



State of Washington

DEPARTMENT OF FISH AND WILDLIFE

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White Paper

A Proposal for

Enhanced Hatchery Production of Chinook Salmon to Increase Prey Abundance for Southern Resident Killer Whales

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The purpose of this short white paper is to

- provide a basic description of the proposal including its policy foundation;
- describe how this proposal may benefit Southern Resident Killer Whales;
- outline how this proposal may be consistent with Federal ESA mandates on threatened and endangered salmon and endangered killer whales;
- describe how this proposal may provide benefits to depressed salmon fisheries; and
- provide key administrative and funding aspects of the proposal.

Proposal Description

In response to Governor Inslee's Executive Order 18-02ⁱ directing an initiative to reverse the decline and recover Southern Resident Killer Whales (SRKWs), the Washington Fish and Wildlife Commission (WFWC) adopted a proposal to substantially increase the number of Chinook salmon released from hatcheries. The primary purpose of this proposal is to address one of the three key threats advanced by the Governor's Task Force to explain the recent decline of endangered SRKWs: that there is a lack of their primary prey, Chinook salmon, that may be contributing toⁱⁱ poor health and reproductive failure. This proposal addresses that threat by selecting a target increase in smolt production of 50 million.

The proposal calls for 30 million additional smolts to be released in carefully selected Puget Sound areas and 20 million in similarly strategic Columbia River areas, accomplished in a manner that may be compliant with Endangered Species Act (ESA) implementation for both threatened and endangered Chinook salmon populations and endangered SRKWs. The areas where the enhanced hatchery production would be released were deliberately chosen to avoid river basins containing wild Chinookⁱⁱⁱ, with the assumption that these areas will afford some protection to existing wild Chinook populations. The proposal calls for using only those Chinook salmon stocks that have marine migration routes that coincide with feeding areas known to be used by the SRKWs.^{iv}.

This proposal warrants serious consideration for legislative support to fund this initiative. After considering staff analysis and deliberating policy implications, the proposal was moved forward by the WFWC unanimous vote on September 7, 2018. Increased hatchery production of Chinook salmon was discussed in the SRKW Task Force process. The final Task Force report released on November 16, 2018, included *Recommendation 6*, which called for a significant increase in releases of additional hatchery-origin Chinook salmon, coupled with significant investments in habitat restoration, and included a reference to the 50 million smolt level proposal^v. The WFWC proposal and the SRKW Task Force recommendations were reviewed by Governor Inslee's office and funding for a substantial increase in hatchery production of Chinook salmon is contained in his SRKW recovery budget proposal to the Legislature^{vi}. If this proposal were funded there must be full consultation with the tribal co-managers and the National Marine Fisheries Service prior to implementation.

Benefit to SRKWs

The primary purpose of this proposal is to produce substantial caloric benefits to SRKWs in the near term (3-10 years) to address prey limitation concerns, using Chinook salmon stocks that migrate through SRKW feeding areas. An increase of 30 M hatchery smolts released in selected Puget Sound areas would essentially double the current program, and a return to the levels in place as the SRKW population grew from 71 to 98 individuals from 1976 to 1995^{vii}; thus, there is the potential that a prey increase benefit can be achieved from this proposal. Accuracy of estimates on how many adult salmon would be provided as SRKW food depends on many biological and environmental factors affecting Chinook salmon smolt survival. Therefore, any such estimate would carry a high level of uncertainty. However, using a broad average survival rate, an additional 50 M smolts released in Puget Sound and Columbia River may produce approximately 384,000 additional adult salmon.

While it may not be possible to quantify the benefits of this proposal with a high degree of certainty, it is important to note from an overarching policy perspective that this proposal is the only proposal attempting to significantly increase the availability of a primary prey of SRKWs in the near term. Therefore, there may be considerable cost to the viability of the SRKW population in the absence of the activities described in this proposal.

While this proposal is intended to provide significant near-term benefits to SRKW, it is not intended to minimize or replace in any way the need to continue current wild chinook population rebuilding measures, or the initiation of new salmon habitat restoration efforts that are important to SRKW health. However, it is important to note the long-term time frame of these measures: wild chinook rebuilding trajectories based on current strategies involve several generations (with each salmon generation taking 4-5 years), and new habitat measures such as dam removal likely to take decades before significant improvements in salmon abundance can be achieved. Furthermore, the analysis of SRKW benefits in terms of increased chinook prey from further immediate fishery restrictions shows minimal effect in the near term, particularly in comparison to substantially increasing hatchery production.

Protection for Wild Chinook Salmon Populations

Decades of research and monitoring have identified a variety of detrimental practices and risks of hatchery programs to wild salmon populations. There is no question that hatchery practices can pose serious genetic and ecological risks to wild populations if not managed carefully with full consideration of all that has been learned over the history of salmonid hatchery programs in the Pacific Northwest. However, the design of this proposal strives to minimize such negative impacts and to afford protection to the existing wild chinook populations to the greatest extent possible.

The largest risk of this proposal to wild chinook populations may be from the chance of hatchery produced adult salmon breeding with wild salmon. However, the release locations for the increased hatchery production have been selected to achieve geographic separation from wild Chinook populations and allow for a terminal fishery in an attempt to minimize strays to rivers that may be in the general area. In Puget Sound, we identify four locations that fit a “dead end bay” model with no adjacent wild Chinook population, where fish will be reared for roughly two months in net-pen rafts. While not without risk, this proposal assumes that the locations of these net-pens and the terminal fishery removals will minimize straying of hatchery fish into freshwater. In the Columbia River, we identify hatcheries where there are no wild Chinook present locally or where there is a weir, trap, or barrier capable of keeping returning hatchery fish from spawning with the local native wild Chinook population. Table 1 displays the WDFW hatchery program staff thinking on candidate areas, genetic stocks, target numbers, and other information.

As an example of how impacts to wild chinook populations would be minimized, the proposal identifies the Deschutes River in the extreme south of Puget Sound as one location. There has never been a wild chinook population in the Deschutes River due to a 25-foot waterfall near the river mouth, so all returning fish from releases at the upstream hatchery or in net pens near the mouth will be of hatchery origin. It is possible that an intensive terminal fishery could be conducted by the Squaxin Tribe in this area when the adults return to catch production not needed to be trapped for spawning purposes, thereby minimizing the chances of strays to the nearest river with a wild chinook population (the Nisqually River is some 20 shoreline miles away).

There are other environmental risks to this proposal beyond adult fish straying; for example, ecological pressure on lower trophic level forage species and an increase in pinniped populations. -Although we acknowledge that there are real environmental risks to this proposal, from a policy perspective these risks are felt to be less than the cultural, economic, and ecological risks of SRKW extinction.

Lastly, it is important to note that this proposal is temporary until such time that wild chinook abundance increases significantly from current rebuilding efforts and the planned habitat restoration projects. While the FWC has mentioned about 10 years when discussing the

temporary nature of this proposal, the duration and intensity of the program through time will be dependent on the monitoring and results of all the measures designed to improve conditions for SRKW.

Endangered Species Act Compliance

An important element of this proposal is the intent that implementation be consistent with wild Chinook salmon recovery under the ESA. In the event that this proposal advances, the National Marine Fisheries Service (NMFS) will evaluate its compliance with the ESA in terms of jeopardy to Chinook salmon. The NMFS will also consider this proposal, should it advance, in terms of its contribution to a jeopardy decision under the ESA about the variety of human impacts to SRKW and their recovery. There is a serious policy dilemma in weighing an action taken that could yield a significant potential benefit to a species with an endangered listing (SRKW) that is experiencing recent decline against the risk of negative effects of that action that might be identified to another federally listed species (salmon). WDFW looks forward to working with NMFS and the other co-managers in a thorough scientific and policy evaluation and providing adjustments to the proposal as necessary to comply with decisions made by NMFS on achieving implementation of the ESA.

Benefits to Fisheries

It is important to note the intent of the proposal be consistent with contemporary sustainable fishery management principles and that it provide appropriate incidental fishery benefits to depressed salmon fisheries. Terminal area fisheries, such as those inside the Columbia River or in the area near the mouth of the Deschutes River in southern Puget Sound, can provide substantial benefits from adult salmon that have fully migrated through the areas of SRKW feeding towards their spawning areas. This proposal specifically does not involve opening any new fisheries that would target enhanced production and cause a higher fishing rate on ESA listed wild salmon than would otherwise be allowed. However, it is intended to allow for the catch of enhanced production incidentally in salmon fisheries that are open as part of the normal fishery management process designed to achieve conservation goals and target healthy salmon stocks.

Important Administrative and Funding Aspects of the Proposal

This proposal calls for participation, collaboration, and full partnership with several co-managers. Table 1 indicates where important collaboration and coordination with several Native American tribes is as essential part of this proposal, including Puget Sound tribes where the “dead end bay” model calls for intensive terminal fishing and the Columbia River treaty tribes where additional releases are proposed. There must be full consultation with the tribal co-managers prior to implementation of this proposal. Table 1 also notes that the States of Oregon and Idaho are to be approached to consider enhanced Chinook salmon production in one or more of their hatchery facilities and the federal government is to be approached to consider increased Chinook salmon production in two federal hatchery facilities. It will also be

important to coordinate with our Canadian co-managers in Salish Sea areas on such things as smolt release timing. Agreement with Tribal co-managers and state and federal partners is necessary for these components of the proposal to proceed.

Funding is proposed to include a 50% sharing arrangement with federal sources for many of the areas, in recognition of a federal obligation to improve conditions for a species listed as endangered under the federal ESA (Table 1). State funding is proposed to be sourced by new State General Fund monies, without any additional fishing license fee requirements and without any in-lieu cuts to other WDFW programs.

Full implementation of this proposal should be phased-in over the near term and be keyed to an adaptive management process that includes a thorough monitoring program. There are some areas where currently fallow hatchery capacity can immediately be used to produce Chinook salmon smolts, but capital improvements will be needed to achieve full proposal implementation. The Governor's proposed capital budget includes \$75.7 M for hatcheries, including \$1 million for a master plan to evaluate capital improvement needs to achieve the balance of this proposal. Active monitoring of increased hatchery production and its ecological effects is necessary so as to achieve that intended SRKW benefits, accomplish the intended wild Chinook protection, and avoid unintended consequences. This program will focus not only on the status of the SRKWs, but will also contain an expanded effort to quantify the number of hatchery fish on the spawning grounds throughout Puget Sound and Lower Columbia River and their effects. An adaptive management process should be conducted on an annual basis that reacts to monitoring results in a way that comports with the proposal purposes.

Washington State Department of Fish and Wildlife
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ⁱ The full Executive Order can be found at https://www.governor.wa.gov/sites/default/files/exe_order/eo_18-02_1.pdf ; the key tasking to the Washington Department of Fish and Wildlife relative to this proposal was: *“Identify the highest priority areas and watersheds for Southern Resident prey to focus or adjust, as needed, ...hatcheries...policies and programs.”*

ⁱⁱ The other two contemporary reasons are elevated underwater noise/vessel disturbance and exposure to toxic contaminants. See https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendations_11.16.18.pdf for a further explanation of these three contemporary hypotheses.

ⁱⁱⁱ In the case of the Columbia River, the proposal selects a few river basins containing wild Chinook populations, but only those rivers with adult salmon weirs or barriers that can be relied upon to separate and remove returning adult hatchery fish co-mingled with wild fish.

^{iv} https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/killer_whales/recovery/srkw_priority_chinook_stocks_conceptual_model_report_list_22june2018.pdf

^v https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendations_11.16.18.pdf

^{vi} <https://www.governor.wa.gov/sites/default/files/SRKW-policy-brief.pdf>

^{vii} Releases of Chinook salmon from hatchery facilities in Puget Sound grew from about 50 M in 1979-82 to about 80 M in 1989 and declined from that point to less than 40 M in recent years.

Table 1. Washington Department of Fish and Wildlife Proposalⁱ for an Additionalⁱⁱ 50 Million Hatchery Produced Chinook Salmon Smolts for the Primary Purpose of Increasing prey for Southern Resident Killer Whales.

Region	Location	Genetic Strain	Number of smolts ⁱⁱⁱ	Comments
Puget Sound				
	Deschutes River Hatchery/Deep South Sound	Deschutes River fall chinook hybrid	10,000,000	Seek 50% Federal funding; fund State share with GF. Coordinate with Squaxin Tribe.
	Orcas Island Eastsound Bay	Northern Puget Sound fall chinook	10,000,000	Seek 50% Federal funding; fund State share with State GF. Coordinate with several Tribes with local fishing rights. Delayed release strategy to maximize residence.
	Agate Pass Bay	Southern Puget Sound fall chinook	5,000,000	Seek 50% Federal funding; fund State share with GF. Coordinate with Suquamish Tribes
	Deep Hood Canal	Hood Canal fall chinook	5,000,000	Seek 50% Federal funding; fund State share with GF. Coordinate with Skokomish and S'Klallam Tribes
		Puget Sound total	30,000,000	
Columbia River				
	Elochomin River ^{iv}	Elochomin fall chinook	2,000,000	Fund with State GF.
	Cowlitz River Hatchery	Cowlitz River spring chinook	500,000	Fund with State GF.
	Lewis River Hatcheries	Lewis River spring chinook locally adapted hybrid	500,000	Fund with State GF.
	Willamette Hatchery Complex	Upper Willamette River spring chinook	3,000,000	Seek partnership with the State of Oregon; fund with State GF.
	Bonneville Hatchery	Spring Creek fall chinook	3,000,000	100% Federal funding. Coordinate with State of Oregon
	Little White Salmon Hatchery	Locally adapted Upriver Bright fall chinook	3,000,000	Seek 100% Federal funding; fund any State share with State GF. Coordinate with CRITFC.
	Spring Creek Hatchery	Spring Creek fall chinook	5,000,000	Seek 100% Federal funding; fund any State share with State GF. Coordinate with CRITFC.
	Clearwater River Hatchery	Clearwater spring chinook	2,000,000	Seek partnership with the State of Idaho; fund with State GF. Coordinate with Nez Perce Tribe and CRITFC.
	Mid-Columbia locations ^v	Locally adapted spring chinook	1,000,000	Seek partnership with Yakima, Nez Perce, and Umatilla Tribes; fund with State GF. Coordinate with CRITFC.
		Columbia River total	20,000,000	

Table footnotes:

ⁱ There must be full consultation with the tribal co-managers prior to implementation of this proposal, as well as with Federal and State co-managers. The releases in this table are approximate target numbers proposed for evaluation under the Federal ESA implementation process, with adjustments as necessary to achieve ESA compliance approval.

ⁱⁱ Additional is meant to be in addition to the number of smolts released in 2017.

ⁱⁱⁱ The numbers in this column represent target numbers to be achieved when the program is fully implemented, after any necessary capital improvements, additional egg-takes, or other necessities have been completed. The proposal also calls for immediate progress to be made towards the targets in this proposal if there is fallow capacity at hatcheries and additional broodstock are available.

^{iv} In the event the Elochomin River Hatchery cannot be rehabilitated, 2,000,000 additional smolts are proposed to be added to the Kalama River and/or Cowlitz River hatchery programs.

^v These include programs in the Yakima River, Asotin Creek, and the Tucannon River.