The Washington Department of Fish and Wildlife (WDFW) developed the North Fork Nooksack Chum Hatchery and Genetic Management Plan (HGMP), placed a draft version on our web page on January 16, 2013, announced its availability, and solicited public comment through February 15, 2013.

The comments were received from: Mr. Andy Appleby and Dr. Peter Paquet representing the Hatchery Scientific Review Group (HSRG) – Washington. Their comments are posted under a separate cover, and our responses are appended below.

WDFW Response to Comments by HSRG – submitted to WDFW February 15, 2013.

Principles and System-Wide Recommendations

The HSRG's three principles for hatchery management are presented below, with each of 17 system-wide recommendations (applicable to programs across the Columbia River Basin hatchery system) listed under the principle from which it is derived. These principles and system-wide recommendations represent the key findings of the HSRG during its review of Columbia River Basin hatcheries, but are applicable to all hatchery programs. Hatchery programs that adhere to these principles and recommendations are more likely to contribute to the managers' harvest and conservation goals.

1. **Principle: Develop Clear, Specific, Quantifiable Harvest and Conservation Goals for Natural and Hatchery Populations within an "All H" Context.**

Recommendation 1: Express conservation goals in terms of a population's biological significance (Primary, Contributing, Stabilizing) and viability (natural-origin spawning abundance and productivity).

> **Comment 1.** *The biological significance (Primary, Contributing, Stabilizing) of the Nooksack chum population is not stated in the HGMP, perhaps explaining why goals for conservation of the population are lacking. Mention is made that the population is not ESA-listed (Section 7, Item 7.9). It is stated, however, that the population has declined in numbers because of habitat degradation due to development in the watershed and associated shorelines (Section 1, Item 1.8) and that harvests to satisfy tribal needs are not possible without augmentation of the population using a hatchery program (Section 1, Items 1.7 and 1.8).*
>
> *No statements are given regarding population viability but, as stated above, mention is made that the population is not ESA-listed.*
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> > **WDFW Response**: The Co-managers have designated this population as primary, and it is considered "Healthy" (SASI, 2002).

Recommendation 2: Express harvest goals in terms of a population's contribution to specific fisheries.

> **Comment 2.** *Quantifiable harvest goals are not stated and they should be. The goals should be stated in terms of the number of fish expected to be harvested in various fisheries or, at the very least, in terms of the total number of adults needed for harvest. The proposed program is a re-initiation of a previous program that "existed in the past" and was terminated in 2004*

(Section 1, Item 1.13). No reason is given for the termination in the HGMP, but WDFW terminated the program in response to HSRG recommendations in 2003 (HSRG, March 2003). At that time the HSRG recommended the program be terminated or converted into a properly integrated program with the recommendation that a new broodstock be established using natural origin adults. Table 3 1.12.1 lists hatchery returns of the program for 2002 to 2011 but no information is provided on smolt- to- adult survivals or on adult production levels even though these values may have been available from the original program that was terminated in 2004. However, the main purpose of this "harvest augmentation" program is to provide fish for tribal harvest. It should be noted that based on Table 3.3.1.1, the terminal run was highly variable during the period 2003-2011 with the largest run recorded in 2011 for the years provided.

WDFW Response: Salmon hatchery programs support state sport, state commercial, Treaty commercial, and Treaty ceremonial and subsistence fisheries. Unlike the State's lowland lake trout fisheries where such metrics as are being asked for make sense, the complexities of the salmon life history and salmon harvest management overlaid with Endangered Species Act conservation restrictions do not lend themselves to the creation of specific quantifiable goals for contribution to specific fisheries. The State sport and treaty harvests occur in all of Puget Sound as well as in the freshwater environments. The marine fisheries are supported by a host of hatchery programs throughout Puget Sound, whereas the freshwater fisheries are supported mostly by the local production. In order to create a fishery package for salmon harvest management, there are conservation objectives for specific stocks that must be met. Therefore, the success of fisheries is not only dependent on the size of hatchery programs but also on the fishery package in place that meets all the conservation objectives. For example, it may be that one year the harvest in a particular fishery is less in order to limit the harvest on a population that is not meeting its conservation objective. In another year the harvest might be higher because the limiting stocks did not curtail fisheries where a particular hatchery program's fish are caught. That and the number of different fisheries supported by each hatchery program and the number of different hatchery programs that support each fisheries make the concept impractical for salmon programs.

The chum program terminated in 2004 was not marked, so fry to adult survival rates, and hatchery contribution on the natural spawning grounds could not be determined. All of the production in the re-initiated program will be thermally marked, so both survival rates and pHOS can be determined if funding is available for otolith analyses.

Recommendation 3: Ensure goals for individual populations are coordinated and compatible with those for other populations in the Region.

Comment 3. *The program will abide by directives of the* US v Washington *court decision which, among other things, provides the legal basis for coordinating hatchery programs. It will also follow the guidelines for hatchery reform formulated by the Hatchery Scientific Review Group and will carry out the actions mandated by the* Hatchery Action Implementation Plan *for the watershed (Section 3, Item 3.1). The program will form part of The Salmon Recovery Plan for the Nooksack Basin which is integrated into the Regional Salmon Recovery Plan (Section 3, Item 3.4).*

WDFW Response: Comment noted.

2. Principle: Design and Operate Hatchery Programs in a Scientifically Defensible Manner.

Recommendation 4: Identify the purpose of the hatchery program (i.e., conservation, harvest or both).

Comment 4. *The purpose of this "integrated harvest" program (Section1, Item 1.6) is "harvest augmentation" (Section 1, Item 1.7). Precautions are being taken to avoid adverse effects on the natural chum population serving as the source of the hatchery broodstock. Initially, all broodstock (1,100 adults sufficient to satisfy the 1.2 million egg-take goal) will be comprised of natural-origin adults collected in the river (Section 1, Item 1.11; Section 6, Item 6.2.2) using weirs and seine nets which are non-lethal and selective (Section 1, Item 1.10.2, page 8). Eventually, adults returning to the hatchery are expected to make the program self-sustaining (Section 1, Item 1.11). At this stage, additional NORS will be taken from the river and incorporated into the hatchery broodstock only to maintain the "integrated" nature of the program but a specific HOR/NOR target for this purpose is not stated in the HGMP (Section 6, Item 6.1). Although monitoring the number of spawners in the North Fork Nooksack River is listed as a Performance Indicator (Table 1.20.2; Performance Standard 3.3.1), the number of spawners in recent years is not provided. Without this information, evaluating the performance of the hatchery program relative to natural-origin fish cannot be determined.*

WDFW Response: Spawner escapement numbers from 2003-2011 are provided in HGMP Table 3.3.1.1. Evaluating the performance of this program will not be possible until a full brood cycle returns from this program, in 2017.

Recommendation 5: Explicitly state the scientific assumptions under which a program contributes to meeting the stated goals.

Comment 5. *The rationale for operating this program is given in Section 1, Item 1.8 and the scientific assumptions under which the program can be expected to meet its goals are the same as those used successfully by other past and current programs of this nature (see for example Table 3.3.1.1 detailing the results of a successful Tribal chum program fishery which would not be allowed to proceed were it to unduly threaten the natural chum population from which the adults for the program were originally derived).*

WDFW Response: Comment noted.

Recommendation 6: Select an integrated or segregated broodstock management strategy based on population goals and hatchery program purpose.

Comment 6. *The program selected is an integrated one but no statements are made about the proportion of NORS to be used in the broodstock to maintain integration with the native stock.*

WDFW Response: 100% natural-origin recruits will be utilized for four years, after which the program will be re-evaluated; continuation will be based on funding and analyses of the program.

Recommendation 7: Size hatchery programs based on population goals and as part of an "all H" strategy.

Comment 7. *The basis for choosing to start the program using 1.2 million eggs, equivalent to 550 females and 550 males, is unclear (Section 7, Item 7.4.1). In addition, no goal statement is*

given about of the number of adults to be produced to satisfy the harvest needs. If data on egg-to-smolt and smolt-to-adult survival rates exist from the program terminated in 2004, and if the desired goal for the number of adults to be made available for harvest were stated, this would be a better basis for selecting the number of eggs required for the program (see also Recommendation 4 above).

WDFW Response: This program serves a dual purpose of providing harvest opportunity and a safeguard against winter flooding conditions; incubation capacity is also limited at Kendall Creek Hatchery. The program would have been larger if more incubation capacity was available at the facility, contingent on co-manager agreement and funding availability.

Recommendation 8: Manage harvest, hatchery broodstock and natural spawning escapement to meet HSRG standards appropriate to the affected natural population's designation.

Comment 8. *Only if the biological significance of the affected population is established can the appropriate standards relevant to the three factors mentioned in the recommendation above be managed appropriately. It would seem likely that the population would be classified as Primary. If so, the Co-Managers should consult the hatchery reform document cited in the HGMP. The biological significance of the population should be given earlier in the HGMP (under Recommendation 1).*

WDFW Response: Tribal harvest levels, and natural spawning escapement from 2003-2011 are provided in HGMP Table 3.3.1.1. The population is considered "Primary" by the Co-managers, and only natural-origin broodstock will be utilized for the current four-year term of the production agreement.

Recommendation 9: Manage the harvest to achieve full use of hatchery-origin fish.

Comment 9. *Harvests from this new program are still in the future (assuming the program gets its funding to proceed). However, if harvests (including selective harvest) of the program's adults fail to utilize all of the production, the program size should be reduced to correct this situation.*

WDFW Response: Comment acknowledged. If this situation comes up in the future, the Co-managers will address it.

Recommendation 10: Ensure all hatchery programs have self-sustaining broodstocks.

Comment 10. *The intention for the program is to eventually have a self-sustaining broodstock, at which point NORs will only be used to ensure that the broodstock is integrated with the natural population (Section 6, Item 6.1).*

WDFW Response: Comment noted.

Recommendation 11: Coordinate hatchery programs within the Regions ecosystem to account for the effects of all hatchery programs on each natural population and each hatchery program on all natural populations.

Comment 11. *The program will abide by directives of the US v Washington court decision which, among other things, provides the legal basis for coordinating hatchery programs. It will also follow the guidelines for hatchery reform formulated by the Hatchery Scientific Review Group and will carry out the actions mandated by the Hatchery Action Implementation Plan for the watershed (Section 3, Item 3.1). The program will form part of The Salmon*

Recovery Plan for the Nooksack Basin which is integrated into the Regional Salmon Recovery Plan (Section 3, Item 3.4).

WDFW Response: Comment noted.

Recommendation 12: Assure that facilities are constructed and operated in compliance with environmental laws and regulations.

Comment 12. *Kendall Creek Hatchery water intake screens are not in compliance with the State and NMFS criteria established in 2011. The screens are identified for replacement but replacement is not considered of high priority because Chinook do not spawn above the Kendall Creek rack and because Kendall Creek is not thought to support spawning and rearing of bull trout (Section 1, Item 1.8.1). The facility complies well with the NPDES requirements (Section 4, Table 4.2.1).*

WDFW Response: Comment noted.

Recommendation 13: Maximize survival of hatchery fish consistent with conservation goals.

Comment 13. *Fish are forced-released as fed fry (smolts) at a time, size, and life history stage likely to result in rapid migration to sea and to favor increased survival (Section 1, Item 1.8.1; Section 9, Item 9.2.8, and Section10, Item 10.3). The goal is to raise fish to 400 fpp at the time of release; however in the single year of operation (2011), fish were released at a smaller size (600 ffp).*

WDFW Response: Comment noted.

3. Principle: Monitor, Evaluate and Adaptively Manage Hatchery Programs.

Recommendation 14: Regularly review goals and performance of hatchery programs in a transparent, regional, "all-H" context.

Comment 14. *The HGMP describes monitoring activities for obtaining information on survival, contributions to fisheries, and impacts on natural spawners (Section 1, Item 1.10.1 and 3.3.1) and for modifying the program if it is necessary to do so (see for example Section 1, Table 1.11.2.1). However, due to the lack of specific harvest goals, it is unclear how this information would be used to modify the hatchery program. Also, the harvest will be conducted in terminal Tribal gillnet fisheries and in mixed-stock areas (Area 7, 7A, and Strait of Juan de Fuca) (Section 3.3.1), complicating monitoring.*

WDFW Response: Comment noted.

Recommendation 15: Place a priority on research that develops solutions to potential problems and quantifies factors affecting relative reproductive success and long-term fitness of populations influenced by hatcheries.

Comment 15. *If funding can be obtained, the HGMP mentions the intention to do genetic studies on genetic variation within the basin (Section 1, Item 1.10.2, page 7).*

WDFW Response: Comment noted.

Recommendation 16: Design and operate hatcheries and hatchery programs with the flexibility to respond to changing conditions.

Comment 16. *Comment: A reading of the HGMP leaves the strong impression that the program will be open to modifications to accommodate changing conditions.*

WDFW Response: Comment noted.

Recommendation 17: Discontinue or modify programs if risks outweigh the benefits.

Comment 17. *Comment: The Kendall Creek chum hatchery program utilizing the current population of Nooksack fall chum was discontinued (for unstated reasons) in 2004 but was re-initiated using adults collected in 2011 primarily because of the need to provide for tribal harvest. It seems unlikely that the program would again be terminated. It seems more likely that, if necessary, it would be modified to significantly reduce any risks posed by the program. Currently, risk averse measures include collecting NORs for broodstock only when the risks to listed Chinook and steelhead are minimal (Section 1, Item 1.10.2, page 5) and conducting harvest when listed Chinook and steelhead are not present in significant numbers (Section 1, Table 1.8.1, page 4). In addition, HORs on the spawning ground will be monitored to ensure that they do not exceed the "appropriate portion of the total spawning population" (Section 1, Item 1.10.2, page 7).*

WDFW Response: Comment noted.