystems to sustain ceremonial, subsistence, commercial, and recreational fisheries; non-consumptive fish benefits; and other related cultural and ecological values." This goal remains important, but advancements in scientific modeling (e.g., Ecosystem Diagnosis and Treatment model, All-H Analyzer), risk assessments (e.g., Benefit-Risk Assessment Procedure), assistance from

independent science groups (e.g., Hatchery Scientific Review Group, technical recovery teams) and initiatives for local problem solving (e.g., Lower Columbia Salmon Recovery Board, Shared Strategy) are allowing WDFW to substitute tailored management plans for the generic provisions of the WSP.

Comment 4e. WT expressed concern that "The HGMPs fail to consider or discuss credible, meaningful alternatives to current programs."

WDFW Response: WDFW does not agree with WT's interpretation of the information required for section 1.16 of the HGMP. The HGMP template requests "alternative actions considered for attaining program goals, and reasons why those actions are not being proposed." Consistent with this direction, WDFW has frequently identified alternative actions that might increase the likelihood of meeting the program goals identified in section 1.7 of the HGMP. Many of these alternative were developed as the result of a multi-agency effort involving NOAA Fisheries, WDFW, United States Fish and Wildlife Service, the Columbia River Intertribal Fish Commission, and members of the public in a series of meetings that reviewed each program individually and developed alternatives actions. These alternatives and cost estimates were subsequently provided to the Northwest Power and Conservation Council for consideration.

Several examples of the alternatives developed during this process and included in the HGMPs are provided below.

Klickitat URB Fall Chinook

Alternative 1. Develop a local broodstock and eventually eliminate Priest Rapids stock from Klickitat River. This would involve trapping in the lower river at Lyle Falls, transporting to the Klickitat Hatchery for holding and spawning. Overall goal of the Klickitat Subbasin Anadromous Fishery Master Plan is to maintain the Klickitat fall chinook program for harvest augmentation for the future with 50% of the production released from a lower river site.

In order to develop a local broodstock, 2 new holding ponds will have to be constructed at the hatchery. Lyle Falls trap would need to be constructed.

Ringold Springs URB Chinook

Alternative 1. Additional rearing has been proposed in the past year. Alternatives include: move program elsewhere, possibly Priest Rapids, if funding can be secured and facility is upgraded to handle additional rearing requirements, upgrading the facility to meet current and future rearing needs and rear and release Priest Rapids stock rather than Bonneville URB.

Facility upgrades should be incorporated to improve rearing conditions. Accessing more of the available surface water, rebuilding the 9-acre rearing pond, improving or in some cases repairing faulty plumbing, implementation of trap improvements, modification of the river pump for more consistent operation, installation of security fencing and permanent bird predation covers, etc. are all necessary to insure quality fish culture standards are met. These long overdue

repairs and improvements would be significant in cost, but an actual dollar amount is not available. The Army Corp of Engineers (ACOE) has toured the facility as a potential site for investment, allowing for John Day mitigation.

Comment 5, Larry Doyle. Proposed Rule #16 ? talks about selective gear to protect wild steelhead for a kill moritorium, but recinds the rule if a steelhead kill moritorium is recinded? I cannot understand the verbage of this proposal - it leaves me with a headache. We should maintain a selective gear rule for wild run protection. The communication is confusing and promotes wild steelhead kill (run reduction rather than run enhancement). In addition, where is the reg that bait is REQUIRED for coho fishing on the Solduc? This kind of work is sloppy and less than professional. Management take notice!

Larry Doyle
Port Townsend

WDFW Response: This comment is outside the intended scope of the HGMPs public comment request but has been forwarded to the WDFW Steelhead Species Specialist for review and response.

Comment 6, Jason Curd. I have just heard that for the 3rd year in a row, the "workers" at the Cowlitz trout hatchery have let a little over almost half of the steelhead smolt die, for some unforsaken reason. I have heard that nobody can be held accountable for this, for there are no real "supervisors" overseeing this process. If this is true, I would like to seem some changes, fire some people, or see that this doesn't happen again, because as you know, with the fishing industry going to hell for the next 3 years or more, so does the local economy: guides, stores, and all kinds of other local businesses. I would appreciate some kind of feedback for this, and hopefully some changes, for myself and every other fisherman and woman that loves dearly to fish the cowlitz and other western washington rivers.

Thank you,
Jason Curd

WDFW Response: This comment is outside the intended scope of the HGMPs public comment request but has been forwarded to the WDFW Hatchery Division Manager for review and response.

Appendix A. Document provided by Washington Trout.

Comments on Three WDFW Chinook, Three WDFW Coho, and Four WDFW Steelhead Hatchery and Genetic Management Plans for Columbia River Tributaries

Submitted to Washington Department of Fish and Wildlife
by Washington Trout,
March 21, 2005

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Comments on Three WDFW Chinook, Three WDFW Coho, and Four WDFW Steelhead Hatchery and Genetic Management Plans for Columbia River Tributaries

Submitted to Washington Department of Fish and Wildlife
by Washington Trout,
March 21, 2005

INTRODUCTION

Washington Trout has reviewed the three chinook, three coho, and four steelhead Hatchery and Genetic Management Plans currently made available for public review by the Washington Department of Fish and Wildlife. We appreciate the opportunity to respectfully submit the following sets of comments to WDFW for its consideration and response.

Washington Trout remains skeptical of the approach WDFW has adopted in application for take authorization for hatchery operations. Washington Trout submitted comments to WDFW on August 1, 2003, reviewing chinook, coho, and steelhead HGMPs for Puget Sound, and on October 28, 2004, reviewing chinook and steelhead HGMPs for Columbia River Tributaries. In both those reviews Washington Trout expressed in detail its concerns and objections regarding what we found to be inadequacies that run throughout all or many of the HGMPs. These include our assessment that:

- In general, the HGMPs fail to adequately describe clear performance standards and indicators, or adequately detailed monitoring and evaluation protocols or timetables;
- A number of erroneous and/or unsupported assumptions run throughout the HGMPs;
- There is a consistent failure to quantify, as required, the estimated take of listed salmon and steehead;
- The HGMPs fail to describe or reconcile inconsistencies between individual programs and WDFW's Wild Salmonid Policy;
- The HGMPs fail to consider or discuss credible, meaningful alternatives to current programs.

WDFW published responses to public comments suggesting that the department found merit with and/or concurred with some specific concerns raised in reviews submitted by Washington Trout and other members of the interested public. However, the current group of HGMPs available for public review provides no indication that WDFW has revised its approach or even specific weaknesses in the HGMPs that WDFW has acknowledged in its responses to public comments.

The three chinook, three coho, and four steelhead HGMPs currently available for public review are in most substantive respects identical to the HGMPs reviewed in Washington Trout's comments submitted October 28, 2004. Most of the ten currently available HGMPS contain essentially identical answers to critical sections of the HGMP Template that deal with program justifications, performance standards, alternatives to the proposed actions, and the monitoring

and evaluation of the proposed action, often utilizing the same vague language verbatim, consistently failing to adequately address these particular queries.
The HGMP process offers the opportunity to evaluate several broad factors, including: the justification for a particular hatchery program; the social, cultural, and economic benefits of the program; the current state of the affected listed population; the potential for the program to take listed species, including a credible quantitative estimate of the level of the potential take, and the measures proposed by the program proponents to minimize that take (including a credible quantitative estimate of the expected reduction in potential take and the ongoing monitoring and evaluation of those measures) -- and to weigh these factors against each other in order to determine if take authorization is warranted.

The HGMPs currently available for public review fail to take adequate or effective advantage of that opportunity. The HGMPs provide little reason to believe that levels of take of listed species attributable to the proposed programs are being or will be effectively contained, or that hatchery benefits justify those impacts. The HGMPs commit to NO readily identifiable, measurable, or appropriate performance standards or indicators. They fail to identify alternative management actions that will or might be undertaken in light of the evaluation of the results of a clear quantitative monitoring program.

Justifications for programs are at best inadequately described. Risks of several types of adverse impacts to listed populations from the described programs appear to be high. Measures to minimize take are either inadequately described or based on assertions left unsupported. Likewise, the description of proposed methods for monitoring and evaluating those measures are unacceptably vague, at best.

Washington Trout believes the critical, central issues addressed in our October 28 2004 comments can in most instances be applied to all or most of the HGMPs currently available for public review. Where in any individual HGMP the responses to specific sections are substantively similar to those cited and evaluated in that review, or fail to adequately provide the types of required information identified and requested in that review, then the applicable element of that review should be considered as submitted comments to that individual HGMP, and should be responded to in the context of every applicable HGMP. We submit by reference our October 28, 2005 review for that purpose.

Rather than repeat essentially identical comments for every HGMP, we are submitting one set of general comments that should be applied to all of the HGMPS currently available for public and federal agency review. These general comments address the repeated, often redundant failure of the HGMPs to adequately address critical factors that must be evaluated in order to objectively judge whether the proposed hatchery programs should qualify for take authorization. With account for the idiosyncrasies of individual HGMPs, the same set of comments applies to the evaluated sections of each HGMP.

GENERAL COMMENTS AND CONCERNS

Failure to Adequately Describe Performance Standards and Indicators, or Monitoring and Evaluation Protocols or Timetables

Sections 1.9 and 1.10 require descriptions of Performance Standards, Performance Indicators and related Monitoring and Evaluation programs and procedures. NOAA Fisheries is very clear that identifiable quantitative measures that are clearly related to program goals and objectives and that can serve as monitoring variables be identified. All HGMPs fail to provide or identify such quantitative measures, and in general seem to confuse assertions of goals and objectives with descriptions of standards and indicators. This issue has arisen early in the process of developing the HGMP Template in connection with the Northwest Power Planning Council's Artificial Production Review in the Columbia River Basin, and it is germane to quote the Independent Science Advisory Board (ISAB) review of the Draft Performance Standards and Indicators for Artificial Production in the Northwest Power Planning Council's Artificial Production Review (ISAB 2002-2, February 23, 2000) which NOAA places on its HGMP website as an accompanying document for completing individual HGMPs:

- A standard is a *quantifiable* state or condition described in such a way that it is easy to determine whether or not it is being met (emphasis added);
- Indicators are a list of *measurable metrics* that bear directly on the quantitative determination as to whether or not the standard is being met (emphasis added) (p. 6).

No HGMP reviewed rises to this elementary standard of articulating performance standards and indicators relevant to program goals and objectives, especially those objectives concerned with quantifying potential levels of take and minimizing adverse impacts on listed fish.

Genuine and appropriate standards and indicators are essential to the establishment and the implementation of hatchery program monitoring and evaluation plans. They establish the list of measurable metrics that could be employed to monitor program performance. In the absence of such metrics, the HGMPs' efforts to describe monitoring and evaluation are inevitably vague, and unacceptably so. No timelines are provided for gathering needed information or meeting performance standards.

In Sections 1.9 and 1.10 of the HGMPs, WDFW provides two tables listing Performance Standards, Indicators, and Monitoring and Evaluation measures. The exact same tables are presented in nearly every HGMP currently available for public review, the same tables presented in nearly all the HGMPs reviewed in Washington Trout's Oct 2005 comments. The tables in general fail to identify bona fide standards or indicators, or are stated at an inappropriate level of generality. The tables do not comply with the guidance provided in the HGMP Template to provide standards that are "*measurable*, realistic, and time specific" (emphasis added), and to provide indicators that identify "*specific parameters* to be monitored and evaluated." (Emphasis added.) The repetition of this inadequate response throughout the HGMPs suggests an attempt to avoid thorough, case-specific analyses of the risks to listed salmon and steelhead populations presented by WDFW hatchery programs, and/or the specific measures that could potentially eliminate, minimize, or even evaluate those risks.

The tables presented in Section 1.10 are each designated as applicable to either "benefits" or "risks" per Template instructions. In general, the table listing performance standards and indicators for "benefits" comes closer to meeting the Template requirements, insofar as the standards listed correspond to samples provided in the NPPC *Artificial Production Review*. However, in most cases the Indicators listed do not reach the level of measurable specificity directed by the APR.

For instance, the table identifies the following standard: "Assure that hatchery operations support Columbia River fish Mgt. Plan *(US v Oregon)*, production and harvest objectives." This appears to adequately correspond to the following sample provided in the APR: "Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding overharvest of non-target species." (The caveat of "avoiding overharvest of non-target species" is addressed in the following table; see below.) However, the corresponding Performance Indicators do not reach the level of specificity provided in the APR samples:

- *Indicator:* Annual number of fish produced by this program caught in all fisheries, including estimates of fish released and associated incidental mortalities, by fishery.
- *Indicator:* Annual numbers of each non-target species caught (including fish retained and fish released/discarded) in fisheries targeting this population.
- *Indicator:* Recreational angler days, by fishery.
- *Indicator:* Annual escapements of natural populations that are affected by fisheries targeting program fish.
- *Indicator:* Catch per unit effort, by fishery.

This higher level of specificity is required in order to *adequately* judge how the program performs relative to objectives and applicable mandates, and to weigh the relative value of that performance against negative impacts to listed stocks that may occur. It is not credible that WDFW would not have this information available. (In the context of the HGMP Template, the *actual numerical estimates* corresponding to these sample indicators should be provided: i.e., "*Indicator:* 848 Kalama-Program fall chinook harvested; 424 tribal; 222 non-tribal commercial; 222 non-tribal recreational; etc." This is implicit in the guidance provided in the APR.)

The performance indicator provided appears to be in most instances derived from a table provided in response to Section 1.12, reporting "current" program performance. It does not seem appropriate to merely tally up past program performance – not apparently related to any particular goal at all – and simply declare it an acceptable performance indicator for future program operations, particularly when in many instances performance appears to be low both objectively and relative to stated program goals. There is no accompanying discussion of how adequately these numbers "support" harvest or mitigation objectives, or how contributions to sport, tribal, and commercial fisheries are objectively determined to be "meaningful."

The responses to section 1.12 do not consistently provide all the data requested in the HGMP Template: smolt-to-adult survival rates, catch- levels, total adult production levels, and/or escapement levels. Generally no discussion or analysis accompanies the data reported to indicate

whether performance has been considered acceptable, expected, or a matter of concern, despite clear guidance in the HGMP Template to provide program goals for these parameters.

Insofar as the HGMPs propose to use the average of past program SAR and/or harvest rates as acceptable performance indicator for future program operations (see Section 1.10), it has an obligation to discuss the relationship of past performance to past goals. Mean performance for many programs appears to be low both objectively and relative to stated program goals.

In the four steelhead HGMPs, SAR rates are only estimated, and only sport-harvest goals are identified as a performance indicator, even though at least one HGMP acknowledges that contribution from the program to those harvest rates cannot be determined. Further, the sport-harvest goals vary widely from program to program. Most distressingly, no data are reported in Section 1.12 re hatchery escapement to natural spawning areas (as requested in the Template). Spawning interaction between highly domesticated hatchery populations and wild, locally adapted populations presents acknowledged risks to listed steelhead populations, and high hatchery stray rates have been documented in many programs. Some information on hatchery escapement to natural spawning areas is required to adequately weigh any purported harvest benefits attributable to indivdual programs.

We believe that more is required in addressing subsection 1.12of the HGMP than has been generally provided, including a description of a monitoring and evaluation plan that has been (or will be) employed in measuring program performance. Such a monitoring and evaluation plan should include features that monitor program impacts on listed fish. This will require clear statements of measurable performance standards and performance indicators. It will also require statements of appropriate management responses when specific threshold levels of indicators are attained (or fail to be attained, depending upon the manner in which the indicator is stated).

We suggest that the following be included in assessing program performance.

- Stray rates (% hatchery spawners present on spawning grounds with listed fish in specific subbasins): clear upper bounds that are in compliance with the Wild Salmonid Policy guidelines.
- The proportion that the annual number of released hatchery juveniles bears to the estimated annual number of listed conspecific juveniles within the river basin or subbasin where the hatchery releases occur: a clear upper bound combined with a scaling of the absolute number of hatchery juveniles released to the estimated juvenile freshwater carrying capacity of the basin.
- Hatchery smolt-to-adult survival rates, and wild smolt-to-adult survival rates: A lower limit to smolt-to-adult survival rates for hatchery fish should be established. Determination of an appropriate limit should include fitness considerations. Fitness considerations should include considerations of the long-term viability and productivity of the hatchery stock and considerations of the impacts on listed fish of interbreeding with hatchery strays at the upper acceptable level (specified under #1 above). A minimal, biologically acceptable lower limit on hatchery smolt-to-adult survival, however, cannot be purchased at the cost of significant size/condition differentials at the time of release between hatchery and listed juveniles. Limits (performance standards) need to be set on both the maximum size/condition differential between hatchery and listed juveniles and the minimum smolt-to-adult survival

rate of hatchery juveniles. Both are required to assure that the program goal of minimizing adverse impacts on listed fish can be attained.

- In addition, a minimum wild smolt-to-adult survival rate should be established that would be sufficient to insure the recovery and long-term persistence of local in-basin populations. Estimation of this rate should take into account the modal value of age-specific female fecundity, the adult population age-structure and sex ratio, the expected range and distribution of variation in survival rates between egg deposition and adult return, and expected harvest impacts. While the role hatchery releases may have in depressing wild smolt-to-adult rates may be unknown or controversial, it is certainly unexamined and un-monitored. Knowing whether and to what extent this may be occurring would appear to be essential to providing an acceptable evaluation of the performance of a hatchery program. This cannot occur without establishing a performance standard for wild smolt-to-adult survival.

The listed Performance Standard, "Program contributes to fulfilling tribal trust responsibility mandates and treaty rights" corresponds adequately to a relevant sample provided in the APR. However, the corresponding Performance Indicator is *not* an indicator (it really does nothing more than restate the standard), and does not even approach the measurable specificity of the samples provided in the APR:

- *Indicator:* Total number of fish harvested in tribal fisheries targeting this program.
- *Indicator:* Total fisher days or proportion of harvestable return taken in tribal resident fisheries, by fishery.
- *Indicator:* Tribal acknowledgment regarding fulfillment of tribal treaty rights.

(Again, terms like "Total number" and "Total fisher days" should be replaced by *actual numerical estimates.*)

The listed Performance Standard, "Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish" corresponds adequately to a relevant sample provided in the APR. (However, some description of the relevant "information needs and protocols" would be helpful.) But again, the corresponding Performance Indicators are often little more than a restatement of the standard, and do not consistently identify any "specific parameters to be monitored" (HGMP Template), or provide "measurable metrics that bear directly on the quantitative determination as to whether or not the standard is being met" (*Artificial Production Review*; p 3). The listed indicators do not always acknowledge or reconcile admissions program fish are not marked. We include the following examples from the APR for comparison:

- *Indicator:* Marking rate by mark type for each release group.
- *Indicator:* Sampling rate by mark type for each fishery.
- *Indicator:* Number of marks of this program observed in fishery samples, and estimated total contribution of this population to fisheries, by fishery.

(Again, terms like "Marking rate," "Sampling rate," "Number of marks," and "estimated total contribution" should be replaced by *actual numerical estimates.*)

The table does not include relevant performance standards/indicators for potential benefits associated with every purpose, goal, and/or justification of the program presented in the HGMPs. The APR provides sample performance standards and corresponding performance indicators for mitigation requirements, conservation of wild/naturally spawning populations, and socio-economic effectiveness (see *Artificial Production Review;* pp 6-19). None of these are included in the table. If nothing else, this illustrates an inherent weakness and inefficiency in WDFW's "one size fits all" cut-and-paste approach to the development of the HGMPs currently available for review.

The "risks" table is even less adequate for the purposes of take authorization. "Minimize impacts and/or interactions to ESA listed fish" is not a bone fide standard, but at best is a program goal. The APR defines a performance standard as, "a *quantifiable* state or condition described in such a way that it is easy to determine whether or not it is being met." (Emphasis added.) There is nothing quantifiable in this purported "standard," and it is described in a way that actually makes it *impossible* to determine whether or not it is being met. What is meant by "minimize?" Will impacts be minimized relative to current levels, or some otherwise determined unacceptable level? What are those levels? How were they identified and/or determined? Exactly which impacts and/or interactions will be minimized, and how will that minimization be achieved? How will compliance with this "standard" be judged?

The APR provides a range of performance standards/indicators that would be pertinent to the goal of minimizing impacts and/or interactions to ESA listed fish:

- Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production, and to evaluate effects of the program on the local natural population.
- Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of the population from which broodstock is taken.
- Broodstock collection does not significantly reduce potential juvenile production in natural rearing areas.
- Life history characteristics of the natural population do not change as a result of this artificial production program.
- Annual release numbers do not exceed estimated basin-wide and local habitat capacity, including spawning, freshwater rearing, migration corridor, and estuarine and nearshore rearing.
- Patterns of genetic variation within and among natural populations do not change significantly as a result of artificial production.
- Collection of broodstock does not adversely impact the genetic diversity of the naturally spawning population.
- Artificially produced origin adults in natural production areas do not exceed appropriate proportion of the total natural spawning population.
- Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.

- Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally produced population.
- Weir/trap operations do not result in significant stress, injury, or mortality in natural populations.
- Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish.

(Note: *We acknowledge that not all of these standards would be specifically applicable to each particular program in each particular ESU. Given the verbatim repetition of this table in nearly all the HGMPs currently available for public review, we wish to make these comments as broadly applicable to every HGMP as possible.*)

The performance indicators provided in the table fail to meet a level of specificity to qualify as actual indicators. As in the Benefits table, they are generally no more than restatements of the purported standards, or at best lists of possible parameters that could serve as indicators, if they were adequately monitored (and described in measurable terms). Few of the items listed under the heading Performance Indicator are clearly stated as a measurable indicator.

The Monitoring and Evaluation Plans corresponding to the standards and indicators presented in the two tables contain no measurable criteria and no specific descriptions of actions associated with attempts to measure either fishery benefits, or impacts of hatchery releases on listed populations.

For instance, in almost all HGMPs, the Monitoring and Evaluation Plan corresponding to the purported standard of minimizing impacts to listed fish includes the statement: “instream evaluations of… NOR/HOR ratio on the spawning grounds.” A mere statement that NOR/HOR ratios of adults will be “evaluated” fails to specify a number for an acceptable target-ratio, much less how such a ratio is to be estimated and where and when it will be measured. An adequate Monitoring and Evaluation Plan would include a specification of index areas and frequency of spawner counts during the course of the spawning season together with a description of sample methods and associated sample sizes for estimating ages, sex ratios, and percentage of hatchery-origin fish. (An actual performance indicator associated with such monitoring plan might be "the minimum number of natural origin spawners observed in index reaches A,B, and C, are at least X,Y, and Z with a percentage of females age 4 and older of 90%.")

For the purported standard, “Harvest of hatchery-produced fish minimizes impact to wild populations,” no adequate indicators are provided, except in the most general terms (see comments on “benefits” table, above, for samples of more appropriate performance indicators). Likewise, the description of the corresponding monitoring and evaluation measures, “harvests are monitored by agencies and tribes to provide up to date information” provides little useful information. An adequate monitoring plan for these standards and indicators would at very least describe the methods by which catch will be monitored and survival rates estimated.

In responses to Section 2.2.3 and Section 11.1, WDFW fails to adequately provide requested information re monitoring and evaluating program performance standards and indicators. Given the uncertainty and difficulty the response to Section 2.2.3 acknowledges in determining levels

of impact to listed fish from almost all program operations, we are disappointed not to see a discussion of monitoring or evaluation plans designed to fill relevant data gaps in these areas.

As discussed in relation to sections 1.9 and 1.10 there are no *bone fide* performance standards and indicators described in the HGMP around which a clear monitoring and evaluation plan could be structured. The responses to Section 11.1 generally do little more than very broadly describe the parameters that should be monitored and why. They rarely describe how the parameters will be monitored. The responses are not presented in the requested format, and do not consistently reconcile with all the performance "standards" and "indicators" presented in Section 1.10.

As noted throughout all of Washington Trout's HGMP reviews, a monitoring and evaluation plan should set impact-containment objectives for the measurement of which specific marks are relevant. Specific ranges or levels of impact of concern need to be explicitly stated (as quantitative performance standards), the means and manner by which such levels will be estimated identified using measurable quantities (performance indicators) and a range of management responses to various measured levels of each indicator identified. No monitoring plans have been identified and described, and no standards have been specified against which the results of monitoring could be *evaluated.*

Responses to Section 11.1.2 appear to acknowledge that some monitoring activities will be exposed to budget limits. No information is provided about funding status in this regard.

The failure to adequately respond to these issues is acutely disappointing, given WDFW's response to comments regarding this exact failure in the Puget Sound HGMPs made available for public review in summer 2003. In *of Public Comments Received on Puget Sound HGMPs* (2003), WDFW offered to revise those HGMPs to "provide *specific, numeric* performance measures for key program characteristics." (Emphasis added.) WDFW concurred with public comments that "Detailed description of the monitoring plans and methods related to the performance indicators is not provided," and pledged to provide "additional details" for PS HGMP monitoring plans during the development of an Environmental Impact Statement on the overall PS hatchery program. Washington Trout submitted significant, substantive comments to WDFW regarding the unacceptable lack of detail in monitoring and evaluation plans in PS HGMPs, largely paralleling the relevant comments in this review. As far as we are aware, the public has not had opportunity to review any "additional details" regarding the monitoring plans for PS hatchery operations. However, the HGMPs currently available for review lack any significantly informative descriptions of the monitoring and evaluation plans associated with each proposed program, and the failure in two subsequent rounds of HGMPs to provide anything approaching quantifiable performance standards or include any measurable metrics as performance indicators is far from encouraging in this regard.

This vagueness has the result that neither NMFS nor the public can or will be able to determine whether or not any particular program is achieving its stated or, more often, implied goals and objectives, particularly where take of listed salmon and steelhead is concerned. Washington Trout believes that quantitative standards that provide clear threshold levels of potential adverse impact to be avoided need to be stated and then clearly linked to quantitative monitoring

variables and monitoring plans containing detailed timelines for achieving biologically appropriate performance standards.

All the HGMPs fail to meet these criteria, despite WDFW responses to public comments suggesting WDFW understanding of the need to provide the type of specific, detailed information missing from the HGMPs currently available for public review.

Failure to Examine Credible Alternatives

An obvious course of action in view of stated program goals, the alleged and the largely unquantified (or apparently unrealized) benefits resulting from the programs and the potential risks to listed populations, is to reduce or eliminate programs altogether. It appears that consideration of such an alternative would be mandatory.

Other potential alternatives/reforms relevant to an examination of actual program alternatives would include: reducing the size of the program; placing "greatest concern" on the ecological risks of competition between wild and hatchery chinook; accurately monitoring the integration of broodstock and naturally spawning populations; and monitoring hatchery and wild juvenile migration to fill important data gaps regarding competition, predation, and disease-transfer risks to listed salmon and steelhead juveniles.

We suggest that these and/or other alternatives be discussed at length and in detail. The HGMP Template clearly requires that if clear *alternatives to the proposed program* were considered that could potentially meet stated program goals or reduce program impacts, they be described and "reasons why those actions are not being proposed" provided.

One repeatedly stated program goal is to conduct hatchery operations so as to minimize potential adverse impacts on listed fish. Significant thought should be given to ways in which facility operations might be altered or other program goals modified so as to achieve the goal of minimizing potential adverse impacts. These should be enumerated and discussed here together with a statement of reasons for not adopting such changes. At a minimum considerable detail should be provided to support a claim that current operations and goals are sufficiently protective of ESA concerns.

We suggest that the following be considered among the kinds of changes that would better satisfy the goal of minimizing potential adverse impacts on listed fish. 1) reducing the proposed number of juveniles released until stray rates attributable to the program within the basin and neighboring basins are determined to be within the Wild Salmonid Policy guidelines; 2) changing rearing practices so as to produce juveniles that are similar in size and condition to wild conspecifics likely to be rearing in and migrating from the basin during the time of release; 3) within the limits of the facility, releasing juveniles over a more protracted period of time to more closely approximate the temporal distribution of wild juvenile migration, in order to avoid overwhelming wild juveniles with one large pulse of hatchery juveniles.

The Independent Scientific Advisory Board of the NW Power Planning Council released in 2003 a *Review of Salmon and Steelhead Supplementation* for the Columbia Basin. One of the ISAB's key findings was an urgent need to develop "robust experiments with *unsupplemented* reference

streams" (emphasis added) in order to adequately quantify the benefits and/or impacts of hatchery supplementation of native salmonid stocks throughout the basin.

Given the program's apparently marginal (at best) contribution to catch rates and associated mitigation obligations, it appears that the Basin might make a good candidate for the types of experiments surrounding hatchery closures being recommended by the ISAB and NOAA Fisheries' Salmon Recovery Science Review Panel. The RSRP issued a report of Panel meetings held July 2003, to discuss "how modification or closure of hatcheries provides NOAA Fisheries with opportunities to investigate the experimental effects of hatcheries on wild populations" and to "urge that NOAA Fisheries take the lead in multi-agency efforts to utilize planned hatchery closures and modifications as experimental units."

The RSRP specifically endorsed the findings and recommendations of the ISAB Review, and made several findings and recommendations of its own. The RSRP found, among other things, that "questions on the negative impact of hatchery fish on wild stocks abound …, while scant progress has been made toward investigation and resolution of this major topic." The report noted that "In all examples that the RSRP has been able to locate, when experiments were conducted to test claims for the success of hatcheries in promoting the conservation of naturally spawning fish, the initial claims have been proven false." The report found that large-scale experiments involving hatchery closures could test "possible consequences" of current hatchery programs, including:

- Do hatchery releases cause extreme ecological stress to natural fish in streams?
- Will supplementation hatchery programs increase the number of natural-origin adults on the spawning grounds?
- Are there only minor negative consequences of taking wild fish for broodstock?
- Is the increased predation on natural-origin fish in a mixed-species fishery significant?
- Do hatchery releases seriously influence the marine growth and survival of natural fish?
- What is the effect of spawners that are strays from production hatcheries on the genetics of wild stock?

The RSRP explicitly emphasized that "critical data on the demographic and genetic effects of hatchery fish on the wild population can be obtained *only by completely eliminating gene flow from the hatchery to the wild population*, and by observing demographic and evolutionary changes in both populations as they (re)adapt to their own environments" (emphasis added), and that "a full assessment of interacting demographic and genetic effects of hatchery fish on the wild population can only be obtained from additional experiments in which some hatchery programs (if not the entire hatchery) are completely terminated to remove competition between hatchery and wild fish in freshwater and estuarine habitats." The report recommends an experimental approach that stops or otherwise modifies hatchery production in a watershed and compares various aspects of subsequent performance of the affected wild salmon population with those in a population whose hatchery operations have not been altered.

These alternatives, it seems to us, would be consistent with overall social and legal mandates listed as "justifications" for the current program, particularly given the value such options would have for other ongoing supplementation experiments. Serious evaluation of these potential alternatives should be undertaken.

Both the ISAB Review and the RSRP report provide exceptionally valuable blueprints for significant and positive reform of Columbia Basin hatchery programs in general, particularly in the context of qualifying those programs for take authorization. The ISAB noted explicitly that, "most (Columbia Basin) hatchery programs are not integrated with natural production because they rely extensively on fish of hatchery-origin for their broodstock. Nevertheless, the hatchery productions from these programs are present in large numbers on the breeding grounds of many natural spawning stocks. In some cases this is deliberate; in others it is inadvertent. Either way, this constitutes a supplementation action." The RSRP found "an obvious need for additional experiments testing the efficacy of conservation hatcheries and of modified systems that have the joint objective of production and conservation." In other words, the findings and recommendations of the two reports should be applicable to most if not all programs throughout the basin. We recommend that WDFW utilize the *Review of Salmon and Steelhead Supplementation* (ISAB; 2003), and the *Report for the RSRP Meeting Held July 21-23, 2003* (RSRP; 2003) as guides to developing reasonable alternatives to major characteristics of all HGMPs currently available for public review.

Related to the alternatives of program reduction or elimination would be a consideration of how and whether habitat-management efforts could replace or augment hatchery production to meet some program goals at a lower level of biological risk. Efforts on the Skagit River in Puget Sound provide an example for consideration. In 1980 and again in 1990, Seattle City Light (SCL) radically changed the operation of the Upper Skagit dams with increased commitments of flow to better accommodate salmon spawning and rearing. It is apparent there has been a shift of wild Skagit chinook production increasingly into that section upstream of Rockport.

Between 1974-1984 the percentage of the overall wild Skagit chinook population that spawned upstream of Rockport was 62%, between 1985-1993 it was 73%, and between 1094-2001 it was 78% (Connor and Pflug 2003). This sub-stock of chinook is the only one in the watershed that has remained in stable numbers in the period of spawning survey record between 1974-2001. For comparison, these same data indicate that the percentage of change in mean escapement between the 1974-1984 time period and the 1985-2001 time period was +3% for the Upper Skagit while it was -41% for the Lower Skagit and -52% for the Lower Sauk River, the major wild chinook spawning tributary to the Skagit. While the Upper Skagit wild chinook have remained stable, or increased slightly, the remaining basin has been in significant downward decline. From 1974-2001, the overall average wild Skagit chinook population escapement remained relatively stable: 1974-84 - 12,112; 1985-93 - 10,279; 1994-2001 - 11,526. Wild-chinook productivity for the population is being increasingly carried by the Upper Skagit.

Since 1980, SCL mitigation investments became increasingly focused on habitat acquisitions with related habitat protection, habitat restoration, or habitat re-creation projects (personal communication Dave Pflug 2000, 2001, 2002, per Bill McMillan, 2003). This contrasts with hydro electric dam mitigation for fish losses more commonly realized in the form of hatchery programs elsewhere. While Upper Skagit wild chinook have remained stable, the rest of the Skagit basin has remained in wild chinook decline at the same levels as other Puget Sound areas

where habitat investments have most often been lower and hatchery domination commonly higher in those other river basins.

The Skagit system is the only place in the Puget Sound region where wild fish have a clear production advantage. Seiler et al. (2002a) show that the 12-year (1989-2000) annual production of wild fry and fingerlings averaged 2.8 million fish. This compares favorably with a relatively modest hatchery program planned for 672,000 fingerlings and 150,000 yearlings.

Evidence suggests that on the Skagit, where emphasis has been on moderation of hatchery chinook production, coupled with relatively intensive habitat protection and recovery, the result has been comparatively high wild fry and fingerling production. This credible alternative, with others, should be discussed and contrasted with the proposed alternatives offered in response to this section, with a rationale for rejecting any. We do not believe that this HGMP can credibly qualify for take authorization without significant revision to this section.

Erroneous Assumptions

The HGMPs rely upon tenuous, uncertain, and even false assumptions concerning the rearing and migratory behavior of listed juveniles and the conditions under which competition and predation by hatchery juveniles may occur. The HGMPs simply assume that there is a unique and narrow period of time during which an overwhelming majority of wild juveniles migrate downstream and out of the river basin. Hatchery release protocols that are asserted to be aimed at minimizing adverse impacts on migrating wild juveniles are not reconciled with the planned releases of hatchery juveniles several weeks prior or during periods of wild juvenile swim-up and/or migration.

Wild fish will commonly be available as rearing fish and as downstream migrants in freshwater habitats for a three to four month period. Substantial evidence exists to support the assumption that wild juvenile chinook downstream migration generally occurs over a protracted period of time ranging from February to July. Outmigration appears to be more or less continuous with several small modes scattered from mid-March to mid-June.

These same fish will be available (as documented in other state and tribal reports) in estuaries and nearshore marine habitats for several additional months (e.g., Beamer et al 2000). Thus, there is really an extended period of up to six months in which problems with competition and predation will occur.

The responses to Section 2.2.3 present a relatively thorough attempt to describe program activities that may impact listed populations, and the risks of those impacts. However, we believe the response still fails to address several relevant issues in sufficient detail, relies on some unsupported and sometimes contradictory assumptions, ignores and/or dismisses impacts to neighboring ESUs, and is inappropriately sanguine about the risks inherent in the scientific uncertainty that the response acknowledges surrounds some of these issues.

The response provides relatively detailed information intended to support WDFW's assertion that competition and predation impacts can be effectively minimized by juvenile-release strategies currently employed at most WDFW hatchery programs. However, the response is

weakened by a reliance on some unsupported and sometimes contradictory assumptions, its failure to consider impacts to all applicapble ESUs, and its inappropriate reaction to uncertainty.

The response generally states that hatchery juveniles are released "at a time and size that indicates fish are smolted and can emigrate quickly." The response acknowledges that "Salmon and steelhead feed actively during their downstream migration (Becker 1973; Muir and Emmelt 1988; Sager and Glova 1988) and if they do not migrate they can compete with wild fish," but then presents information and references to support the assertions that wild and hatchery juveniles are effectively segregated by some behavioral and habitat-preference differences between hatchery and wild juveniles, and "rapid" downstream migration of hatchery juveniles released as smolts.

The response states that, "WDFW is unaware of any studies that have empirically estimated the competition risks to listed species posed by [the program described in this HGMP]." This statement is repeated or paraphrased several times throughout the response and in nearly every HGMP. In fact the bulk and substance of the response is repeated essentially verbatim in nearly every HGMP. In the absence of such a narrow study, the HGMP invests a high degree of confidence in "studies conducted in other areas (that) indicate that this program is likely to pose a minimal risk of competition." At best the referenced studies "suggest" support for the relevant assertion; they do not "indicate" anything in this context. But never mind semantics; without due consideration of studies in "other areas" that may suggest a potential for more than "minimal" competition-impacts from the proposed program, WDFW's value-standard risks a bias toward particular assumptions about program performance.

Recent data on the timing of wild juvenile chinook outmigration in mid-Puget Sound rivers gathered by the Department's own Wild Salmon Production Evaluation Unit (WSPE) (Seiler et al. 2001(a), 2001(b), 2001(c), 2002, and 2003) provides substantial evidence that wild juvenile chinook downstream migration generally occurs over a protracted period of time ranging from February to July. The majority of this data is noteworthy in displaying no pronounced mode in the timing of wild chinook outmigration. Rather, outmigration appears to be more or less continuous with several small modes scattered from mid-March to mid-June. This suggests it would be extremely unlikely that hatchery smolt releases can be scheduled to temporally segregate them from all wild emigration unless hatchery releases occur in late August or early September. The response generally fails to acknowledge or address the likelihood of hatchery juveniles interacting with rearing juveniles of other listed species/populations, including populations that employ life-history strategies that include multi-year freshwater rearing.

The response relies on findings in Flagg et al that "it is unclear whether or not hatchery and wild chinook salmon utilize similar or different resources in the estuarine environment." But it does not discuss current work in Puget Sound that strongly suggests hatchery and wild juvenile salmonids are commingling in near-shore habitats in Puget Sound for significant periods of time before migrating to the open ocean, any attempt at temporal segregation during emigration from upstream, freshwater habitats notwithstanding. Early data from beach-seine and surface-trawl sampling in Skagit Bay in 2002 demonstrate that hatchery-marked and unmarked chinook juveniles of various age and size classes are present together in significant ratios throughout the spring, summer, and fall, in several types of estuarine and near shore habitats. Sampled hatchery-

marked juveniles are mixed with unmarked juveniles in mean percentages ranging from 10% to nearly 60% from May through November (personal comm., Casey Rice, NMFS; 2003). Both hatchery-marked and unmarked fish-presence is consistent throughout these periods, but attempts to identify exact ratios of hatchery to wild juveniles are confounded by the fact that some hatchery juveniles released outside but nearby the study area are not visibly marked, and may be entering the study area during certain sampling periods, creating a possibility of undercounting hatchery juveniles during sampling. During the periods that hatchery and wild juveniles are present together in these near shore environments, the hatchery juveniles may enjoy several competitive advantages over their wild counterparts, including most significantly size, which may contribute to create a significant risk of adverse interactions and impacts to listed chinook, including competition, displacement, and predation. WDFW is aware of these preliminary findings. These data should warrant some discussion and analysis in this context, insofar as WDFW is relying on studies in "other areas" to support the assertion that it can successfully minimize adverse impacts to listed populations by effectively segregating wild and hatchery juveniles during freshwater out-migration and rearing life stages.

The response makes a reasonably strong case that temporally and/or spatially segregating hatchery juveniles from listed juveniles can reduce or minimize competition-impacts to listed juveniles in freshwater habitats. However, the response rather overstates the conclusiveness of the evidence presented to support the assertion that wild and hatchery juveniles are being effectively segregated by the release strategies described in HGMPs currently available for public review. The response acknowledges uncertainty about the level of interactions between hatchery and wild juveniles in the Columbia estuary, and about the consequences of those interactions.

The response ignores the potential for encounters with listed juveniles of other ESUs that may be rearing and/or migrating in the mainstem Columbia or its estuary, even though encounters with listed salmon and steelhead juveniles could occur in the Columbia mainstem. The admission that "it is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor" underscores the necessity of considering ecological impacts to other ESUs in the migration corridor, given the admission early in the response that "salmon and steelhead feed actively during their downstream migration."

The response acknowledges a high level of scientific uncertainty regarding the frequency of competitive interactions between hatchery and wild juveniles, and in determining the consequences of those interactions. But the reaction to that uncertainty is inappropriate. When faced with genuine uncertainty as to a potential harmful effect of a hatchery practice -- resulting either from data gaps or uncertainty regarding biological mechanisms involved in potentially harmful inter- and intra-specific interactions -- assumptions should be employed that risk over-estimating rather than under-estimating the level of take. The estimation process ought to be more concerned with providing reasonably low probability of making a Type II error than with keeping the probability of making a Type I error low for a null hypothesis that hatchery releases cause no or little take. The HGMP is simply more concerned about wrongly over-estimating a level of take than it is with failing to guard listed juveniles against a credible risk. As with most of the numerous factors responsible for the decline and listing of salmonid populations under the ESA, the listed resource is forced to bear the full burden of the uncertainty.

While the HGMP makes a reasonable case that evidence exists to suggest that impacts from competitive interactions between wild and hatchery juveniles are difficult to quantify, it fails to make a compelling case that these risks can be dismissed.

In identifying and analyzing risk factors for competition and predation, the response fails to adequately address several relevant issues. Both competition and predation are dependent upon the relative sizes of the individuals involved and hatchery smolts are generally released at sizes significantly larger than wild juvenile conspecifics of the same age.

Both competitive ability and predation potential need to be explicitly considered in order to evaluate the extent to which the time of release and the duration of migration to saltwater of released hatchery fish may negatively impact wild listed juveniles. The relative sizes of released hatchery smolts and wild listed juveniles should be specified and then evaluated with respect to potential levels of competition and predation. While the response provides some of this information, it fails to specify the expected *distribution* of sizes of released hatchery smolts and of wild listed juveniles that may be affected by the released smolts and to specify the absolute numbers of hatchery releases relative to both the expected numbers of rearing and migrating listed juveniles and the capacity of the river basin for rearing listed juveniles.

It is inadequate to assume (or imply) that there is a single size (i.e., the mean size) of hatchery smolts at the time of release and that there is a single (mean) size of wild listed juveniles during the time of emigration of hatchery smolts. The respective distributions of sizes are needed in order to properly estimate the likelihood of competitive displacement and/or predation by hatchery smolts on wild listed juveniles during the period of freshwater emigration of released hatchery smolts.

The response is significantly weakened by its failure to consistently include evaluations of the likelihood of competitive interactions with juvenile salmon and steelhead from every ESU likely to be impacted by an individual program. For instance, how will the relative body size of listed chinook, coho, chum, sockeye, and steelhead juveniles likely to be rearing and/or migrating in the lower mainstem Columbia or its estuary during the period that program releases will be outmigrating bear on predation and/or competition impacts attributable to individual programs?

The risk of take from potential genetic impacts should be analyzed in the context of hatchery releases. The HGMPs acknowledge the value of marking some hatchery populations, and the urgent need to mark all hatchery releases, but it does not discuss how those marks will be used to implement direct management actions designed to keep gene flow within acceptable limits, or what those limits will be. Sufficient evidence exists to also suggest that HORs from proposed programs could be straying to natural spawning areas both within and among subbasins in the Columbia Watershed. The Kalama Fall Chinook HGMP (August 2004) acknowledges as much in Section 6.2.1 ("strays from other hatcheries within this GDU are common").The potential for spawning interactions between HORs and wild listed chinook in all Columbia River tributaries should be evaluated.

Failure to Quantify Take of Listed Salmon and Steelhead

NMFS in its January 5, 2002 guidance document titled *Hatchery and Genetic Management Plan Template: Purpose, Applications, and Instructions,* clearly directs HGMP applicants to supply a "numerical estimate" of expected take from hatchery operations "as best as possible". Paragraph G is particularly explicit:

> "Under the broad definition of ESA, "take" of listed species will include hatchery activities that lead to harassment, behavioral modification, capture, handling, tagging, bio-sampling, rearing, release, competition, predation, disease transfer, adverse genetic effects, injury, or mortality of listed fish. When "take" of a listed species is expected in the hatchery operation, *the ESA requires that a numerical estimate be quantified as best as possible.* To meet this objective, a "take table" is appended to the HGMP that, when completed for each hatchery program, will provide a uniform means to report estimated take (see Table 1) (emphasis added)."

The majority of HGMPs consistently report "unknown" for predation losses involving yearling salmonids and otherwise make no effort to estimate the likely numeric range of actual or potential take, nor do they attempt to explain why such estimates were not or could not be made. It is difficult to see how NMFS could credibly approve any HGMP that does not comply with Paragraph G of the Guidance without forcing the listed resource to bear the entire burden of the risk that arises due to the uncertainty of the *level* of take that is likely to occur from the various acknowledged risk factors related to hatchery practices.

In the responses to Section 2.2.3, no attempt is made to estimate the level of take, yet this is what is explicitly requested in the HGMP Template and in the HGMP Completion Guidelines. Merely listing "unknown" fails to qualify as providing a numerical estimate as best as possible.

Clearly, in the absence of case-specific data and adequate research there is considerable uncertainty to estimates of levels of take resulting from the factors enumerated under guideline G. However, this uncertainty neither excuses the HGMP from making a credible attempt to estimate take levels as required by NOAA, nor does the presence of uncertainty itself render it impossible for credible estimates to be made.

We also note that while the information and techniques available to undertake to provide estimates of levels of take may not reside within the staff at the hatchery facility or program level, WDFW does have staff knowledgeable and practiced in risk assessment. We believe that such staff must be more directly engaged in these aspects of completing HGMPs. The NMFS Science Center can likewise provide support for these types of assessments and analyses. We recommend that WDFW enlist the Science Center's assistance if necessary in making these critical assessments.

The responses in Section 2.2.3 regarding contingency planning provides boilerplate assurance (pasted into HGMP after HGMP) that if WDFW monitors any "additional" or "significant" mortality among listed salmonids, it will seek "guidance" and "determine an appropriate plan." It amounts to little more than a commitment to do something. The term "additional mortality" is meaningless in this context, as the HGMPs steadfastly refuse to present any quantitative estimates of current mortality levels from individual programs. The response should include a list

of predetermined management options for response to specific performance indicators regarding levels of take attributable to the program.

Critical to successfully pursuing the program goal of minimizing adverse impacts on listed fish is the existence of clear measurable quantitative impact-containment objectives (performance standards and indicators) and a monitoring program committed to collecting and analyzing the requisite data. An inevitable feature of a *bone fide* impact monitoring and evaluation program is a set of contingency plans for reacting to circumstances where impact thresholds are exceeded.

For instance, a suite of potential response-options should be developed for a range of potential circumstances including levels of interaction between hatchery and wild listed-juveniles above or between a series of predetermined thresholds, or levels of HORs present in natural spawning areas with listed conspecifics above or between a series of predetermined thresholds. Monitoring and evaluations plans adequate to generate, analyze, and act on the relevant data should be developed and described.

We recommend that the Department develop quantifiable impact-containment objectives related to risk of take of listed juveniles by hatchery operations due to behavioral modification, competition, and predation, among other elements listed in Guideline G. In addition, we recommend that the Department assign a team consisting of individuals with experience in risk assessment and in wild stock research to work with individual hatchery managers in developing impact containment objectives, associated monitoring and research plans, and program responses to monitoring data indicating that impact thresholds have been exceeded or are likely to be exceeded.

We believe any HGMP that presently lacks such a risk-based impact-containment program cannot credibly qualify for take authorization.

Violations of the Wild Salmonid Policy

Our use of the term "Wild Salmonid Policy" in this review refers to the combination of (1) Policy of Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes Concerning Wild Salmonids plus (2) Additional Policy Guidance on Deferred Issues Concerning Wild Salmonid Policy. Both were adopted by the Washington Fish and Wildlife Commission on December 5, 1997, and together became the existing WDFW Wild Salmonid Policy. The first document is commonly but mistakenly referred to as the "joint policy" since it was never adopted by the Northwest Treaty Indian Tribes.

In discussing the "alignment" of hatchery programs with other management plans and objectives in Section 3, the HGMPs fail to actually "describe (the) alignment of the hatchery program" with any of the documents, policies, or plans listed, or discuss any "deviations from the plan or policies." They merely assert that hatchery operations are "consistent" with a list of plans, often including the WSP.

An obvious repeated violation of the Wild Salmonid Policy is with respect to the allowable percentages of hatchery fish on the spawning grounds (see Table 2, page 16 of the Additional Guidance). For a high level of similarity of hatchery fish, the maximum percent of the wild

spawning population that is of hatchery origin should be 5 to 10%. For an intermediate level of similarity, the limit is 1 to 5%, while the limit for low similarity is 0 to 1%. Compliance with this important policy element is generally not discussed, even though violations are common and acknowledged in other sections of many HGMPs.

The Wild Salmonid Policy, adopted in 1997, provides clear performance standards and policy guidance for hatchery operations and practices throughout Washington State. WDFW has repeatedly cited the WSP as a guiding document in its ESA-related recovery management. Yet no mention is made of the relationship or alignment of the hatchery programs described in individual HGMPs with any particular performance standard or policy guidance in the WSP. Ample evidence suggests that current hatchery practices and operations, including practices and operations described in the HGMPs currently available for public review, are inconsistent with the WSP. The HGMP should describe the WSP standards and guidance, and discuss the relationship between individual programs and the WSP.

CONCLUSION

The HGMPs by and large share a central flaw, a general unwillingness or inability to adequately quantify estimates of the harm the individual programs may be doing to listed populations of salmon and steelhead, or estimates of the benefits the HGMPs claim derive from the programs. Levels of take are consistently characterized as unknown. Levels of benefit are described in cursory, vague language; important information about how many fish, caught where, by whom, and at what total value, is rarely if at all provided in sufficient detail. Few adequate standards, targets, or thresholds are offered for either harm or benefit. Efforts to determine and/or monitor levels of harm and benefit, standards for each, or any measures or timetables to meet those standards are not adequately described.

Several fundamental issues must be reconciled in any application for take authorization. What level of take would be authorized? What types of benefits can the level of take be weighed against? What is the difference between current levels and any appropriate standard for those levels? How were those standards determined? How will they be met, when, and how will those efforts be monitored? Failing to provide this important information creates uncertainty that could provide the potentially inappropriate implication that the level of harm is lower than it actually is, and the level of benefit greater. The overall scope and scale of the Columbia River hatchery program is simply too large to responsibly accommodate the level of uncertainty presented in the HGMPs.

Given these significant shortcomings, this review finds the applications apparently inadequate to justify take authorization under the criteria enumerated in the 4d Rule.

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