Supplemental Information Report for alterations to four Hatchery Genetic Management Programs in the Hood Canal

1. Introduction

On October 17, 2016, the National Marine Fisheries Service (NMFS) issued a final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA) in connection with its determination that ten programs considered in the Hood Canal region of Washington State satisfy requirements under the Endangered Species Act (ESA) Limit 6 of the Section 4(d) Rule for salmon and steelhead.

2. Proposed Changes — The purpose of this supplemental information report is to determine whether proposed changes to four HGMPs received on March 12, May 18, 2020, and June 23, 2020 are substantial enough to require a supplemental NEPA analysis.

The 2016 EA analyzed four alternatives: 1) a "no action" alternative of not making a determination under Limit 6 of the ESA 4(d) Rule; 2) the alternative of making a determination that the proposed changes to hatchery genetic management plans (HGMPs) meet the requirements under Limit 6 of the ESA 4(d) Rule; 3) making a determination that proposed changes to the HGMPs do not meet the requirements under Limit 6 of the ESA 4(d) Rule, resulting in termination of the hatchery salmon programs in the Hood Canal; and 4) making a determination that the HGMPs, revised to reflect reduced production levels, meet the requirements under Limit 6 of the ESA 4(d) Rule.

In 2020 the co-managers are proposes changes to four of the HGMPs and seeks NMFS' determination whether the proposed changes to HGMPs meet requirements specified in Limit 6 of the ESA 4(d) Rule. The proposed changes of each HMGP are summarized below:

- Hoodsport fall Chinook salmon: investigate smolt release timing on adult survival by releasing experimental groups of 100,000 subyearling fish during early (April/May) and late (August/September) periods. These two experimental release groups will accompany the normally-timed release of approximately 2.1 million fall Chinook salmon measuring approximately 92 millimeters (mm) in length. As a result of the early or late timing fish included in the experimental release groups will be either smaller (82 mm) or larger (120 mm), respectively, in comparison to fish released in June.
- Hoodsport fall chum salmon: increase production by three million chum salmon fry. Current releases of fall chum salmon at the Hoodsport hatchery is 12 million fry. The increase of fall chum salmon released to a total of 15 million fish is a 20 percent increase.
- Hood Canal steelhead supplementation program: the co-managers currently sample more than 14,000 juvenile steelhead in seven Hood Canal tributaries: Big Beef Creek, and Dewatto, Duckabush, Hamma Hamma, Little Quilcene, Skokomish, Tahuya, and Union rivers. The co-manager propose to increase the number of juvenile steelhead currently captured, handled, and collected by 120, all of which will be sampled from the Dosewallips River from river mile (RM) 0 to 15. The co-managers propose to capture fish for the purposes of collecting tissue samples for genetic analysis. The co-managers will use the same techniques for capturing fish in the existing seven tributaries.
- Port Gamble coho net pen; increase the current production of 400,000 yearling coho salmon to 650,000 fish in two phases, 125,000 fish in the first phase and 125,000 fish in the second phase. The additional production constitutes a 27 percent increase in the first phase and a 21 percent increase in the second phase.

3. New Circumstances or Information

Since completion of the EA additional information relevant to the status of marine fishes and wildlife species and environmental issues has become available. Additional research findings merely supplements existing information and does not change the substance of decisions or considerations addressed in the 2016 EA. The conservation status of one species has changed since the 2016; canary rockfish, was removed from the listed of threatened species on March 24, 2017 (82 FR 7711). NMFS analyzed effects on ESA-listed species in a separate biological opinion (NMFS 2020).

Because alterations to two hatchery programs are for the purposes of increasing forage for SRKW the conservation of this endangered marine mammal is of particular relevance. The conservation status of the SRKW has not changed since the previous EA, although successive years of low juvenile recruitment provide justification for additional actions supporting species conservation (Dygert et al. 2018; NMFS 2018). There are three primary factors limiting recovery of SRKWs: bioaccumulation of chemical pollutants, lack of prey, and noise and harassment from vessel traffic (NMFS 2008). WDFW proposed increasing the number of salmon released into Puget Sound to improve foraging conditions for SRKW increasing the amount of prey. Chinook salmon is the primary prey base for SRKWs, making up 80-90 percent of their diet, although chum salmon and coho salmon constitute a portion of the SRKW's diet (Ford et al. 2009; Ford et al. 2016).

Hatchery management practices have resulted in the simplification of life histories, reducing the phenotypic and genetic diversity of salmonids throughout the Puget Sound region. Managers release large quantities of fish in a short period of time, often using broodstocks from different regions selected for known run timing or desirable physical characteristics. In general, dispersal of hatchery fish into tributaries has affected genetic diversity throughout the Puget Sound (Waples et al. 1991; Kassler et al. 2008). Fisheries scientists seek to understand the effects of increased life history diversity on behavioral, genetic, and phenotypic expression within salmon populations. The proposed experimental releases of fall Chinook salmon from the Hoodsport Hatchery in staggered periods and different sizes than used in standard practices researchers is intended to mimic the greater levels of juvenile run time diversity exhibited by natural origin fish. Hatchery managers hypothesize that early and late release groups of fall Chinook salmon may experience more favorable migratory conditions resulting in greater adult survival.

4. No Changes in Environmental Impacts

Cultural resources. No change from the previous EA.

Environmental justice. No change from the previous EA.

Human health and safety. No change from the previous EA.

Nutrient cycling. There are no changes that differ from the previous EA.

Research, Monitoring and Evaluation. No change from the previous EA.

Water quantity. No change from the previous EA.

5. Changes in Environmental Impacts

Water quality. The increased number of juvenile salmon reared at the Hoodsport Hatchery and Port Gamble net pens will add more nitrogen and particulates from waste and excess fish food, and chemicals used for disease and therapeutic treatments. These releases are known to degrade water quality. In general, the additional degradation in water quality will occur for a duration of several months beginning in the late fall until fish are released the following spring.

The Port Gamble S'Klallam Tribe (PGST) coho net pen program is located on the north side of Port Gamble Bay. The water source for this facility is derived entirely from natural saltwater that circulates between the 1,210-acre bay and Hood Canal. Although no permit is necessary for use of the saltwater, the additional coho salmon will exceed 20,000 pounds at the time of release, a threshold that requires a permit from the Washington State Department of Ecology (DOE) for water quality impacts to marine waters. The PGST subsequently applied for, and received, a National Pollution Discharge Elimination System (NPDES) permit from DOE (WAG 13-2000) for the aforementioned effects to water quality.

Coho salmon are first reared at WDFW's George Adams Hatchery until they are large enough to be reared in saltwater. At this point, which typically occurs in early February, the fish are transported to PGST's net pens. Water quality impacts associated with rearing fish in Port Gamble Bay will be limited from February to until the fish are released in April or May. Thus, water quality impacts related to rearing 27 percent more coho salmon will be limited to approximately three months. Although the proportional increase in coho salmon reared at the facility is considerable, at full-capacity the program will release about 8 percent more fish than the average hatchery program in the Hood Canal. Thus, the moderate size of the proposed production increase, coupled with the short duration (2-3 months) of rearing at the saltwater facility will yield only a minimal increase in water quality. The limiting factor affecting environmental health at the facility is related to phytoplankton (*Chaetoceros* spp.) blooms associated with higher temperatures that have no causal relationship to effluent from the facility.

PGST expects water quality parameters are expected to be maintained well below regulatory action by DOE. The PGST will continue to monitoring water quality and disease measurements as performance indicators used to identify thresholds for operational capacity of the net pen facility. Recent measurements indicate water quality is minimally affected during the months of yearling coho salmon culture at the facility and that the Port Gamble net pen program can support additional coho salmon with minimal degradation to water quality in Port Gamble Bay.

The Hoodsport Hatchery operates under a program classified as "Upland Fin-Fish Hatching and Rearing" that requires National Pollution Discharge Elimination System (NPDES) permit issued by the Washington Department of Ecology (DOE) - (permit number WAG13-1011). Proposed changes in water quality associated with the alteration of fall Chinook salmon release timing are proportional to the total number of fish in the early and late release groups. Each release group consists of 100,000 fall Chinook salmon, or approximately 3.8 percent of the fish associated with this program. The co-managers plan to release the early and late groups of fall Chinook salmon six to ten weeks earlier or later than the normal June release period. Therefore, in comparison to current conditions water quality will improve by approximately 3.8 percent after release of the first group in April/May and degrade by the same proportion until the third group of fish is released in August/September.

Overall, none of the proposed changes to hatchery programs are expected to result in exceedances of NPDES permits. Changes to the programs are either low intensity, or too short in duration to result in substantial changes to water quality. As such, the change in water quality proportional to each program will not result in a substantial change water quality effects from those described in the 2016 EA.

Salmon and steelhead. There are several species of salmon and steelhead known to use tributaries of the Hood Canal, including Chinook salmon, coho salmon, chum salmon, pink salmon (*O. gorbuscha*), steelhead, cutthroat trout (*O. clarkii*). There are three ESUs/DPSs in the Hood Canal currently listed under the ESA: Hood Canal summer-run chum salmon, Puget Sound (PS) Chinook salmon, and PS steelhead. The most recent five-year ESA status review of these species were updated on April 14, 2014 and April 6, 2017 (NMFS 2017). The recovery plan for PS steelhead was released on December 21, 2019 (NMFS 2019). The conservation status has not changed for these species since the 2016 EA was completed. The Hood Canal also contains several non-listed salmon, including: fall-run Chinook salmon, coho salmon, fall-run chum salmon, and pink salmon. Effects to salmon and steelhead from proposed alterations to the four HGMPs are described in this section.

The total number of salmonids released each year from the ten hatchery programs in the Hood Canal includes 16.2 million fall chum salmon, 1 million coho salmon, 3.2 million fall Chinook salmon, 400,000 pink salmon, and nearly 49,000 steelhead. The proposed action would increase the number of juvenile fall chum salmon fry released from Hoodsport Hatchery by 25 percent. The cumulative increase in juvenile coho salmon released from the Port Gamble net pens is 31 percent. The proposed increases will add approximately 16 percent hatchery-reared juvenile salmon produced from the ten Hood Canal programs evaluated in the 2016 EA.

The increased number of juvenile salmon released in the Hood Canal is intended to provide more adult fish as forage for SRKWs. The number of adult fish returning annually from each program ranges from 256 to 10,873 and is summarized by NMFS in the aforementioned EA (NMFS 2016). Harvest and escapement data from the Hoodsport fall chum salmon and Port Gamble coho net pen programs note SAR rates of 1.34 percent and 1.68 percent, respectively (PGST 2013; WDFW 2013). Assuming equal post-release mortality the proposed action would result in additional 21,192 adult salmon (i.e., 20,100 fall chum salmon and 1,092 coho salmon), or approximately 5.5 percent of adult salmon returns associated with the ten hatchery programs in the Hood Canal.

Annual changes in the amount of food resources and among other species creates considerable inter-annual variability in smolt to adult return rates (SARs) vary considerably between years. The competitive interactions and availability of food resources experienced by juvenile salmonids at the early-marine life stage are especially critical in determining SARs (Bax 1983; Chittenden et al. 2009; Beamish et al. 2010). The co-managers theorize that variability in early-marine survival between experimental release groups of fall Chinook salmon may indicate necessary changes in hatchery release methodologies. Individual fish in early and late-season release groups may interact or compete other species of salmon and steelhead in the Hood Canal and Puget Sound. Overall, the number of fall Chinook salmon in the early and late release groups (i.e., 200,000 fish total) is too small to result in changes in smolt-to-adult survival rates that are biologically meaningful to other salmonids in the Hood Canal.

Straying rates of adult fish associated with coho salmon and fall Chinook salmon hatchery programs in the Hood Canal varies from 0.1 to 5 percent (NMFS 2016). Although the co-managers are unable to estimate stray rates of chum salmon because these fish are not implanted with coded wire tags, stray rates of hatchery-origin chum salmon in Hood Canal are thought to be low (Fuss and Hopley 1991) and consistent with those noted above for other salmonids.

Years of hatchery fish releases have resulted in adult fish straying into adjacent watersheds and interactions between natural and hatchery-origin salmonids. Finch Creek does not support salmon or steelhead, apart from small resident populations of rainbow trout and cutthroat trout in the upper portions of the watershed. It is reasonably likely that a small number of chum salmon may stray into nearby streams such as Enetai Creek, Hamma Hamma River, Lilliwaup Creek, Skokomish River, and Tahuya River. Likewise, several small unnamed tributaries flow into or near Port Gamble Bay, some of which provide habitat for one of more of the following species: fall-run chum salmon, coho salmon, winter-run steelhead, and cutthroat trout. As previously noted, the three programs at Hoodsport Hatchery and Port Gamble Bay involve fall Chinook salmon, fall chum salmon, and coho salmon. These species return to hatchery sites in mid- to late-fall and that does not overlap with summer chum salmon (WDFW and PNPTT 2000). Because current adult run timing of fish associated with these programs currently does not affect summer chum salmon and will remain unaltered by the proposed action. Any additional straying will be undiscernible from the current level of straying that is ongoing and does not constitute a substantive change from the effects on salmon and steelhead analyzed in the 2016 EA.

The magnitude of increased production would not require additional handling of adults as all individuals, regardless of hatchery or natural origin. None of the proposed changes would modify fishing regulations, or potential disease transfer between hatchery-origin and natural-origin fish.

Additional field sampling of PS steelhead is proposed to occur in the Dosewallips River during the July through early September. Summer chum salmon spawning occurs from late August through late October, generally within the lowest one to two miles of the tributaries (WDFW and PNPTT 2000). WDFW proposes to sample juvenile PS steelhead from RM 0-15, thus there is minimal potential for overlap with summer chum salmon. The potential inadvertent handling of non-target species (including summer chum salmon) in Hood Canal tributaries resulting from sampling of juvenile steelhead was analyzed in the 2016 EA. Because the occurrence and run timing of fish in the Dosewallips River is similar to other watersheds in the Hood Canal region the inadvertent handling of hatchery or natural-origin salmonids fish is not substantially different from that analyzed in the 2016 EA.

There are no proposed changes to operations at the Finch Creek diversion weir, yielding no change in the number of ESA-listed species encountered. NMFS evaluated changes to ESA-listed species resulting from the proposed action in a separate biological opinion (NMFS 2020) in which it found the proposed production increase would not change the magnitude, intensity, or duration of effects analyzed in the 2016 EA (NMFS 2016).

Other fish species. The marine waters of Puget Sound are home to dozens of fishes (Healey 1982; Miller and Borton 1980). This includes many species in the cod, rockfish, and hake families that may consume additional juvenile salmonids, or compete with them for space and resources. Puget Sound rockfish species can be roughly categorized into three general ecological assemblages based on their distribution patterns and habitat associations: sedentary, pelagic, and deepwater.

Copper, quillback, brown, tiger, and China rockfishes are highly associated with rocky habitats (Love et al. 2002) and a sedentary life history with small home ranges. Some of these species show a high affinity to natural rocky habitats (Matthews 1990 a, b, c) and are characterized by inhabiting shallow depths of 40 meters or less (Gunderson and Vetter 2006).

Black, yellowtail, Puget Sound, silvergray, bocaccio, and blue rockfishes are pelagic species that occur in schools in the water column, above the bottom, or off of steep slopes (Moulton 1977, Washington 1977, Love et al. 2002). Some of these species are typically found in less than 40 meters deep, as in the case of black, Puget Sound, and blue rockfishes (Gunderson and Vetter 2006). Others occur in depths of 50 to 500 meters, such as silvergray, widow, canary, and bocaccio rockfishes. All of these species may still be associated with, or near, rocky habitats.

Yelloweye rockfishes, inhabit rocky pinnacles (Washington 1977, Love et al. 2002) and boulder fields (Wang 2005) and are typically found in deep waters of 50 to 500 meters (Gunderson and Vetter 2006). Some rockfishes, including canary, greenstriped, and silvergray, are generalists and occur over a wide variety of habitat types off the Washington coast (Wang 2005). Other species found in shallow water can also occur among deep-water communities, including tiger rockfishes (Gunderson and Vetter 2006) and quillback, redstripe, and juvenile yellowtail rockfishes.

NMFS also considered changes in conservation status of fishes at both the state and federal levels. One species, canary rockfish, was removed from the listed of threatened species on March 24, 2017 (82 FR 7711). NMFS analyzed the effects on ESA-listed marine fishes (i.e., bocaccio rockfish and yelloweye rockfish) in a separate document (NMFS 2020) and found the proposed actions were no different than those previously considered in the 2016 EA. Regardless of conservation status, there are many species which may benefit from the slight increase in forage base. Overall, the change in abundance, timing, and availability of juvenile or adult salmon is not large enough to change the fitness or survival of other fish species. Thus, NMFS finds the proposed modifications to hatchery programs is not substantially different from those analyzed in the 2016 EA.

Wildlife. Modifications to three programs may yield changes relevant to avian and marine wildlife. Indeed, the proposed increases of fall chum salmon and yearling coho salmon are specifically intended to

provide additional adult salmon as forage for a particular species of marine wildlife: SRKWs. The effects on other wildlife species will vary considerably, as juvenile salmonids are often prey for smaller birds and mammals, whereas adult salmonids are prey for medium to large mammals.

The additional juvenile salmon produced will reside in the Hood Canal for weeks and migrate to the Pacific Ocean prior to returning to the Hood Canal after either two to three years. At current survival rates the proposed increases juvenile fish will yield approximately 20,000 adult chum salmon and 1,100 adult coho salmon. Chum salmon constitute a less than 1 percent of diet composition of SRKW (Ford et al. 2009; Ford et al. 2016), thus the additional number of adults returning to the Hood Canal will have minimal effect on improving survival of SRKWs. Coho salmon compose about 40 percent of the diet of SRKWs during late summer (Ford et al. 2017). The increased number of juvenile coho salmon released from the Port Gamble net pens may slightly improve foraging conditions for SRKWs, whereas the increased number of adult chum salmon will be relatively inconsequential. Estimates of SRKW metabolic rates suggest each individual consumes dozens of salmon each day (Kriete 1995). When analyzed individually the proposed increases at each of the hatchery programs constitute a negligible increase in prey for SRKW and other species. Thus, the magnitude of increased adult salmonids available as forage is not large enough to constitute a change in SRKW forage from that evaluated in the 2016 EA.

Other species of marine mammals, such as harbor seals, sea lions and other pinnipeds may also consume additional chum and coho salmon. Typically, pinnipeds are likely to consume adult salmonids, although larger-bodied juveniles Chinook salmon and steelhead are preyed on opportunistically at certain locations (Moore et al. 2012; 2013). Chum salmon fry will migrate through the Hood Canal at a small size, and coho salmon will avoid migrating through the marine mammal predation hotspot at the Highway 104 Hood Canal Bridge (Moore et al. 2012). As a result, the degree of benefit is likely similar to other marine mammal species will similar to current conditions. Pinnipeds, like other species may experience slightly improved foraging conditions with the additional number on adult salmonids. However, the increased number of adult chum salmon is too minimal to constitute a change from that evaluated in the 2016 EA.

NMFS also considered changes in wildlife species protected under the ESA and the Migratory Bird Treaty Act by the U.S. Fish and Wildlife Service. Several species of migratory birds that consume juvenile salmon inhabit the Hood Canal, including species of cormorants, gulls, murrelets, terns that are known to consume juvenile salmonids (Evans et al. 2012; Evans et al. 2016). Many of these species nest at wildlife refuges near the mouth of the Dungeness River. In general, fall chum salmon and coho salmon reside in shallow marine waters for days to weeks until transitioning to deeper waters prior to seaward migration (Mason 1974). Coho salmon typically migrate to deeper waters of the Hood Canal and greater Puget Sound several months after release from the hatchery (Chittenden et al. 2009; Beamish et al. 2010). Given the daily migration distance to the aforementioned avian nesting colonies of 25-35 miles, the likelihood of a considerable change in forage available to these species is minimal. Avian species residing within close proximity of Hoodsport Hatchery and Port Gamble Bay are most likely to experience some increase in forage that will be limited in duration to hours, yielding a minimal increase in forage. Overall, avian species may experience slight increase in foraging conditions, but not at a scale different from that described in the 2016 EA.

The co-managers proposed angling as the method for collecting juvenile steelhead in the Dosewallips River. The proposed sampling methodologies and personnel is the same as those proposed in the 2016 EA for collection of steelhead in seven tributaries within the Hood Canal. This analysis addresses whether including an additional sampling location (i.e., RM 0-15 of the Dosewallips River) will result in different exposure to wildlife. Therefore, the proposed action will not differ from that previously described in the 2016 EA.

Socioeconomics. As a result of the proposed action, the number of adult chum salmon and coho salmon returning to hatcheries in the Hood Canal may increase by up to about 21,000 fish if conditions for foraging and survival are consistent with previous years. The additional number of adult chum salmon

available for harvest or sale is approximately 12,856 fish. The average number of fish harvested from this program during 1988 through 2011 varied considerably 17,238 ±11,792 fish (NMFS 2016). The annual increase in expected adult returns, if realized, would be slightly greater than the variation of adult returns observed during the previous two decades that constitutes a modest increase in harvest or surplused fish.

6. Public Process

The Draft Environmental Assessment that included all ten hatchery programs was released for a 30-day public comment period on March 3, 2016 (81 FR 11192). NMFS received one comment letter during the public comment period. NMFS also reviewed effects of the proposed action to ESA-listed species. NMFS also determined that operation of the then hatchery programs would have no effect on Pacific eulachon (*Thaleichthys pacificus*), SRKW, or rockfish species (NMFS 2016). In this case, after analyzing the effects to ESA-listed species resulting from the changes associated with four hatchery programs NMFS determined there to be no change in incidental take authorized in the 2016 biological opinion solely for increased incidental take of Puget Sound steelhead. Because the actions described above are not significantly different from those described in the 2016 EA no public comment or notification of change is warranted in regards to effects of the new action on ESA-listed species.

7. Conclusion

NMFS considered and analyzed whether the alterations to HGMPs proposed by the co-managers constitute a substantial change from effects analyzed in the 2016 EA. In this case, NMFS finds no substantial change in the magnitude, scope, and intensity of effects related to the proposed alterations. Therefore, NMFS has determined that there is no need to supplement the 2016 EA because: (1) the updates to the proposed action that are relevant to environmental considerations are not substantial; and (2) the new circumstances or information relevant to environmental concerns and bearing on the updated proposed action or its impacts are not significant under NEPA.

8. List of Agencies and Persons Consulted

In preparing this supplemental information report the NMFS consulted with the Skokomish Tribe, Northwest Indian Fisheries Commission, Port Gamble S'Klallam Tribe, U.S. Fish and Wildlife Service, and the Washington Department of Fish and Wildlife.

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