The Washington Department of Fish and Wildlife developed the Elwha River Chinook Hatchery and Genetic Management Plan (HGMP), placed a draft version on our web page on June 4, 2012, and subsequently placed a revised version for public review on July 5, 2012, announced its availability, and solicited public comment through August 5, 2012.

A total of 13 individuals or organizations subsequently provided comments to WDFW during the public comment period. The comments ranged from short paragraphs to extensive reviews, and were received from Mr. Nick Gayeski at the Wild Fish Conservancy (WFC), from Mr. Andy Appleby and Dr. Peter Paquet representing the Hatchery Scientific Review Group – Washington, from Mr. Bryan Irwin at the Coastal Conservation Association, from Mr. Pete Soverel at The Conservation Angler, and from 9 members of the general public via email. Their comments are posted under separate cover, and our responses are appended below.

Response to Comments by the Hatchery Scientific Review Group – submitted to WDFW July 27, 2012:

1. Triggers

The HSRG requests that the HGMP clearly develop and define the triggers to be used and the decision tree from which these triggers are developed.

WDFW Response: The HGMP will direct operations of the Elwha Chinook hatchery during the Preservation and Recolonization phases of the Elwha salmon recovery plan as defined in Section 1.7 of the HGMP, described in Section 11.1.1, and displayed in the Performance and Trigger table. Triggers to progress from the Recolonization phase to the Local Adaptation are likewise displayed in the table in Section 11.1.1, but WDFW does not expect to transition to the Local Adaptation phase prior to developing a revised HGMP using data collected in the Preservation and Recolonization phases. The biological rationale for the numbers used in this table and the evaluation were developed by the inter-agency Elwha Working Group, and triggers for the transition to the Local Adaptation phase will be informed by data to be collected in the two earlier phases. WDFW will adhere to the required terms and conditions of the Biological Opinion developed by NOAA Fisheries, authorizing this program under Section 4(d) of the ESA.

The numbers used as abundance triggers between the phases were adopted by WDFW as provided in initial guidelines developed by the Elwha Working Group. The triggers were based on production necessary to seed the accessible habitat in the Elwha River. In the Self-Sustaining phase, the natural spawner abundance indicator is the expected spawner capacity of the Elwha River ecosystem. For the purpose of selecting a performance trigger for adaptive management, the Elwha Working Group relied on empirical data from recent studies based on 25 Chinook salmon populations from Oregon to Alaska (Parken et al. 2006, Liermann et al. 2010). A Ricker spawner-recruit

function was applied to these data sets and the authors demonstrated that the number of Chinook salmon spawners producing maximum sustainable yield is correlated with accessible watershed size and can be calculated with a few parameters:

$S = \hat{b}\chi * e^{\ln \hat{a} + (\frac{\sigma^2}{2})}$ (refer to Parken et al. 2006 for explanation of formula parameters).

This equation was applied to Elwha River Chinook salmon assumed to fully use their potential habitat and assumed to express both ocean (sub yearling migrants) and stream type (yearling migrants) life histories (Healey 1991). The trigger value selected was the abundance of ocean and stream type Chinook supported by the accessible watershed size (Parken et al. 2006; Liermann et al. 2010). For the Self-Sustaining phase, accessible watershed size is the entirety of the intrinsic potential predicted from topographic data, potential migration barriers, salmon habitat use below the dams, and salmonid habitat preferences (Pess et al. 2008). For the Preservation, Recolonization, and Local Adaptation phases, watershed size was assumed to be 7%, 33%, and 66% of this value, following the distribution trigger values described in this document.

The selected trigger levels in the table in Section 11.1.1 are slightly lower than the range of spawner abundance projections previously predicted for a self-sustaining population of Chinook salmon in the Elwha River. Spawner capacity has been estimated to range between 17,000 (FERC 1993, DOI et al. 1994) and 31,000 (DOI et al. 1995) spawners in an unfished population. The EFRP additionally calculated a self-sustaining spawner escapement level to be 6,900 in a fished population with a 78% exploitation rate (Ward et al. 2008), corresponding to a pre-fishing abundance of 31,000 Chinook. This wide range of published values corresponds with the planning recovery targets for Elwha Chinook salmon described in the Puget Sound Chinook Recovery Plan (Puget Sound Salmon Recovery Plan 2007). The conservative escapement values selected as performance triggers are consistent with the general approach to selecting triggers adopted for this monitoring and adaptive management plan (e.g., preparation for the next restoration phase not a maximum potential in a given restoration phase).

The HSRG also commented that a pHOS standard is not identified in the Performance and Trigger table and no pHOS objective is identified. As indicated in the listing and monitoring of Performance Indicators (Sections 1.10 and 11), and explained in section 6.2.3, the WDFW intends to operate the hatchery during the Preservation and Recolonization phases without reference to pHOS standards. We will begin broodstock management (pHOS and pNOB) through active program management after transition to the Local Adaptation phase of recovery.

2. Marking plan for hatchery-origin fish

The HSRG requests that hatchery-origin fish be marked to identify and manage hatchery-origin and natural-origin chinook in the broodstock and in natural escapements.

WDFW Response: Because of the need to determine harvest in pre-terminal fisheries, and to manage adult returns as the population transitions to the Local Adaptation phase, WDFW proposes to adipose-clip all subyearling Chinook releases from the Elwha Chinook program. Beginning with brood year 2012, WDFW will tag and mark (Ad/CWT) 240,000 sub-yearling chinook to assess exploitation rates on this portion of the production. It is our intent to adipose-clip all sub-yearling chinook releases beginning in 2016. Currently, all yearling chinook (400,000) will be released with a coded-wire tag, but will not receive an adipose clip. The specifics of marking are described in Section 10.7 of the submitted HGMP, and the document will be updated to reflect current marking commitments.

3. Definition of final phase of recovery.

The HSRG notes that the HGMP used the terms "Self-sustaining exploitable populations" and "Full restoration", and suggests that only one term be used for clarity.

WDFW Response: We agree, and will consistently use the term “Self-sustaining population” as the generic term for the final phase of chinook salmon recovery.

4. Question as to why yearling fish are to be released, as opposed to all sub-yearling releases.

The HSRG notes that there are no advantages to the release of yearling chinook relative to survival or adult returns from releases of sub-yearling chinook.

WDFW Response: We intend to spread the risk to recovery by rearing and release of multiple life-histories of Elwha chinook salmon as described in Section 1.11.2.

Cited References:

DOI (U.S. Department of the Interior), NMFS (U.S. National Marine Fisheries Service), and LEKT (Lower Elwha Klallam Tribe). 1994. The Elwha Report – Restoration of the Elwha River ecosystem and native anadromous fisheries: a report submitted pursuant to Public Law 102-495. Olympic National Park, Port Angeles, WA.

DOI (U.S. Department of the Interior), NMFS (National Marine Fisheries Service), and Lower Elwha Klallam Tribe. 1995. Elwha River ecosystem restoration. Final Environmental Impact Statement, June 1995. Olympic National Park, Port Angeles, WA. Available online at http://www.nps.gov/olym/naturescience/elwha-restoration-docs.htm.

FERC (Federal Energy Regulatory Commission). 1993. Proposed Elwha (FERC No. 2683) and Glines Canyon (FERC No. 588) hydroelectric projects, Washington. Office of Hydropower Licensing (now Division of Hydropower Licensing within the FERC Office of Energy Projects). Federal Energy Regulatory Commission, Washington, D.C.

Healey, M. C. 1998. Life history of Chinook salmon (*Onchorhynchus tshawytscha*). C. Groot, and L. Margolis, editors. Pacific salmon life histories. UBC Press, Vancouver.

Liermann, M. C., R. Sharma, and C. K. Parken. 2010. Using accessible watershed size to predict management parameters for Chinook, *Oncorhynchus tshawytcha*, populations with little or no spawner-recruit data: a Bayesian modelling approach. Fisheries Management and Ecology 17:40-51.

Parken, C. K., R. E. McNicol, and R. E. McNicol. 2006. Habitat based methods to estimate escapement goals for Chinook salmon stocks in British Columbia, 2004. Research Document 2006/083, Canadian Science Advisory Secretariat, Ottawa, ON.

Pess, G. R., M. L. McHenry, T. J. Beechie, and J. Davies. 2008. Biological impacts of the Elwha River dams and potential salmonid responses to dam removal. Northwest Science 82 (Special Issue):72-90.

Puget Sound Salmon Recovery Plan. 2007. Chapter 4: technical recovery criteria and goals for Puget Sound Chinook salmon and bull trout. Adopted by the National Marine Fisheries Service July 19, 2007. http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Puget-Sound/PS-Recovery-Plan.cfm.

Ward, L., P. Crain, B. Freymond, M. McHenry, D. Morrill, G. Pess, R. Peters, J.A. Shaffer, B. Winter, and B. Wunderlich. 2008. Elwha River fish restoration plan-developed pursuant to the Elwha River Ecosystem and Fisheries Restoration Act, Public Law 102-495. U.S. Dept. of Commerce, NOAA Technical Document NMFS-NWFSC-90, 168 p.

Response to comments on the WDFW Elwha River Chinook HGMP by the Wild Fish Conservancy, submitted by Nick Geyeski on July 12, 2012. The Comments of the Wild Fish Conservancy were reiterated by Pete Soverel, "The Conservation Angler", in his comments submitted on July 25, 2012

WFC Comments:

1. General observation that HGMP does not clearly define triggers and specifics of Restoration Plan phases

WDFW Response: WDFW acknowledges that some recolonization and local adaptation will begin during the Preservation and Recolonization phases identified in the Elwha Fish Restoration Plan. The triggers to move from one phase to another include a combination of the measures of population abundance, stock composition spatial distribution, diversity, and productivity of the population as described in Section 11.1.1 of the HGMP.

WDFW understands that the life of the ESA take authorization for this program will cover only the Preservation and Recolonization phases of recovery. It is expected that a revised HGMP will be developed subsequent to the collection of data specific to the performance of the Elwha chinook hatchery program, as well as data on the performance of naturally-spawning fish in the middle and upper river as dams are removed and sediment movement and stabilization occurs. It is further expected that the interagency Elwha Monitoring Group, a multi-agency group consisting of biological staff from the Lower Elwha Klallam Tribe, National Marine Fisheries Service, Olympic National Park, U.S. Fish and Wildlife Service, U.S. Geological Survey, and the Washington State Department of Fish and Wildlife, will have finalized the Elwha Monitoring and Adaptive Management Plan, including scientifically-based triggers for transitioning from the Recolonization to the Local Adaptation phase. The Performance and Trigger table in Section 11.1.1 of the HGMP reflects the initial guidelines of the Monitoring Group.

Chinook salmon restoration during the Preservation and Recolonization phases relies on hatchery-origin fish resulting from on-station releases, while restoration during the local adaptation and self-sustaining phases will rely on colonization and reproduction from natural-origin fish, with a reduction in the production of fish in the hatchery. The reliance on hatchery-origin fish during the early phases of restoration are due to the assumption that high turbidity during and immediately following dam removal will kill a majority of fish left in the river, and cause failure of any redds deposited where the sediment will smother them. Thus, adult Chinook salmon will be brought into the hatchery to prevent extinction and protect the native Elwha Chinook genetic material. This management action is also required by the Biological Opinion (NMFS 2006). The reliance on hatchery supplementation activities decreases as the population transitions to the Local Adaptation phase, as

the turbidity levels in the Elwha River decrease to levels that no longer result in sub-lethal or lethal effects and abundance of natural spawners increases.

2. Wishes WDFW to request ESA coverage for short (5 year) term

WDFW Response: The duration of ESA take authorization under the auspices of NOAA Take Limit 6 will be at the discretion of the National Marine Fisheries Service. WDFW requested ESA take authorization, anticipating coverage through the Preservation and Recolonization phases of Elwha chinook salmon recovery, at a minimum through July 2020. This was based on our anticipation that restoration of Chinook salmon in the Elwha River would not enter into the Local Adaptation phase prior to 2021, at the earliest.

At the end of the authorization period, WDFW will develop a revised HGMP using data collected on hatchery- and natural-origin chinook with respect to the recovery of natural-origin Elwha chinook, the recommendations of the Elwha Monitoring Group and the Hatchery Scientific Review Group, and requirements from NOAA Fisheries.

3. HGMP does not describe current Genetic diversity of Elwha Chinook

WDFW Response: Elwha Summer/Fall Chinook were identified as a distinct population based on their distinct spawning distribution. Allozyme analysis has shown that Elwha Chinook are genetically distinct from all other Washington Chinook stocks examined (Marshall et al. 1995). Spawning has been limited to the lower 4.8 miles of the river below the Elwha Dam site. Population components in the wild and in the hatchery originate from native Elwha stock. The WDFW Elwha Hatchery collects broodstock from the Elwha River annually. The wild and hatchery components are intermingled.

While Winans et al. (2008) found genetic information indicating that the hatchery stock may be dissimilar from the Hunt's Road Channel chinook, the otolith information from Duda et al (2011) revealed that a significant part of the adult Chinook salmon naturally spawning in the Hunt Road Complex (outside of the index area that WDFW uses for spawner surveys in the lower Elwha River) were of hatchery origin. Combining both collection years (2008-09), 87 percent of the adult Chinook otoliths examined were of hatchery origin. Their findings are consistent with the understanding that naturally-spawning chinook in the Elwha River are of recent Elwha hatchery origin.

4. Monitoring of natural and hatchery populations requires dedicated research into genetics

WDFW Response: Preliminary guidelines from the Elwha Monitoring Group are to collect adequate genetic samples to estimate the number of alleles and expected

heterozygosity. Although the number of genetic samples needed to estimate genetic diversity will vary with the effective population size, the adequate sample sizes is assumed to be 100 genetic samples with good spatial and temporal representation from a given return year (K. Warheit, WDFW, personal communication). A collection of at least 100 samples each from natural spawners and from hatchery spawners will be needed to assess diversity of the integrated hatchery program.

Genetic diversity will be represented by the number of alleles at selected loci and the expected heterozygosity (Hedrick 2000). Two performance indicators for genetic diversity of Chinook salmon will be the number of alleles for a selected set of loci and the expected heterozygosity (H_e). The triggers selected for these indicators assume that the Elwha River Chinook salmon population is in Hardy-Weinberg equilibrium, an assumption that should be tested annually and is supported by a recent genetic analysis of Elwha River Chinook salmon (Winans et al. 2008). During the Preservation and Recolonization phases, where hatchery and natural Chinook are managed as an integrated stock, indicators of genetic diversity should remain constant if hatchery practices ensure equal contribution of all breeding families to the total production (Allendorf and Ryman 1988). During these phases, a decrease in either value may result if the population becomes too small (due to genetic drift or inbreeding, for number of alleles and heterozygosity, respectively) or if hatchery practices are not maximizing crosses among family groups (thereby reducing the effective population size, N_e). Therefore, no trend in number of alleles or expected heterozygosity will be the trigger for the Preservation and Recolonization phases.

5. Scale of hatchery brood program too large

WDFW Response: The WDFW Chinook hatchery program is designed to maintain current releases through the Preservation and Recolonization phases. It is not expected that the Chinook salmon population in the Elwha River will be in the Local Adaptation phase while the requested HGMP is in effect. The Elwha Monitoring Group is currently developing a Monitoring and Adaptive Management Plan which will provide triggers to transition to the Local Adaptation phase of recovery (Section 11.1.1 – Performance and Trigger table) based on biological and physical parameters to guide the reduction of the Chinook hatchery program as Chinook salmon colonize and establish viable populations in the watershed.

The abundance threshold for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2.5 million sub-yearlings and 400K yearlings). This threshold value was selected by WDFW, on preliminary recommendation from the Elwha Monitoring Group, for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases. During the subsequent Local Adaptation phase, the number of Chinook used for hatchery production will be reduced by 20% for every 1,000 fish increase in natural origin spawner abundance.

6. Severe loss of fitness in high level of hatchery releases

WDFW Response: The HSRG (2002) recommended that the program size be maintained to provide an effective number of breeders of at least 500–1,000 adults per year. WDFW agrees with the initial guidelines of the inter-agency Elwha Monitoring Group that a level of 1,700 spawners be maintained during the Preservation and Recolonization phases of Elwha salmon recovery, consistent with this recommendation, to ensure stock maintenance and survival. The program's primary focus will be on appropriate quality and diversity of Chinook smolts. The abundance threshold for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2.5×10^6 sub-yearlings, 400K yearlings). This threshold value was selected for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases.

The primary purpose of this program is to maintain existing genetic resources in support of natural production in the basin, including the re-colonization of the upper watershed following dam removals. To this end, the program calls for the take of approximately 3.5 million eggs. Gametes are taken to the Hurd Creek Hatchery where they are eyed and then transferred to Soleduck Hatchery for hatching and early rearing. Final rearing occurs at the Elwha Rearing Channel. About 2.5 million sub-yearling smolts are to be released into the Elwha River, and 400,000 yearling smolts to be released in the Elwha River and Morse Creek.

The Elwha chinook salmon stock derives from fish captured in the Elwha River during the 1930s. This stock has been maintained through adults returning to the hatchery trap and through netting or gaffing adults on the spawning grounds. The genetic distinctness of the Elwha chinook population is consistent with the maintenance of the population in the hatchery environment subsequent to dam construction and adverse impacts to the river habitat. The Washington Conservation Commission stated that hatchery operations to maintain genetic integrity are imperative until habitat productivity is restored (HSRG 2002). This is the aim and goal of the Elwha Chinook Salmon hatchery program.

7. Need to conduct studies into survival of juvenile chinook in Elwha nearshore

WDFW Response: The Elwha Chinook HGMP is being submitted to address the operation of the Elwha Chinook hatchery program, relative to the maintenance and survival of the species during the Preservation and Recolonization phases identified in the Hatchery Scientific Review Group's review of the Elwha Fish Restoration Plan (Ward et al. 2008). Historical Smolt-to-adult return ratios are presented in the HGMP in Sections 1.12 and 3.3.1, and will be monitored for hatchery and naturally-produced chinook. Studies specific to survival in the nearshore have not been identified for the Elwha Chinook HGMP.

8. Imperative to reduce size of hatchery program to reduce level of domestication

WDFW Response: During the Preservation and Recolonization phases of Elwha River Chinook recovery, there are no plans to manage for the proportion of natural-origin broodstock, or of the proportion of hatchery-origin spawners in the wild, in the Chinook hatchery program. It is expected that the duration of ESA coverage for this HGMP will not extend beyond Recolonization. It is further expected that a revised HGMP will be developed, based upon data collected on the performance indicators of this HGMP and on the abundance, stock composition, productivity, distribution and diversity of Chinook in the Elwha River, which will inform managers on modifications to the size of the hatchery program, and the necessary levels of pNOB during the Local Adaptation phase.

The abundance threshold for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2.5 million sub-yearlings and 400K yearlings). This threshold value was selected by WDFW, on preliminary recommendation from the Elwha Monitoring Group, for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases. During the subsequent Local Adaptation phase, the number of Chinook used for hatchery production will be reduced by 20% for every 1,000 fish increase in natural origin spawner abundance.

9. Imperative to incorporate minimum level of pNOB into hatchery broodstock

WDFW Response: During the Preservation and Recolonization phases of Elwha Chinook recovery, WDFW will adhere to the recommendations of the interagency Elwha Monitoring Group to maintain the current hatchery program level. This will minimize the risks associated with the dam removal process and subsequent transport of released sediment on in-river Chinook spawning success. Prior to the end of ESA coverage under this HGMP, WDFW anticipates that the Elwha Monitoring Group will have developed guidelines and triggers to adaptively-manage the size and composition of the hatchery program through the Local Adaptation phase, and that the program will be eliminated as the population becomes fully restored. During the Adaptive Management phase of restoration, WDFW expects to begin management of the chinook population in a manner consistent with the recommendations of the HSRG, relative to pHOS/pNOB.

10. Size program to no more than 500 hatchery chinook

WDFW Response: The abundance threshold for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2.5 million sub-yearlings and 400K yearlings). This threshold value was selected by WDFW, on preliminary

recommendation from the Elwha Monitoring Group, for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases. During the subsequent Local Adaptation phase, the number of Chinook used for hatchery production will be reduced by 20% for every 1,000 fish increase in natural origin spawner abundance.

11. The conservation purpose of the Chinook program, maintenance of a minimum viable number of brood fish in the naturally-spawning population, should be the sole focus of the HGMP during at least the initial ten years.

WDFW Response: The primary purpose of the Elwha chinook program is to prevent extinction and to maintain the diversity and identity of the existing population during the Preservation phase. During the Recolonization phase, the objective of the chinook program is to achieve total spawning abundance goals, to maintain stock productivity, to increase the abundance and distribution of natural-origin spawners (HGMP Section 11.1.1).

The WDFW supports the recommendation of the HSRG to adopt their standards for operating the hatchery program for a “Primary” population during the “local adaption” phase. While in the Preservation and Recolonization phases of the recovery program, however, management actions in the Recolonization Phase will likely require more than just producing and releasing programmed numbers of juveniles from the hatchery. To improve distribution, abundance, and productivity sufficient to move the population into the Local Adaptation Phase will require flexibility in hatchery and fish management to allow improved pNOB and pHOS when possible. Otherwise, the population might remain in the Recolonization Phase. To achieve the goals of restoring chinook to the Elwha River, WDFW will begin active management of pHOS and pNOB during the Adaptive Management phase, as recommended by HSRG (2012).

12. Mark hatchery-origin releases to distinguish pNOB/pHOB and pHOS/pNOS to achieve PNI standards

WDFW Response: During the Preservation and Recolonization phases of Elwha Chinook recovery, the purpose of the hatchery program is to maintain the extant chinook stock, with a transition to operating the hatchery program for a “Primary” population during the “Local Adaption” phase. Because of the need to determine harvest in pre-terminal fisheries, and to manage adult returns as the population transitions to the Local Adaptation phase, WDFW proposes to adipose-clip all subyearling Chinook releases from the Elwha Chinook program. Beginning with brood year 2012, WDFW will tag and mark (Ad/CWT) 240,000 sub-yearling chinook to assess exploitation rates on this portion of the production. It is our intent to adipose-clip all sub-yearling chinook releases beginning in 2016. Currently, all yearling chinook (400,000) are released with a coded-wire tag, but will not receive an adipose clip. The specifics of marking are

described in Section 10.7 of the submitted HGMP, and the document will be updated to reflect current marking commitments.

13. Preserve specified, quantitative levels of genetic diversity, constrain domestication, facilitate local adaptation during initial 10 years of recovery

WDFW Response: During the Preservation and Recolonization phases, where hatchery and natural Chinook are managed as a passively-integrated stock, indicators of genetic diversity should remain constant if hatchery practices ensure equal contribution of all breeding families to the total. During these phases, a decrease in either value may result if the population becomes too small (due to genetic drift or inbreeding, for number of alleles and heterozygosity, respectively) or if hatchery practices are not maximizing crosses among family groups (thereby reducing the effective population size). Therefore, no trend in number of alleles or expected heterozygosity will be the trigger for the Preservation and Recolonization phases. As the recovery program transitions to the Local Adaptation phase, WDFW expects that there will be two performance indicators for genetic diversity of Chinook salmon: the number of alleles for a selected set of loci, and the expected heterozygosity.

14. Mark all or a sub-set of CWT hatchery releases to analyze harvest

WDFW Response: The HGMP states that appropriate coded-wire tag groups are to be released annually to monitor harvest rates on the Elwha Chinook stock. Currently these rates are monitored for adherence to exploitation rates limitations on the stock, not fishery benefits. Canadian fisheries monitoring programs generally sample only fish that have their adipose fin removed. WDFW Response: Because of the need to determine harvest in pre-terminal fisheries, and to manage adult returns as the population transitions to the Local Adaptation phase, WDFW proposes to adipose-clip all subyearling Chinook releases from the Elwha Chinook program. Beginning with brood year 2012, WDFW will tag and mark (Ad/CWT) 240,000 sub-yearling chinook to assess exploitation rates on this portion of the production. It is our intent to adipose-clip all sub-yearling chinook releases beginning in 2016. Currently, all yearling chinook (400,000) are released with a coded-wire tag, but will not receive an adipose clip. The specifics of marking are described in Section 10.7 of the submitted HGMP, and the document will be updated to reflect current marking commitments.

15. Require PST fisheries to monitor all catches for CWT

WDFW Response: This is outside the scope, and therefore not a component, of the Hatchery and Genetic Management Plan.

16. Include Elwha chinook in regional GSI data base to evaluate harvest impacts (put in Sec 12 – Research)

WDFW Response: It is expected that harvest impacts will be evaluated through use of the coded-wire tag program.

17. Lethal effects of suspended sediment are based upon conjecture; must be evaluated

WDFW Response: WDFW acknowledges the conclusions of NOAA Fisheries that the hypotheses and time frames described in the Biological Opinions (NMFS 2006, NMFS 2012) are based on the best assumptions of the scientific community. NMFS expects sediment loads to have serious short-term adverse effects on Chinook salmon, particularly those fish residing, spawning, and rearing in the mainstem channel. Suspended sediment loads are expected to increase drastically during dam removal with in-river peak sediment loads projected to be as high as 51,000mg/l for 1 to 3 days (Randle et al. 1996), and are expected to be elevated for up to 3 years post dam removal. Increased transport of course and fine sediment bed loads is expected to occur for up to 5 years post dam removal (Randle et al. 1996). Increased bed loads will primarily be advected along the mainstem channel of the Elwha River. These increased bed loads are likely to cause increased egg mortality and redd destruction from any mainstem spawning, the preferred location for Chinook salmon spawning. Additionally, high flow events may also lead to increased transport of bed load into side-and off-channel habitats, potentially leading to the destruction of eggs and redds in these habitats as well, though this is less likely than in the mainstem channel.

If significant successful natural spawning does occur sooner than expected during the Recolonization phase, leading to transition to the Local Adaptation phase, WDFW and NOAA will be required to re-consult on the HGMP in accordance with Section 4(d) of the ESA take authorization.

18. Release all juveniles from hatchery facilities – no upriver releases

Acknowledged. The final HGMP clearly states in Section 10 that releases of juvenile hatchery chinook will be made from the hatchery facilities in the lower river.

19. Definition of Integrated Recovery; The HGMP here needs to be clear about whether it means by integrated recovery what the HSRG meant by this term.

Acknowledged. The final HGMP clarifies that the Elwha River hatchery chinook program will be operated to maintain the current hatchery program through the Preservation and Recolonization phases, with the intent of reducing hatchery production as the chinook population transitions into the Local Adaptation phase. The broodstock will remain integrated with respect to the current mixed composition of chinook in the Elwha River, as both hatchery-origin and natural-origin chinook will be proportionally incorporated into the hatchery broodstock. There is no intent, during the Preservation and Recolonization phases, to manage for pHOS and

pNOB. As the population enters the Local Adaptation phase, the hatchery program will begin stock management to adhere to the HSRG standards for a primary population during that phase.

20. Must address pHOS and pNOB in Preservation and Recolonization phase

WDFW Response: WDFW acknowledges that citations of estimated levels of pHOS and pNOB are not appropriate during the operation of the hatchery chinook program during the Preservation and Recolonization phases, because the objectives of the program during the initial phases of recovery are to maintain the current extant chinook population. Therefore, the Elwha chinook hatchery program does not intend to manage pHOS and pNOB, nor to adopt an integrated broodstock strategy as defined by the HSRG, and by the Washington Fish and Wildlife Commission's Policy POL-C3619 on Hatchery and Fishery Reform, during the Preservation and Recolonization phases of Elwha chinook recovery.

21. Goals for Phases must be informed by determination of minimum number of spawners in the wild. 1,700 broodstock is too large.

WDFW Response: Consistent with the goals of maintaining adequate hatchery production to guarantee desired adult return levels and to maintain the genetic characteristics of the extant population, the abundance threshold for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2.5 million sub-yearlings and 400K yearlings). This threshold value was selected by WDFW, on preliminary recommendation from the Elwha Monitoring Group, for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases. During the subsequent Local Adaptation phase, the number of Chinook used for hatchery production will be reduced by 20% for every 1,000 fish increase in natural origin spawner abundance.

WDFW has not established PNI goals for Chinook salmon during the Preservation or the Recolonization phases. This is based on two factors: the current stock composition and the limited marking of the current hatchery program. Chinook salmon in the Elwha River have largely been maintained through the hatchery program and hatchery returns far exceed natural origin returns. For example, the current escapement of approximately 1,700 hatchery and 1,000 natural origin adult Chinook salmon results in a PNI value of 0.05. In addition, recent otolith data suggest that the productivity of natural spawning adults does not replace the natural spawners (Zimmerman, WDFW, personal communication). This situation will likely continue through the early stages of restoration, since the hatchery will be used to preserve the stock during the period when high turbidities associated with dam removal exist. This high turbidity level has resulted in the NMFS establishing egg-take goals at the current levels during this period of high turbidity to ensure the stock is preserved (NMFS 2006).

22. “Hatchery program role”: The text is far too general and vague, and requires specific plans to Maintain genetic characteristics of population

WDFW Response: WDFW believes that maintaining the current level of hatchery production during this phase is likewise maintaining the current genetic characteristics of the extant population. Genetic diversity (number of alleles and expected heterozygosity) will be evaluated at a selected number of microsatellite loci and comparable to the baseline work conducted by Winans et al. (2008). Genetic samples will be collected from Chinook salmon intercepted at the hatchery rack, the weir and from carcasses recovered during foot and boat surveys. Genetic diversity measures will be evaluated for the integrated stock as a whole and compared between natural and hatchery spawners.

23. Desired adult return levels – goals need to be reconsidered

WDFW Response: The abundance trigger for Chinook salmon spawned in the hatchery is up to 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2,500,000 sub-yearlings and 400,000 yearlings). This trigger value was selected for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases. During the Local Adaptation phase, the number of Chinook used for hatchery production will be reduced by a percentage determined by the Elwha Monitoring Group for every 1,000 fish increase in natural origin spawner abundance. The production and escapement levels are entirely consistent with the objectives of maintaining the current abundance and diversity of the chinook population during the early phases of restoration. An escapement of significantly fewer Chinook may well jeopardize the goals of the restoration plan by risking the continuance of the chinook population until the naturally-spawning population is assured of transitioning to the Local Adaptation phase.

24. Phase 2, Re-colonization: “hatchery program role” to “continue operation of the hatchery program, allowing returning hatchery fish to escape to spawning grounds to supplement natural spawning abundance”. This is too vague.

WDFW Response: This is specifically the role of the hatchery program during the Recolonization phase. Because WDFW will not manage pHOS or pNOB during the early phases of the restoration program, the intent of the hatchery will be to maintain the population at least at current levels until the naturally-spawning population is assured of transitioning to the Local Adaptation phase.

25. Need reference to threshold levels of pHOS

WDFW Response: WDFW does not intend to manage for pHOS or pNOB during the Preservation and Recolonization phases.

26. Definitions of the Local Adaptation and Self-sustaining phases of recovery, and specific recovery targets for those phases.

WDFW Response: WDFW has adopted the HSRG's conceptual framework of four biologically-based phases of restoration. Because this HGMP is not intended to address the Local Adaptation or Self-sustaining phases, WDFW does not intend to specify the minimal levels or targets for spawner abundance, productivity, and distribution for these phases in Section 1.7 of the HGMP. The numbers of natural-origin broodstock and hatchery-origin broodstock in the program, as well as the proportion of hatchery-origin spawners and target PNI to be managed for, will be described in a subsequent HGMP, to be developed as the chinook population transitions to the Local Adaptation phase, based on recommendations of the HSRG for a primary population.

27. Use of the term “exploitable” when describing the Self-Sustaining phase of recovery.

WDFW Response: This definition was made by the Elwha Monitoring Group to account for exploitation taking place in Alaskan and Canadian fisheries. Between 2000 and 2008, exploitation rates on Elwha River Chinook salmon averaged 36%, with 90% of the exploitation occurring in waters off British Columbia and Alaska. This exploitation rate, which represents a noticeable proportion of the fish returning to the river, means that fisheries in waters off British Columbia and Alaska are an important portion of the productivity indicator for Elwha River Chinook salmon. The WDFW recognizes that the recovery of Elwha River chinook must account for such exploitation.

28. It will require a special decision by NOAA to permit directed harvest of a component of the listed ESU.

WDFW Response: The determination of impacts to ESA-listed Puget Sound Chinook during harvest management activities is dictated by a specific Harvest Management Plan (PSIT and WDFW 2010) developed under Limit 6 of the NOAA 4(d) Rule, and is not a component of the Elwha River Chinook HGMP.

29. The continuation of the level of performance of the program during the recent past, relative to smolt-to-adult survival, is undesirable and unjustifiable.

WDFW Response: Between 2005 and 2011, freshwater productivity of Chinook salmon spawning naturally in the Elwha River averaged 218 (±189, ±1SD) juveniles/female, based on outmigrant estimates from the Elwha smolt trap and the number of females spawning. Elwha River freshwater productivity during this period was comparable to other Puget Sound populations with similar hydrologic regimes.

30. We note the vagueness and lack of specific, quantitative targets and thresholds to the listed “hatchery program objectives” and “program indicators”.

WDFW acknowledges this comment and has modified Section 11 to provide more clarity in the objectives, indicators and triggers to monitor and evaluate the performance indicators initially described here. Because the hatchery chinook program is intended to maintain the stated production levels through the Preservation and Recolonization phases, the performance indicators in this HGMP will reflect the Artificial Production Review standards for the Performance Indicators listed in Section 1.10.

31. Expected size of program. We have already noted concerns regarding the proposed size of the hatchery program.

WDFW Response: As stated above, to maintain the population during the early phases of recovery, the abundance trigger for Chinook salmon spawned in the hatchery is 1,700 adults, consistent with the number of spawners needed to produce 2.9 million hatchery Chinook (2,500,000 sub-yearlings and 400,000 yearlings). This trigger value was selected, based on the initial guidelines of the Elwha Monitoring Group, for both the Preservation and Recolonization phases and does not increase as the total number of returning spawners increases.

32. The HGMP fails to recognize and address the serious issue that fitness of the current hatchery-dominated stock has been driven extremely low. This makes continued release of large numbers of hatchery brood during phases 1 and 2 questionable as wild stock preservation.

WDFW Response: As stated above, Elwha River chinook freshwater productivity during 2005-2011 was comparable to other Puget Sound populations with similar hydrologic regimes. During the Preservation and Recolonization phases, and prior to the attainment of a scientifically-recognized locally-adapting population, WDFW does not intend to risk the continued survival of the Elwha chinook population by limiting production below levels approved by NOAA Fisheries.

References in WDFW Responses to WFC Public Comments for Elwha Chinook HGMP Draft:

Allendorf, F. W., and N. Ryman. 1988. Genetic management of hatchery stocks. Pages 141-160 *in* N. Ryman, and F. Utter, editors. Population genetics and fishery management. University of Washington Press, Seattle, Washington.

Duda, Jeffrey J., Matthew M. Beirne, Kimberly Larsen, Dwight Barry, Karl Stenberg, and Michael L. McHenry. 2011. Aquatic Ecology of the Elwha River Estuary Prior to Dam Removal, Chapter 7 *of* Duda, J.J., Warrick, J.A., and Magirl, C.S., eds., Coastal habitats of the Elwha River, Washington—Biological and physical patterns and processes prior

to dam removal: U.S. Geological Survey Scientific Investigations Report 2011-5120, pp. 175-223.

Hatchery Scientific Review Group (HSRG) – Lars Mobrand (chair), John Barr, Lee Blankenship, Don Campton, Trevor Evelyn, Conrad Mahnken, Robert Piper, Lisa Seeb and Bill Smoker. 2002. *Hatchery Reform Recommendations for the Puget Sound and Coastal Washington Hatchery Reform Project, Eastern Strait of Juan de Fuca, South Puget Sound, Stillaguamish and Snohomish Rivers*. Long Live the Kings, 1305 Fourth Avenue, Suite 810, Seattle, WA 98101 (available from www.hatcheryreform.org).

Hatchery Scientific Review Group (HSRG). 2012. Review of the Elwha River Fish Restoration Plan and accompanying Hatchery and Genetic Management Plans. Prepared for the Lower Elwha Klallam Tribe and Washington Department of Fish and Wildlife. January, 2012. 149 pp + appendices.

Hedrick, P.W. 2000. *Genetics of Populations.* 2nd ed. Jones and Bartlett Publishers, Sudbury, MA. Pp. 553.

Marshall, A.R., C. Smith, R. Brix, W. Dammers, J. Hymer, and L. LaVoy. 1995. Genetic diversity units and major ancestral lineages for Chinook salmon in Washington *in* C. Busack and J. B. Shaklee (eds.), Genetic diversity units and major ancestral lineages of salmonid fishes in Washington, p. 111 ‑ 173. Wash. Dep. Fish Wildl. Tech. Rep. RAD 95-02. Washington Department of Fish and Wildlife, 600 Capital Way N., Olympia, WA 98501-1091.

National Marine Fisheries Service (NMFS). 2006. Endangered Species Act Section 7 Formal Consultation for Elwha River Ecosystem and Fisheries Restoration Project (Elwha River, Fifth Field HUC 1711002005, Clallam County, Washington). NMFS, Washington State Habitat Office, NWR-2005-07196. 79 pp.

National Marine Fisheries Service (NMFS). 2012. Reinitiation of Endangered Species Act Section 7 Formal Consultation for the Elwha River and Fisheries Restoration Project, Clallam County, Washington (5th field HUC 1711002005, Port Angeles Harbor, Strait of Juan de Fuca). NMFS, Washington State Habitat Office, NMFS Consultation Number: 2011-03769. 53 pp.

Puget Sound Indian Tribes (PSIT) and Washington Department of Fish and Wildlife (WDFW). 2010. Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component. April 12, 2010. 230 pp.

Randle, T.J., C.A. Young, J.T. Melenda, and E.M. Ouellette. 1996. Sediment analysis and modeling of the river erosion alternative. US Department of the Interior, Elwha Technical Series PN-95-9, 136pp.

Ward, L., P. Crain, B. Freymond, M. McHenry, D. Morrill, G. Pess, R. Peters, J.A. Shaffer, B. Winter, and B. Wunderlich. 2008. Elwha River Fish Restoration Plan – Developed pursuant to the Elwha River Ecosystem and Fisheries Restoration Act, Public Law 102-495. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-90, 168pp.

Winans, G. A., M. McHenry, J. Baker, A. Elz, A. Goodbla, E. Iwamoto, D. Kuligowski, K. M. Miller, M. P. Small, P. Spruell, and D. Van Doornik. 2008. Genetic inventory of anadromous Pacific salmonids of the Elwha River prior to dam removal. Northwest Science 82 (Special Issue):128-141.

WDFW Response to Comments by the Coastal Conservation Association – submitted August 1, 2012:

1. Plan relies on continuation of artificial production practices

WDFW Response: The primary purpose of this program is to maintain existing genetic resources in support of natural production in the basin, including the re-colonization of the upper watershed following dam removals. To this end, the program calls for the take of approximately 3.5 million eggs. Gametes are taken to the Hurd Creek Hatchery where they are eyed and then transferred to Sol Duc Hatchery for hatching and early rearing. Final rearing occurs at the Elwha Rearing Channel. About 2.5 million sub-yearling smolts are to be released into the Elwha River, and 400,000 yearling smolts to be released in the Elwha River and Morse Creek.

The Hatchery Scientific Review Group (2012) recommended that Elwha River fish restoration proceed through four biologically-defined phases. These are the preservation, recolonization, local adaptation, and full restoration phases, as defined in Section 1.7 of the HGMP. Chinook salmon restoration during the Preservation and Recolonization phases relies on hatchery-origin fish resulting from on-station releases, while restoration during the local adaptation and self-sustaining phases will rely on colonization and reproduction from natural-origin fish, with a reduction in the production of fish in the hatchery. The reliance on hatchery-origin fish during the early phases of restoration are due to the assumption that high turbidity during and immediately following dam removal will kill a majority of fish left in the river, and cause failure of any redds deposited where the sediment will smother them. Thus, adult Chinook salmon will be brought into the hatchery to prevent extinction and protect the native Elwha Chinook genetic material. This management action is also required by the Biological Opinion (NMFS 2006, NMFS 2012). The reliance on hatchery supplementation activities decreases as the population transitions to the Local Adaptation phase, as the turbidity levels in the Elwha River decrease to levels that no longer result in sub-lethal or lethal effects and abundance of natural spawners increases.

The current levels of hatchery production will be maintained through the Preservation and Recolonization phases, as described in Section 1.7 and the Performance and Trigger table in Section 11.1.1. As the naturally-produced chinook population transitions to the Adaptive Management phase, the number of Chinook used for hatchery production will be reduced by 20% for every 1,000 fish increase in natural origin spawner abundance. As the natural-origin chinook population transitions to the Self-sustaining phase, hatchery production will cease.

2. HGMP fails to commit to visibly marking all hatchery releases for in-season broodstock management

WDFW Response: The HGMP states that appropriate coded-wire tag groups are to be released annually to monitor harvest rates on the Elwha Chinook stock. Currently these rates are monitored for adherence to exploitation rates limitations on the stock, not fishery benefits. Canadian fisheries monitoring programs generally sample only fish that have their adipose fin removed. Because of the need to determine harvest in pre-terminal fisheries, and to manage adult returns as the population transitions to the Local Adaptation phase, WDFW proposes to adipose-clip all subyearling Chinook releases from the Elwha Chinook program. Beginning with brood year 2012, WDFW will tag and mark (Ad/CWT) 240,000 sub-yearling chinook to assess exploitation rates on this portion of the production. It is our intent to adipose-clip all sub-yearling chinook releases beginning in 2016. Currently, all yearling chinook (400,000) will be released with a coded-wire tag, but will not receive an adipose clip. The specifics of marking are described in Section 10.7 of the submitted HGMP, and the document will be updated to reflect current marking commitments.

3. The HGMP is vague on description of decision process relative to adaptive management.

WDFW acknowledges this comment and has modified Section 11 to provide more clarity in the objectives, indicators and triggers to monitor and evaluate the performance indicators initially described here. Because the hatchery chinook program is intended to maintain the stated production levels through the Preservation and Recolonization phases, the performance indicators in this HGMP will reflect the Artificial Production Review standards for the Performance Indicators listed in Section 1.10. The triggers to move from one phase of chinook salmon restoration to another include a combination of the measures of population abundance, stock composition spatial distribution, diversity, and productivity of the population as described in Section 11.1.1 of the HGMP.

References in WDFW Responses to CCA Public Comments for Elwha Chinook HGMP Draft:

Hatchery Scientific Review Group (HSRG). 2012. Review of the Elwha River Fish Restoration Plan and accompanying Hatchery and Genetic Management Plans. Prepared for the Lower Elwha Klallam Tribe and Washington Department of Fish and Wildlife. January, 2012. 149 pp + appendices.

National Marine Fisheries Service (NMFS). 2006. Endangered Species Act Section 7 Formal Consultation for Elwha River Ecosystem and Fisheries Restoration Project (Elwha River, Fifth Field HUC 1711002005, Clallam County, Washington). NMFS, Washington State Habitat Office, NWR-2005-07196. 79 pp.

National Marine Fisheries Service (NMFS). 2012. Reinitiation of Endangered Species Act Section 7 Formal Consultation for the Elwha River and Fisheries Restoration Project, Clallam County, Washington (5th field HUC 1711002005, Port Angeles Harbor, Strait of Juan de Fuca). NMFS, Washington State Habitat Office, NMFS Consultation Number: 2011-03769. 53 pp.

Response to Public Comments on the draft WDFW Elwha HGMP received by email.

Section 1: General Program Description
Section 1.7: Purpose of Program
Comment:
Use original gene pool salmon for the hatchery and shut down the hatchery as soon as the original gene pool salmon are sustainable from generation to generation.

Call for No hatchery program
Comments:

- Wouldn't it be best to not build a hatchery on that river system (or any others in the state for that matter)? For the record, I am against any new hatchery production on the Elwha. (Armstrong)
- The watershed likely still has the potential of reproducing this quality of fish (100 pound kings) over time and I believe a hatchery program could be detrimental to that process. (Burkholder)
- I am totally against hatchery fish...let the wild fish spawn naturally. (Kosin)
- I personally am opposed to hatcheries and more so to genetically modified fish. (Fausett)

WDFW Response: The Elwha Channel Hatchery program has been sustained for decades only through the collection of broodstock from the adult salmon population returning to the Elwha River. The Puget Sound Technical Recovery Team identified Chinook salmon spawning in the Elwha River as geographically distinct from other populations in east Puget Sound and Hood Canal and genetically distinct from all other Puget Sound Chinook populations. The hatchery and natural-origin components of the Elwha population are genetically indistinguishable and are thought to represent the remnant, genetically-unique and independent Elwha Chinook population. Recent natural-origin Chinook productivity data suggest that Elwha Chinook would be extinct except for supportive breeding provided through annual operation of the Elwha Channel hatchery program over the past 30-40 years.

With the removal of the Elwha and Glines Canyon dams, WDFW acknowledges the conclusions of NOAA Fisheries that the hypotheses and time frames described in the Biological Opinions (NMFS 2006, NMFS 2012) are based on the best assumptions of the scientific community. NMFS expects sediment loads to have serious short-term adverse effects on Chinook salmon, particularly those fish residing, spawning, and rearing in the mainstem channel. Suspended sediment loads are expected to increase drastically during dam removal with in-river peak sediment loads projected to be as high as 51,000 mg/l for 1 to 3 days (Randle et al. 1996), and are expected to be elevated for up to 3 years post dam removal. Increased transport of course and fine sediment bed loads is expected to occur for up to 5 years post dam removal (Randle et al. 1996). Increased bed loads will primarily be advected along the mainstem channel of the Elwha River. These increased bed loads are likely to cause increased egg mortality

and redd destruction from any mainstem spawning, the preferred location for Chinook salmon spawning. Additionally, high flow events may also lead to increased transport of bed load into side-and off-channel habitats, potentially leading to the destruction of eggs and redds in these habitats as well, though this is less likely than in the mainstem channel.

Disposition of Hatchery

Comment:

- What happens to the hatchery if you reach a self-sustaining population; is it reclaimed or retooled for other work? (Wells)

WDFW Response: As the Elwha River chinook population transitions into a Self-sustaining phase, the program will have been discontinued. No decision has been made at this time concerning the disposition of the hatchery facility at that time.

Section 1.10: List of program "Performance Indicators."

Comment:

- Is there any set of standards to evaluate whether or not the ongoing hatchery operation is positively/negatively affecting the natural/wild spawning populations in the recolonization and local adaptation steps of this? (Wells)

WDFW Response: The Hatchery Scientific Review Group (2012) recommended that Elwha River fish restoration proceed through four biologically-defined phases. These are the preservation, recolonization, local adaptation, and full restoration phases, as defined in Section 1.7 of the HGMP.

The Elwha Chinook HGMP is being submitted to address the operation of the Elwha Chinook hatchery program, relative to the maintenance and survival of the species during the Preservation and Recolonization phases identified in the Hatchery Scientific Review Group's review of the Elwha Fish Restoration Plan (Ward et al. 2008). The performance indicators for the program, relative to both natural- and hatchery-origin chinook, will be monitored to ensure that the objectives of restoring a self-sustaining population that can sustain exploitation by fisheries are met.

The primary purpose of this program is to maintain existing genetic resources in support of natural production in the basin, including the re-colonization of the upper watershed following dam removals. To this end, the program natural and hatchery components of the population will be monitored throughout the several phases of restoration. The HGMP provides clarity in the objectives, indicators and triggers to monitor and evaluate the performance indicators described in Section 1.10. Because the hatchery chinook program is intended to maintain the stated production levels through the Preservation and Recolonization phases, the performance indicators in this HGMP will reflect the Artificial Production Review standards for the Performance Indicators. The triggers to move from one phase of Chinook salmon restoration to another include a combination

of the measures of population abundance, stock composition spatial distribution, diversity, and productivity of the population as described in Section 11.1.1 of the HGMP.

Section 3: Relationship to Other Management Programs
Section 3.3: Relationship to Harvest Objectives
Comments:

- Allow No Fishing Until Run Is Established. If people must fish, provide an opportunity for them with marked fish. (Blankenship)
- Designate put and take areas / fisheries like The Cowlitz River or East Fork Lewis. No wild fishery there to impact. If the native population must harvest, provide a "Black Hole" opportunity for them with marked fish, so the struggling wild fish population can be released and get established. (Blankenship)
- Let nature take its course after conditions have been restored and then treat the resource in a sustainable fashion including harvesting by state residents. (Kirkham)
- Any allowable commercial / aboriginal harvest should be via fish traps. This would allow for harvest discrimination and preclude "by-catch" or collateral damage on wild stocks. (Blankenship)

WDFW Response: WDFW and the co-managers have agreed to a moratorium on fisheries directed on Elwha River salmon for a period of 5 years beginning in 2012. Subsequent to the end of the moratorium, potential harvest will occur within limits on harvest and the terminal harvest rate for naturally-produced chinook consistent with ESA conservation standards to avoid impeding the recovery of the native chinook population. Presently, no harvest is directed on this stock. Terminal Chinook fisheries and terminal fisheries for other species as well, have been curtailed in the Elwha River and marine area in the proximity of the Elwha River (Freshwater Bay) to minimize impacts on Elwha Chinook. Adult fish are harvested in mixed stock marine waters, particularly the ocean and the Strait of Juan de Fuca as well as Canadian waters. There are no plans for future fishery benefits from this program. Future fisheries may be directed toward wild Elwha Chinook, once a self-sustaining, viable and exploitable population is re-established in the basin. The hatchery program is intended to be discontinued when the Self-sustaining phase of recovery is achieved.

Section 7: Broodstock Collection
Comments:

- Find seed stock that best represents the physical characteristics of "native" stocks and the river environment. (Blankenship)
- Use original gene pool salmon for the hatchery and shut down the hatchery as soon as the original gene pool salmon are sustainable from generation to generation. (Kirkham)

WDFW Response: Elwha Summer/Fall Chinook were identified as a distinct population based on their distinct spawning distribution. Allozyme analysis has shown that Elwha

Chinook are genetically distinct from all other Washington Chinook stocks examined (Marshall et al. 1995). Spawning has been limited to the lower 4.8 miles of the river below the Elwha Dam site. Population components in the wild and in the hatchery originate from native Elwha stock. The WDFW Elwha Hatchery collects broodstock from the Elwha River annually. The wild and hatchery components are intermingled.

While Winans et al. (2008) found genetic information indicating that the hatchery stock may be dissimilar from the Hunt's Road Channel chinook, the otolith information from Duda et al (2011) revealed that a significant part of the adult Chinook salmon naturally spawning in the Hunt Road Complex (outside of the index area that WDFW uses for spawner surveys in the lower Elwha River) were of hatchery origin. Combining both collection years (2008-09), 87 percent of the adult Chinook otoliths examined were of hatchery origin. Their findings are consistent with the understanding that naturally-spawning chinook in the Elwha River are of recent Elwha hatchery origin.

Comment: After reading about the suit against several parties including NOAA are these (Twin River) smolt traps INDEED part of a scientific study or are the smolt being relocated to the Elwha River? (Fausett)

WDFW Response: The monitoring of the Elwha River and the Intensively Monitored Watershed project on the Twin Rivers and Deep Creek are two distinctly separate programs, although they use some similar methodologies. No salmon, steelhead or other fish are being transferred from the Twin Rivers to the Elwha.

Section 7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Section 7.8) Disposition of carcasses.

Comment:

- Are carcasses from salmon being placed up the length of the Elwha to start the process for the salmon to return? (Neff)

WDFW Response: We recognize the importance of marine-derived nutrients in the watersheds, as a benefit to the freshwater ecosystems and – ultimately – the anadromous fisheries. We also recognize that the upper Elwha has been 'starved' of these nutrients for decades. Because of the need to restrict motorized equipment that would be required to distribute salmon carcasses into the protected areas of Olympic National Park, the National Park Service has not been in favor of 'artificial' nutrient enhancement in the Park, preferring that live fish should carry the nutrients upstream after the dams are removed, and we do not currently have plans to 'artificially' move hatchery carcasses into the Park.

Because insufficient chinook return directly into the WDFW facility, the Elwha Channel chinook hatchery relies partially on eggs taken from salmon spawned 'in the river', where the carcasses are left in-stream at the spawning site. Because the hatchery, and

the current chinook spawning area, is in the lower river, these marine-derived nutrients benefit only a portion of the watershed.

Of the fish returning to, or captured and transported to, the hatchery, they are held until 'ripe' for spawning. Because of the likelihood for the use of formalin as a fungicidal treatment on adult salmon being held for spawning at the hatchery facility, it is not possible for us to use those carcasses for nutrient enhancement, and those carcasses are disposed of by burial. Neither WDFW policy, nor the U.S. Food and Drug Administration rules, allows us to place medically or chemically-treated carcasses back into the river.

However, a portion of hatchery-origin and natural-origin chinook will be passed, alive, to the upper watershed and allowed to spawn. After natural spawning, these fish will die and their nutrients will start the process of ecological nutrient enhancements. When Glines Canyon dam is removed, the returning fish will return to the upper watershed - with increasing 'culling' of hatchery-origin returns at the weir as time progresses, so as to allow for the expression of locally-adapted genetics to prevail over 'hatchery-influence' genetics as the re-colonization and local adaptation phases of the recovery program are reached. As the salmon populations increase, we anticipate that substantial amounts of nutrients will pass upstream to the upper Elwha through natural spawning escapements.

General Comment:

- I thought that the damn dam removal and all that praying was going to fix everything. (Hadsell)

WDFW Response: WDFW intends to address the goals and objectives of Elwha River Chinook salmon recovery consistent with the biologically-based recommendations of the Hatchery Scientific Review Group, collaboration with our co-managers, and under the provisions of chinook recovery under the Endangered Species Act take authorized by NOAA Fisheries.

References in WDFW Responses to Comments submitted by email for the Elwha Chinook HGMP Draft:

Duda, Jeffrey J., Matthew M. Beirne, Kimberly Larsen, Dwight Barry, Karl Stenberg, and Michael L. McHenry. 2011. Aquatic Ecology of the Elwha River Estuary Prior to Dam Removal, Chapter 7 *of* Duda, J.J., Warrick, J.A., and Magirl, C.S., *eds*., Coastal habitats of the Elwha River, Washington — Biological and physical patterns and processes prior to dam removal: U.S. Geological Survey Scientific Investigations Report 2011-5120, pp. 175-223.

Hatchery Scientific Review Group (HSRG). 2012. Review of the Elwha River Fish Restoration Plan and accompanying Hatchery and Genetic Management Plans.

Prepared for the Lower Elwha Klallam Tribe and Washington Department of Fish and Wildlife. January, 2012. 149 pp + appendices.

Marshall, A.R., C. Smith, R. Brix, W. Dammers, J. Hymer, and L. LaVoy. 1995. Genetic diversity units and major ancestral lineages for Chinook salmon in Washington *in* C. Busack and J. B. Shaklee (eds.), Genetic diversity units and major ancestral lineages of salmonid fishes in Washington, p. 111 ‑ 173. Wash. Dep. Fish Wildl. Tech. Rep. RAD 95-02. Washington Department of Fish and Wildlife, 600 Capital Way N., Olympia, WA 98501-1091.

National Marine Fisheries Service (NMFS). 2006. Endangered Species Act Section 7 Formal Consultation for Elwha River Ecosystem and Fisheries Restoration Project (Elwha River, Fifth Field HUC 1711002005, Clallam County, Washington). NMFS, Washington State Habitat Office, NWR-2005-07196. 79 pp.

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Winans, G. A., M. McHenry, J. Baker, A. Elz, A. Goodbla, E. Iwamoto, D. Kuligowski, K. M. Miller, M. P. Small, P. Spruell, and D. Van Doornik. 2008. Genetic inventory of anadromous Pacific salmonids of the Elwha River prior to dam removal. Northwest Science 82 (Special Issue):128-141.

Ward, L., P. Crain, B. Freymond, M. McHenry, D. Morrill, G. Pess, R. Peters, J.A. Shaffer, B. Winter, and B. Wunderlich. 2008. Elwha River Fish Restoration Plan – Developed pursuant to the Elwha River Ecosystem and Fisheries Restoration Act, Public Law 102-495. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-90, 168pp.