

Puget Sound Hatchery Action Advisory Committee Final Report

**Hatchery Evaluation and Assessment Team
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Abstract

A growing body of scientific research has shown that wild populations of salmon and steelhead can be negatively impacted due to interactions with their hatchery reared counter parts, which has spurred the need for hatchery reform. In 2011, the Washington Department of Fish and Wildlife (WDFW) created the Puget Sound Hatchery Action Advisory Committee (PSHAAC) to help guide the prioritization of hatchery reform actions needed to reduce the risks posed by the state's hatchery operations in the Puget Sound region. The PSHAAC met monthly beginning in July of 2011 and continued through April of 2012. The group was provided with information regarding the status of natural populations of salmon and steelhead as well as the performance and economic benefits of hatchery programs throughout the Puget Sound. Based on these data, the PSHAAC suggested population designations to help set hatchery reform standards and recommended watersheds in which hatchery fish should not be released, and would be designated Wild Salmonid Management Zones (WSMZs). The recommendations provided by the PSHAAC are being used by the Department in on-going Hatchery Action Implementation Plan (HAIP) discussions as well as in development of Hatchery Genetic Management Plans (HGMPs) with the tribal Co-managers to help refine management goals for hatchery fish programs in watersheds throughout the Puget Sound region. WDFW hatchery programs, and all other Co-manager operated hatchery programs within the State of Washington, are operated under *U.S. v Washington* (1974). This legal basis for Co-management of salmon in Puget Sound is also based on the Puget Sound Salmon Management Plan (PSSMP), which was developed by the Co-managers and adopted as an order of the Federal court in 1985.

Table of Contents

Introduction.....	1
Why form a Puget Sound Hatchery Action Advisory Committee?	2
Committee Focus.....	3
Methods.....	4
Results.....	6
Puget Sound Chinook Salmon (<i>Oncorhynchus tshawytscha</i>).....	6
Snoqualmie Chinook.....	9
Committee Recommended Portfolio of Actions for Progress on Green River and Skokomish River Chinook Populations	9
Green River Chinook Recommendations.....	9
Skokomish Chinook Recommendations	10
Puget Sound Steelhead (<i>Oncorhynchus mykiss</i>)	11
Puget Sound Coho Salmon (<i>Oncorhynchus kisutch</i>)	13
Puget Sound Sockeye Salmon (<i>Oncorhynchus nerka</i>).....	14
Puget Sound Chum Salmon (<i>Oncorhynchus keta</i>).....	15
Puget Sound Pink Salmon (<i>Oncorhynchus gorbuscha</i>).....	16
Discussion.....	17
Acknowledgements.....	18
Works Cited	19
Appendix A.....	21
Appendix B.....	23

List of Tables

Table 1.	Species Covered by the Committee, ESA and population status, and state hatchery releases of the same species within Puget Sound	1
Table 2.	Constituent Population Designation Summary Recommendations for <i>Oncorhynchus tshawytscha</i> Puget Sound Chinook.....	6
Table 3.	Recommendations for priority programs to meet the FWC policy C-3619 guidelines for <i>Oncorhynchus tshawytscha</i> Puget Sound Chinook.....	7
Table 4.	Constituent Population Designation Summary Recommendations for <i>Oncorhynchus mykiss</i> Puget Sound Steelhead.....	11
Table 5.	Constituent Population Designation Summary Recommendations for <i>Oncorhynchus kisutch</i> Puget Sound Coho	13
Table 6.	Constituent Population Designation Summary Recommendations for <i>Oncorhynchus nerka</i> Puget Sound Sockeye	14
Table 7.	Constituent Population Designation Summary Recommendations for <i>Oncorhynchus keta</i> Puget Sound chum	15
Table 8.	Puget Sound salmon and steelhead releases from WDFW facilities (WDFW Future Brood Document 2012)	21

Introduction

The Washington Department of Fish and Wildlife operates 83 hatcheries across the State of Washington, the majority producing salmon and steelhead to mitigate for fish habitat losses and adverse drainage basin impacts from the development of the Puget Sound region, as well as providing harvest opportunities for recreational, commercial and tribal fisheries. Between the years 2000 and 2008, an average of 32,655,000 Chinook, 2,126,000 steelhead, 6,319,000 coho, and 26,503,000 fall chum were released from state facilities (WDFW Hatchery Database 2012; Table 1). While state hatcheries have provided economic, educational and cultural benefits, they also may have had negative impacts on wild salmonid populations. With the listings of Hood Canal summer chum (*Oncorhynchus keta*) and Puget Sound Chinook (*Oncorhynchus tshawytscha*) as threatened in 1999 and Puget Sound steelhead (*Oncorhynchus mykiss*) as threatened in 2007 under the federal Endangered Species Act (Table 1), the need for conservation has become increasingly necessary. Consequently, in 2000 Congress created the Hatchery Scientific Review Group (HSRG) to help review and provide advice and recommendations on strategies for reducing biological risks of hatchery programs in a manner that allows for continued production to meet fishery objectives.

Table 1. Species Covered by the Committee, ESA and population status, and state hatchery releases of the same species within Puget Sound.

Species	ESA Listing Status and Date	Population Status/ Trend	WDFW Hatchery Releases (average per year 2000-2008) ¹
Chinook	Listed as threatened in 1999, reaffirmed in 2005 and 2011.	Depressed populations with flat trend since 1995. Most populations have declined since 2005 (Ford 2011).	32,655,000
Steelhead	Listed as threatened in 2007, reaffirmed 2011.	Populations have shown declines over the past decade, with some sharply declining (Ford 2011).	2,126,000
Coho	Not listed	Abundance of Puget Sound coho salmon remains quite high and had a mean run size of 851,000 for years 2000-2008	6,319,000
Sockeye	Not listed	Puget Sound sockeye populations are maintained primarily by hatchery returns. In recent years, the Baker Lake population has shown increasing escapement, while the Lake Washington population has not met the escapement goal of 350,000 since 2006.	Baker Lake: 2,292,500 Cedar River: 12,567,300
Chum	Hood Canal Summer Chum listed as threatened in 1999, reaffirmed 2005, 2011. Fall stocks not listed	Although the abundance of summer chum has increased across the ESU since the listing, numbers have declined slightly in more recent brood years (Ford 2011). Fall chum populations remain healthy throughout the Puget Sound overall population trends have been relatively stable in recent years.	Summer Chum: 381,100 Fall Chum: 26,503,000

(Continued on Page 2)

Table 1. (continued) Species Covered by the Committee, ESA and population status, and state hatchery releases of the same species within Puget Sound.

Species	ESA Listing Status and Date	Population Status/ Trend	WDFW Hatchery Releases (average per year 2000-2008) ¹
Pink	Not listed	With the exception of Strait of Juan de Fuca and Hood Canal stocks, over the past decade pink salmon populations have significantly increased and shown some degree of range expansion.	1,389,700

¹ Does not include RSI releases (only yearling releases for coho and steelhead, sub-yearling and yearling for Chinook and fry for chum and pink).

Data Sources: Ford 2011, WDFW SaSI 2012 and WDFW Hatchery Database 2008.

Why form a Puget Sound Hatchery Action Advisory Committee?

The Washington Fish and Wildlife Commission (FWC) adopted the Hatchery and Fishery Reform Policy (FWC Policy C-3619) in 2009. This policy defined guidelines, including a goal of achieving HSRG broodstock standards for the State’s hatchery system by 2015. The intent of this policy is to be achieved through a number of strategies, including brood stock management, mass-marking of all hatchery Chinook, coho and steelhead, and the establishment of Wild Salmonid Management Zones (WSMZ). These WSMZs are places where there is to be no further hatchery production for a particular species. Based on the FWC policy the Department will:

“Work with tribal Co-managers to establish network of Wild Salmonid Management Zones (WSMZ) across the state where wild stocks are largely protected from the effects of same species hatchery programs. The Department will have a goal of establishing at least one WSMZ for each species in each major population group (bio-geographical region, strata) in each ESU/DPS. Each stock selected for inclusion in the WSMZ must be sufficiently abundant and productive to be self-sustaining in the future. Fisheries can be conducted in WSMZ if wild stock management objectives are met as well as any necessary federal ESA determinations are received.”

The Puget Sound Hatchery Action Advisory Committee (PSHAAC or the Committee) was created in 2011 as a communication link between the Washington Department of Fish and Wildlife (the Department) and the interested public. The Committee was established to provide meaningful opportunity for understanding the Department’s management trajectory and advising the Department on issues related to hatchery production and the implementation of hatchery reform in the Puget Sound region. The 11-member Committee was guided by plans and policies adopted by the FWC; these included the Statewide Steelhead Management Plan (SSMP) and the FWC Policy C-3619. Actions recommended by the Committee will be used by the department as it moves forward in implementing the FWC policy. In addition to the 11-member Committee, at least two members of the Washington HSRG participated at each meeting as technical experts for implementation of hatchery reform.

Committee Focus

The Committee's principle focus was recommending population designations for all Puget Sound salmon populations, recommending WSMZs by species, and evaluating and recommending implementation strategies to reduce biological risk to naturally spawning populations, while meeting habitat loss mitigation obligations and supporting sustainable fisheries. The Committee also discussed strategies to balance conservation of the salmon resource while supporting sustainable fisheries. In particular, the recommendations and input are guiding the Department as staff work with tribal Co-managers in developing new management plans for state hatcheries that are unique to each watershed. The HAIPs and HGMPs focus on collaboration with tribal Co-managers to identify and implement actions that will reduce or eliminate risks that hatchery programs can pose to natural populations. The HAIP process is intended to implement hatchery reform as part of an "all-H" strategy that integrates hatchery, harvest, and habitat actions consistent with FWC policy C-3619. The Committee strongly supports the HAIP process as a step toward managing salmon in an All-H context.

This report summarizes the information, process and work products of the Committee.

Methods

Committee members participated in monthly discussions from July 2011 through April 2012. The focus of the meetings followed a species-by-species process. In preparation for each meeting, WDFW staff provided the Committee with information regarding the abundance and status of natural populations, numbers of hatchery fish released (Tables 1 and 7), the subsequent adult return numbers, the economic costs and benefits of the hatchery programs and the level of biological risk the hatchery programs posed relative to natural production. Where available, the Committee was also provided with information regarding PNI (proportionate natural influence), pHOS (proportion of hatchery-origin spawners in the watershed), pNOB (proportion of natural-origin spawners in the hatchery brood stock), values for specific watersheds and the draft designations on which hatchery influence in each watershed would be managed. This basic information helped the group consider and recommend draft population designations consistent with the FWC policy C-3619.

The concept of population designation was originally adopted by the Lower Columbia Fish Recovery Board (LCFRB 2004) and expanded upon by the HSRG (2009), and is used to define the role of a population in contributing to regional conservation and fishery goals. All distinct salmon populations are classified as *primary*, *contributing*, or *stabilizing*. Under the population designation concept, the objective for managing primary populations is to achieve at least a high viability by maintaining a pHOS of less than 5% of the natural spawners for segregated programs, or a pHOS of less than 30% for integrated programs as well as a PNI of 67%. The objective for managing contributing populations is to achieve a medium viability by maintaining a pHOS of less than 10% of the natural spawners for segregated programs, or a pHOS of less than 30% for integrated programs, as well as a PNI of 50%. The objective for managing stabilizing populations is to maintain at least the current level viability and current hatchery operating conditions.

Meetings were usually dedicated to one species, and were organized to review and discuss fundamental scientific information. The Committee considered and requested additional material for review and to better inform their recommendations. Recommendations were formulated and considered by the Committee as a whole.

Chinook was the first species reviewed and discussed by the PSHAAC. Information provided included population status, recovery planning targets, and harvest exploitation rates. For Chinook, the Committee was also provided with computer model outputs featuring different scenarios for harvest and hatchery management for the programs as inputs, using the All-H-Analyzer (AHA model), to demonstrate to the Committee what production might look like under these differing regimes. Population designations and candidate WSMZs were then identified by the Committee, and the Committee developed specific recommendations for achieving management targets over the short (by 2015) or long term (Table 3). While the FWC policy C-3619 identifies a goal of only one WSMZ per geo-region, the Committee often identified several populations as candidate WSMZs for each region.

Following the discussions on Chinook, the Committee's focus shifted to steelhead. In addition to population status, harvest and hatchery data, the Committee also held a special discussion on gene flow since that metric is a key for measuring hatchery introgression into wild populations (see Statewide Steelhead Management Plan). The WDFW genetics lab provided the Committee with feedback on how gene-flow between hatchery and wild populations might be monitored across the Puget Sound to meet the 2% or less gene-flow standard set in the SSMP (WDFW 2008). The details of this discussion can be viewed on the WDFW website in the January 2012 meeting minutes at: <http://wdfw.wa.gov/hatcheries/pshaac/minutes.html>.

For Puget Sound coho, the Committee considered the population management based approach for harvest agreed to by the state and tribes in the Comprehensive Coho Management Plan (CCMP) (PSTT and WDFW 1998), as well as the status of associated natural populations. From this information, the Committee formulated recommendations for coho population designations. Given that there is limited hatchery production associated with Puget Sound chum, pink and sockeye, the Committee considered the abundance of natural populations in watersheds with concurrent hatchery production to develop recommended population designations. Department staff worked with the Committee to outline final recommendations by species and organize the information within a status tracking table.

Meeting minutes and supporting technical material can be found on the WDFW's website at: <http://wdfw.wa.gov/hatcheries/pshaac/>.

Results

Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

The PSHAAC recommended designating seventeen populations as primary, three as contributing, and two as stabilizing. Among these populations, six were also recommended to be designated as potential WSMZs (Table 2). The Committee also advised on whether programs were a priority to meet the FWC policy guideline regarding HSRG broodstock standards by 2015 and actions needed to meet the population designations (Table 3).

Table 2. Constituent Population Designation Summary Recommendations for *Oncorhynchus tshawytscha* Puget Sound Chinook.

Geo-region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
Strait of Georgia	NF Nooksack	Yes			No
	SF Nooksack	Yes			No
Whidbey Basin	Upper Skagit - summer	Yes			No
	Lower Skagit - fall	Yes ¹			No
	Cascade - spring	Yes ²			No
	Suiattle - spring	Yes			Yes
	Upper Sauk – spring	Yes			Yes
	Lower Sauk – summer	Yes			Yes
	NF Stillaguamish - summer	Yes			No
	SF Stillaguamish - fall		Yes		No
	Skykomish - summer	Yes ³			No
	Snoqualmie - fall	Yes			Yes
Central/South Basin	N. Lk. Washington Sammamish			Yes	No
	Cedar		Yes		Yes
	Green		Yes ⁴		No ⁶
	White	Yes			No
	Puyallup			Yes	No
	Nisqually	Yes			No
Hood Canal	Skokomish	Yes ⁴			No
	Mid-Hood Canal	Yes			No
Strait of Juan de Fuca	Dungeness	Yes			No
	Elwha	Yes ⁵			Yes ⁵

¹ Consider for WSMZ designation.

² If discontinue current program want to designate as WSMZ.

³ Want to revisit and consider changing designations with SF Stillaguamish.

⁴ Expect quantifiable benchmarks for implementation to allow progress from current.

⁵ Committee would like to see rise to a WSMZ designation eventually.

⁶ Want a viable natural population.

Table 3. Recommendations for priority programs to meet the FWC policy C-3619 guidelines for *Oncorhynchus tshawytscha* Puget Sound Chinook.

Geo-region	Hatchery Program	Priority for 2015 Commission Goal?	See Options for MSF1 role	Top actions to align program with population designation and HSRG broodstock standards
Strait of Georgia	NF Nooksack - spring	No	N/A	<ol style="list-style-type: none"> 1. Design program that can meet intermediate standard of 0.50 PNI with less concern over pHOS level to counter strays 2. Possibility of a mark selective fishery in the terminal area
	SF Nooksack - spring	N/A	N/A	<ol style="list-style-type: none"> 1. Work to address stray risks from other watersheds
	Nooksack – Fall (Bertrand Hatchery)	Yes	N/A	<ol style="list-style-type: none"> 1. Make sure programs fall within stray limits for the recovering population 2. Address programs that are problems 3. Model selective harvest to see if it can affect the problem of the above if there is a problem
Whidbey Basin	Upper Skagit - summer	Yes	N/A	<ol style="list-style-type: none"> 1. As long as indicator stock is needed keep the program. Eliminate program as soon as the indicator stock is no longer needed
	Cascade - spring	Yes	N/A	<ol style="list-style-type: none"> 1. Keep the utility of the hatchery program as an indicator 2. Do not increase the size of the program 3. Would like to change to a local stock, but this may be politically untenable
	NF Stillaguamish - summer	No	No	<ol style="list-style-type: none"> 1. Really need to determine how to help this population 2. Get the highest PNI we can in the short term by controlling pHOS – removal during broodstock
	SF Stillaguamish - fall	N/A	N/A	<ol style="list-style-type: none"> 1. Not a priority since there is no hatchery program 2. Want to re-visit with ESU designations to evaluation 3. Deal with any pHOS issues
	Skykomish - summer	No	N/A	N/A
	Snoqualmie - fall	Yes ²	N/A	<ol style="list-style-type: none"> 1. Pursue lower reach MSF to reduce pHOS from summer run fish 2. Pursue options for a weir if the above option fails

(Continued on Page 8)

¹ Mark-selective sport and net fisheries (MSF) were discussed as a management tool for reducing the proportion of hatchery-origin fish on spawning grounds (pHOS) while providing fisheries benefits. Other tools, such as weirs, can be used for managing pHOS but may not provide the same fisheries opportunities or may not be feasible due to physical or logistical constraints

² Need to address stray rate.

Table 3. (continued) Recommendations for priority programs to meet the FWC policy C-3619 guidelines for *Oncorhynchus tshawytscha* Puget Sound Chinook.

Geo-region	Hatchery Program	Priority for 2015 Commission Goal?	See Options for MSF3 role	Top actions to align program with population designation and HSRG broodstock standards
Central/South Basin	N. Lk. Washington Sammamish	Yes	Yes	1. Need to address stray rate
	Cedar	Yes	N/A	1. Remove hatchery fish at Landsburg Dam to address pHOS.
	Green	No	Yes	See text below for further details
	White	Yes	No	1. pHOS goal of 0.30 2. Transition Hupp Springs Hatchery into a segregated harvest program
	Voights Creek (Puyallup)	N/A	N/A	1. Prioritize habitat recovery
	Nisqually	Yes ⁴	N/A	N/A
Hood Canal	George Adams (Skokomish)	No	Yes	See text below for further details
	Hoodspout	N/A	N/A	1. Check into a phased release from George Adams Hatchery
	Hamma Hamma	No	N/A	1. Priority but not relative to the 2015 FWC goals 2. Move the population towards local adaptation and as it gets there ensure it meets standards
Strait of Juan de Fuca	Dungeness	No	No	1. Priority to meet standards but not for the 2015 goal 2. Implement or find funding for marking to better support broodstock management principles
	Elwha ⁵	No	No	1. Develop an adaptive management plan 2. Ensure that monitoring and evaluation funding is in place

³ Mark-selective sport and net fisheries (MSF) were discussed as a management tool for reducing the proportion of hatchery-origin fish on spawning grounds (pHOS) while providing fisheries benefits. Other tools, such as weirs, can be used for managing pHOS but may not provide the same fisheries opportunities or may not be feasible due to physical or logistical constraints.

⁴ Need to address stray rate.

⁵ Population should be managed as a genetic reserve right now.

Also see:

http://wdfw.wa.gov/hatcheries/pshaac/documents/ps_chinook_status_progress_20july.pdf

Snoqualmie Chinook

Due to high pHOS levels (18%) in the proposed Snoqualmie fall Chinook WSMZ, the Committee suggested the implementation of a mark selective fishery in the lower Snoqualmie River.

Committee Recommended Portfolio of Actions for Progress on Green River and Skokomish River Chinook Populations

The PSHAAC has identified the Green River Chinook population as a candidate for a higher viability goal in recovery (Contributing) than was originally proposed by the Department (Stabilizing), and has concurred with the Puget Sound Chinook Recovery Plan's designation of the Skokomish River Chinook for high viability in recovery.

It is acknowledged and understood by the Committee that the current survival and productivity of the natural Chinook populations in both the Green and Skokomish rivers is likely limited by the condition of the current habitat. Improved survival and productivity cannot occur solely or even principally through significant changes in the hatchery programs without having large effects on fisheries currently in place throughout Puget Sound and the pre-terminal areas of these watersheds.

However, it is important to the PSHAAC that WDFW hatchery programs, operating in these watersheds, be brought into balance with these conservation objectives over time. To that end, the PSHAAC recommends a portfolio of actions, with performance benchmarks, be developed and implemented to ensure progress towards greater protection of the natural populations of Chinook in these watersheds. The PSHAAC strongly advocates for implementation of the portfolio of actions to reduce risk and provide greater protection from effects of hatcheries, and barring implementation and/or failure to achieve benchmarks, the PSHAAC would advocate for a significant reduction of Chinook production in both watersheds.

Green River Chinook Recommendations

Near Term Actions – 2011 - 2015

1. Re-evaluate the productivity of wild Green River Chinook, considering possible habitat degradation, e.g. effect of massive slide downstream of Flaming Geyser State Park.
2. Develop a natural-origin escapement goal within the current aggregate escapement goal.
3. Implement mark selective fisheries in pre-terminal and terminal area targeting Soos Creek origin hatchery Chinook.
4. Update of Puget Sound Chinook Harvest Resource Management Plan and associated harvest impacts on the natural population.
5. Seek and secure capital funds to rebuild Soos Creek Hatchery.

Short Term Actions – 2015 – 2020

Achieve all near term actions, plus,

1. Rebuild Soos Creek Hatchery inclusive of a Green River weir to assist in managing pHOS in the watershed.
2. Evaluate and implement two-stage integration.
3. Ensure natural-origin escapement goal achieved annually within aggregate.
4. Re-evaluate the overall program performance with other changes occurring in watershed
 - a. Howard Hansen Dam operation/downstream juvenile fish passage.
 - b. Habitat protection/restoration through salmon recovery.
 - c. Soos Creek Hatchery survival and contribution to fisheries between 2015 – 2020.

Long Term Actions – 2020 – 2025

Achieve all near and short term actions, plus,

1. pHOS at 30% or less.
2. Program performance achieving at least contributing metric.

Skokomish Chinook Recommendations

Spring Chinook Restoration

The Skokomish Tribe is working to reintroduce spring Chinook to the Skokomish basin and would like to manage these fish as the primary population. The spring Chinook reintroduction program is grounded in a recovery planning evaluation of the historic nature of the watershed (historic flows and the Chinook that utilized the North Fork Skokomish River) that informed the recent Cushman Dam relicensing agreement between Tacoma Power and the Skokomish Tribe. The PSHAAC expressed support of the Skokomish Tribe’s decision to continue the process of developing and evaluating a spring Chinook program for recovery purposes. The below recommendations are in the context of the present management scenario, in which the fall Chinook population is listed under the ESA as a primary population that is essential for recovery.

Near Term Actions – 2011 - 2015

1. Re-evaluate or develop more contemporary EDT estimates for Skokomish Watershed given habitat restoration actions.
2. If productivity of habitat better than estimates in AHA model, then incorporate new estimates in model runs and re-evaluate performance.
3. If productivity of habitat better than current AHA model estimates, then pursue in short term period a weir, if needed and feasible, for use in managing the pHOS level.
4. If productivity of habitat better than current AHA model estimates, then evaluate a two-stage integration Chinook program at George Adams Hatchery.
5. Ensure smolt monitoring occurs to document productivity.

Short Term Actions – 2015 – 2020

Achieve all near term actions plus,

1. Implement terminal mark selective fisheries for all parties.
2. Construct weir if productivity better.

Long Term Actions – 2020 – 2025

1. Ensure progress towards primary stock designation metrics.
2. Ensure pHOS remains at or below 30%.

Puget Sound Steelhead (*Oncorhynchus mykiss*)

The Committee had difficulty reaching consensus on WSMZ designations for some key populations, but ultimately was able to arrive at a set of WSMZ designations that met the SSMP policy (Table 4).

General recommendations the Committee discussed for all Puget Sound steelhead populations are:

1. Support of WDFW’s new policy direction for steelhead, associated with the Statewide Steelhead Management Plan, and priority recovery actions for Puget Sound steelhead identified in the memo to the Governor.
2. Recommend investigating additional methods of protecting the early component of wild steelhead runs where segregated hatchery programs are operated. Several members of the Committee are concerned that the existing segregated management schema (early hatchery for harvest / late wild) could still inhibit the wild populations from rebuilding a more protracted adult return time as was historically the case.
3. Recommend developing a better understanding of the relative importance of resident rainbow trout to the steelhead population located in the same basin, and manage accordingly. (This is to address concerns that the resident component may not be getting the same degree of conservation support when they may in fact be playing a substantial role in sustaining the composite resident/anadromous population in some systems.)

Skagit Summer/ Winter Steelhead A WSMZ designation for this population would require the discontinuation of steelhead releases from the Marblemount Hatchery. That action would substantially reduce steelhead angler opportunity (harvest and catch-and-release) in the Skagit system, at least in the near-term due to the critically depressed status of the Puget Sound steelhead population. The Committee discussed the alternative of moving to an integrated program at Marblemount in order to address some of the genetic risks posed by the current hatchery program. However, if this were the case the population would not qualify as a WSMZ.

Steelhead Hatchery Benefits and Priorities

The steelhead hatcheries in the Snohomish basin were shown to have the greatest economic benefit within the Puget Sound (Wegge 2009), and the PSHAAC identified these programs (Tokul, Reiter, and Wallace) as the highest priority programs to retain into the future (Figure 4).

Table 4. Constituent Population Designation Summary Recommendations for *Oncorhynchus mykiss* Puget Sound Steelhead.

Geo-region	Population	WSMZ	Priority to retain associated hatchery program
North Sound	Nooksack Winter	No	5 (Winter Low Priority)
	SF Nooksack Summer	Yes	NA
	Samish Winter	Yes	NA

(Continued on Page 12)

Table 4. (continued) Constituent Population Designation Summary Recommendations for *Oncorhynchus mykiss* Puget Sound Steelhead.

Geo-region	Population	WSMZ	Priority to retain associated hatchery program
	Skagit Summer/ Winter	See footnote 1	3 (Winter Moderate Priority)
	Baker Summer/ Winter	No	NA
	Sauk Summer/ Winter	Yes	NA
	Stillaguamish Winter	See footnote 2	2 (Summer High Priority, Winter Moderate Priority)
	Deer Creek Summer	See footnote 2	NA
	Canyon Creek Summer	See footnote 2	NA
	Snohomish /Skykomish Winter	See footnote 2	1 (Summer High Priority, Winter High Priority)
	Pilchuck Winter	Yes	NA
	Snoqualmie Winter	No	1 (Summer High Priority, Winter High Priority)
	NF Skykomish Summer	Yes	1 (Summer High Priority, Winter High Priority)
	Tolt Summer	Yes	NA
	Lake Washington Winter	No	NA
Central/South Basin			
	Cedar	No	NA
	Green	No	4 (Summer High Priority, Winter Moderate Priority)
	White Winter	Yes ³	NA
	Puyallup/ Carbon Winter	Yes	NA
	Nisqually	Yes	NA
	South Sound Tributaries	No	NA
	East Kitsap Winter	No	NA
Olympic	Skokomish Winter	Yes ³	NA
	East-Hood Canal Winter	Yes ³	NA
	West Hood Canal Winter	Yes ³	NA
	Sequim Winter	Yes	NA
	Dungeness Winter	No	6 (Winter Low Priority)
	Strait Independent Winter	No	NA
	Elwha	Yes ³	NA

¹ High ranking candidate by most individual members. However the necessity to discontinue the Marblemount Hatchery program precluded reaching consensus for a WSMZ candidate (see WSMZ priority ranking link below).

² Identified as candidate WSMZ but not a final recommendation.

³ Recommended as candidate once supplementation program is sunset.

Also see:

Hatchery Program Priority Ranking:

http://wdfw.wa.gov/hatcheries/pshaac/documents/pshaac_ps_sthd_hatchery_prog_priority_ranking_final-022012.pdf

WSMZ Priority Ranking:

http://wdfw.wa.gov/hatcheries/pshaac/documents/ps_steelhead_wsmz_and_risk_ranking_results_rev-final.pdf

Puget Sound Coho Salmon (*Oncorhynchus kisutch*)

The PSHAAC recommended designating eleven populations as primary, five as contributing, and five as stabilizing. Among these populations, thirteen were also recommended as potential WSMZs (Table 5).

Cedar River Coho

The PSHAAC recommended designating the Cedar River coho population as primary with a caveat that this would not lead to the termination of the current RSI programs on Lake Washington. It is thought that there may be a straying risk to the natural population associated with the RSI fish, however this program provides significant cultural and educational benefits. Steps should be taken to minimize impacts to the Cedar River population, through monitoring strays and possible reductions in the release numbers. If the population still does not meet primary standards due to RSI fish, a contributing designation should be adopted.

South Sound Coho

The PSHAAC identified that potential WSMZ's might exist in the Deep South Sound; however no recommendations were made as to the candidate populations. Data on hatchery origin fish straying and pHOS estimates for these streams is somewhat limited. According to Peters (1997) the WDFW assumption that 500 fish from the Squaxin Island Net Pens stray into streams of the South Sound appears to be conservative and is based on data from 30 years ago. It is also unclear whether streams in this region could be successfully managed as WSMZ's due to the unknown stray rate.

Table 5. Constituent Population Designation Summary Recommendations for *Oncorhynchus kisutch* Puget Sound Coho.

CCMP Production Region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
Nooksack/ Samish	North Puget Sound Coho	Yes			Yes
	Upper Nooksack	Yes			No
	General Nooksack			Yes	No
	Samish	Yes			Yes
Skagit	Skagit	Yes			Yes ¹
	Baker				No
Stillaguamish/ Snohomish	Stillaguamish	Yes			Yes
	Snohomish	Yes ²			Yes ²
Mid Puget Sound	Lake Washington	Yes ³			Yes ³
	Green/ Duwamish		Yes		No
	East Kitsap		Yes		Yes
	White River	Yes			Yes
	Puyallup River			Yes	
South Puget Sound	Chambers Creek			Yes	No
	Nisqually		Yes		No
	Deschutes		Yes		Yes
	Deep South Sound		Yes		Yes ⁴
Hood Canal	Quilcene/ Dabob Bay			Yes	No

(Continued on Page 14)

Table 5. (continued) Constituent Population Designation Summary Recommendations for *Oncorhynchus kisutch* Puget Sound Coho.

CCMP Production Region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
	Mainstem Hood Canal	Yes			Yes
	Skokomish		Yes		No
Strait of Juan de Fuca	Eastern Strait of Juan de Fuca	Yes			Yes
	Dungeness			Yes	No
	Elwha	Yes			No

¹ Would require termination of Marblemount release.

² Snoqualmie River is a potential candidate.

³ Cedar River is a potential candidate.

⁴ Specific watersheds not identified.

Also see:

http://wdfw.wa.gov/hatcheries/pshaac/documents/population_designation_coho_summary.pdf

Puget Sound Sockeye Salmon (*Oncorhynchus nerka*)

Sockeye salmon have the most limited geographic distribution of any of the species discussed in the Puget Sound, and the group provided recommended designations for each population. Of these, one was designated as primary and a WSMZ candidate and two were set as stabilizing (Table 6).

Baker Lake Sockeye

PSHAAC members expressed an interest in having a formal escapement goal for Baker Lake sockeye developed.

Cedar River Sockeye

The PSHAAC discussed fishery management goals for sockeye, and expressed an interest in a reassessment of the escapement goal for sockeye in Lake Washington. Aside from fish management goals they recommended a population designation of stabilizing, as this stock is considered to be of non-native origin and was introduced to Lake Washington to support harvest.

Table 6. Constituent Population Designation Summary Recommendations for *Oncorhynchus nerka* Puget Sound Sockeye.

Geo-region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
Skagit Basin	Baker Lake			Yes	No
Central/South Basin	Lake Washington/Sammamish	Yes			Yes
	Lake Washington Beach Spawners			Yes	
	Cedar River			Yes	No

Puget Sound Chum Salmon (*Oncorhynchus keta*)

The PSHAAC did not recommend population designations or WSMZ's for Puget Sound fall chum populations. Most are thought to not be significantly impacted by hatchery actions and most populations are considered to be healthy. Of the populations designated, two were considered as contributing and one was determined to be stabilizing (Table 7).

Table 7. Constituent Population Designation Summary Recommendations for *Oncorhynchus keta* Puget Sound chum.

Geo- Region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
Nooksack/ Samish	Nooksack	Yes			No
	Samish		Yes		No
Skagit	Skagit				
	Sauk				
Stillaguamish/ Snohomish	North Fork Stillaguamish				
	South Fork Stillaguamish				
	Skykomish				
	Wallace				
	Snoqualmie				
Mid Puget Sound	Green/ Duwamish				
	Puyallup/ Carbon River				
	Gig Harbor/ Olalla Creek				
	Sinclair Inlet Fall Chum				
	Dyes Inlet/ Liberty Bay				
South Puget Sound	Chambers Creek				
	Nisqually				
	Eld Inlet				
	Totten Inlet				
	Skookum Inlet				
	Upper Skookum Creek				
	Johns/ Mill Creek				
	Goldsborough/ Shelton Creek				
	Case Inlet				
Carr Inlet			Yes	No	
Hood Canal	Northeast Hood Canal				
	Dewatto				
	Southeast Hood Canal				
	West Hood Canal				
	Lower Skokomish Fall Chum				
	Upper Skokomish Late Fall Chum				
	Hamma Hamma Late Fall Chum				
Duckabush Late Fall Chum					

(Continued on Page 16)

Table 7. (continued) Constituent Population Designation Summary Recommendations for *Oncorhynchus keta* Puget Sound chum.

Geo- Region	Population	Designation			WSMZ
		Primary	Contributing	Stabilizing	
	Dosewallips Late Fall Chum				
	Quilicene Late Fall Chum				
Strait of Juan de Fuca	Dungeness /East Straits Tribs				
	Elwha				

Puget Sound Pink Salmon (*Oncorhynchus gorbuscha*)

The PSHAAC did not arrive at any population designations or WSMZ suggestions for Puget Sound pink salmon. Given the limited hatchery production and geographic range of Puget Sound pink salmon, most natural populations could be considered as WSMZ by default of their current management.

Discussion

Puget Sound hatcheries provide a necessary and valuable resource as set forth in U. S. v. Washington (1974) and the PSSMP (1985). The work done by the PSHAAC will support the Washington Department of Fish and Wildlife in making decisions on how to manage this resource. While hatchery salmon and steelhead may pose a potential risk to natural populations, the Committee, along with WDFW staff worked diligently to identify where risks and benefits of hatchery programs existed and steps for moving forward with hatchery operations in the Puget Sound in a manner consistent with the FWC Hatchery and Fishery Reform Policy (C-3619). The Committee's recommended WSMZ designations provide the WDFW with an economically reviewed and scientifically defensible list of priority watersheds for each species, into which hatchery fish of that species would not be planted. The Committee's draft population designations provide WDFW staff with a framework to refer to in the continued HAIP and HGMP negotiations with tribal Co-managers, and options for how to manage Puget Sound salmon and steelhead populations.

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Appendix A

Table 8. Puget Sound salmon and steelhead releases from WDFW facilities (WDFW Future Brood Document 2012).

Geo-region	WDFW Facility	Programs	Program Type	Current Program Size
Nooksack/ Samish	Kendall Creek	Spring Chinook (sub-yearling) Winter Steelhead	Integrated Segregated	750,000 150,000
	Whatcom Creek	Winter Steelhead Fall Chum Pink	Segregated Segregated Segregated	40,000 2,000,000 500,000
	Samish River	Fall Chinook (sub-yearling)	Segregated	4,000,000
Skagit	Marblemount	Spring Chinook (sub-yearling) Summer Chinook (sub-yearling) Winter Steelhead Coho	Segregated Integrated Segregated Integrated	587,500 200,000 230,000 250,000
	Baker Lake	Coho Sockeye	Integrated Integrated	58,992 6,000,000
Stillaguamish/ Snohomish	Whitehorse Ponds	Summer Chinook (Tribal) Summer Steelhead Winter Steelhead	Integrated Segregated Segregated	220,000 70,000 140,000
	Wallace River	Summer Chinook (sub-yearling) Summer Chinook (yearling) Winter Steelhead Coho	Integrated Integrated Segregated Integrated	1,000,000 500,000 20,000 150,000
	Reiter Ponds	Summer Steelhead Winter Steelhead	Segregated Segregated	190,000 160,000
	Tokul Creek	Winter Steelhead	Segregated	150,000
Lake Washington	Issaquah Creek	Fall Chinook (sub-yearling) Coho	Integrated Integrated	1,500,000 450,000
	Cedar River	Sockeye	Integrated	34,000,000
Mid Puget Sound	Soos Creek	Fall Chinook (sub-yearling) Summer Steelhead Winter Steelhead Winter-Late Steelhead Coho	Integrated Segregated Segregated Integrated Integrated	3,200,000 30,000 35,000 18,000 600,000
	Icy Creek/ Flaming Geysers	Fall Chinook (yearling) Summer Steelhead Winter Steelhead Winter-Late Steelhead	Integrated Segregated Segregated Integrated	300,000 20,000 35,000 26,000
	Voights Creek	Fall Chinook (sub-yearling) Coho	Integrated Integrated	400,000 780,000
South Puget Sound	Chambers /Garrison	Fall Chinook (sub-yearling)	Segregated	850,000
	Tumwater Falls	Fall Chinook (sub-yearling)	Segregated	3,800,000
	Minter Creek/ Hupp Springs	Spring Chinook (sub-yearling) Fall Chinook (sub-yearling) Fall Chinook (yearling) Coho Fall Chum	Segregated Segregated Segregated Integrated Integrated	400,000 1,400,000 120,000 500,000 2,000,000

Continued on Page 22

Table 8. (continued) Puget Sound salmon and steelhead releases from WDFW facilities (WDFW Future Brood Document 2012).

Geo-region	WDFW Facility	Programs	Program Type	Current Program Size
Hood Canal	George Adams	Fall Chinook (sub-yearling) Coho	Integrated Segregated	3,800,000 300,000
	McKernan	Winter-Late Steelhead Fall Chum	Integrated Segregated	21,600 11,500,000
	Hoodsport	Fall Chinook (sub-yearling) Fall Chinook (yearling) Fall Chum	Segregated Segregated Segregated	2,800,000 120,000 12,000,000
Strait of Juan de Fuca	Dungeness/ Hurd Creek/ Gray wolf Ponds	Spring Chinook (sub-yearling)	Integrated	50,000
		Spring Chinook (yearling)	Integrated	50,000
		Winter Steelhead	Segregated	10,000
		Coho	Segregated	500,000
	Morse Creek	Fall Chinook (yearling)	Integrated	200,000
Elwha River	Fall Chinook (sub-yearling)	Integrated	2,500,000	
	Fall Chinook (yearling)	Integrated	200,000	

Data Source: WDFW Hatchery Database 2012.

Appendix B

WDFW PSHAAG MINORITY REPORT

DECEMBER 11, 2012

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We are submitting this Minority Report of the Puget Sound Hatchery Action Advisor Group to aid the Washington Fish and Wildlife Commission (Commission) in its determination of the most appropriate and timely path forward for the Department to achieve compliance with the Commission's hatchery reform policy (FWC Policy C-3619). We believe that some of the operating procedures governing the conduct of the PSHAAG result in the failure of the final report to the Commission to adequately reflect some of the more strongly conservation-oriented perspectives of members.

We also disagree with what seems to us to have been an emphasis on economics and a predilection for the maintenance of full hatchery production that was inappropriate to the conservation concerns that are the primary motivation for the HSRG Recommendations that are the foundation for FWC Policy C-3619. Given the depressed condition of many Puget Sound salmon stocks, including the majority of Chinook and steelhead stocks, and their listing under the ESA, a clearer and stronger emphasis should have been applied to conservation of wild fish and their recovery and to the most effective and rapid way to achieve the Commission's Hatchery Policy and the Hatchery Science Review Group (HSRG) standards. To the contrary, we found the HAAG process too frequently

emphasizing economics and often minimizing and failing to provide sufficient information on hatchery impacts to wild fish or ways to achieve conservation.

Regarding substance, we have disagreements with several of the rankings of steelhead and salmon populations contained in the draft final report. We hope that stating these in a separate (minority) report will make it easier for the Department and the Commission to understand them and to evaluate their importance and merits. Due to the unavoidable short amount of time each of the authors had to provide this report in time for the Commission meeting on December 14, we provide substantive concerns about rankings for selected steelhead and Chinook salmon populations as bullet points. We are happy to provide additional details and/or discuss these and related concerns with the Commission and Department policy staff subsequent to the Commission meeting.

Procedure.

We believe that the conduct of PSHAAG meetings failed to properly follow the WDFW Operating Protocols and Guidelines for Advisory Groups (Guidelines). Importantly, the Guidelines pamphlet was never provided the committee members; nor were the responsibilities of advisory group members or the rules governing the process of advising the department explained, either during the initial meeting or during periods of voting/advise making.

We have reviewed the Guidelines rules governing the decisions made by the Department during meetings and found that the WDFW facilitators often applied the wrong interpretations of the rules and used those interpretations to cast aside some of the committee's majority decisions. As example, the facilitators required a 100% vote on a subject to move it forward for a WDFW policy review and final decision. The WDFW appropriately choose members to represent a broad range of interests. Such a diverse group is unlikely to achieve unanimity on any subject

that was controversial. The pamphlet clearly states that recommendations have utility when they represent the full range of stakeholder views. In some situations the Group was lead to reach a consensus that appeared to represent little more than the existing preference of Department staff.

Regarding substance, we have disagreements with several of the rankings of steelhead and salmon populations contained in the draft final report. A prominent task set the Group was to identify and recommend candidate populations for Wild Management Zone (WMZ) status. We are much encouraged that the majority of the Group were supportive of more than the minimum number of populations (one) per species per major population group. However, the emphasis on reaching consensus and the emphasis on economics over conservation concerns resulted in the draft final report failing to recognize important opportunities to identify WMZ's for one or more large river systems.

Steelhead Rankings

One example of the handling of a candidate steelhead WSMZ was prominent in forming of our descent. During the meetings we reviewed the 14 Demographically Independent Populations (DIPs) for the North Puget Sound Geo-region for designating Wild Steelhead Management Zones (WSMZs). Eight committee members voted on a priority selection for steelhead WSMZs for this geo-region. Members voted the Sauk DIP (summer and winter) as #1 and the Skagit DIP (summer and winter stocks) as #2 for designation. This ranking would mean that the entire Skagit River watershed could be designated as a WSMZ. This designation would require the elimination of the Chambers Creek program at the Marblemount Hatchery. Terminating this program would eliminate the significant threat posed by this program to native Skagit winter-run steelhead from introgression from straying fish from the program. Recent research in the Skagit has shown that a large number of hatchery origin spawners and juvenile progeny of naturally-spawning hatchery adults are present in several tributaries

to the middle and upper Skagit river, resulting in significant introgression with wild steelhead and competition with wild juveniles. The proportions of hatchery-origin adults on spawning grounds (pHOS) are well in excess of the minimum levels recommended by the HSRG for segregated programs. Continuation of the Marblemount hatchery steelhead program will continue to support excessively high levels of pHOS.

Instead of accepting the strong support of a majority of committee members to designating the entire Skagit a steelhead WMZ, the WDFW facilitator unexpectedly stated that a consensus was needed (or a 100% vote) for the Skagit DIP and it would not move forward for further consideration. This was the first time the WDFW facilitator had stated that a consensus would be required to form a final decision. Still at this time the WDFW did not indicate or introduce their rules pamphlet.

One result of the insistence on consensus was that those populations that were recommended as candidates for WMZs were the relatively easy ones to decide: those in which no current hatchery facilities were located or in which releases had not recently occurred. We are fully supportive of those designations. However, this resulted in a failure of the final report to consider the timeliness of managing large river systems as hatchery-free WMZs. These are critically important for evaluating the productive potential of current populations and for serving as controls for evaluating the impact of hatchery programs on wild stocks and the ability of hatchery programs to assist in recovering wild populations. We argue that these considerations should take precedence over short-term economic considerations pertaining to hatchery-subsidized fishing opportunities.

We draw attention to two river systems that we believe the Commission should strongly consider for designation as Wild Steelhead Management Zones, and eliminate hatchery steelhead releases and/or close facilities:

- The Skagit River, including the Sauk and Cascade Rivers.
- The Snoqualmie River.

We disagree with the Advisory Group's ranking the Snoqualmie winter-run program a high priority to retain. The Tokul Creek winter-run program remains the only program releasing anadromous hatchery salmonids into the river, and releases are non-native Chambers Creek stock that threaten wild steelhead. Except for stray Chinook from the Tulalip Bay Hatchery, the Snoqualmie is a defacto wild management zone for all salmon species, including one of the largest native coho salmon spawning populations in all of Puget Sound. The program is a marginal one and the facility is in need of significant upgrades to its water intake system and has blocked access to several miles of spawning and rearing habitat.

Chinook Rankings.

We recommend the following be designated as Chinook salmon WMZs:

- The Skagit River, including the Sauk and Cascade Rivers, all populations.

The only obstacle to designating the entire Skagit system as a Chinook WMZ appears to be the summer/fall population coded-wire tag program pursuant to the Pacific Salmon Treaty. It should be possible to identify an alternative population to serve the purpose of this program. The Commission should direct the Department to make this a high priority.

Designation of the entire Skagit River basin as a WSMZ for steelhead and Chinook salmon would provide the state the ability to apply meaningful and improved management practices and habitat improvements for recovery. It would establish a research setting for species recovery in a complete and large watershed in Washington with the exclusion of the continued impacts of hatchery

fish. The Skagit River would provide the WDFW a template for recovery programs in other rivers and stocks in the Puget Sound DPS as well as in other listed rivers (other DPS's in WA).

Conclusion.

Finally, we wish to make it clear and to emphasize that the conduct of our fellow members on the PSHAAG, the representatives of the HSRG, and key Department staff responsible for collecting and summarizing population and hatchery program data for the Advisory Group was collegial and professional throughout. The format for the PSHAAG meetings was overall efficient and despite the significant diversity of the membership of the PSHAAG, many important issues and details of stock status were presented and discussed effectively. We are grateful to the Department and key staff for forming the Group and for providing a considerable amount of important detail to the group.



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