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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 223

[Docket No. 260109-0027; RTID 0648-XR124]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Olympic Peninsula Steelhead Distinct Population Segment Under the Endangered Species Act

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notification of 12-month petition finding.

SUMMARY: We, NMFS, have completed a comprehensive status review for the Olympic Peninsula (OP) Distinct Population Segment (DPS) of steelhead, *Oncorhynchus mykiss*, in response to a petition to list this species as threatened or endangered under the Endangered Species Act (ESA). We have determined that OP steelhead is a DPS under the ESA and that listing is not warranted at this time. Accordingly, NMFS will continue to monitor the OP steelhead DPS status, including working closely with Tribal and State co-managers.

DATES: This finding was made available on [**INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

ADDRESSES: The petition, status review, **Federal Register** notices, and the list of references can be accessed electronically online at: *https://www.fisheries.noaa.gov/species/steelhead-trout*. The peer review plan and charge to peer reviewers are available at *https://www.noaa.gov/information-technology/biological-status-of-olympic-peninsula-steelhead-distinct-population-segment-dps-id478*.

FOR FURTHER INFORMATION CONTACT: Robert Markle, NMFS West Coast Region, at *robert.markle@noaa.gov*, (971) 710-8155.

SUPPLEMENTARY INFORMATION:

Background

On August 1, 2022, we received a petition from The Conservation Angler and Wild Fish Conservancy (hereafter, the Petitioners) to list the OP steelhead (*Oncorhynchus mykiss*) DPS as a threatened or endangered species under the ESA. On February 10, 2023, we published a positive 90-day finding (88 FR 8774) announcing that the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted. We also announced the initiation of a status review of the species, as required by section 4(b)(3)(A) of the ESA, and requested information to inform the agency's decision on whether this species warrants listing as threatened or endangered.

Listing Species Under the Endangered Species Act

To make a determination whether a species is threatened or endangered under the ESA, we first consider whether it constitutes a "species" as defined under section 3 of the ESA, then whether the status of the species qualifies it for listing as either threatened or endangered. Under the ESA, a listing determination may address a species, which is defined to also include subspecies and, for any vertebrate species, any DPS that interbreeds when mature (16 U.S.C. 1532(16)). On February 7, 1996, NMFS and the U.S. Fish and Wildlife Service (USFWS) adopted a joint policy for recognizing DPSs under the ESA (DPS Policy; 61 FR 4722). The DPS Policy adopted criteria similar to those in the evolutionarily significant unit (ESU) policy (ESU Policy; 56 FR 58612, November 20, 1991) for determining when a group of vertebrates constitutes a DPS: the group must be discrete from other populations, and it must be significant to its taxon (species or subspecies). A group of organisms is discrete if it is "markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, and behavioral factors." Significance is measured with respect to the taxon. Considerations for significance include but do not necessarily require the following:

1. Persistence of the DPS in an ecological setting unusual or unique for the taxon,

2. Evidence that loss of the DPS would result in a significant gap in the range of a taxon,

3. Evidence that the DPS represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or

4. Evidence that the DPS differs markedly from other populations of the species in its genetic characteristics.

In 2006, NMFS changed its previous practice of applying the ESU Policy to delineate species of *O. mykiss* and instead applied the joint DPS Policy (71 FR 834, January 5, 2006). NMFS determined that the use of the ESU Policy—originally intended for Pacific salmon—should not continue to be extended to *O. mykiss*, a type of salmonid with characteristics not typically exhibited by Pacific salmon. A court ruling in 2001 (*Alsea Valley Alliance* v. *Evans*, 161 F. Supp. 2d 1154 (D. Or. 2001)) determined that listing only a subset of a species or ESU/DPS, such as the anadromous portion of *O. mykiss*, was not allowed under the ESA. Because of this court ruling, NMFS conducted updated status reviews for ESA-listed west coast steelhead ESUs that took into account those non-anadromous populations below dams and other major migration barriers that were considered to be part of the steelhead ESUs (Good *et al.*, 2005). Subsequently, NMFS used the joint USFWS-NMFS DPS Policy to delineate steelhead-only DPSs rather than ESUs that included both steelhead and the related non-anadromous forms (71 FR 833, January 5, 2006). OP steelhead (the petitioned entity) were not addressed in the 2005 status review (Good *et al.*, 2005) nor in subsequent listings (71 FR

833, January 5, 2006).

Section 3 of the ESA defines an endangered species as “any species which is in danger of extinction throughout all or a significant portion of its range” and a threatened species as one “which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Thus, in the context of the ESA, we interpret an endangered species to be one that is presently in danger of extinction, while a threatened species is not currently in danger of extinction but is likely to become so in the foreseeable future. The primary statutory difference between a threatened and endangered species is the timing of when a species is in danger of extinction, either presently (endangered) or not presently but within the foreseeable future (threatened).

When we consider whether a species qualifies as threatened under the ESA, we must consider the meaning of the term “foreseeable future.” This is described in 50 CFR 42.11(d) as follows: “In determining whether a species is a threatened species, the Services must analyze whether the species is likely to become an endangered species within the foreseeable future. The foreseeable future extends as far into the future as the Services can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. The Services will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability. The Services need not identify the foreseeable future in terms of a specific period of time.”

Section 4(a)(1) of the ESA requires us to determine whether a species is endangered or threatened as a result of any one, or a combination of, the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence (16 U.S.C. 1533(a)(1)). We are also required to make listing determinations based solely on the best scientific and commercial data available, after conducting a review of the species' status and after taking into account efforts, if any, being made by any state or foreign nation (or subdivision thereof) to protect the species (16 U.S.C. 1533(b)(1)(A)).

Life History of West Coast Steelhead

Steelhead is the name commonly applied to the anadromous form of the biological species *O. mykiss*. The present distribution of steelhead extends from Kamchatka in Asia, east to Alaska, and down to the U.S.-Mexico border (Busby *et al.*, 1996; 67 FR 21586, May 1, 2002). *O. mykiss* exhibit perhaps the most complex suite of life history traits of any species of Pacific salmonid. They can be anadromous (steelhead) or freshwater residents (rainbow or redband trout) and, under some circumstances, yield offspring of the alternative life-history form. Those that are anadromous can spend up to 7 years in freshwater prior to smoltification (the physiological and behavioral changes required for the transition to salt water) and then spend up to 3 years in salt water prior to first spawning. *O. mykiss* is also iteroparous, meaning individuals may spawn more than once (steelhead that survive spawning and return to the ocean are known as kelts), whereas other Pacific salmonid species are principally semelparous (meaning individuals predominately spawn once and die).

Within the range of west coast steelhead, spawning migrations occur throughout the year, with seasonal peaks of activity. In a given river basin, there may be one or more peaks in migration activity known as "runs," which are usually named for the season in which the peak occurs. Rivers can contain one or more runs of winter-, spring-, summer-, or fall-run steelhead. In basins with both summer-run and winter-run steelhead, the summer run generally occurs where habitat is not fully utilized by the winter run or where a temporal hydrologic barrier, such as a waterfall, separates them. Summer-run steelhead usually spawn farther upstream than winter-run steelhead (Withler 1966; Roelofs 1983; Behnke 1992; Myers *et al.*, 2015).

Previous Status Review

In 1996, NMFS completed a comprehensive status review of coastal and inland steelhead populations in Washington, Oregon, Idaho, and California (Busby *et al.*, 1996). As part of this review, which was prior to the practice of using the DPS Policy to delineate steelhead populations, NMFS identified an OP steelhead ESU comprised of populations that occupy “river basins of the Olympic Peninsula, Washington, west of the Elwha River and south to, but not including, the rivers that flow into Grays Harbor on the Washington coast.” The OP steelhead ESU was primarily made up of winter-run steelhead but also included several summer-run steelhead populations (Busby *et al.*, 1996). At the time, NMFS included the resident *O. mykiss* below long-standing natural barriers in the ESU because of the opportunity for residents to interbreed with anadromous life history forms. In determining OP steelhead as an ESU, Busby *et al.* (1996) stated:

> Genetic data collected by Washington Department of Fish and Wildlife support the hypothesis that, as a group, steelhead populations from the Olympic Peninsula are substantially isolated from those in other regions of western Washington. The Olympic Peninsula ESU is further characterized by habitat, climatic, and zoogeographical differences between it and adjacent ESUs. The Olympic Peninsula includes coastal basins that receive more precipitation than any other area in the range of west coast steelhead. Topography on the Olympic Peninsula is characterized by much greater relief than that to the south (Willapa Hills); the Olympic Mountains range from 1,200 to 2,400 meters above sea level. This affects precipitation quantity and

river-basin hydrography. The result is "copious amounts of rain and over 100 inches of snow during the winter months" as well as substantial summer precipitation (Jackson 1993, p. 50-51) [Figure 3, Figure 4]. One manifestation of the ecological difference between Puget Sound and the Olympic Peninsula is the shift in vegetation zone, respectively, from western hemlock (*Tsuga heterophylla*) to Sitka spruce (*Picea sitchensis*) (Frenkel 1993).

NMFS concluded that the OP steelhead ESU was not in danger of extinction or likely to become endangered in the foreseeable future (Busby *et al.*, 1996). However, NMFS was concerned about the overall health of the ESU and specific populations. Although the majority of abundance trends for winter-run OP steelhead were positive at the time of the 1996 review, including for three of the four largest populations, several other populations had downward trends, and for three populations this decline was statistically significant. NMFS noted concerns that hatchery fish were widespread, and interbreeding between natural and hatchery fish could reduce the genetic diversity of natural-origin OP steelhead. NMFS also stated that there was a great deal of uncertainty about the overall health of the ESU because little information exists about the summer-run steelhead stocks, including run size trends in the Olympic Peninsula and the amount of interaction between hatchery and natural stocks. Informed by the status review (Busby *et al.*, 1996), NMFS concluded that the OP steelhead ESU did not warrant listing under the ESA (61 FR 41541, August 9, 1996).

Updated Status Review

To ensure that our review was based on the best available and most recent scientific information, we solicited information during a 60-day public comment period regarding the DPS structure and extinction risk of, and efforts being made to protect, OP steelhead (88 FR 8774, February 10, 2023). We also convened a status review team (SRT) to review the best available scientific and commercial information regarding the

DPS structure and extinction risk of steelhead in the areas previously identified as the range of OP steelhead and consistent with the scope of the listing petition. Specifically, the SRT addressed (1) if the population fits the definition of a DPS and whether the geographic boundaries previously identified in the past NMFS review (Busby *et al.*, 1996) warrant re-delineation or refinement, (2) the relation of hatchery programs propagating steelhead to the defined DPS, (3) current threats faced by the DPS, and (4) the level of extinction risk of the DPS throughout all or a significant portion of its range. The status review presents the SRT's professional judgment of the extinction risk facing OP steelhead but makes no recommendation as to the listing status of the species. The status review (OP Steelhead SRT 2024) is available electronically (see **ADDRESSES**).

The status review was subject to independent peer review pursuant to the Office of Management and Budget Final Information Quality Bulletin for Peer Review (M–05–03; December 16, 2004). The status review was peer-reviewed by two independent scientists selected from the academic and scientific community with expertise in salmonid biology, conservation, and management, and specific knowledge of steelhead. Guidance suggests three reviewers (59 FR 34270; July 1, 1994), and we contacted multiple other experts in the field, but all were not available. The peer reviewers were asked to evaluate the adequacy, appropriateness, and application of data used in the status review, as well as the findings made in the "Risk Assessment" section of the report. Peer reviewer comments were addressed prior to finalizing the status review.

We subsequently reviewed the status review, its cited references, and peer review comments, and concluded that the status review upon which this determination is based, with additions from more recent publications and updated data (including a recent report completed by Tribal and State co-managers), provides the best available scientific and commercial information on OP steelhead. Much of the information discussed below on the DPS configuration, demographics, threats, and extinction risk is attributable to the status review (OP Steelhead SRT 2024). We have applied the statutory provisions of the ESA, including evaluation of the factors set forth in section 4(a)(1)(A)–(E), our regulations regarding listing determinations, and relevant policies identified herein in making the listing determination. In the sections below, we provide information from the report (supplemented with updates since the publication of the status review) regarding threats to and the status of OP steelhead.

Review of 'Species' Delineation

Steelhead in the Olympic Peninsula exhibit two distinct anadromous life history strategies: summer-run (stream maturing) and winter-run migrations, in addition to estuarine and freshwater resident life histories (Kendall *et al.*, 2015). We relied upon the Salmon and Steelhead Stock Inventory (Washington Department of Fisheries *et al.*, 1993), Busby *et al.* (1996), and information from State and Tribal co-managers (COPSWG 2023) to provide a provisional list of winter-run and summer-run populations for analysis. The SRT identified 11 summer-run populations and 30 winter-run steelhead populations in the previously defined range of OP steelhead (see table 2 in OP Steelhead SRT 2024). Winter-run steelhead are found throughout the OP in smaller independent streams that drain directly into the Strait of Juan de Fuca and in larger rivers and their tributaries that drain into the Pacific Ocean (including Queets, Hoh, Quinault, and Quillayute). In the Olympic Peninsula, winter-run steelhead predominate. Summer-run steelhead are currently reported for portions of the largest four river systems draining into the Pacific Ocean: Quinault (East Fork, North Fork, and main stem), Queets (mainstem, Clearwater), Hoh (South Fork Hoh), and Quillayute (Bogachiel, Sol Duc, Sitkum, and Calawah) (Cram *et al.*, 2018). Summer-run steelhead are not currently reported for rivers along the Strait of Juan de Fuca. Historically there was a population reported in the Lyre River (McHenry *et al.*, 1996; Goin 2009).

The SRT concluded that the best available scientific information did not warrant a reconsideration of the previously described geographic boundaries for OP steelhead. Busby *et al.* (1996) defined OP steelhead to include watersheds to the west of the Elwha River and north of Grays Harbor. The data contributing to the findings evaluating the genetic diversity in *O. mykiss* in Busby *et al.* (1996) were from a combination of studies that used genetic variation to delineate patterns of diversity and differentiation among *O. mykiss* from California to British Columbia, including both inland and coastal collections. A number of studies have been published since that time (Phelps *et al.*, 1997; Kassler *et al.*, 2010, 2011), and by request from the SRT, WDFW and the Northwest Indian Fisheries Commission (NWIFC) embarked on an updated analysis of all genetic data that have been collected to date on *O. mykiss* in the range of OP steelhead (Seamons and Spidle 2023). Samples analyzed by Seamons and Spidle (2023) ranged from collections taken from 1994 through 2021 and included both hatchery and natural-origin steelhead, and many collections that had been previously analyzed (Kassler *et al.*, 2010, 2011; Phelps *et al.*, 1997). Though the major coastal streams in the range of OP steelhead are represented in the data, many of the collections used for analyses are decades old, and some of the smaller streams located on the coast and in the Strait of Juan de Fuca, as well as most of the summer-run steelhead-occupied streams, are not represented.

Seamons and Spidle (2023) evaluated the genetic relationships between *O. mykiss* populations on the Olympic Peninsula and surrounding regions. Generally, the natural-origin OP steelhead genetic collections from streams sampled show very little genetic differentiation from one another. The major coastal streams along the Pacific coast, which have the best coverage of samples, particularly show little to no significant genetic differentiation. This finding supports the idea that there is a genetic exchange between populations on the coast and is consistent with results from other studies (Kassler *et al.*, 2010 and 2011; Phelps *et al.*, 1997; Reisenbechler and Phelps 1985). Based on genetic data, the southern boundary of OP steelhead, north of Grays Harbor (previously defined by Busby *et al.*, 1996), is supported by genetic differentiation from populations in southwest Washington. Very few samples from within the range of OP steelhead have been collected from the small streams draining into the Strait of Juan de Fuca; only the Pysht and Lyre River collections from the 1990s have been used for genetic analyses. Though there is clear genetic differentiation between OP steelhead and the Puget Sound steelhead DPS overall, more recent collections would be needed to get a definitive understanding of the genetic differentiation among steelhead populations on the Olympic Peninsula and, in particular, the genetic differentiation in the Strait of Juan de Fuca between the streams to the west of the Elwha River and the Elwha River and east (in the Puget Sound DPS). Therefore, we have no new genetic information that would indicate that the current boundaries for OP steelhead should be modified from those determined by Busby *et al.* (1996). A resident population of *O. mykiss* exists in Lake Crescent, isolated by a series of impassable cascades, and is notably genetically different from all other *O. mykiss* sampled. This endemic local form of resident rainbow trout, known as the Beardslee trout (see Brenkman *et al.*, 2014 for a review), was not considered by the SRT as part of the OP steelhead populations.

Findings from the SRT (OP Steelhead SRT 2024) and from Busby *et al.* (1996) directly inform our species delineation under the joint DPS Policy. First, Busby *et al.* (1996) found that the OP is characterized by habitat, climatic, and zoogeographical differences between it and the adjacent regions of western Washington and that genetic data collected supported the hypothesis that, as a group, steelhead populations from the OP are substantially isolated from populations in other regions. More recent genetic information reviewed by the SRT (OP Steelhead SRT 2024) continues to indicate that OP steelhead are isolated from other regions (as discussed above). These observations regarding separation/isolation similarly satisfy the discreteness criterion under the joint

DPS Policy, as OP steelhead are markedly separated from other such populations of *O. mykiss* due to physical and ecological factors.

Similar factors also satisfy the significance criterion of the DPS Policy. As stated above, Busby *et al.* (1996) described the unique ecological region occupied by OP steelhead, including that the Olympic Peninsula receives more precipitation than any other area in the range of west coast steelhead. Occupation of a unique ecological region satisfies a DPS criterion for significance. Loss of steelhead from the OP region would also represent a significant gap in the range of the species. Finally, as discussed above, OP steelhead are genetically distinct from the steelhead found in neighboring regions in Southwest Washington and the Puget Sound. Therefore, the loss of OP steelhead would be a significant loss to the genetic diversity of the taxon.

Based on the SRT's findings on new genetic information summarized above, the previous considerations of OP steelhead as an ESU, and our considerations under the joint DPS Policy, we conclude that OP steelhead meet the significance and discreteness criteria and warrant delineation as a DPS. Consistent with previous findings under the ESU policy, the geographic boundaries of the OP steelhead DPS continue to include winter- and summer-run steelhead runs occupying river basins of the Olympic Peninsula, Washington, west of the Elwha River (excluded) and south to Grays Harbor (excluded) on the Washington coast.

DPS Membership of Resident O. mykiss

The SRT concluded that the contribution of resident (non-migratory) *O. mykiss* to the productivity and genetic diversity in anadromous *O. mykiss* is currently unknown for OP steelhead, and there is no existing information on the genetic diversity and differentiation of resident versus migratory *O. mykiss* in OP steelhead range. Studies of *O. mykiss* in the southern portion of the species' range have identified a major genome region associated with migration and residency in *O. mykiss* (Nichols *et al.*, 2008; Hale *et al.*, 2014; Pearse *et al.*, 2019), but later research on *O. mykiss* in the Elwha River contradicted these earlier studies, finding no association between genetic variation at this region and migration or residency (Fraik *et al.*, 2021). Diversity in this region of the genome has not been examined in OP steelhead. The association of this part of the genome with migration and residency is not consistent across the range northward and inland, where the resident DNA variant for this genome region increases in frequency in both anadromous (migratory) and resident *O. mykiss* (Pearse *et al.*, 2019; Weinstein *et al.*, 2019). However, there is additional evidence for genetic differences between resident and anadromous *O. mykiss* related to smolt transformation (Nichols *et al.*, 2008), metabolism (Sloat and Reeves 2014), and growth (Kelson *et al.*, 2020), and further evidence for genetic divergence between the two life history forms (Narum *et al.*, 2004).

Resident and anadromous forms can interbreed, but the extent to which this occurs in the Olympic Peninsula is unknown. It has been demonstrated that below long-standing barriers, resident fish can contribute to the anadromous population, and the resident form can be derived from the anadromous form (Zimmerman and Reeves 2000; Pascual *et al.*, 2011; Thrower *et al.*, 2004, Kendall *et al.*, 2015). Resident fish are known to be present in the watersheds of the Olympic Peninsula, but there have been limited efforts to quantify their abundance and demographic relationship with the anadromous form across the OP region. Notably, the DPS Policy says, "the standard adopted [for discreteness] does not require absolute separation of a DPS from other members of its species, because this can rarely be demonstrated in nature for any population of organisms. … [T]he standard adopted allows for some limited interchange among population segments considered to be discrete, so that loss of an interstitial population could well have consequences for gene flow and demographic stability of a species as a whole" (61 FR 4722, 4724; February 7, 1996).

Physical, physiological, ecological, and behavioral differences between resident and anadromous life forms continue to be apparent, as similarly detailed in previous steelhead listings. The 2006 listing of multiple steelhead DPSs (71 FR 834; January 5, 2006) detailed fundamental biological differences between resident and anadromous forms of steelhead, including differences in prey, predators, size (anadromous are larger), fecundity (anadromous produce more eggs), smoltification process, and migratory strategy. A primary difference between the two life forms is that the resident fish complete their life cycle solely in freshwater while the anadromous fish migrate to the ocean. Additionally, work in a limited number of rivers in the Olympic Peninsula found that the two life history forms varied in their arrival timing in spawning reaches, with anadromous males primarily entering in late winter/early spring and resident males in late spring/early summer (McMillan *et al.*, 2007). Resident males were more common than anadromous males in upper reaches (though both overlapped in time and space with anadromous females), and the two life forms showed differences in mating behavior tactics. Also, the genetic differences related to growth and metabolism result in physical and physiological differences (larger size at a younger age in resident fish, higher metabolic costs in anadromous fish; see review by Kendall *et al.*, 2015).

Based on the best available information, the SRT found, and we agree, that the resident and anadromous forms are markedly separate in physical, physiological, and ecological factors. There is some evidence of genetic differences between anadromous and resident populations, though this has not been studied specifically in the range of OP steelhead. Additionally, though there can be physical overlap between the two forms, and interbreeding and gene flow can occur, discreteness under the DPS Policy does not require no overlap whatsoever. Therefore, under the DPS Policy, the resident form is discrete from the anadromous form and is not part of the OP steelhead DPS.

DPS Membership of Hatchery-Origin Steelhead

On July 28, 2005, NMFS released a policy on the inclusion of hatchery-origin fish in the ESA listing determinations for Pacific salmon and steelhead ESUs [or DPS in the case of steelhead but not specified] (70 FR 37204). This policy states that "[i]n delineating an ESU [or DPS] to be considered for listing, NMFS will identify all components of the ESU, including populations of natural fish (natural populations) and hatchery stocks that are part of the ESU. Hatchery stocks with a level of genetic divergence relative to the local natural population(s) that is no more than what occurs within the ESU: (a) are considered part of the ESU; (b) will be considered in determining whether an ESU should be listed under the ESA; and (c) will be included in any listing of the ESU."

The SRT summarized what is currently known about the genetic distinction between natural-origin and hatchery-origin steelhead in the Olympic Peninsula. Few studies have been undertaken to specifically evaluate the influence of hatchery stocks on natural-origin steelhead in the Olympic Peninsula. Kassler *et al.* (2010, 2011) used DNA sequences in an evaluation of the genetic diversity among natural- and hatchery-origin steelhead from coastal collections of OP steelhead, including the Hoh, South Fork Hoh, Sol Duc, Calawah, and Bogachiel Rivers, as well as hatchery-origin steelhead from four Olympic Peninsula hatcheries. For the most part, Kassler *et al.* (2010, 2011) failed to find significant introgression (transfer of genetic material from one population to another) of hatchery steelhead with natural-origin OP steelhead, except in the 2008 South Fork Hoh River winter collection, which shows evidence of interbreeding with the Cook Creek hatchery collection. This same finding was reported by Seamons and Spidle (2023) in a reanalysis of the samples with newer data (but note some of these data are outdated and not comprehensive for the entire DPS). Furthermore, samples were taken from sites with minimal hatchery influence to be more representative of natural populations. In the 2009 and 2010 Hoh River winter collections, these steelhead were more similar to other OP natural-origin steelhead collections (see Seamons and Spidle 2023). Also, DNA analyses (Kassler *et al.*, 2010, 2011; Seamons *et al.*, 2017) showed presumed natural-origin population samples with mixed ancestry (that includes genetic information from non-native early-winter and early-summer run steelhead) however, natural-origin fish were still overall genetically distinct from hatchery broodstock.

Seamons and Spidle (2023), in their more recent genetic analysis, included three hatchery stocks that currently propagate and release juvenile steelhead in Olympic Peninsula streams: Chambers Creek early winter steelhead (Puget Sound origin), Skamania early hatchery summer steelhead (Lower Columbia River origin), and Cook Creek early winter steelhead (putatively Olympic Peninsula origin). The majority (9 of 11) of hatcheries are operated as segregated programs, so they should retain their own genetic identity. While the early winter Chamber Creek Hatchery and early summer Skamania Hatchery stocks are derived from out-of-DPS sources and are therefore genetically distinct and not considered part of the DPS, the origin of the Cook Creek/Quinault National Fish Hatchery stock is unclear. There are limited data on if Cook Creek stock is similar to natural stocks. Furthermore, although current sampling for genetic analysis provides limited coverage of the DPS, there is some indication that hatchery stocks in the Queets and Quinault Rivers are not representative of the natural populations in those watersheds (HSRG 2004; Kassler *et al.*, 2012; Seamons *et al.*, 2017). For the two integrated programs (Quinault Lake and Salmon River), the broodstocks were founded by Quinault Lake winter-run steelhead, but with uncertainty about origin (see OP Steelhead SRT 2024; Marston and Huff 2022). In Seamons and Spidle (2023), none of the hatchery stock samples grouped with samples taken from presumptive natural-origin OP steelhead in a cluster analysis (statistical analysis where samples are grouped based on genetic similarity). This analysis also showed some evidence of hatchery influence on the natural-origin steelhead in OP streams in historical collections. Individuals collected from the Lyre and Pysht Rivers (in 1995 and 1994, respectively) in the Strait of Juan de Fuca are similar to Chambers Creek hatchery winter steelhead, and individuals collected from the Hoh River in 2008 appear to have been influenced by Skamania summer steelhead hatchery individuals (Seamons and Spidle 2023). Newer collections would be needed to assess the influence of past and extant hatchery releases on the genetic diversity and provenance of natural-origin *O. mykiss*, particularly since the termination of or modification of hatchery programs and releases that occurred relatively recently. Finally, out-of-DPS hatchery stocks were possibly selected by local resource managers because of differences in the run and spawn timing between the hatchery broodstocks and the native populations; therefore, the hatchery-origin steelhead exhibit a unique life history compared to the natural-origin steelhead.

Based on the SRT's conclusions, we conclude that where genetic information is available, hatchery steelhead stocks are genetically distinct from co-occurring natural-origin steelhead populations, indicating a level of genetic divergence relative to local natural populations greater than what occurs within the OP steelhead DPS. The SRT also found that the best available information suggests the hatchery stocks were founded with out-of-DPS stocks and/or out-of-DPS stocks were incorporated later, and, therefore, we conclude that the hatchery stocks are not included as part of the DPS.

Determination of "Species"

Based on the best available information, we find that natural-origin steelhead (anadromous life history) occupying river basins of the Olympic Peninsula, Washington, west of the Elwha River (excluded) and south to Grays Harbor (excluded) on the Washington coast, are a DPS and constitute a species under the ESA. Furthermore, we find that none of the steelhead hatchery stocks within the geographic range of OP steelhead meets the criteria to be considered part of the OP steelhead DPS.

Assessment of Extinction Risk

The SRT synthesized the best scientific and commercial data available regarding the DPS's status, which includes its life history, demographic trends, and susceptibility to threats, and evaluated the extinction risk of the DPS. The SRT included in its assessment an evaluation of the likely effects of hatchery-origin fish on the viability of the DPS. Additionally, the SRT assessed demographic components and threats that contribute to the uncertainty of the status of OP steelhead. Here we summarize information of status and threats, identifying uncertainties throughout. Following publication of the Status Review report (OP Steelhead SRT 2024), the Tribal and State co-managers provided a review of the SRT report, highlighting additional uncertainties in the status and threats related to OP steelhead.

Demographic Risk Analysis

The SRT identified 11 summer-run populations and 30 winter-run populations in the DPS (see table 2 in OP Steelhead SRT 2024). Steelhead on the Olympic Peninsula are most abundant in the major Pacific coastal basins of the Quinault, Quillayute, Queets, and Hoh Rivers (collectively, the "four major basins"), and less abundant in rivers along the Strait of Juan de Fuca. Winter-run steelhead, presently and historically, are more abundant in the smaller drainages and are distributed more ubiquitously throughout the Olympic Peninsula than summer-run steelhead (Houston and Contour 1983; Scott and Gill 2008; Cram *et al.*, 2018).

The SRT, utilizing data previously provided by Washington State and Tribal co-managers (collectively, "co-managers"), estimated that total run size (abundance) for winter-run in the four major basins has decreased by 42 percent, from 32,556 (1991-1995) to 18,821 (2018-2022). Using combined escapement estimates as additional information on abundance, escapement in the four major basins has decreased by 16 percent from 18,597 (1991-1995) (Busby *et al.*, 1996) to a current level of 15,653 (2018-

2022). Adequate escapement data (*i.e.*, more than a few years of dispersed data) were not available to complete trend analysis for all winter-run populations. Of the 14 populations for which adequate escapement data were available for trend analysis (of 30 total winter-run populations), 1 had a stable trend and 13 were negative (10 significantly negatively different from 0). Analysis of the four major basins by WDFW indicated that total run size had nearly halved in size from the late 1970s and 1980s to 2022, while the trend in escapements was slightly declining or stable (Harbison *et al.*, 2022). Notably, adequate information was not available for 16 of 30 winter-run populations.

The most recent 15-year spawner abundance trend estimates (2008-2022) indicate that 5 of the 15 populations that we have 15-year trend estimates for across the entire range had negative trends, mainly for the larger rivers that account for the largest proportion of the DPS. Of those negative trends, 4 were significantly different from 0, including the larger Queets River and Bogachiel River (part of the Quillayute River system) winter-run populations. Positive recent 15-year trends were observed in 8 of the 15 populations. The positive trends in two of the populations were significant, specifically the trends for the smaller Pysht River and East Twin River winter-run populations along the Strait of Juan de Fuca. Under dramatically reduced harvest conditions experienced in the last 3 years for winter-run populations in the four major basins, total run size appears to have stabilized or increased slightly. Though recent years may exhibit some stabilization in the 15-year spawner abundance estimates, the long-term trends still suggest long-term decline.

Factors related to how these abundances are estimated lead to biases and uncertainty in the estimates. Escapement abundance was estimated using redd (salmon nests) counts from after March 15 only, assuming that redds after March 15 are produced by natural-origin, not hatchery-origin, fish. However, steelhead spawn prior to March 15, and evidence suggests that both natural-origin (unmarked) and hatchery-origin steelhead contribute to this pre-cutoff date production (Marston and Huff 2022). Overall, from an abundance perspective, current estimates of escapement may underestimate natural production, and early natural-origin spawners may represent an additional 10 percent increase in overall abundance (Marston and Huff 2022). The relative contribution of hatchery-origin versus natural-origin spawners prior to March 15 varies with changes in harvest effort and timing and the intensity, location, and timing of hatchery releases, creating variable bias in abundance estimates depending on the year and/or river basin. Further, there is uncertainty in the use of redd counts to derive spawner abundances, specifically regarding assumptions of redd-to-adult ratios and the accuracy of redd observations, which can bias estimates either high or low (see Gallagher *et al.*, 2007, 2010; Dauphin *et al.*, 2010; Murdoch *et al.*, 2018). The WDFW coastal steelhead proviso plan (Harbison *et al.*, 2022) also points out other information about redd spawning surveys that could over- or under-estimate spawner abundances.

There was less data available for summer-run steelhead in the OP steelhead DPS. Information was limited to past and present harvests (based on run timing, we assumed that steelhead caught between April and October were summer-run steelhead) and intermittent snorkel surveys carried out in the last two decades. It is possible that some of the fish caught in the spring are winter-run kelts (repeat spawners). Likewise, fish caught in October could be very early returning winter-run fish. Summer-run steelhead are currently present in the Quillayute (Sol Duc, Calawah, and Bogachiel Rivers), Hoh, Queets, and Quinault Rivers. Based on historical summer-run harvest data, it appears that, prior to the releases of hatchery-origin summer-run fish, many of the rivers supported runs of several hundred natural-origin summer-run fish. Further, it is unclear if a remnant summer-run population still exists in the Lyre River (McHenry *et al.*, 1996; Goin 2009).

Based on snorkel surveys, recent summer-run steelhead abundances in individual rivers likely range from less than a hundred to a few hundred adults, though potentially into the thousands for Sol Duc River and Quinault River, with considerable uncertainty in these estimates. Based on riverscape surveys, the average estimated abundance across rivers was 66 breeding fish per year, or roughly a breeding population size of approximately 260 per river, assuming a 4-year generation time. The co-managers also developed abundance estimates for summer steelhead populations in the Hoh, Quillayute, and Quinault River systems and estimated summer-run median abundance at 90 to over 550 individuals per river but with ranges extending from low hundreds to approximately 1,350 depending on the river (Co-Manager OP Steelhead Working Group [COPSWG] 2023; and see table 8 in the status review). Therefore, there is substantial uncertainty in the current abundances of summer-run populations, but they are likely at low abundance.

Few measures of productivity are available for natural populations. Modeling conducted by the SRT indicates that in most years fishing mortality in the four major basins was greater than the intrinsic growth rate (natural population growth based on births minus natural deaths), which will result in declining populations. Only a small minority of years in each population were judged to have population growth greater than zero. Estimates of population growth rate for the smaller populations along the Strait also indicate that, on average, past harvest was depressing growth rates. However, the effect of past harvest was more subtle than in the four major basins on the coast; these Strait populations have not rebounded in the 10 or so years since harvest was terminated. The four major basins (Queets, Hoh, Quinault, and Quillayute), which contain the majority of the DPS abundance, exhibited diminished productivity as indicated by below-replacement population growth rates in most years and declining short- and long-term trends in natural-origin escapement and total run size.

Smolt survival (both natural and hatchery) has decreased since the 1980s (Harbison *et al.*, 2022). Certain analyses point to correlations with oceanographic processes and other environmental factors (COPSWG 2023; Ohlberger *et al.*, 2025), but those correlations were studied only in the four major basins within the DPS range. Similarly, the survival of kelts in the four major basins has declined by nearly half since the 1980s, with some evidence pointing to similar factors as with the smolt declines (COPSWG 2023).

OP steelhead currently occupy nearly their entire historical range because they lie in a region of the west coast that is not impacted by dams or other major artificial passage blockages, though there are multiple smaller culverts and barriers. State, county, and forest road stream crossings may block or impair passage at culverts, which may reduce spatial structure. However, in general, road culverts block tributary access to relatively small areas of spawning and rearing habitats, and collectively they do not appear to be a major limitation on habitat. Impassable culverts on state roads are required to be upgraded under the 2013 U.S. District Court Injunction (*U.S. v. WA Culvert Case*), whereas forestry road culverts are covered under the Road Maintenance and Abandonment Plan (RMAP). Considerable progress has been made in replacing culverts in the past decade, especially under the RMAP process where over 80 percent of culverts are now fish-passable. Still, some additional culverts exist that are not included within the RMAP (NWIFC 2020). Consequently, the SRT generally viewed current population connectivity as good; *i.e.*, no barriers that prevent access to significant juvenile rearing or adult spawning habitat.

The potential exists for future restrictions in spatial structure with present and future environmental variability due to low summer flows that may limit passage to headwater areas. Future projections for flow and temperature into the foreseeable future suggest that low-flow or high water-temperature barriers may develop and create temporal passage blockages, which would disproportionately affect spatial extent for summer-run steelhead. Changes in summer flows, with some reaches going dry, directly affect summer-run steelhead in their ability to reach their headwater spawning reaches. The upstream spatial extent of the DPS is influenced by the presence of summer-run populations in the larger river systems. Generally, but not necessarily, summer-run steelhead return-timing is coordinated with river flow patterns and temporal flow windows that allow access to headwater spawning areas; thus, summer-run steelhead access some spawning and rearing habitat that is unavailable to winter-run steelhead. However, over 99.3 percent of summer-run habitat is also winter-run habitat. In other words, of the habitat utilized by summer-run, only about 0.7 percent is summer-run only. Given the generally good connectivity and lack of anthropogenic barriers overall, as well as that summer-run spatial extent largely overlaps with winter-run, the SRT concluded the risk to the viability of OP steelhead from reduced spatial structure ranges from very low to low.

Available historical harvest information reviewed by the SRT indicated that the winter-run steelhead return timing was historically earlier than is currently expressed. McLachlan (1994) found a contraction in run timing in the Quillayute River, with a decrease in the proportion of the run return before January 1 from 35 percent of the run to 20 percent of the run. McMillan *et al.* (2022) estimated that peak run-timing has shifted 1 to 2 months later for winter-run steelhead in the Hoh and Quillayute, and run timing is up to 26 days shorter for some populations. Large numbers of winter-run steelhead were harvested from November to January (in some years fish were harvested in October, although these numbers may include summer-run steelhead) prior to and following the initiation of hatchery programs in the range of the OP steelhead DPS. With the beginning of hatchery programs in the DPS utilizing early-returning winter-run steelhead (*i.e.*, Chambers Creek Hatchery Stock from south Puget Sound), there was a directed harvest of the early-returning portion of the run targeting hatchery fish. As a consequence of this continued harvest, it is likely that a proportion of the early-returning (November-

January) natural-origin winter-run steelhead were and continue to be harvested, even if incidentally (OP Steelhead SRT 2024).

Hatcheries in the region utilize out-of-DPS stocks, and there is concern about the potential impacts on natural-origin steelhead genetic diversity from the use of out-of-DPS broodstock in most hatcheries (namely, Chambers Creek and Skamania origin). Though the use of out-of-DPS stocks prevents natural-origin runs from being taken for broodstock, there can be negative impacts if non-native hatchery steelhead interbreed with natural-origin steelhead. Non-native broodstocks are presumed to be more adapted to the ecology of their watershed of origin and, therefore, express life history traits that are not necessarily adapted to the watershed to which they are transferred. If non-native hatchery-origin steelhead are present on native spawning grounds, maladaptive genotypes (because the out-of-DPS stocks are not adapted to this environment) may be integrated into the naturally spawning native population through interbreeding with hatchery fish (known as introgression).

Information on the amount of interbreeding between hatchery-origin and natural-origin steelhead is limited. Some genetic data show the likely influence of non-native stocks on natural-origin OP steelhead, but in the absence of systematic genetic sampling and spawner surveys, it was not possible for the SRT to quantitatively assess this risk. DNA analyses (Kassler *et al.*, 2010, 2011; Seamons *et al.*, 2017) show presumed Olympic Peninsula natural-origin population samples with mixed ancestry that includes genetics from non-native early-winter steelhead and early-summer steelhead, though natural-origin fish were still overall distinct from hatchery broodstock. Also, while early-winter run hatchery steelhead females may generally spawn earlier than the natural-origin females, there is a tendency for hatchery-origin males to remain on the spawning grounds for extended periods, increasing the likelihood of hybridizing with natural-origin female steelhead (though hatcheries select for different spawn timing compared to natural-origin to help reduce spawning overlap).

There are limited releases of summer-run hatchery steelhead in the range of OP steelhead DPS and releases have been eliminated in many tributaries on the Strait. Even with limited releases, snorkel surveys for summer-run steelhead observed that natural-origin and hatchery-origin fish often co-occurred within the same kilometer of river channel in the Hoh, Bogachiel, and Sol Duc Rivers. Natural populations along the Strait and Cape Flattery are at relatively low abundances and, although hatchery releases in many tributaries draining to the Strait were eliminated almost a decade ago, past and continuing releases are more likely to have a significant effect on abundance and genetic composition because of their small population size.

There are circumstances that also help limit interactions and limit genetic impacts from hatchery-origin steelhead. There have been changes in hatchery operations to reduce off-station releases in order to increase the proportion of fish returning to the hatchery and decrease the number of hatchery-origin fish straying and spawning naturally (including eliminated off-station release in the Hoh River). Co-managers have made changes to reduce negative effects; for example, releases of winter-run and summer-run fish have been eliminated from the Clallam River, Goodman Creek, Lyre River, Pysht River, and Sol Duc River (COPSWG 2023). Also, larger rivers draining to the Pacific Ocean have larger natural populations and greater spatial structure; thus, despite the large size of many of the corresponding hatchery programs, it is possible that there is somewhat limited interaction and introgression between the hatchery- and natural-origin populations. Resident *O. mykiss*, multiple spawner ages, and repeat spawners all contribute to bolstering the number of effective spawners and provide some buffering against inbreeding. Additionally, the relative nearness of the populations within the DPS to each other allows for the continued exchange of individuals between populations, and helps maintain genetic diversity.

Threats Assessment

As described above, section 4(a)(1) of the ESA and NMFS' implementing regulations (50 CFR 424.11(c)) state that we must determine whether a species is endangered or threatened because of any one or a combination of the 4(a)(1) factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence (16 U.S.C. 1533(a)(1)). We evaluated whether and the extent to which each of the foregoing factors contributes to the overall extinction risk of the DPS, identifying uncertainties throughout.

Related to listing factor (A), while cumulative impacts of land-use practices have been large over space and time, the four major basins still exhibit fundamental natural watershed processes and associated habitat characteristics. These include a large, forested floodplain, relative to other watersheds, which is still intact and functioning. The SRT noted moderate-to-good conditions in river and riparian habitat, large percentages of forest cover, and declines in timber harvest activity (see NWIFC 2020), especially those rivers with substantial portions being located within Olympic National Park (ONP) or headwaters in the ONP (mainly the four major basins). OP steelhead currently occupy nearly all of their historical range because they lie in a region of the West Coast that is not impacted by dams or other major in-stream artificial passage blockages. For steelhead watersheds outside the ONP the majority of land use is for timber harvest and despite recent habitat improvement efforts, the legacy of past industrial logging practices will continue to negatively affect steelhead productivity in a number of rivers for the foreseeable future. Still, several restoration programs to retire forest roads, repair culverts, and supplement woody debris, amongst other things, were also seen as having improved habitat. Generally, habitat in many of the rivers has improved since the review by Busby *et al*. (1996), although it was recognized that the natural recovery from past timber harvest events and stream "clearing" practices takes decades. Despite some legacy effects of forestry and land use practices, habitat quality and connectivity are generally good within the DPS due to declining timber harvest activity, especially within the ONP, and the absence of dams or other major artificial passage blockages in the region.

For listing factor (B), utilization in the form of harvest of OP steelhead has declined within the last decade (particularly the last few years) and varies greatly by region (Strait vs. the four major basins). Annual harvest rates of OP steelhead in the four major basins have declined in most recent years (2021-2024). Estimates of harvest rate for the DPS and the four major basins average across population prior to 2014 were 25.6 percent and 36.5 percent, respectively (Cram *et al.*, 2018). Based on data from the co-managers, between 2014 and 2020, rates averaged across years for each of the four major basins ranged from 21 percent to 41 percent. Most recently (2021-2024), based on data including co-manager provided data since publication of the status review, harvest rate estimates for the four major basins have ranged from 7 percent to 25 percent. While harvest rates have declined recently, as stated above, modeling by the SRT with data through 2022 indicates that in most past years fishing mortality in the four major basins was greater than intrinsic natural growth, resulting in continued declines in populations (a small minority of years had growth above zero) (OP Steelhead SRT 2024). Population estimates associated with the most recent harvest rates have yet to be determined since the progeny of those brood years have not yet fully returned to spawn. Increases in abundance in the last couple of years in certain basins are promising, and it will take several years to detect a response signal from such recent actions.

For most rivers along the Strait, harvest was terminated in various years between 2005 and 2020 (see OP Steelhead SRT 2024). Population growth rate patterns considered by the SRT appear very similar among streams, including in streams where fishing continues. Therefore, it appears that other non-harvest factors (such as freshwater and/or ocean conditions) may also be influencing trends in Strait populations.

Multiple factors lead to uncertainty in harvest rates, which leads to difficulty in determining the level of threat under factor (B). Rivers within the OP steelhead range with recreational fishing have been catch and release since 2016, and the state assumes a 10 percent hooking mortality for all state-wide steelhead sport fisheries. Certain commenters on the 90-day Petition finding questioned this estimate and believe the hooking mortality rate to be lower, citing research from river systems not in the Olympic Peninsula, and there are no known data to precisely calculate hooking mortality rates for rivers within the OP DPS range. For the harvest estimates presented above, a hooking mortality estimate is included for only the Hoh River sport fishery harvest rate; therefore, rates for other basins are likely higher if incorporating catch and release mortality. Additionally, evidence suggests a sport angler encounter rate of 1.14 for natural-origin steelhead, implying some steelhead are caught and released more than once (Bently 2017; Harbison *et al.*, 2022). Estimates of the effect of multiple captures on hooking mortality are not available, but, presumably, multiple captures would increase hooking mortality. Winter-run harvest rates include all steelhead caught between management week 45 (approximately November 1) and week 18 (April) no matter the target fishery, but not any steelhead caught outside that time period (pers. comm. Jim Scott on behalf of co-managers, July 17, 2024), leading to additional uncertainty in harvest rates if any late returning fish are caught after week 18. Finally, harvest typically occurs from November to May, while escapement is calculated from counts of redds created after March 15 when it is assumed that all the fish present are natural-origin steelhead, resulting in a potential underestimate of run sizes and an overestimate of harvest rate. All in all, there are factors that both underestimate and overestimate harvest rates/mortality.

For summer-run steelhead, since 1992, catch-and-release regulations have been in place in state waters and the ONP. Fisheries data show low, limited harvest (and/or catch and release mortality) of summer-run steelhead in recent years (see OP Steelhead SRT 2024, including appendix B). It is difficult to interpret an impact of catch given the level of uncertainty associated with summer-run abundance, but available information suggests that the directed harvest of natural-origin summer-run steelhead has declined since the 1996 status review. Contributing further to the uncertainty, data on indirect harvest of summer-run steelhead in fisheries targeting other Pacific salmon were not available for review.

For listing factor (C), as detailed in the status review, most of all known disease cases are in hatchery fish populations, and little information exists on the impacts to natural-origin steelhead in the Olympic Peninsula as natural-origin steelhead are less commonly sampled (Breyta *et al.*, 2013; data from Tony Capps, WDFW). To accurately assess the potential threat of disease in this population, we would need annual pathology reports from each hatchery to effectively assess the presence/prevalence of pathogens, viruses, and bacteria. Because most known disease outbreaks have been in hatchery-origin steelhead, most hatcheries are segregated from natural-origin, and hatchery fish are not part of the DPS, the status review team considered disease to be a very low-risk threat for natural-origin OP steelhead.

Though the consumption of salmonids by predators, especially marine mammals, has increased, we have little information on the consumption of OP steelhead. Recent research suggests that predation pressure on salmon and steelhead from marine mammals has been increasing in the northeastern Pacific over the past few decades (Chasco *et al.*, 2017 a, b; Couture *et al.*, 2024; Rub *et al.*, 2018), but this work mainly focused on predation on Chinook salmon (Couture *et al.* (2024) also discuss other salmonids but there is limited mention of steelhead). Also, predation from marine mammals likely is not a primary cause of the lack of salmonid population recovery in Washington state (WSAS 2022). Studies have found that pinnipeds can have a significant predation impact on outmigrating juvenile steelhead in Puget Sound (Moore *et al.*, 2021, 2024; Moore and Berejikian 2022), winter adult steelhead at the Ballard Locks in Lake Washington (NMFS 1995), and other adult salmonids (see Rub *et al.*, 2018). Scordino *et al.* (2022) found consumption of multiple sizes of steelhead in coastal Washington by Steller and California sea lions based on scat samples (though most consumption was on Coho salmon [*O. kisutch*]). Seabirds are present in the Olympic Peninsula watersheds and consume juvenile salmonids, but we are unaware of any unusual or excessive predation events by seabirds or hotspots of seabird predation (based on pers. Comm. with Thomas Good, 15 October 2023, NMFS NWFSC). Invasions of non-native fish species pose threats to native fish fauna, but little is known about the extent or effects on OP steelhead.

Anthropogenic habitat alterations, including dams, irrigation diversions, fish ladders, and human-created islands, have the potential to create sites that may increase predation opportunities on adult and juvenile salmonids (Antolos *et al.*, 2005; Evans *et al.*, 2012; Hostetter *et al.*, 2012; Moore & Berejikian 2022; Collins *et al.*, 1976). However, there are no large dams or barriers in the OP steelhead range. While increases in predation associated with increases in pinniped populations along the West Coast are possible, we have no specific information to indicate that predation has increased for OP steelhead and no quantitative information on predation over time. Also, less is known about predation of steelhead in the marine environment. Tribal managers in the area have voiced concern about pinniped predation on these populations, but we lack quantitative data about the level of threat or if predation is a factor limiting the viability of OP steelhead specifically. Therefore, the SRT concluded that predation was a low risk.

Related to listing factor (D), various Federal and State protection measures exist across the Olympic Peninsula and the state of Washington to protect forests and salmonid habitat. Many provide protection to the species and its habitat. These include the Northwest Forest Plan (NWFP) and the associated Aquatic Conservation Strategy, the General Management Plan for the ONP, the Washington Forest Practices Act, the Washington State Forest Practices Rules, the DNR Habitat Conservation Plan, and state legislation to remove fish passage barriers. Additionally, multiple rivers and streams where OP steelhead occur have been designated as bull trout (*Salvelinus confluentus*) critical habitat (75 FR 63875-63978, October 18, 2010) and other ESA-listed species like Lake Ozette sockeye salmon (*Oncorhynchus nerka*), marbled murrelet (*Brachyramphus marmoratus*), and Northern spotted owl (*Strix occidentalis caurina*) occur on the peninsula. NMFS and USFWS have conducted biological opinions under section 7 of ESA for Federal actions in this region, including for the forest management activities in the Olympic National Forest, that lead to the prevention of activities that may jeopardize listed species and/or adversely modify their critical habitat. However, it is difficult to assess if these actions are adequate to conserve OP steelhead. Progress towards habitat protection is hard to measure since any ongoing efforts related to habitat restoration may take decades (if not longer) to show an effect. There is a spectrum of regulatory mechanisms protecting and restoring habitat, and the degree of protection depends on the entity with regulatory authority and the specific land activities in each area.

Regulations related to harvest and hatcheries within Washington State also affect OP steelhead. OP steelhead fisheries are collectively managed by WDFW (State waters outside of the ONP) and Treaty Tribes (in their usual and accustomed fishing areas) and also by the ONP (in the park). The Treaty Tribes regulate commercial and subsistence fisheries and on-reservation sport and tribal-guided fisheries. Martin (2023) notes that sustainable harvest management is a core principle of traditional resource management and is embedded into the tribes' societal roles. Salmon and steelhead have been managed since time immemorial during a time when steelhead thrived (including their habitat), and this management included both traditional hatchery practices and harvest practices. Strategies have been implemented since the 1990s to support sustainable fishing including: prohibiting retention of natural-origin winter-run steelhead for recreational fisheries in state waters (since 2016, recreational fishing on certain tribal lands allows for retention of natural-origin), harvest restrictions (such as bag limits), shorter seasons, and gear restrictions (limits on hooks, prohibiting bait, prohibiting fishing from boats in certain rivers) in the face of declining natural-origin steelhead populations (Harbison *et al.*, 2022). In recent years, recreational fisheries have been closed inside and outside of the ONP for certain rivers due to low returns. As noted above, reductions in harvest rates, with large reductions in tribal harvest rates, have occurred in recent years (2021, 2022, and 2023-2024 season). For most rivers along the Strait, steelhead-directed harvest has been prohibited since between 2005 and 2020 (depending on the river).

The state of Washington has proposed, but not yet implemented, the 2022 WDFW Coastal Steelhead Proviso Implementation Plan ("Proviso") (Harbison *et al.*, 2022) and has begun the process for updating state harvest regulations (*https://wdfw.wa.gov/fishing/management/steelhead/coastal*). The Proviso outlines management strategies for the future of OP steelhead and other coastal steelhead populations. The Proviso Plan is based on existing state policies and does not represent a change in policy. It was developed as a response to recent declines in coastal steelhead and the need for adaptive management strategies to address these declines. There are additional plans by the State to update coastal steelhead management, though there are limited details on the plan at this time (*https://wdfw.wa.gov/fishing/management/steelhead/coastal*). Finally, as noted throughout, the Tribal and State co-managers actively monitor and have a policy of protectively managing the species. The co-managers have also committed to changes to hatchery and harvest regulations (see Co-manager Olympic Steelhead Working Group

2025), most notably efforts to mark all hatchery fish, testing of natural-derived broodstock in the Quillayute, evaluation of the March 15 management cut-off date, updating catch-and-release mortality, and expanding methods for abundance estimation. NMFS will continue to work with the co-managers to evaluate the effectiveness of the existing regulatory mechanisms and the future impact of these commitments on the species' status.

WDFW operation of hatcheries is currently subject to the Statewide Steelhead Management Plan and the Anadromous Salmon and Steelhead Hatchery Policy C-3624 (2021), superseding the policy from 2009 (Hatchery and Fishery Reform Policy C-3619). This policy provides general guidelines and notes that Hatchery Monitoring Plans (HMPs) will be developed for all state hatcheries. We did not find any evidence of completed HMPs at this point. This policy applies to state hatcheries and not to Federal or Tribal facilities. The C-3624 policy is not an enforceable regulation, but a guiding policy. However, the co-managers are currently working to develop hatchery management plans for hatchery facilities within the Olympic Peninsula (Harbison *et al.*, 2022).

Extensive hatchery programs have been implemented throughout the range of west coast steelhead. While some programs may have succeeded in providing harvest opportunities and increasing the total number of naturally spawning fish, the programs have also likely increased risks to natural populations, though this can depend on specific management and if measures are taken to reduce impacts to native runs. Hatchery operations, especially those utilizing non-native broodstocks, could introduce maladapted life history traits through interbreeding between natural-origin and hatchery-origin fish (introgression). We cannot currently quantitatively estimate the level of reproductive exchange between natural-origin and hatchery-origin steelhead in the Olympic Peninsula. Estimates of the proportion of hatchery-origin spawners (pHOS) and genetic data give some insight into the level of possible introgression but were only available for a limited proportion of the DPS, and many were not from recent years. Available information suggests some introgression, and the continued use of non-native broodstocks presents ecological and genetic risks, though this risk varies with the specifics of the particular hatchery program and natural population. There have been changes in hatchery operations to reduce straying. NMFS will continue to work with the co-managers to evaluate the impacts of hatchery operations and the effectiveness of efforts to reduce risks to OP steelhead.

Finally, for listing factor (E) scientists predict the rising temperatures and associated ecosystem changes caused by environmental variation to impact Pacific salmon by a variety of mechanisms throughout their life cycle (Crozier *et al.*, 2008, 2019, Isaak *et al.*, 2022, Crozier and Siegel 2023). These impacts are complex and vary among species, DPSs, and habitats. For U.S. West Coast salmon and steelhead, expected changes to freshwater habitats include increased air and stream temperatures and changes in seasonal (but not necessarily annual mean) rainfall patterns, with larger and more extreme storms and droughts. These increased temperatures will result in more winter precipitation falling as rain than snow at intermediate elevations, which alters both seasonal streamflow and water temperatures.

Many changes in temperature and stream flow have already been observed in the Olympic Peninsula watersheds (see OP Steelhead SRT 2024). Additionally, multiple papers have already documented extensive glacier losses in the Olympic Mountains; between 1980 and 2015, 35 glaciers and an additional 16 perennial snowfields disappeared from the Olympic Mountains (Fountain *et al.*, 2022; Riedel *et al.*, 2015; NWIFC 2020). Increases in summer stream temperatures especially pose risks to steelhead due to extended freshwater rearing; *i.e.*, juvenile steelhead that spend up to 2 or 3 years in freshwater (Halofsky *et al.*, 2011; Climate Impacts Group 2009). Winter-run steelhead predominate in the Olympic Peninsula and are expected to be somewhat less susceptible to risks from changing stream temperatures than summer-run steelhead. Low summer stream flows can affect summer-run steelhead migration by dewatering stream reaches or limiting the accessibility of waterfalls or cascades (Halofsky *et al.*, 2011). Future increases in flows at other times of year can displace juvenile fish and/or reduce the availability of suitable slow-water habitats for young fish. However, winter-run steelhead generally spawn after peak flow events and are less susceptible to redds being scoured (Halofsky *et al.*, 2011). Still, future increases in streamflow can increase the magnitude and frequency of streambed mobilization and scour, impacting eggs and embryos, while warmer temperatures may result in more rapid incubation leading to earlier timed and smaller individuals at emergence (Dalton *et al.*, 2016).

Environmental variability now and into the future will also likely impact steelhead in the marine environment. Modeling analysis predicted an 8 to 43 percent contraction of steelhead species' marine habitat due to changing thermal conditions between the 2020s and 2080s, depending on time period (Abdul-Aziz *et al.*, 2011). The assessment by the co-managers (COPSWG 2023) and subsequent publication (Ohlberger *et al.*, 2025) suggested that interannual variation in recruitment and kelt survival were both partially explained by summer sea surface temperatures (SST) with lower recruitment and kelt survival with warmer summer SST. Models showed that pink salmon abundance as well as North Pacific Gyre Oscillation (NGPO) also influence recruitment (Ohlbergur *et al.,* 2025). There is uncertainty in how smolt survival and recruitment and kelt survival will change over time, but kelt survival has already declined since the 1980s.

There may be positive impacts from environmental variability, particularly temperature, such as possible longer rearing seasons due to temperature increases at certain times of the year, increased productivity within the food web, and more rapid growth at certain times and life stages (Halofsky *et al.*, 2011; Dalton 2016). Warmer conditions in summer would likely reduce growth, but warmer temperatures at other times of the year could increase growth rates (Dalton *et al.*, 2016) and improve rearing conditions for juveniles, especially in the lower river reaches. However, warmer temperatures also potentially increase susceptibility to disease and increase competition with other species or predation, through the increased presence of non-native piscivorous species.

At the population level, the ability of organisms to genetically adapt to environmental variability depends on how selection on multiple traits interact and whether those traits are linked genetically. Factors that affect genetic diversity can limit the ability of a population to adapt to variability in environmental conditions. These factors include, but are not limited to, small population size, domestication in hatchery environments, and/or introgression by introduced non-native stocks. Also, future environmental changes are likely to happen much faster than normal adaptation processes can respond.

Rangewide Risk of Extinction

The SRT's determination of rangewide extinction risk to the OP steelhead DPS used the categories of high, moderate, or low risk of extinction. The risk levels are defined as:

(1) High risk: A species or ESU with a high risk of extinction is at or near a level of abundance, productivity, diversity, and/or spatial structure that places its continued existence in question. The demographics of a species or ESU at such a high level of risk may be highly uncertain and strongly influenced by stochastic and/or depensatory processes. Similarly, a species or ESU may be at high risk of extinction if it faces clear and present threats (*e.g.*, confinement to a small geographic area; imminent destruction, modification, or curtailment of its habitat; disease epidemic) that are likely to create such

imminent demographic risks.

(2) Moderate risk: A species or ESU is at moderate risk of extinction if it exhibits a trajectory indicating that it is more likely than not to reach a high level of extinction risk in the foreseeable future. A species or ESU may be at moderate risk of extinction due to projected threats and/or declining trends in abundance, productivity, spatial structure, or diversity. The appropriate time horizon for evaluating whether a species or DPS is more likely than not to become at high risk in the future depends on various case- and species-specific factors. For example, the time horizon may reflect certain life-history characteristics (*e.g.*, long generation time or late age-at-maturity) and may also reflect the timeframe or rate over which identified threats are likely to impact the biological status of the species or ESU (*e.g.*, rate of disease spread). The appropriate time horizon is not limited to the period that status can be quantitatively modeled or predicted within predetermined limits of statistical confidence.

(3) Low risk: A species or ESU is at low risk if it is not at moderate or high risk of extinction.

The SRT considered the “foreseeable future” to be a time period of approximately 40 to 60 years. Following Stout *et al.* (2012), the shorter end of this timeframe corresponds to roughly 10 steelhead generations, which the SRT concluded was a reasonable value over which to consider current demographic trends. The longer end of this timeframe corresponds to a timeframe over which scientific studies of the impacts of environmental variability on salmonid freshwater and ocean habitat are available. For example, the SRT utilized analyses of predicted future stream temperatures and stream flow in the years 2040 and 2080 and marine studies for *O. mykiss* that center on the 2040s and 2080s (Abdul-Aziz *et al.*, 2011).

The SRT used a likelihood point method to account for uncertainty in the overall extinction risk by allocating ten risk points across the low, moderate, and high-risk categories. In their overall evaluation of the DPS status, the majority of the SRT members put the majority of their 10 allocated risk likelihood points in the moderate extinction risk category leading to an average of 5.5 in moderate, 4 in low, and 0.5 in high. A minority of members (2/8) put either equal points between low and moderate extinction risk or the majority of points in low extinction risk category (six points in low, four in moderate). SRT members with the majority of points in low extinction risk concluded that the overall DPS abundance was still relatively moderate compared to other steelhead DPSs and that the major threats, other than environmental variability, could be addressed directly through management actions. Therefore, there was uncertainty across the members about the level of risk facing OP steelhead (not unanimous).

In consideration of the factors identified in 4(a)(1) of the ESA and our analysis of the viability of the DPS, including any uncertainties, we are unable to find the DPS faces a high or moderate risk of extinction now or in the foreseeable future. Despite some legacy effects of forestry and land use practices, habitat quality and connectivity are generally good within the DPS due to declining timber harvest activity, especially within the ONP, and the absence of dams or other major artificial passage blockages in the region. OP steelhead habitat has also benefitted from several restoration programs including efforts to repair culverts, retire forest service roads, and supplement woody debris. Additionally, under existing regulatory mechanisms, the co-managers have implemented improved harvest management strategies and harvest of OP steelhead has declined within the last decade, particularly the last few years. There have also been changes in hatchery operations to reduce straying. Abundance trends suggest populations have declined over the long-term; however, increases in abundance in the last couple of years in certain basins are promising, and overall DPS abundance is still relatively moderate compared to other steelhead DPSs. The co-managers and NMFS will continue monitoring populations for response signals from recent and future conservation management actions. While information is limited, disease risk to natural-original OP steelhead is considered very low risk. Some evidence suggests introgression between hatchery-origin and native fish, though data regarding the current levels of genetic mixing are limited. The extent to which predation may be limiting the viability of OP steelhead is uncertain, although pinniped predation is not considered a primary threat to steelhead in these ecosystems. Predicted variation in stream temperatures and flows, changes to the marine environment, and alterations in seasonal rainfall patterns are likely to negatively impact the DPS in the foreseeable future; however, some beneficial impacts are also possible, and there remains considerable uncertainty about the localized effects of environmental variation to OP steelhead populations. Based on the foregoing, we have determined the DPS is not at a high risk of extinction or near a level of abundance, productivity, diversity, and/or spatial structure that places its continued existence in question; nor does the DPS exhibit a trajectory indicating that it is more likely than not to reach a high level of extinction risk in the foreseeable future.

Significant Portion of Its Range Analysis

As noted in the introduction above, the definitions in section 3 of the ESA of both "threatened species" and "endangered species" contain the term "significant portion of its range" (SPR), which we interpret to refer to an area smaller than the entire range of the species. As indicated by these definitions, we can list a species based on their status in all of their range or based on their status in a SPR. The range of a species is considered to be the general geographical area within which that species can be found at the time NMFS or USFWS makes any particular status determination. This range includes those areas used throughout all or part of the species' life cycle, even if they are not used regularly (*e.g.*, seasonal habitats). (79 FR 37578, 37583, July 1, 2014).

In construing the statutory definitions of threatened species and endangered species, we are thus required to give some independent meaning to the SPR phrase to avoid rendering it superfluous to the "throughout all" language (See *Defenders of Wildlife* v. *Norton*, 258 F.3d 1136 (9th Cir. 2001)). Under the 2014 policy regarding the interpretation of the phrase "significant portion of its range" (SPR Policy), which was issued jointly by NMFS and USFWS, first we evaluate the status of the species throughout its range and, unless we find the species is endangered based on the rangewide analysis, we must go on to consider whether the species may have a higher risk of extinction in an SPR (79 FR 37578, July 1, 2014). The assessment consisted of identifying and evaluating portions of the DPS that are potentially at high risk of extinction and are important to the overall DPS's long-term viability, yet not so important as to be determinative of its current or foreseeable status. In other words, the goal of the SPR analysis was to determine if there are biologically important portions of the DPS that are currently at higher risk than the DPS rangewide but that are not so important that their status would lead to the entire DPS being currently at higher risk.

Because a species' range can theoretically be divided into an infinite number of portions, the SRT first discussed and identified several sub-DPS portions that had a reasonable likelihood of being at higher risk of extinction than the DPS rangewide and a reasonable likelihood of being biologically significant to the species. Unless a portion meets both conditions, they will not be further considered in the SPR analysis (as they could not form the basis for a proposed listing). In evaluating whether a portion was biologically significant, the SRT considered whether the species within that portion was important to the DPS's long-term viability but not so important that their status would drive current or foreseeable DPS-wide extinction risk. After considering multiple possibilities, the SRT settled on a more detailed evaluation of two types of strata based on geography or adult run-timing.

In this case, the geographic units considered include steelhead populations in rivers that drain to the Strait and steelhead populations in rivers that drain to the Pacific Ocean. These two regions were identified as potential portions due to the hydrological and geographic distinctiveness of the rivers supporting Strait populations and coastal populations. The majority of the SRT members assigned a majority of their 10 allocated points in the not biologically significant category for populations in rivers draining to the Strait. The SRT concluded that populations in the Strait portion may express distinct life-history strategies, however, there are coastal populations in streams ecologically similar to those in the Strait, and over the long term it is likely that the rivers on the Strait could be recolonized by coastal OP steelhead runs. So, though these runs are important to diversity and spatial structure, they are not so important as to be biologically significant relative to the overall long-term viability of the species. Because the SRT determined that the Strait populations did not meet the agency's criteria for significance, the Strait portion of the range is not considered to be an SPR. Coastal populations are the most numerous and widespread portion of the DPS. The status of the coastal component is determinative of the rangewide status of the DPS and is therefore not a valid SPR.

The team also considered whether the variation in adult run-timing might form the basis for identifying alternative portions. In general, summer- and winter-run steelhead utilize spatially different freshwater habitats, particularly during the adult freshwater migration and spawning portions of the life cycle. Generally, summer-run steelhead tend to spawn in the upper portions of river systems. Sometimes these areas are above temporal flow barriers that are only accessible during high spring flows (Withler 1966; Myers *et al.*, 2015; Waples *et al.*, 2022), thus not utilized by winter-run and leading to a different geographic extent for summer-run.

However, we have determined the summer-run stratum does not qualify as a valid portion of the OP steelhead range because, consistent with the ESA and the 2014 SPR Policy (79 FR at 37583), the selection of portions for consideration should be premised at least in part on a geographically oriented rationale. Here, the summer-run component lacks sufficient spatial segregation from the winter-run to be considered a valid portion of the DPS's range for the purposes of SPR analysis under the ESA. A review of spawning and rearing habitat utilized by summer-run steelhead, found only 0.7 percent of the habitat was used solely by summer-run steelhead. In other words, >99.3 percent of summer-run geography is shared with winter-run fish. Therefore, the summer-run component does not qualify as a valid portion of the OP steelhead range.

Additionally, the SRT concluded that the summer-run portion did not meet the criteria to be considered biologically significant to the DPS's long-term viability. The SRT concluded that summer-run populations contribute to genetic diversity and spatial structure diversity of the DPS. However, the SRT ultimately concluded the summer-run fish to be not significant because summer-run steelhead currently are not and historically were not a major contributor to overall DPS abundance, winter-run and summer-run populations in the same watershed are not reproductively isolated and have generally been found to be genetically very similar (thus there is some possibility for reestablishment if a summer-run population is lost), and summer-run specific habitat (predominantly just for spawning) represents a minor fraction of the total accessible spatial structure. Summer-run steelhead was voted to have a higher risk than the DPS range-wide, but given that summer-run steelhead did not meet the agency's criteria to be considered significant and a valid portion, this grouping is not considered an SPR.

Finally, winter-run populations are the most numerous and widespread portion of the DPS. The status of the winter-run component is determinative of the rangewide status of the DPS and is therefore not a valid SPR. We conclude that there are no portions of the DPS's range that are both significant and at higher risk of extinction than the DPS as a whole.

Final Determination

Section 4(b)(1) of the ESA requires that we make listing determinations based solely on the best scientific and commercial data available after conducting a review of the status of the species and taking into account those efforts, if any, being made by any State or foreign nation, or political subdivisions thereof, to protect and conserve the species. We have independently reviewed the best available scientific and commercial information, including references cited in the petition, public comments submitted on the 90-day finding (88 FR 8774; February 10, 2023), the status review report, and information provided by co-managers, and we have consulted with species experts and individuals familiar with steelhead.

Based on the foregoing information, we determine OP steelhead do not warrant listing at this time. Primary factors leading to this conclusion include: habitat quality and connectivity are generally good within the DPS and are benefitting from ongoing restoration efforts; spatial distribution is good; State and Tribal co-managers have implemented improved harvest and hatchery practices and reduced harvest significantly in recent years; abundance trends suggest declining populations, but the response to recent management actions has yet to be seen; and while environmental variation is expected to have some negative impacts on the DPS, there could also be positive impacts while the precise localized effects are unclear. Additionally, we did not identify any portions of the DPS that were both significant and facing a higher level of extinction risk than the DPS rangewide. Therefore, we determine listing is not warranted. NMFS intends to continue to monitor the status of the OP steelhead DPS and work closely with the State and Tribal co-managers.

References

A complete list of all references cited herein is available upon request (See **FOR FURTHER INFORMATION CONTACT)**.

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

Samuel D. Rauch, III,

Deputy Assistant Administrator for Regulatory Programs,

National Marine Fisheries Service.

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