Designation of Critical Habitat for Lower Columbia River Coho Salmon and Puget Sound Steelhead

DRAFT Biological Report

November 2012

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EXECUTIVE SUMMARY

This report contains biological assessments supporting the National Marine Fisheries Service's (NMFS) proposed designation of critical habitat under section 4 of the Endangered Species Act for two listed distinct population segments (DPS): lower Columbia River coho salmon and Puget Sound steelhead. NMFS convened two critical habitat analytical review teams (CHART) charged with analyzing the best available data for each DPS to make findings regarding the presence of essential habitat features in each watershed, potential management actions that may affect those features, and the conservation value of each watershed within each DPS's range. This report summarizes the agency's mapping efforts, methods and information used, and final CHART assessments for these two DPSs. This information will be used in conjunction with other agency analyses (e.g., economic analyses) to determine which areas to propose as critical habitat for lower Columbia River coho salmon and Puget Sound steelhead.

BACKGROUND

In previous rulemaking, we, the National Marine Fisheries Service (NMFS) determined that lower Columbia River coho (*Oncorhynchus kisutch*) and Puget Sound steelhead (*O. mykiss*) are each a distinct population segment (DPS)[1] that warrant protection as threatened species under the Endangered Species Act (ESA)(70 FR 37160, June 28, 2005; 72 FR 26722, May 11, 2007). The agency also determined that critical habitat was not determinable at the time of those final listing decisions and announced that it would propose critical habitat designations in separate rulemaking. Since the time of listing the recovery planning process has progressed for these two species and additional new information is now available to better inform the designation process. In view of these developments, we issued an advance notice of proposed rulemaking on January 10, 2011 (76 FR 1392) to solicit comments and information that may be useful in making proposed critical habitat designations for lower Columbia River coho salmon and Puget Sound steelhead. This report describes the process and results of conducting the biological assessments supporting our proposed designation of critical habitat for these two listed DPSs.

[1] Each of the species addressed in this report isare considered a DPS under the Endangered Species Act. Although NMFS typically refers to Pacific salmon DPSs as “evolutionarily significant units” or “ESUs” (56 FR 58612; November 20, 1991), this report uses the DPS term to reduce confusion.

CRITICAL HABITAT UNDER THE ESA

The ESA defines critical habitat under section 3(5)(A) as follows:

> (i) the specific areas within the geographical area occupied by the species, at the time it is listed . . ., on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
>
> (ii) specific areas outside the geographical area occupied by the species at the time it is listed . . . upon a determination by the Secretary that such areas are essential for the conservation of the species.

Once critical habitat is designated, ESA Section 7 requires federal agencies to ensure that they do not fund, authorize, or carry out any actions that are likely to destroy or adversely modify that habitat. This requirement is in addition to the Section 7 requirement that federal agencies ensure that their actions do not jeopardize the continued existence of listed species.

Section 4(a) of the ESA precludes military land from designation, where that land is covered by an Integrated Natural Resource Management Plan that the Secretary has found in writing will benefit the listed species.

ESA Section 4(b)(2) requires NMFS to designate critical habitat for threatened and endangered species "on the basis of the best scientific data available and after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat." This section grants the Secretary [of Commerce] discretion to exclude any area from critical habitat if he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat." The Secretary's discretion is limited, as he may not exclude areas if it "will result in the extinction of the species."

SALMONID LIFE HISTORY

Pacific salmon and steelhead are anadromous fish, meaning adults migrate from the ocean to spawn in freshwater lakes and streams where their offspring hatch and rear prior to migrating back to the ocean to forage until maturity. The migration and spawning times vary considerably between and within species and populations (Groot and Margolis, 1991). At spawning, adults pair up to lay and fertilize thousands of eggs in freshwater gravel nests or "redds" excavated by females. Depending on lake/stream temperatures, eggs incubate for several weeks to months before hatching as "alevins" (a larval life stage dependent on food stored in a yolk sac). Following yolk sac absorption, alevins emerge from the gravel as young juveniles called "fry" and begin actively feeding. Depending on the species and location, juveniles may spend from a few hours to a few years in freshwater areas before migrating to the ocean. The physiological and behavioral changes required for the transition to salt water result in a distinct "smolt" stage in most species. On their journey, juveniles must migrate downstream through every riverine and estuarine corridor between their natal lake or stream and the ocean. For example, smolts from Idaho will travel as far as 900 miles from their inland spawning grounds. En route to the ocean, the juveniles may spend from a few days to several weeks in the estuary, depending on the species. The highly productive estuarine environment is an important feeding and acclimation area for juveniles preparing to enter marine waters.

Juveniles and subadults typically spend from 1 to 5 years foraging over thousands of miles in the North Pacific Ocean before returning to spawn. Some species, such as coho salmon, have precocious life history types (primarily male fish) that mature and spawn after only several months in the ocean. Spawning migrations known as "runs" occur throughout the year, varying by species and location. Most adult fish return or "home" with great fidelity to spawn in their natal stream, although some do stray to non-natal streams. Salmon species die after spawning, while steelhead may return to the ocean and make repeat spawning migrations.

This complex life cycle gives rise to complex habitat needs, particularly during the freshwater phase (Spence *et al.* 1996). Spawning gravels must be a certain size and free of sediment to allow successful incubation of the eggs. Eggs also require cool, clean, and well-oxygenated waters for proper development. Juveniles need abundant food sources, including insects, crustaceans, and other small fish. They need places to hide from predators (mostly birds and bigger fish), such as under logs, root wads, and boulders in the stream, as well as beneath overhanging vegetation. They also need places to seek refuge from periodic high flows (side channels and off-channel areas) and from warm summer water temperatures (coldwater springs and deep pools). Returning adults generally do not feed in fresh water but instead rely on limited energy stores to migrate, mature, and spawn. Like juveniles, they also require cool water and places to rest and hide from predators. During all life stages, salmon and steelhead require cool water that is free of contaminants. They also need migratory corridors with adequate passage conditions (timing, water quality, and water quantity) to allow access to the various habitats required to complete their life cycle.

The homing fidelity of salmon and steelhead is reflected in the distribution of distinct, locally adapted populations among watersheds with differing environmental conditions and distinct habitat characteristics (Taylor 1991, Policansky and Magnuson 1998, McElhany *et al.* 2000). Spatially structured populations in which populations or subpopulations occupy habitat patches, connected by some low-to-moderate stray rates, are often generically referred to as "metapopulations" (Levins 1969). Low-to-moderate levels of straying result in regular genetic exchange among populations, creating genetic similarities among populations in adjacent watersheds (Quinn 1993, Utter *et al.* 1989, Ford 1998).

The overall health and likelihood of persistence of salmon and steelhead metapopulations are affected by the abundance, productivity, connectivity/spatial structure, and diversity of the component populations (McElhaney *et al.* 2000). With respect to the habitat requirements of a healthy salmonid DPS, a DPS composed of many diverse populations distributed across a variety of well-connected habitats can better respond to environmental perturbations including catastrophic events (Schlosser and Angermeier 1995, Hanski and Gilpin 1997, Tilman and Lehman 1997, Cooper and Manger 1999). Additionally, well-connected habitats of different types are essential to the persistence of diverse, locally adapted salmonid metapopulations capable of exploiting a wide array of environments, as well as capable of responding to and surviving both short- and long-term environmental change (e.g., Groot and Margolis 1991, Wood 1995). Differences in local flow regime, temperature regime, geological, and ecoregion characteristics correlate strongly with DPS population structure (Ruckelshaus *et al.* 2001, Puget Sound Technical Recovery Team 2011).

DPSs with fewer and less diverse habitat types and associated populations are more likely to become extinct due to catastrophic events. They also have a lower likelihood that the necessary phenotypic and genotypic diversity will exist to maintain future viability. DPSs with limited geographic range are similarly at increased extinction risk due to environmental variability and catastrophic events. DPSs with populations that are geographically distant from each other, or that are separated by severely degraded habitat, may lack the connectivity to function as metapopulations and are more likely to become extinct. DPSs with reduced local adaptation and limited life-history diversity are more likely to go extinct as the result of correlated environmental catastrophes or environmental change that occurs too rapidly for an evolutionary response. Assessing the conservation value of specific habitat areas to DPS viability involves evaluating the quantity and quality of habitat features (for example, spawning gravels, wood and water condition, side channels), the relationship of the area to other areas within the DPS, and the significance to the DPS of the population occupying that area.

GEOGRAPHICAL AREA OCCUPIED BY THE SPECIES

Agency regulations at 50 CFR 223.102 define the two DPSs under consideration as follows:

(1) Lower Columbia River coho—"…including all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood

Rivers, and includes the Willamette River to Willamette Falls, Oregon, as well as twenty-five artificial propagation programs…" and

(2) Puget Sound steelhead—"…including all naturally spawned anadromous O. mykiss (steelhead) populations, from streams in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington, bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive), as well as the Green River natural and Hamma Hamma winter-run steelhead hatchery stocks."

Both descriptions emphasize the freshwater range of each DPS because we delineated salmon and steelhead DPSs based on spawning (or natal) areas .

Given these considerations, the freshwater geographical area occupied by the species includes:

(1) Lower Columbia River coho—in the lower Columbia River basin, the Columbia River mainstem from the Pacific Ocean upstream to the confluence of the Washougal and Sandy Rivers, East Fork Hood River, West Fork Hood River, Hood River, White Salmon River, Little White Salmon River, Wind River, Middle Columbia/Grays Creek, Middle Columbia/Eagle Creek, Salmon River, Zigzag River, Upper Sandy River, Middle Sandy River, Bull Run River, Washougal River, Columbia Gorge Tributaries, Lower Sandy River, Salmon Creek, Upper Lewis River, Muddy River, Swift Reservoir, Yale Reservoir, East Fork Lewis River, Lower Lewis River, Kalama River, Beaver Creek/Columbia River, Clatskanie River, Germany/Abernathy, Skamokawa/Elochoman, Plympton Creek, Headwaters Cowlitz River, Upper Cowlitz River, Cowlitz Valley Frontal, Upper Cispus River, Lower Cispus River, Tilton River, Riffe Reservoir, Jackson Prairie, North Fork Toutle River, Green River, South Fork Toutle River, East Willapa, Coweeman, Youngs River, Big Creek, Grays Bay, Abernethy Creek, Collawash River, Upper Clackamas River, Oak Grove Fork Clackamas River, Middle Clackamas River, Eagle Creek, Lower Clackamas River, Johnson Creek, Scappoose Creek, and Columbia Slough/Willamette River.

(2) Puget Sound steelhead—in Puget Sound and the Strait of Juan de Fuca, Bellingham Bay, Samish River, Birch Bay, Upper North Fork Nooksack River, Middle Fork Nooksack River, South Fork Nooksack River, Lower North Fork Nooksack River, Nooksack River, Skagit River/Gorge Lake, Skagit River/Diobsud Creek, Cascade River, Skagit River/Illabot Creek, Baker River, Upper Sauk River, Upper Suiattle River, Lower Suiattle River, Lower Sauk River, Middle Skagit River/Finney Creek, Lower Skagit River/Nookachamps Creek, North Fork Stillaguamish River, South Fork Stillaguamish River, Lower Stillaguamish River, Tye And Beckler Rivers, Skykomish River Forks,

Skykomish River/Wallace River, Sultan River, Skykomish River/Woods Creek, Middle Fork Snoqualmie River, Lower Snoqualmie River, Pilchuck River, Snohomish River, Cedar River, Lake Sammamish, Lake Washington, Sammamish River, Upper Green River, Middle Green River, Lower Green River, Upper White River, Lower White River, Carbon River, Upper Puyallup River, Lower Puyallup River, Mashel/Ohop, Lowland, Prairie1, Prairie2, Skokomish River, Lower West Hood Canal Frontal, Hamma Hamma River, Duckabush River, Dosewallips River, Big Quilcene River, Upper West Hood Canal Frontal, West Kitsap, Kennedy/Goldsborough, Puget, Prairie3, Puget Sound/East Passage, Chambers Creek, Port Ludlow/Chimacum Creek, Discovery Bay, Sequim Bay, Dungeness River, Port Angeles Harbor, and Elwha River.

This report contains maps and tables depicting the location, extent, and other attributes of these stream reaches and watersheds.

Both DPSs also occupy vast areas of the Pacific Ocean where they forage during their juvenile and subadult life phases before returning to spawn in their natal streams. The PS steelhead DPS also occupies marine waters in Puget Sound. As described further in the Section 4(b)(2) report (NMFS 2012a), we could not identify "specific areas" within the ocean range that meet the definition of critical habitat. We did ask the CHARTs to consider the marine areas in Puget Sound for PS steelhead, but did not ask them to consider habitat in the Pacific Ocean.

"PHYSICAL OR BIOLOGICAL FEATURES ESSENTIAL TO THE CONSERVATION OF THE SPECIES" (PRIMARY CONSTITUENT ELEMENTS)

Agency regulations at 50 C.F.R. 424.12(b) interpret the statutory phrase "physical or biological features essential to the conservation of the species." The regulations state that these features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species. The regulations further direct us to "focus on the principal biological or physical constituent elements . . . that are essential to the conservation of the species, and specify that these elements shall be the 'known primary constituent elements'." The regulations identify primary constituent elements (PCE) as including, but not being limited to: "roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types."

For the 2005 critical habitat designations (70 FR 52630, September 2, 2005), NMFS biologists developed a list of PCEs specific to salmon steelhead and relevant to determining whether occupied stream reaches within a watershed meet the ESA section (3)(5)(A) definition of "critical habitat," consistent with the implementing regulation at 50 CFR 424.12(b). Relying on the biology and life history of each species, we determined the physical or biological habitat features essential to their conservation. For the present rulemaking, we use the same features, which we identified in the advance notice of proposed rulemaking (76 FR 1392, January 10, 2011). These features include sites essential to support one or more life stages of the DPS (sites for spawning, rearing, migration and foraging). These sites in turn contain physical or biological features essential to the conservation of the DPS (for example, spawning gravels, water quality and quantity, side channels, forage species). Specific types of sites and the features associated with them (both of which are referred to as PCEs) include the following:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.

2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.

4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.

5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels. As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannot successfully transition from natal streams to offshore marine areas.

6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential for conservation because without them juveniles cannot forage and grow to adulthood.

"SPECIFIC AREAS" WITHIN THE OCCUPIED GEOGRAPHICAL AREA OCCUPIED BY THE SPECIES

Freshwater Areas

After determining the geographical area occupied by each DPS, and the physical and biological features essential to their conservation, we next identified the specific areas within the geographical area occupied by the species that contain the essential features. We based our delineation of "specific areas" where these features are found on the biology and population structure of the species, and the characteristics of the habitat it occupies. To delineate specific areas, we used standard watershed units, as mapped by the U.S. Geological Survey (USGS), designated by fifth field hydrologic unit codes, or

HUC5s (this report refers to these HUC5s as “watersheds”). The USGS maps watersheds as polygons, bounding a drainage area from ridge-top to ridge-top, encompassing streams, riparian areas and uplands. Within the boundaries of any watershed, there are stream reaches not occupied by the species. Land areas within the watershed boundaries are also generally not “occupied” by the species (though certain areas such as flood plains or side channels may be occupied at some times of some years). We used the watershed boundaries as a basis for aggregating stream reaches, for purposes of delineating “specific” areas where the physical or biological features are found.

Within these HUC5 watersheds, we developed extensive information regarding the stream reaches occupied by lower Columbia River coho and Puget Sound steelhead using data compiled by state and tribal fisheries agencies in Oregon and Washington, as the best available information. We collected and verified these data and produced distribution maps at a scale of 1:24,000 using standard Geographic Information System (GIS) software. We accessed these GIS data beginning in 2010, modified them based on input from state and tribal fishery biologists, and believe that they represent the best available information about areas occupied by each species at the time of listing. We also developed latitude-longitude identifiers for the end-points of each occupied stream reach.

Teams of federal biologists then examined each habitat area within a watershed to determine whether the stream reaches occupied by the species contained the physical or biological features previously identified as essential to conservation. The Teams also determined whether, consistent with the regulatory definition of “special management considerations or protection” (50 C.F.R. 402.02 (j)), there were “any methods or procedures useful in protecting physical and biological features.” The Teams drew upon their first-hand knowledge of the areas and the physical or biological features as well as their experience in section 7 consultations. We asked them to determine whether there were actions occurring in those areas that may threaten the features, such that there would be any methods or procedures useful in protecting the features. The Teams identified and documented such activities for each area in tables contained in their report (NMFS 20012a).

Marine Areas

As in the 2005 designations, we identified estuary features essential to conservation. For streams and rivers that empty into marine areas, we include the associated estuary as part of the HUC5 “specific area.” Also as in the 2005 designations, we identified certain prey species in nearshore and offshore marine waters (such as Pacific herring) as essential features, and concluded that some may require special management considerations or protection because they are commercially harvested.

However, prey species move or drift great distances throughout marine waters, often in association with oceanographic features that also move (such as eddies and thermoclines). Thus, although we sought new information to better inform this question, we continue to conclude that we cannot identify specific offshore marine areas where the essential habitat features may be found (see NMFS, 2012b).

We also considered marine areas in Puget Sound for steelhead but concluded that at this time the best available information suggests there are no areas that meet the definition of critical habitat in the statute. In our 2005 rule, we designated critical habitat in nearshore areas for Puget Sound Chinook and Hood Canal summer-run chum salmon. However, steelhead move rapidly out of freshwater and into offshore marine areas, unlike Puget Sound Chinook and Hood Canal summer chum, making it difficult to identify specific foraging areas where the essential features are found. (Appendix B contains a more detailed discussion of the Puget Sound CHART's consideration of nearshore areas.) We therefore determined that for Puget Sound steelhead it is not possible to identify specific areas in the nearshore zone in Puget Sound.

SPECIAL MANAGEMENT CONSIDERATIONS OR PROTECTION

Our ESA regulations at 424.10(j) define "special management considerations or protection" to mean "any methods or procedures useful in protecting physical and biological features of the environment for the conservation of listed species." Based on discussions with NMFS biologists in the Habitat Conservation Division and the report "An Ecosystem Approach to Salmonid Conservation" by Spence *et al.* (1996), the agency identified a number of activities that may threaten the features, such that there would be any methods or procedures useful in protecting the features. The Spence *et al.* (1996) report contains a comprehensive review of factors limiting salmonid growth and production and relates them to specific human activities and useful management practices/actions. Major categories of habitat-related activities, identified in this report and through discussions with NMFS biologists, include (1) forestry (2) grazing, (3) agriculture, (4) road building/maintenance, (5) channel modifications/diking, (6) urbanization, (7) sand and gravel mining, (8) mineral mining, (9) dams, (10) irrigation impoundments and withdrawals, (11) river, estuary, and ocean traffic, (12) wetland loss/removal, (13) beaver removal, and (14) exotic/invasive species introductions. In addition to these, the harvest of salmonid prey species (e.g., herring, anchovy, and sardines) may present another potential habitat-related activity (Pacific Fishery Management Council 1999). All of these activities have PCE-related impacts via their alteration of one or more of the following: stream hydrology, flow and water-level modifications, fish passage, geomorphology and sediment transport, temperature, dissolved oxygen, vegetation, soils, nutrients and chemicals, physical habitat structure, and stream/estuarine/marine biota and forage (Spence *et al.* 1996, Pacific Fishery

Management Council 1999). The CHARTs identified and documented such activities for each area in tables contained in this report.

UNOCCUPIED AREAS

Section 3(5)(A)(ii) of the ESA authorizes the designation of "specific areas outside the geographical area occupied at the time [the species] is listed" if these areas are essential for the conservation of the species. Regulations at 50 CFR 424.12(e) emphasize that the agency "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." We focused our attention on the species' historical range when considering unoccupied areas since these logically would have been adequate to support the evolution and long-term maintenance of distinct population segments. As with occupied areas, we considered the stream segments within a HUC5 watershed to best describe specific areas. While it is possible to identify which HUC5s represent geographical areas that were historically occupied with a high degree of certainty, this is not always the case with specific stream segments. This is due, in part, to the emphasis on mapping currently occupied habitats and to the paucity of site-specific or systematic historical stream surveys.

We asked the CHARTs whether there were any unoccupied areas within the historical range of the two DPSs that may be essential for conservation. The Puget Sound CHART indicated there were unoccupied stream reaches in the upper Elwha River basin that were essential for the conservation of Puget Sound steelhead. The decommissioning of two longstanding dams in this basin began in the fall of 2011 and will allow steelhead and other salmonids access to approximately 45 miles (72 km) of habitat in the basin upstream (Washington Department of Fish and Wildlife 2011, Olympic National Park 2012). The Team noted the significant amount of spawning habitat that would be available in the Elwha following dam removal relative to other much smaller streams in the Strait of Juan de Fuca, as well as the high likelihood that these habitats will be able to support both summer- and winter-run life forms of steelhead. Because the Strait represents a major HUC4 subbasin, and the Elwha provides adequate suitable habitat to support viable populations of both life history types, the CHART considered the Elwha essential for conservation of the DPS. .

In other cases, the CHARTs did not have information available that would allow them to make a determination that unoccupied areas are essential for conservation. The CHARTs nevertheless identified areas they believe may be determined essential through future recovery planning efforts (e.g., habitat for coho above Condit Dam on the White Salmon River, Washington). We anticipate that ongoing recovery planning processes will develop additional information about the species' need for these or other areas unoccupied at the time of listing.

CRITICAL HABITAT ANALYTICAL REVIEW TEAMS

OVERVIEW

To assist in the designation of critical habitat, the agency convened two CHARTs; one for lower Columbia River coho salmon and one for Puget Sound steelhead. The CHARTs consisted of federal salmonid biologists and habitat specialists tasked with assessing biological information pertaining to areas under consideration for designation. The CHARTs explored a variety of data sources and used their best professional judgment to (1) verify the presence of PCEs within each occupied area, (2) verify the existence of activities that may affect the PCEs, and (3) rate the conservation value of watersheds, riverine corridors, and estuarine and nearshore marine areas and determine if any unoccupied areas may be essential to conservation.

The CHARTS have completed three phases of work associated with critical habitat designations. In the first phase, each CHART met to discuss the assignment and to identify the best scientific information available regarding the habitats supporting the DPSs in their domain. This phase also involved reviewing a CHART scoring system for systematic discussion and evaluation of PCEs and for contributing to the determination of the overall conservation value of particular watersheds and areas. After collecting and synthesizing the available data for n DPS, the CHARTs met during Phase 2 to review and discuss the information. In this phase the CHARTs verified the presence of the PCEs in each occupied watershed/area, identified management activities that may affect those PCEs, and collectively scored each occupied watershed/area using the system developed in the first phase. In Phase 3, the CHARTs reviewed the scores derived in Phase 2 and then considered additional information about the relationship of each watershed/area to others in the range of the DPS and information about the population occupying each watershed/area and that population's relationship to other populations in the DPS. Based on the scores and the additional considerations, the CHARTs assigned conservation value ratings of high, medium, or low to each watershed/area. Details and key considerations involved in each phase are discussed below.

CHART PHASE 1

In Phase 1, CHARTs convened for a one-day orientation to the statutory and regulatory aspects of ESA critical habitat and discussed ways to identify the best available scientific data relevant to assessing critical habitat for each DPS. CHART biologists also helped develop and test a multi-factor scoring system that provided a consistent framework within which they could process information that would ultimately inform their conservation value rating of each watershed or area. The basis for using this factor-based scoring system was twofold. First it allowed CHART members with varied levels of experience in a particular geographic area to share and discuss their knowledge of specific places and biological/physical features using a consistent set of relevant factors for each watershed in the range of a DPS. Second it generated quantitative results (i.e., sums of factor scores) that displayed numerical variation between watersheds/areas that greatly facilitated the ultimate CHART rating of each watershed/area's conservation value.   Third, it provided a uniform and systematic way to assess the overall conservation value of component watersheds and areas for each DPS under agency consideration. The scoring system used by the CHARTs is shown in Table 1.

CHART PHASE 2

In Phase 2, each CHART met to discuss the information identified in Phase 1 and to (1) verify the presence of PCEs in each HUC5, (2) identify current or potential activites that may affect the PCEs, and (3) apply the scoring system. For each watershed, the CHART members assessed the best available fish distribution data and noted any discrepancies with their own knowledge of the area (which included documented sources of information). If discrepancies were found, they were flagged for follow-up and resolution with the appropriate state or tribal fishery agency. The CHARTs then confirmed whether the occupied reaches/areas were likely to contain one or more of the specified PCEs. To aid in these assessments, the teams were provided with GIS data and maps displaying a variety of data layers including fish and PCE distributions, DPS population boundaries, stream hydrography, land use, land cover, and land ownership. The CHARTs were also asked to determine whether, consistent with the regulatory definition of "special management considerations or protection" (50 C.F.R. 402.02 (j)), there were "any methods or procedures useful in protecting physical and biological features." The CHARTs were asked to determine whether there were actions occurring in occupied areas that may threaten the PCEs, such that there would be any methods or procedures useful in protecting the PCEs. CHART members drew upon their first-hand knowledge of the areas and the physical or biological features as well as their experience in section 7 consultations. The CHARTs identified and documented such activities for each area; see Appendix A (lower Columbia River coho) and Appendix B (Puget Sound steelhead).

CHART PHASE 3

In Phase 3, the CHARTs met to discuss the watershed scores generated in Phase 2, along with additional considerations, to assign a High, Medium, or Low conservation value[2] to

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[2] In the Advance Notice of Proposed Rulemaking (76 FR 1392, January 10, 2011) we describe the conservation value of a site as depending on "(1) the importance of the populations associated with a site to the DPS conservation, and (2) the contribution of that site to the conservation of the population either through demonstrated or potential productivity of the area."

each watershed/area (the conservation value of a given HUC5 is the relative importance of the HUC5 to conservation of the DPS). The additional considerations included the relationship of each HUC5 to others in the DPS and the significance to the DPS of the population occupying each HUC5. As an example of the first additional consideration, a HUC5 with a particular raw score might receive a medium rating if it is in close proximity to several other high-scoring HUC5s that support the DPS, while another HUC5 with that same raw score might receive a high rating if it is one of only a few HUC5s supporting a DPS, or if the other HUC5s have low scores.

The second consideration involves population characteristics and is relevant because some populations have a higher conservation value to the DPS than others. Thus a HUC5 that received a medium score might nevertheless be rated high if it supports a unique or significant population within the DPS. As an example of applying both the first and second considerations, connectivity of habitats is an important consideration for anadromous salmonids, which require access to the ocean as well as to a network of connected spawning habitats. Thus a HUC5 might have medium-value tributary habitat but contain a high-value rearing and migration corridor because it is a rearing and migration corridor for fish from a high-valued spawning area. To accommodate this situation, we assigned separate conservation ratings where a HUC5 contains both tributary habitat and a migration corridor. The migration corridor was given the same rating as the highest-rated HUC5 for which it serves as a migration corridor.[3]

In other words, the scores provided a judgment about the value of each HUC5 in isolation, while the additional considerations allowed the CHARTs to evaluate the relative contribution of each HUC5 and come up with an overall rating.

Based on the raw scores and the additional considerations, high-value watersheds/areas were those deemed to have a high likelihood of promoting DPS conservation, while low-value watersheds/areas were expected to contribute relatively less to conservation. The watershed scoring system proved to be a useful tool for informing the rating of conservation value; in general, those watersheds and areas that received the highest scores in Phase 2 also were deemed to have a high conservation value for the DPS, while the opposite was true for low-scoring watersheds and areas.

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[3] The CHARTs were unanimous in concluding that it was a logical conclusion for anadromous salmon and steelhead to assign a conservation value to a migration corridor based on the conservation value of the spawning areas to which it connects and the fish it serves. Moreover, it helped resolve a recurring issue for some DPSs with HUC5s having relatively low or limited value tributary spawning habitats but which had primary importance as a rearing/migration corridor for fish/habitats upstream. In this case, the HUC5 could be assigned a lower overall conservation value, but could still contain a rearing/migration corridor with a higher conservation value.

During this phase the CHARTs were also asked to determine how well their conservation value ratings corresponded to the benefit of designation (i.e., as it pertains to the ESA's balancing of designation/exclusion benefits in section 4(b)(2)). We recognized that the "benefit of designation" needed to take into account not only the CHARTs' conservation ratings but also the likelihood of a section 7 consultation occurring in that area and the degree to which a consultation would yield conservation benefits for the species. To address this concern, we developed a profile for a watershed that would have "low leverage" in the context of section 7. The "low leverage" profile included watersheds with: less than 25 percent of the land area in federal ownership, no hydropower dams, and no consultations likely to occur on instream work (see Appendix C). We chose these attributes because federal lands, dams and instream work all have a high likelihood of consultation and activities undergoing consultation have a potential to significantly affect the physical and biological features of salmon and steelhead habitat.

We then asked the CHARTs to confirm whether they would conclude that the watersheds matching this profile did in fact have low leverage. To make this determination the CHARTs relied on the agency's recent consultation history (e.g., using data from the NMFS Public Consultation Tracking System), detailed topographic maps and GIS data for each watershed, as well as their own knowledge of actions taking place in the watershed that may warrant ESA section 7 consultation. If the CHART affirmed that a watershed was likely to be "low leverage" then we would diminish the watershed's benefit of designation[4] for the purposes of conducting the ESA 4(b)(2) analysis. The CHART conclusions are contained in Appendix C of this report.

The next step in Phase 3 involved asking the CHARTs to identify any unoccupied areas that may be essential for the conservation of a DPS. Section 3(5)(C) of the ESA defines critical habitat as including unoccupied areas, but only upon making a finding that "such areas are essential for the conservation of the species." Regulations at 50 CFR 424.12(e) state that the agency "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." The CHARTs were asked to provide their professional judgment as to whether limiting the designation to the entire occupied range would be adequate to ensure the conservation of the DPS. In one case (areas in the upper Elwha River previously blocked by dams) the CHART was able to determine that particular unoccupied areas "are" essential for the conservation of Puget Sound steelhead (see Appendix B). In making this assessment, the CHARTs used information regarding the DPS's historic and potential distribution, as well as pertinent

[4] The benefit of designation was diminished somewhat but not completely, since the educational benefits of designation would still be more important the higher the conservation value of an area, and since we cannot predict with complete accuracy all of the section 7 consultations that are likely to occur in a particular area.

information from Section 7 consultations and ongoing recovery and re-introduction efforts.

The final step in Phase 3 involved asking the CHARTs to consider whether excluding from critical habitat designation particular areas with certain economic impacts would significantly impede conservation. The CHARTs considered these areas both alone or in combination with other eligible areas. In making this determination, the CHARTs considered such factors as the role the particular area plays in the conservation of the population(s), the uniqueness or importance to the population(s), any recovery planning emphasis on the area, and similar considerations. The CHART conclusions are contained in Appendix D of this report.

NEXT STEPS

This and other related reports will be distributed for public comment and peer review during the agency's rulemaking process. The CHARTs will be reconvened to review the comments and any new information that might bear on their initial assessments before the agency publishes final critical habitat designations for lower Columbia River coho salmon and Puget Sound steelhead.

Table 1. Factors and Associated Criteria Considered by CHARTs to Determine the Conservation Value of Occupied HUC5s

Factors	**Criteria**
Factor 1. PCE Quantity Considers the total stream area or number of reaches in the HUC5 where PCEs are found and compares them relative to other HUC5s and their probable historical quantity in the HUC5.	3 = High number of stream reaches with PCEs in the HUC5. 2 = Moderate number of stream reaches with PCEs in the HUC5, near or reduced from historic levels. 1 = Low number of stream reaches with PCEs are in the HUC5, likely reduced from historic potential. 0 = Low number of stream reaches with PCEs are in the HUC5, likely near historic potential.
Factor 2. PCE Quality – Current Condition Considers the existing condition of the quality of PCEs in the HUC5.	3 = PCEs in the HUC5 are in good to excellent condition. 2 = PCEs in the HUC5 are in fair to good condition. 1 = PCEs in the HUC5 are in fair to poor condition. 0 = PCEs in the HUC5 are in poor condition.
Factor 3. PCE Quality – Potential Condition Considers the likelihood of achieving PCE potential in the HUC5, either naturally or through active conservation/restoration, given known limiting factors, likely biophysical responses, and feasibility.	3 = PCEs in the HUC5 are highly functioning and are at their historic potential. 2 = PCEs in the HUC5 are reduced, but have high improvement potential. 1 = PCEs in the HUC5 may have some improvement potential. 0 = PCEs in the HUC5 have little or no improvement potential.
Factor 4. PCE Quality – Support of Rarity/Importance Considers the PCE support of rare genetic or life history characteristics or rare/important habitat types in the HUC5	3 = Highly likely that PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type (e.g., seeps, coldwater refuges, side channels, lakes). 2 = Possible that PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type. 1 = Unknown whether PCEs in the HUC5 support a rare genetic or life history type or include a rare/important habitat type. 0 = Unlikely that PCEs in the HUC5 probablysupport a rare genetic or life history type or include a rare/important type.
Factor 5. PCE Quality – Support of Abundant Populations Considers the PCE support of variable-sized populations relative to other HUC5s and the probable historical levels in the HUC5	3 = PCEs in the HUC5 currently support a large population. 2 = PCEs in the HUC5 historically supported a large population that is currently small. 1 = PCEs in the HUC5 currently and/or historically supported a small population. 0 = PCEs in the HUC5 support a population whose abundance is unknown or it is unlikely that it is or was significant.
Factor 6. PCE Quality – Support of Spawning/Rearing Considers the PCE support of spawning or rearing of varying numbers of populations.	3 = PCEs in the HUC5 support (currently or historically) spawning or rearing of multiple populations or life history types, or support the only extant spawning habitat for a single population. 2 = PCEs in the HUC5 related to spawning or rearing are found in two or more HUC5s that support a single population. 1 = Uncertain but possible that the PCEs in the HUC5 support spawning or rearing for at least one population. 0 = Unlikely that there are PCEs in the HUC5 that support spawning/rearing for at least one population.

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