Science, Service, Stewardship

5-Year Review:
Summary & Evaluation of
Middle Columbia River Steelhead

National Marine Fisheries Service
Northwest Region
Portland, OR

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5-Year Review: Middle Columbia River Species

Species Reviewed	Distinct Population Segment
Steelhead (*Oncorhynchus mykiss*)	*Middle Columbia River Steelhead*

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Contributors
Northwest Region (alphabetical)

Nora Berwick
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-231-6887
Nora.Berwick@noaa.gov

Rob Clapp
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-231-2314
Robert.Clapp@noaa.gov

Diane Driscoll
304 S. Water, Suite 201
Ellensburg, WA 98926
509-962-8911
Diane.Driscoll@noaa.gov

Lynn Hatcher
304 S. Water, Suite 201
Ellensburg, WA 98926
509-962-8911x223
Lynn.Hatcher@noaa.gov

Lynne Krasnow, PhD
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-231-2163
Lynne.Krasnow@noaa.gov

Eric Murray
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-231-2378
Eric.Murray@noaa.gov

Rich Turner
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-736-4737
Rich.Turner@noaa.gov

Randy Tweten
3502 Highway 30
La Grande, OR 97850
541-975-1835
Randy.Tweten@noaa.gov

Northwest Fisheries Science Center (alphabetical)

Tom Cooney
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232
503-231-6888
Tom.Cooney@noaa.gov

Mike J. Ford, PhD
2725 Montlake Blvd East
East Building
Seattle, WA 98112-2097
206-860-5612
Mike.Ford@noaa.gov

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1 ▪ General Information

1.1 Introduction

Many West Coast salmon and steelhead (Oncorhynchus spp.) stocks have declined substantially from their historic numbers and now are at a fraction of their historical abundance. There are several factors that contribute to these declines, including: overfishing, loss of freshwater and estuarine habitat, hydropower development, poor ocean conditions, and hatchery practices. These factors collectively led to the National Marine Fisheries Service's (NMFS) listing of 28 salmon and steelhead stocks in California, Idaho, Oregon, and Washington under the Federal Endangered Species Act (ESA).

The ESA, under section 4(c)(2), directs the Secretary of Commerce to review the listing classification of threatened and endangered species at least once every five years. After completing this review, the Secretary must determine if any species should be: (1) removed from the list; (2) have its status changed from threatened to endangered; or (3) have its status changed from endangered to threatened. The most recent listing determinations for most salmon and steelhead occurred in 2005 and 2006. This document describes the results of the review of the ESA-listed Middle Columbia River (MCR) steelhead.

1.1.1 Background on salmonid listing determinations

The ESA defines species to include subspecies and distinct population segments (DPS) of vertebrate species. A species may be listed as threatened or endangered. To identify distinct population segments of salmon species we apply the "Policy on Applying the Definition of Species under the ESA to Pacific Salmon" (56 FR 58612). Under this policy we identify population groups that are "evolutionarily significant units" (ESU) within their species. We consider a group of populations to be an ESU if it is substantially reproductively isolated from other populations, and represents an important component in the evolutionary legacy of the biological species. We consider an ESU as constituting a DPS and therefore a "species" under the ESA.

To identify DPSs of steelhead, we apply the joint U.S. Fish and Wildlife Service-National Marine Fisheries Service DPS policy (61 FR 4722) rather than the ESU policy. Under this policy, a DPS of steelhead must be discrete from other populations, and it must be significant to its taxon.

Artificial propagation programs (hatcheries) are common throughout the range of ESA-listed West Coast salmon and steelhead. Prior to 2005, our policy was to include in the listed ESU or DPS only those hatchery fish deemed "essential for conservation" of a species. We revised that approach in response to a court decision and on June 28, 2005, announced a final policy addressing the role of artificially propagated Pacific salmon and steelhead in listing determinations under the ESA (70 FR 37204) (hatchery listing policy). This policy establishes criteria for including hatchery stocks in ESUs and DPSs. In addition, it (1) provides direction for

considering hatchery fish in extinction risk assessments of ESUs and DPSs; (2) requires that hatchery fish determined to be part of an ESU or DPS be included in any listing of the ESU or DPS; (3) affirms our commitment to conserving natural salmon and steelhead populations and the ecosystems upon which they depend; and (4) affirms our commitment to fulfilling trust and treaty obligations with regard to the harvest of some Pacific salmon and steelhead populations, consistent with the conservation and recovery of listed salmon ESUs and steelhead DPSs.

To determine whether a hatchery program is part of an ESU or DPS, and therefore must be included in the listing, we consider the origins of the hatchery stock, where the hatchery fish are released, and the extent to which the hatchery stock has diverged genetically from the donor stock. We include within the ESU or DPS (and therefore within the listing) hatchery fish that are derived from the population in the area where they are released, and that are no more than moderately diverged from the local population.

Because the new hatchery listing policy changed the way we considered hatchery fish in ESA listing determinations, we completed new status reviews and ESA listing determinations for West Coast salmon ESUs and steelhead DPSs. On June 28, 2005, we issued final listing determinations for 16 ESUs of Pacific salmon (70 FR 37160). On January 5, 2006 we issued final listing determinations for 10 DPSs of steelhead (71 FR 834).

1.2 Methodology used to complete the review

On March 18, 2010, we announced the initiation of five year reviews for 16 ESUs of salmon and 10 DPSs of steelhead in Oregon, California, Idaho, and Washington (75 FR 13082). We requested that the public submit new information on these species that has become available since our listing determinations in 2005 and 2006. In response to our request, we received information from Federal and state agencies, Native American Tribes, conservation groups, fishing groups, and individuals. We considered this information, as well as information routinely collected by our agency, to complete these five year reviews.

To complete the reviews, we first asked scientists from our Northwest Fisheries Science Center to collect and analyze new information about ESU and DPS viability. To evaluate viability, our scientists used the Viable Salmonid Population (VSP) concept developed by McElhany et al. (2000). The VSP concept evaluates four criteria – abundance, productivity, spatial structure, and diversity – to assess species viability. Through the application of this concept, the science centers considered new information for a given ESU or DPS relative to the four salmon and steelhead population viability criteria. They also considered new information on ESU and DPS boundaries. At the end of this process, the science teams prepared reports detailing the results of their analyses (Ford et al. 2010).

To further inform the reviews, we also asked salmon management biologists from our Northwest Region familiar with hatchery programs to consider new information available since the previous listing determinations. Among other things, they considered hatchery programs that have ended, new hatchery programs that have started, changes in the operation of existing programs, and scientific data relevant to the degree of divergence of hatchery fish from naturally spawning fish

in the same area. They produced a report (Jones et al. 2011) describing their findings. Finally, we consulted biologists and other salmon management specialists from the Northwest Region who are familiar with hatchery programs, habitat conditions, hydropower operations, and harvest management. In a series of structured meetings, by geographic area, these biologists identified relevant information and provided their insights on the degree to which circumstances have changed for each listed entity.

In preparing this report, we considered all relevant information, including: the work of the Northwest Fisheries Science Center (Ford et al. 2010); the report of the regional biologists regarding hatchery programs (Jones et al. 2011); recovery plans for the species in question; technical reports prepared in support of recovery plans for the species in question; the listing record (including designation of critical habitat and adoption of protective regulations); recent biological opinions issued for the MCR steelhead; information submitted by the public and other government agencies; and the information and views provided by the geographically-based management teams. The present report describes the agency's findings based on all of the information considered.

1.3 Background – Summary of Previous Reviews, Statutory and Regulatory Actions, and Recovery Planning

1.3.1 Federal Register Notice announcing initiation of this review

75 FR 13082; March 18, 2010

1.3.2 Listing history

In 1999, NMFS listed MCR steelhead under the ESA and classified it as a threatened species (Table 1).

Table 1. Summary of the listing history under the Endangered Species Act for the MCR Steelhead DPS.

Salmonid Species	ESU/DPS Name	Original Listing	Revised Listing(s)
Steelhead (*O. mykiss*)	Middle Columbia River Steelhead	**FR Notice:** 64 FR 14517 **Date:** 3/25/1999 **Classification:** Threatened	**FR Notice:** 71 FR 834 **Date:** 1/5/2006 **Re-classification:** Threatened

1.3.3 Associated rulemakings

The ESA requires NMFS to designate critical habitat, to the maximum extent prudent and determinable, for species it lists under the ESA. Critical habitat is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area

occupied by the species at the time of listing if the agency determines that the area itself is essential for conservation. We designated critical habitat for MCR steelhead in 2005.

Section 9 of the ESA prohibits the take of species listed as endangered. The ESA defines take to mean harass, harm, pursue, hunt, shoot, wound, trap, capture, or collect, or attempt to engage in any such conduct. For threatened species, the ESA does not automatically prohibit take, but instead authorizes the agency to adopt regulations it deems necessary and advisable for species conservation including regulations that prohibit take (ESA section 4(d)). For threatened salmonids, NMFS has adopted 4(d) regulations that prohibit take except in specific circumstances. In 2005, we revised 4(d) regulations for MCR steelhead, to take into account our hatchery listing policy.

Table 2. Summary of rulemaking for 4(d) protective regulations and critical habitat for the MCR Steelhead.

Salmonid Species	ESU/DPS Name	4(d) Protective Regulations	Critical Habitat Designations
Steelhead (*O. mykiss*)	Middle Columbia River Steelhead	**FR notice:** 70 FR 37160 **Date:** 6/28/2005	**FR notice:** 70 FR 52630 **Date:** 9/2/2005

1.3.4 Review History

Table 3 lists the numerous scientific assessments of the status of the MCR steelhead DPS. These assessments include status reviews conducted by our Northwest Fisheries Science Center and technical reports prepared in support of recovery planning for this DPS.

Table 3. Summary of previous scientific assessments for the MCR Steelhead.

Salmonid Species	ESU/DPS Name	Document Citation
Steelhead (*O. mykiss*)	Middle Columbia River Steelhead	ICTRT and Zabel 2007 ICTRT 2007a ICTRT 2007b McClure et al. 2005 Good et al. 2005 ICTRT 2003 NMFS 1996 NMFS 1997 NMFS 1999a NMFS 1999b

1.3.5 Species' Recovery Priority Number at Start of 5-year Review Process

On June 15, 1990, NMFS issued guidelines (55 FR 24296) for assigning listing and recovery priorities. We assess three criteria to determine a species' priority for recovery plan development, implementation, and resource allocation: (1) magnitude of threat; (2) recovery

potential; and (3) existing conflict with activities such as construction and development. Table 4 lists the recovery priority numbers for the subject species, as reported in the 2006-2008 Biennial Report to Congress on the Recovery Program for Threatened and Endangered Species (available at: http://www.nmfs.noaa.gov/pr/pdfs/laws/esabiennial2008.pdf).

1.3.6 Recovery Plan or Outline

Table 4. Recovery Priority Number and Endangered Species Act Recovery Plans for the MCR Steelhead.

Salmonid Species	ESU/DPS Name	Recovery Priority Number	Recovery Plans/Outline
Steelhead (*O. mykiss*)	Middle Columbia River Steelhead	**1**	**Title:** Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan Available at: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Columbia/Mid-Col-Plan.cfm **Date:** 9/30/2009 **Type:** Final **FR Notice:** 74 FR 50165

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2 · Review Analysis

In this section we review new information to determine whether the MCR steelhead DPS delineation remains appropriate.

2.1 Delineation of species under the Endangered Species Act

Is the species under review a vertebrate?

DPS Name	YES	NO
Middle Columbia River Steelhead	X	

Is the species under review listed as a DPS?

DPS Name	YES	NO
Middle Columbia River Steelhead	X	

Was the DPS listed prior to 1996?

DPS Name	YES	NO	Date Listed if Prior to 1996
Middle Columbia River Steelhead		X	n/a

Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 DPS policy standards?

Not Applicable

2.1.1 Summary of relevant new information regarding delineation of the MCR steelhead DPS

ESU/DPS Boundaries

This section provides a summary of information presented in Ford et al. (2010): Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Northwest.

The boundary between coastal and interior populations of Chinook salmon, coho salmon and steelhead coincides with a major biogeographic barrier that lies along the Cascade Crest, and for aquatic species, may have been delineated by Celilo Falls. Life history, genetic, and ecological information indicate that the Big White Salmon and Klickitat River basins form part of a transitional zone between the two regions. At the time of the coastwide status reviews in the mid-1990s, there was considerable disagreement over the placement of populations within this transitional zone. New information, primarily on DNA microsatellite variation, underscores the

transitional nature of populations in this area. The extirpation and potential alteration (via hatchery transfers) of some populations further cloud the issue of population assignment.

Within the transition zone it is relatively clear that the Hood River steelhead remain closely associated with Lower Columbia River steelhead populations. Given the relatively close proximity of the mouths of the Hood, Big White Salmon, and Klickitat Rivers, and the lack of definitive genetic information indicating that the populations are discrete, it would be reasonable to assign the Big White Salmon and Klickitat River steelhead populations to either the MCR steelhead DPS or to the Lower Columbia River steelhead DPS. The Fifteenmile Creek population, however, is clearly associated with the Interior Columbia steelhead lineage. The recent information underscores the transitional nature of the Big White Salmon and Klickitat River populations and the uncertainty associated with the Lower Columbia River and MCR steelhead DPS boundary highlighted in the previous review.

Membership of Hatchery Programs

In preparing this report, our management biologists reviewed the available information regarding hatchery membership of this DPS (Jones et al. 2011). They considered changes in hatchery programs that occurred since the last status review and made recommendations about the inclusion or exclusion of specific programs. They also noted any errors and omissions in the existing descriptions of hatchery population membership. NMFS intends to address any needed changes and corrections via separate rulemaking subsequent to the completion of these five-year status reviews.

The MCR steelhead DPS includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin (64 FR 14517; March 25, 1999). Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs. We have determined that these artificially propagated stocks are no more divergent relative to the local natural population(s) than what would be expected between closely related natural populations within the DPS (71 FR 834; January 5, 2006).

The MCR steelhead hatchery programs have not changed substantially from the previous ESA status review to suggest that their level of divergence relative to the local natural populations has changed (Jones et al. 2011).

2.2 Recovery Criteria

The ESA requires NMFS to develop recovery plans for each listed species. Recovery plans must contain, to the maximum extent practicable, objective measureable criteria for delisting the species, site-specific management actions necessary to recover the species, and time and cost estimates for implementing the recovery plan.

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

DPS Name	YES	NO
Middle Columbia River Steelhead	X	

2.2.2 Adequacy of recovery criteria

Based on new information considered during this review, are the recovery criteria still appropriate?

DPS Name	YES	NO
Middle Columbia River Steelhead	X	

Are all of the listing factors that are relevant to the species addressed in the recovery criteria?

DPS Name	YES	NO
Middle Columbia River Steelhead	X	

2.2.3 List the recovery criteria as they appear in the recovery plan

For the purposes of reproduction, salmon and steelhead typically exhibit a metapopulation structure (Schtickzelle and Quinn 2007, McElhany et al. 2000). Rather than interbreeding as one large aggregation, ESUs and DPSs function as a group of demographically independent populations separated by areas of unsuitable spawning habitat. For conservation and management purposes, it is important to identify the independent populations that make up an ESU or DPS. For recovery planning and development of recovery criteria, the Interior Columbia Technical Recovery Team (ICTRT) identified independent populations within the MCR steelhead DPS, and grouped them into genetically similar major population groups (MPGs) (ICTRT 2003). The DPS is composed of four MPGs: Cascades Eastern Slope Tributaries, John Day River, Umatilla/Walla Walla Rivers, and Yakima River (Figure 1).

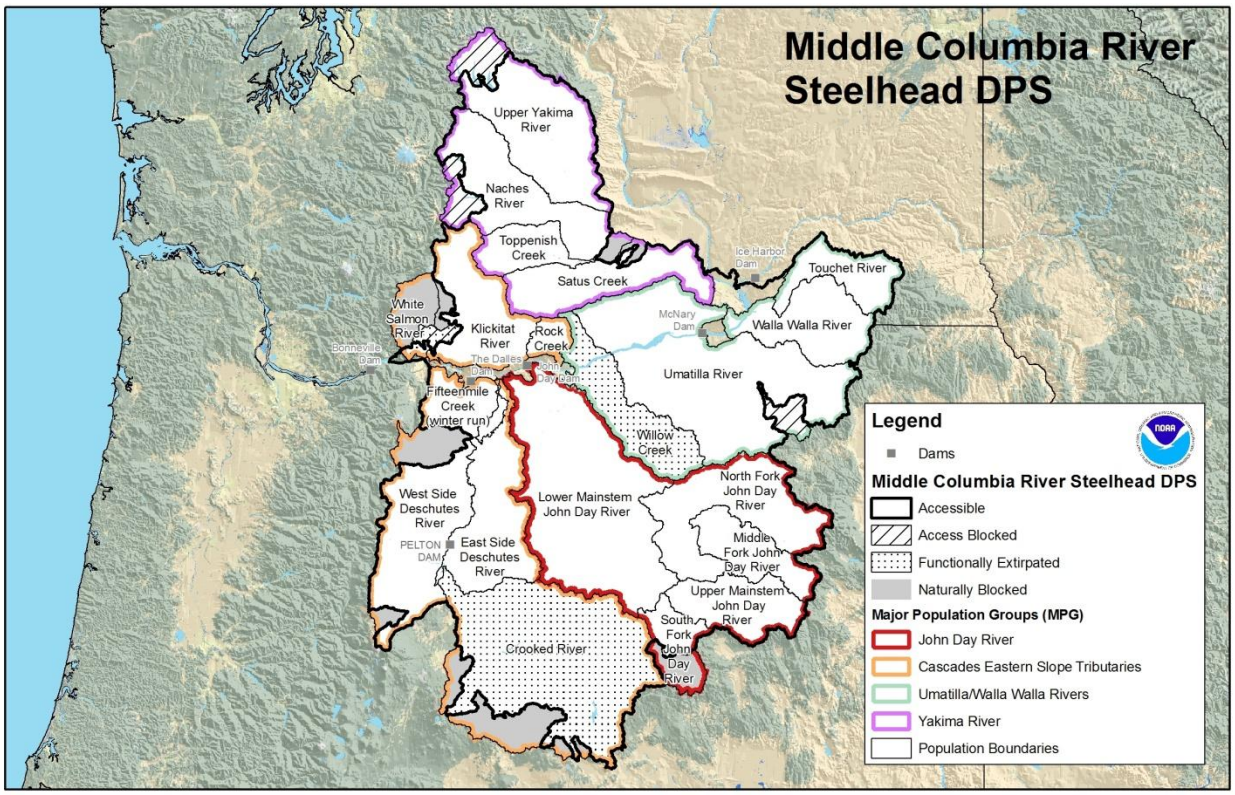

Figure 1. MCR Steelhead population structure[1]

The ICTRT (2007b) also developed specific biological viability criteria based on the VSP concept (McElhany et al. 2000) at the population, MPG, and DPS levels.

At the population level, the ICTRT recommended specific biological criteria based on the four viability components of VSP—abundance/productivity and spatial structure/diversity. These criteria are integrated to develop a total-population viability rating. The population viability ratings, in order of increasing risk, are highly viable, viable, moderate risk and high risk. A further bifurcation occurs at the moderate risk rating. Populations rated at moderate risk are candidates for achieving a "maintained" status. Additional criteria identified in the Recovery Plan must be met before a population at moderate risk can be considered "maintained." Populations that do not meet these additional criteria would remain rated at moderate risk and would generally not contribute to viability at the MPG level.

In 2009, we issued a final recovery plan (Plan) for MCR steelhead, which adopted the ICTRT viability criteria as biological delisting goals (NMFS 2009). The recovery strategies outlined in the Plan are targeted to achieve, at a minimum, the biological criteria for each MPG in the DPS. The criteria are "[t]o have all four major population groups at viable (low risk) status with representation of all the major life-history strategies present historically, and with the abundance,

[1] The map above generally shows the accessible and historically accessible areas for the MCR steelhead. The area displayed is consistent with the regulatory description of the boundaries of the MCR steelhead found at 50 CFR17.11, 223.102, and 224.102. Actions outside the boundaries shown can affect this DPS. Therefore, these boundaries do not delimit the entire area that could warrant consideration in recovery planning or determining if an action may affect this DPS for the purposes of the ESA.

productivity spatial structure and diversity attributes required for long-term persistence." The Plan recognizes that there may be several different combinations of population status that could satisfy the biological criteria for each MPG, and identifies the combinations most likely to result in achieving viability for each MPG (NMFS 2009; Ford et al. 2010). The Plan also recognizes a range of restoration objectives that go beyond the biological viability necessary for delisting (NMFS 2009). The following describes the combinations of population status most likely to achieve viability for each MPG.

Cascades Eastern Slope Tributaries MPG

The Klickitat River, Fifteenmile Creek, East Side Deschutes and West Side Deschutes populations should be viable; at least one of these populations should be highly viable. The Rock Creek population should be at maintained status.

John Day River MPG

The Lower Mainstem John Day River, the North Fork John Day River, and either the Middle Fork John Day River or the Upper Mainstem John Day River populations should be viable. One of these populations should be highly viable.

Yakima River MPG

Two of the four populations in the Yakima River MPG should be viable, including, at a minimum, either the Naches River or the Upper Yakima River population. The other two populations should at least be at maintained status.

Umatilla/Walla Walla Rivers MPG

Either the Walla Walla River or the Touchet River population should be viable, and the Umatilla River population should be highly viable.

2.3 Updated Information and Current Species' Status

In addition to recommending recovery criteria, the ICTRT also assessed the current status of each population within the DPS (ICTRT 2007b). Each population was rated against the biological criteria identified in the recovery plan and assigned a current viability rating.

2.3.1 Analysis of VSP Criteria (including discussion of whether the VSP criteria have been met)

Information provided in this section is summarized from Ford et al. (2010)—Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Northwest.

Abundance and Productivity

Cascades Eastern Slope Tributaries MPG

Abundance data are available for three (Fifteenmile Creek, East Side Deschutes, and West Side Deschutes) of the five extant populations in the Cascades Eastern Slope Tributaries MPG along with two years of estimates for a fourth population (Klickitat River). Total spawning abundance for the most recent five-year series (2005-2009) is below the levels reported in the last status review for the three populations. However, natural-origin spawner abundance is higher for the more recent estimates (for all three populations with more than two years of abundance estimates). Estimates of the proportion of natural-origin spawners were higher for all three (Fifteenmile Creek, East Side Deschutes, and West Side Deschutes) populations in the most recent brood cycle (Ford et al. 2010). Based on mark-recapture analysis during 2006-2007, an average of 1,450 natural and 1,670 hatchery steelhead passed upstream of the Klickitat Falls and into spawning reaches in the Klickitat River.

John Day River MPG

Total escapement and natural-origin escapement were down from the levels reported in the previous status review for four (Upper Mainstem, North Fork, Middle Fork, and Lower Mainstem) out of the five John Day populations. Both total and natural-origin spawning escapements in the South Fork John Day River were higher in the more recent brood cycle than in 1997-2001. Estimates of the fraction of natural-origin spawners were relatively unchanged for the upstream John Day populations, but had increased for the Lower Mainstem John Day River (Ford et al. 2010).

Yakima River MPG

Total and natural-origin escapement estimates were higher in the most recent brood cycle for all four of the Yakima River populations than in the cycle associated with the last status review. Steelhead escapements into the Upper Yakima River, although increased relative to the previous review, remain very low relative to the total amount of habitat available. The proportion of natural-origin fish remained high in the Yakima River Basin (estimated for aggregate run at Prosser Dam) (Ford et al. 2010).

Umatilla/Walla Walla Rivers MPG

Total spawning escapements have increased in the most recent brood cycle over the period associated with the last status review for all three populations in the Umatilla/Walla Walla Rivers MPG. Natural-origin escapements are higher for two populations (Umatilla River and Walla Walla River) while remaining at approximately the same level as in the prior review for the Touchet River (Ford et al. 2010).

Spatial Structure and Diversity

Cascades Eastern Slope Tributaries MPG

Access to 50 miles of habitat in the upper Klickitat River has been greatly enhanced with completion of the Castille Falls fishway. The new facility is expected to improve immigration, but its effectiveness is still being evaluated.

With completion of improved passage facilities at the Pelton Round Butte hydroelectric complex and subsequent release of fish into the upper basin since 2007, access to up-river habitats has substantially improved in the Deschutes River Basin (www.deschutespassage.com). These facilities are expected to result in a substantial increase in habitat available to steelhead. Previous risk ratings for the spatial extent or range of the population were moderate because of the blocked passages at Pelton Round Butte. While the new facilities are expected to improve passage, the effectiveness of those facilities is still being evaluated.

John Day River MPG

Spatial structure and diversity metrics have not changed since the completion of the 2008 ICTRT status assessments (Ford et al. 2010).

Yakima River MPG

Spatial structure and diversity metrics have not changed since the completion of the 2008 ICTRT status assessments (Ford et al. 2010).

Umatilla/Walla Walla Rivers MPG

Spatial structure and diversity metrics have not changed since the completion of the 2008 ICTRT status assessments (Ford et al. 2010).

Updated Risk Summary

Cascades Eastern Slope Tributaries MPG

The current status of two of the five populations in the Cascades Eastern Slope Tributaries MPG, Fifteenmile and the East Side Deschutes River , is rated as viable using the ICTRT criteria incorporated into the recovery plan.

The West Side Deschutes population remains rated at high risk because of relatively low estimates for current productivity and natural-origin abundance. The data series for the Klickitat River population is not sufficient to allow for a rating. However, available mark-recapture based estimates for two recent years indicate that the population may be functioning at, or near viable levels. Data are not available for the remaining extant population (Rock Creek), and the White Salmon River and Crooked River populations are both classified as extinct by the ICTRT.

John Day River MPG

The North Fork John Day population continues to be rated highly viable when data through the 2009 spawning year are incorporated into the assessment. The remaining four populations in the John Day River MPG remain rated as maintained status. Natural-origin abundance estimates (ten year geometric mean) are higher in the current assessments for four populations and lower for the Middle Fork John Day River. Productivity estimates (geometric mean of brood year spawner/spawner ratio at low to moderate parent escapements) were generally lower in the updated data series than the estimates generated for the ICTRT status reviews ending in spawning year 2005.

Yakima River MPG

The ratings for individual populations in the Yakima River MPG should be interpreted with caution given the basis for estimating population specific returns from Prosser Dam counts. The overall viability ratings improved from maintained status to viable for the Satus Creek and Toppenish Creek populations, but remained at maintained status for the Naches River and at high risk for the Upper Yakima River population. The changes in ratings reflect the relatively high annual returns in most years since 2001. Productivity estimates based on the return series updated through 2009 (previously through 2005) have increased or remained at approximately the same levels as estimated in the recovery plan/ICTRT status assessments.

Umatilla/Walla Walla Rivers MPG

The overall rating for the Umatilla River and Walla Walla River populations remain at maintained status after incorporating the updated abundance and productivity data. The current status of the Touchet River population remains at high risk, primarily driven by relatively low productivity. Natural-origin abundance estimates increased for the Umatilla River and the Walla Walla River populations relative to the levels reported in the recovery plan/ICTRT status assessments (through return year 2005). Productivity estimates for all three extant populations in this MPG are lower than in the previous reviews. The Willow Creek population is classified as extinct by the ICTRT.

DPS Summary

Although there have been improvements in the viability ratings for some of the component populations, none of the MPGs are meeting the recovery criteria and only 3 of the 17 extant populations are considered to be viable. Since the DPS-level recovery criteria require that all four MPGs be rated as viable, more progress must be made before this MCR steelhead DPS can be considered recovered.

Several factors cited in the previous status review (Good et al. 2005) remain concerns or key uncertainties. Natural-origin spawning estimates are highly variable relative to minimum abundance thresholds across the populations in the DPS. Some populations, such as the North Fork John Day, are rated highly viable and have consistently high abundance, while several other

populations remain at high risk. Updated information indicates that straying levels into at least the Lower John Day River population are also high. Returns to the Yakima River Basin and to the Umatilla and Walla Walla rivers have been higher over the most recent brood cycle while natural-origin returns to the John Day River have decreased. Out-of-basin hatchery stray proportions, although reduced, remain very high in the Deschutes River Basin.

Overall, the new information considered does not indicate a change in the biological risk category since the time of the last status review. Although direct biological performance measures for this DPS indicate little realized progress to date toward meeting its recovery criteria, there is no new information to indicate that its extinction risk has increased significantly. The DPS remains well distributed throughout its historical range in the Middle Columbia River Basin and at least some populations are considered to be viable. The percentage of natural-origin spawners is relatively high (70-99 percent; Ford et al. 2010) and the estimates of total DPS abundance indicates that the DPS is not at immediate risk of extinction. New information considered during this review confirms that this DPS remains at moderate risk of extinction.

2.3.2 Five-Factor Analysis

Section 4(a)(1)(b) of the ESA directs us to determine whether any species is threatened or endangered because of any of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors affecting its continued existence. Section 4(b)(1)(A) requires us to make listing determinations after conducting a review of the status of the species and taking into account efforts to protect such species. Below we discuss new information relating to each of the five factors as well as efforts being made to protect the species.

Present or threatened destruction, modification or curtailment of its habitat or range

Significant habitat restoration and protection actions at the Federal, state, tribal, and local levels have been implemented to improve degraded habitat conditions and restore fish passage. While these efforts have been substantial and are expected to benefit the survival and productivity of the targeted populations, we do not yet have evidence demonstrating that improvements in habitat conditions have led to improvements in population viability. The effectiveness of habitat restoration actions and progress toward meeting the viability criteria will be monitored and evaluated with the aid of newly implemented monitoring and evaluation programs. Generally, it takes one to five decades to demonstrate such increases in viability. Below, we summarize several noteworthy restoration and protection actions implemented since the last review. We also note areas where concerns about this DPS' habitat condition remain.

The implementation of the Federal Columbia River Power System (FCRPS) Biological Opinion (Opinion) (NMFS 2008a; NMFS 2010) has provided a number of actions that will result in survival improvements, reduced duration of outmigration to the estuary, improvements in juvenile survival and condition, and increased access to habitats. Some of the major milestones include the following:

Improvements in operations and fish passage at hydropower facilities and dams

Implementation of the FCRPS Opinion (NMFS 2008a; NMFS 2010) provides a number of new actions and continuation of existing programs that have and will likely continue to increase passage survival through the Columbia River passage corridor. In addition to increasing direct survival at the dams and through the project reservoirs, these actions reduce the duration of juvenile salmonid outmigration to the estuary, and increase access to habitat for adult migrants.

Since 2006, direct survival for juvenile salmonid outmigration in the Columbia River has likely increased because of installation of, or improvements to, juvenile passage structures at The Dalles Dam (spillway wall installed in 2010), John Day Dam (two surface passage weirs installed in 2008), and McNary Dam (surface passage routes and spillway weirs installed in 2007). Previously installed juvenile passage facilities are performing well at Bonneville Dam (corner surface collector installed in 2004). Mainstem dam juvenile passage facilities have been evaluated for passage survival and behavioral response, and testing continues. Survival and behavioral testing subsequently inform modifications to passage facility design and project operations, based on lessons learned and adaptive management.

Future improvements are anticipated as the FCRPS Opinion (NMFS 2008a; NMFS 2010) is implemented further. Some of the future improvements include adult PIT tag detectors at The Dalles Dam or John Day Dam; enhanced estuarine detection of PIT tagged adults; and development and evaluation of PIT tag detection at project spillways. These technological enhancements will increase the ability to detect and correct salmonid passage issues throughout the Columbia River Basin.

Deschutes Basin Passage Improvements include:

- Pelton Round Butte, Selective Water Withdrawal Facility: The first year of operations was in 2010. The facility and operations have improved the management of water flow and temperature to better resemble historical conditions. These improvements in flow and temperature management are primarily targeted to benefit Chinook populations; the expected benefits for Deschutes River steelhead are unknown. Habitat and passage improvements in Trout Creek, also part of the Pelton Round Butte re-licensing agreement, are expected to benefit the East Side Deschutes steelhead population.
- Fish Reintroduction: Outplants in the Wychus Creek, Crooked River and the Deschutes River of unfed fry from the Round Butte hatchery stock above Pelton-Round Butte are intended to re-establish an extirpated population. The capture of 7,700 steelhead smolts in 2010 at Pelton Round Butte suggests some near-term successes of these reintroduction efforts.

Management of Tributary Habitat

Since the last status review, numerous habitat projects have been completed. Recovery projects throughout the range of the DPS included: (1) improved fish passage and increased access to high quality habitat; (2) riparian vegetation restoration through fencing and planting; (3) instream habitat improvements; (4) screening of irrigation diversions; (5) land acquisitions to protect existing habitat; (6) removal or structural improvements of tributary dams (e.g., Roza on Yakima River, Hofer on Touchet River); (7) protection and enhancement of instream flows, groundwater recharge and water quality; and (8) design and/or implementation of watershed scale plans (e.g., Toppenish, Touchet).

Most of these projects were accomplished with cooperation and/or funding from the Washington Salmon Recovery Funding Board, the Pacific Coastal Salmon Recovery Fund, Habitat Conservation Plans, Bonneville Power Administration, Army Corps of Engineers, Bureau of Reclamation, the Oregon Watershed Enhancement Board, Conservation Districts, Federal, state, local landowners, and others.

Despite significant efforts to improve habitat conditions, much of the habitat in the range of MCR steelhead remains degraded. Restoring habitat to historic conditions may not be needed to attain viability, but considerable improvement is needed to restore habitat to levels that will support viable steelhead populations within the DPS. In particular, the poor status of the habitat and populations in the Yakima Basin is a major obstacle to achieving DPS viability. There are significant opportunities to adjust the operations of the Yakima Basin project to benefit populations in the Yakima River MPG. In the Yakima River and elsewhere in the range of the DPS, there are many opportunities to provide access to historically occupied habitats, preserve existing high quality habitats, and restore degraded habitats.

In addition, mainstem tributary flow remains a key concern, particularly within the Walla Walla River Basin, Umatilla River Basin, and portions of the Yakima River Basin. Late-season tributary flow management is also a concern in certain areas. Some reaches of small to mid-size tributaries providing key rearing habitat often are dry during the summer due to an over-allocation of surface water for irrigation and municipal purposes.

Non-Federal actions including agriculture, urbanization, and development throughout the Middle Columbia River Basin have likely resulted in stormwater inputs, pesticide and herbicide contamination, bank hardening and stabilization, sediment input, channel simplification, high stream temperatures and low stream flow. These types of impacts may further degrade habitat conditions. The net impact of such degradation in the context of habitat restoration efforts being implemented is unknown.

Federal Land Management

Federal land managers have taken a number of measures to protect and restore habitat throughout the range of the MCR steelhead DPS. According to the Forest Service and Bureau of Land Management, habitat improvement and benefits have been demonstrated on Federal lands

through the implementation of PACFISH (USDA and USDI 1994), the Aquatic Habitat Restoration Activities Biological Opinion (ARBO), and other management efforts.

Monitoring results from the PACFISH Biological Opinion Monitoring Program (PIBO) provided by the Forest Service indicate that, within the range of the MCR steelhead, some trends in stream habitat attributes (large woody debris, streambank characteristics, etc.) are positive, some are negative, and others have no trend (Al-Chokhachy et al. 2010a). One notable improvement is an increase in the average number of large woody debris placed in streams across the range of the MCR steelhead DPS (Al-Chokhachy et al. 2010a).

Additional information from the PIBO monitoring program indicates that unmanaged or reference reaches (streams in watersheds with little to no impact from road building, grazing, timber harvest, and mining) on Federal lands in the Interior Columbia Basin are in better condition than managed streams (Al-Chokhachy et al. 2010b). In particular, managed watersheds with high road densities or livestock grazing tend to have stream reaches with worse habitat condition than streams in reference watersheds. When roads and grazing both occur in the same watershed, the presence of grazing has an additional significant negative effect on the relationship between road density and the condition of stream habitat (Al-Chokhachy et al. 2010b). These results indicate that legacy effects of historic management are still manifest in the current condition of streams on Federal lands in the Interior Columbia Basin, and ongoing management may still be affecting stream recovery rates. Forest Service researchers have concluded that the observed differences in average stream condition between reference and managed watersheds may indicate that recent management regulations (e.g, PACFISH) in combination with the legacy of previous management actions may not be sufficient to improve the status of streams within managed watersheds, particularly over relatively short time periods (10-20 years) (Al-Chokhachy et al. 2010b).

Significant progress in livestock grazing management on Federal lands has been made in the last 15 years, but the results of Al-Chokhachy et al. (2010b) indicate that further refinements to grazing management may be necessary in certain areas. In addition to these refinements, it is also essential to carry out adequate monitoring for livestock grazing. Without monitoring data, it will not be possible to tell if future refinements to grazing management are actually being carried out.

The Federal land managers are implementing several programs designed to restore the health of watersheds and improve aquatic habitat. The Forest Service's Legacy Road restoration program and identification of a minimum road system through implementation of Subpart A of the Travel Management Rule may help reduce the aquatic impacts of the transportation system. The Federal land managers have also developed aquatic restoration strategies. The Aquatic Restoration Strategy (Forest Service) and the 2015 Aquatic Strategy Plan (BLM) emphasize cooperative whole watershed-scale restoration. The actual realized benefits of these programs will depend on funding and the effectiveness of implementation.

Due to the vast acreage of Federal land throughout the range of MCR steelhead, conservation of this DPS' habitat on Federal land is a recovery priority. However, there is uncertainty over the future conservation of MCR steelhead on Federal lands. The level of protection afforded to this

DPS and its habitat will be determined by land management plans currently under development by the Forest Service and BLM. In August 2008, the Deputy Regional Directors for the Forest Service, BLM, NMFS, U.S. Fish and Wildlife Service, and Environmental Protection Agency developed "A Framework for Incorporating the Aquatic and Riparian Component of the Interior Columbia Basin Strategy into Bureau of Land Management and Forest Service Plan Revisions." The framework identifies six components to be included in the plan revisions: riparian management areas; protection of population strongholds; identification of restoration priorities; multi-scale analysis; development of management direction to identify desired outcomes of future conditions; and monitoring/adaptive management. The manner in which these components are implemented and integrated with the recovery plan will help determine the extent to which federal land management will contribute to recovery.

Inclusion of a comprehensive effectiveness monitoring program such as PIBO is an essential component of any future aquatic conservation strategy. Effectiveness monitoring data from a large-scale program such as PIBO allows managers to determine if current practices are allowing for the attainment of aquatic and riparian management objectives. It also allows managers to incorporate the additive effects of multiple land management activities when prescribing future management standards that will prevent further degradation of streams and begin to restore physical habitat (Al-Chokhachy et al. 2010b).

Significant opportunities exist for recovery and/or conservation actions on Federal lands as part of the ESA section 7(a)(1) responsibilities. NMFS will continue to work with the Forest Service and BLM to identify opportunities for restoration actions on Federal lands. We will also work with these agencies, to the degree possible, to provide technical assistance for projects that benefit the MCR steelhead DPS. Initiation and completion of consultation by Forest Service and BLM on all actions where consultation is required is also a conservation priority.

Habitat Factor Conclusion

New information available since the last status review indicates there is some improvement in freshwater and estuary habitat conditions due to restoration and additional habitat protection. In particular, changes to hydropower operations have increased juvenile survival rates through the mainstem Columbia River corridor. Improvements to fish passage and numerous tributary habitat restoration projects should result in improved survival for this DPS. We therefore conclude that the risk to the species' persistence because of habitat destruction or modification has improved slightly since the last status review. However, habitat concerns remain throughout the range of this DPS particularly in regards to water quality, water quantity, and riparian condition. There are numerous opportunities for habitat restoration or protection throughout the range of this DPS. It is likely that many additional habitat protection or restoration actions will be necessary to bring this DPS to viable status.

Overutilization for commercial, recreational, scientific, or educational purposes

Harvest

Over the past 5 years, harvest rates of MCR steelhead have remained relatively stable. The overall exploitation rate remained less than 10 percent for all fisheries combined, although higher rates of harvest are reported for some populations. The May 2008 *U.S. v. Oregon* Management Agreement (2008-2017) will, on average, reduce harvest impacts to this DPS (NMFS 2008b).

Research and Monitoring

Although the absolute quantity of take authorized for scientific research and monitoring has been relatively low, requests for authorization of take have increased over the past five years. Our records of take authorization under ESA sections 10(a)(1)(A) and 4(d) for this DPS reveal a steady increase in requests for take for the purposes of scientific research. We expect additional increases in take requests in the foreseeable future with implementation of the 2010 FCRPS Supplemental Biological Opinion (FCRPS Biological Opinion). This Opinion integrates the 2008 reasonable and prudent alternative, the Adaptive Management Implementation Plan, and Hatchery Genetic Management Plans. Handling impacts (e.g., direct mortality, delayed mortality, and sub-lethal effects) from research and monitoring activities (e.g., electroshocking, tagging, and marking) need to be better quantified.

New information available since the last ESA status review indicates harvest impacts have decreased slightly, but research impacts have increased. Impacts from these sources of mortality are not considered to be major limiting factors for this DPS. We conclude that the risk to the species' persistence because of overutilization remains essentially unchanged since the last status review.

Disease or predation

Although actions to reduce avian predation in the Columbia Basin have been ongoing with implementation of the FCRPS Biological Opinion, high levels of avian predation continue to significantly affect the MCR steelhead DPS. A Columbia Basin-wide assessment of avian predation on juvenile salmonids indicates that the most significant impacts to smolt survival occur in the Columbia River estuary (Collis et al. 2009). The combined consumption of juvenile salmonids by Caspian terns and double-crested cormorants nesting on East Sand Island is estimated to be between 7 and 16 million smolts annually. This represents approximately 10 percent of all the salmonid smolts that survive to the estuary in an average year. Estimated smolt losses to piscivorous colonial waterbirds that nest in the Columbia River estuary are more than an order of magnitude greater than those observed on the Mid-Columbia River.

Predation remains a concern due to a general increase in pinniped populations along the West Coast. California sea lion populations are growing rapidly, and there is potential that these predators could substantially reduce the abundance of several salmon and steelhead species. The available information clearly indicates that adult salmon contribute substantially to the diets of pinnipeds in the lower Columbia River and estuary, especially in the spring, late-summer, and

fall seasons when Chinook salmon are most abundant (Scordino 2010). The effect of marine mammals on the productivity and abundance of Columbia River Basin ESA-listed salmon and steelhead populations has not been quantitatively assessed. The absolute number of animals preying on salmon and steelhead throughout the lower Columbia River and estuary is not known, the duration of time that they are present is uncertain, and the portion of their diet that is made up of listed species is unknown. We do have information to indicate that Steller sea lion abundance is increasing in the lower Columbia River and that predation by California sea lions at Bonneville Dam continues to increase (NMFS 2011).

A sport fishing reward program was implemented in 1990 to reduce the numbers of Northern pikeminnow in the Columbia Basin (NMFS 2010). The program continues to meet expected targets, which may reduce predation on smolts in the mainstem Columbia River.

Non- indigenous fish affect salmon and their ecosystems through many mechanisms. A number of studies conclude that many established non-indigenous species (in addition to smallmouth bass, channel catfish, and American shad) pose a threat to the recovery of ESA-listed Pacific salmon. Threats are not restricted to direct predation; non-indigenous species compete directly and indirectly for resources, significantly altering food webs and trophic structure, and potentially altering evolutionary trajectories (Sanderson et al. 2009; NMFS 2010).

Disease rates over the past five years are believed to be consistent with the previous review period. Climate change impacts such as increasing temperature may increase susceptibility to diseases. Recent reports indicate the spread of a new strain of infectious haematopoietic necrosis virus along the Pacific coast may increase disease related concerns for MCR steelhead in the future.

New information available since the last status review indicates there is an increase in the level of avian and pinniped predation on MCR steelhead. At this time we do not have information available that would allow us to quantify the change in extinction risk due to predation. We therefore conclude that the risk to the species' persistence because of predation has increased by an unquantified amount since the last status review.

Inadequacy of existing regulatory mechanisms

Various Federal, state, county and tribal regulatory mechanisms are in place to reduce habitat loss and degradation caused by human use and development. New information available since the last status review indicates that the adequacy of a number of regulatory mechanisms has improved. Examples include:

- Clean Water Act: The Federal Clean Water Act addresses the development and implementation of water quality standards, the development of total maximum daily loads (TMDLs), filling of wetlands, point source permitting, the regulation of stormwater, and other provisions related to protection of U.S. waters. State water quality standards are set to protect beneficial uses, which include several categories of salmonid use. States also develop water quality cleanup plans to address water quality limited streams and to establish limits on pollutants that can be discharged in the water body.

TMDLs address high steam temperatures and other water quality parameters identified as a limiting factor or threat for salmonid populations. TMDLs are subject to approval by EPA.

- The EPA has approved the following TMDLs within the Washington portion of the DPS**:**
    - Little Klickitat River Watershed temperature TMDL approved in 2003 and TMDL Implementation plan approved 2005;
    - Walla Walla River and Tributaries chlorinated pesticides and PCBs TMDL approved in 2006; fecal coliform, temperature, and pH and dissolved oxygen TMDLs approved in 2007; Implementation Plan for the four Walla Walla Basin TMDLs approved in 2008;
    - Within the Yakama River Basin the Naches River temperature TMDL approved in 2010; Selah Ditch fecal coliform and temperature TMDL approved in 2006; Teanaway temperature TMDL approved in 2002; Wilson and Cookie Creeks fecal coliform TMDL approved in 2005.

- The EPA approved Oregon's 2004/2006 Integrated 305(b) report and 303(d) list in February 2007. Oregon submitted its 2010 Integrated Report to EPA in May 2011.

- The EPA approved the following TMDLs within the Oregon portion of the DPS:
    - Walla Walla Subbasin temperature TMDL approved in 2005;
    - Willow Creek Subbasin temperature, pH, and bacteria TMDL approved in 2007;
    - John Day River Basin temperature, bacteria, DO, and biocriteria TMDL approved in 2010.

- Washington State Use-based (e.g., aquatic life use) Surface Water Quality Standards, Washington Administrative Code (WAC) 173-201A. The 2003 standards were amended in 2006 to provide additional spawning and incubation temperature criteria for salmon, trout, and char. The standards include an Antidegradation Policy, which was approved by Environmental Protection Agency (EPA) in May 2007. The EPA approved the Washington State's 2008 Water Quality Assessment 305(b) report and 303(d) list in January 2009. Washington's 2010 water quality report is scheduled for submission to EPA in the fall of 2011.

- Washington Shoreline Management Act, Ch. 90.58 RCW (SMA). In 1971 the Washington State Legislature passed the Washington Shoreline Management Act, adopted by public referendum in 1972. The purpose of the Act is "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines" by requiring every county and many cities to develop a Shoreline Master Plan (SMP) to govern development in shoreline areas, including all wetlands, river deltas, and riparian areas associated with rivers, streams and lakes. The SMP for the Klickitat River and its tributaries, for example, designates various shorelines as "environments," which

determine the level of protection that is warranted. Much of the Klickitat River is designated as either "Natural Environment" which prohibits most development within its shorelines or "Conservancy Environment," which allows a limited scope of development, subject to conditions (i.e., shoreline conditional use permit).

County and city shoreline master programs were originally adopted in the 1970's under Washington Administrative Code, Ch. 173-26. The Washington State Department of Ecology promulgated more protective shoreline requirements in 2003. All counties in Washington State, and the cities within those counties, are subject to these requirements and are updating their shoreline master programs pursuant to the update schedule specified in RCW 90.58.080. The statute requires shoreline master programs to be updated in Skamania County by December 1, 2012; in Kittitas and Benton counties by December 1, 2013; and in Klickitat and Walla Walla counties by December 1, 2014. The Washington State Department of Ecology approved the City of Kennewick's updated SMP in December 2009 and the updated Yakama County Regional SMP in January 2010.

- Washington Growth Management Act, Revised Code of Washington Ch. 36.70A (GMA) and Critical Areas Ordinance (CAO). As with the SMA, GMA also has an update process for city and county critical areas ordinances. Most critical areas ordinances were originally adopted following GMA's enactment in 1990/1991. While CAO are typically amended more often than shoreline master programs, GMA's update schedule for Eastern Washington counties started in December 2005, 2006, or 2007 (depending on the county), with extensions granted to slow-growth counties such as Klickitat, which updated its CAO in 2004 and has an update deadline of December 2013.

Stream Flows:

- Washington Administrative Code, Ch. 173-532, updated in 2007, protects instream flows in the Walla Walla Basin.
- Washington's Anadromous Fish Sanctuary statute (RCW 77.55.191) protects stream flows in the Klickitat and Rock Creek by restricting water diversions and dam construction.
- Oregon's Administrative Rules (OARs), updated in 2011, protect stream flows in the Deschutes Basin (OAR 690-505), the John Day Basin (OAR 690-506), and in the Umatilla Basin (OAR 690-506). The Deschutes River Water Management Rules (OAR 690-522), promulgated in 2010, are intended to operate in conjunction with the Deschutes Basin Ground Water Mitigation Rules (OAR 690-505) and the Deschutes Basin Mitigation Bank and Mitigation Credit Rules (OAR 690-521).

However, despite improvement in the adequacy of regulatory mechanisms within the DPS, there remain a number of concerns regarding existing regulatory mechanisms, including:

- Lack of documentation or analysis of the effectiveness of land-use regulatory mechanisms and land-use management plans.

- Contradictory policies and/or implementation of regulations by Federal agencies. For example, one agency may take actions to improve riparian vegetation and instream habitat in one area while a short distance away another Federal authority requires removal of vegetation and instream structures.
- Lack of reporting and enforcement for some regulatory programs.

We conclude that the risk to the species' persistence because of the adequacy of existing regulatory mechanisms has decreased slightly, based on the improvements noted above. However, many ongoing threats to steelhead habitat could be ameliorated by strengthening existing regulatory mechanisms.

Other natural or manmade factors affecting its continued existence

Climate Change

Current research by Mote and Salathé (2010), and other members of the University of Washington Climate Impacts Group, is providing insights to potential future climate change impacts for the Pacific Northwest region. Although the values or severity of these changes may be uncertain, and their biological impacts on salmonids have yet to be demonstrated, there is general scientific agreement regarding the impacts already evident in the last 40 years of climatological data and expected trends.

Expected climate change impacts for freshwater conditions and salmon and steelhead populations include:

- Increased water temperatures.
- Decreases in snow pack causing a shift of peak flows from summer to spring, and a decrease in summer flows. Shifts in the timing of peak flows will likely result in changes in outmigration timing, changes in survival, changes in distribution, and changes in the availability of spawning and rearing habitats.
- Peak flows will be flashier, likely resulting in channel scouring and increased risk of sedimentation.
- Likely increase in winter flooding events.
- Under future climate scenarios, higher elevation areas will likely continue to provide habitat conditions within the biological tolerances of salmonids. However, lower and transitional areas will experience increasing temperatures reducing the available spawning and rearing habitats, altering distribution, and diminishing survival.

Expected climate change impacts to ocean conditions include:

- Increasing ocean acidification (although there is uncertainty about the effects on marine food webs and salmonid survival in the ocean).

- Ocean temperatures will increase resulting in changes in the distribution and abundance of warm- and cold-water species. There is uncertainty about the effects on marine food webs and ocean survival of salmonids.
- Likely changes to a variety of processes such as the pattern and cycle of the Pacific Decadal Oscillation and the intensity and patterns of upwelling.

Over the past 40 years climate change has degraded environmental conditions for Pacific Northwest salmon and steelhead. The certainty in modeled climate change impacts has increased as has our understanding of likely impacts of these changes on salmonid populations. While climate change impacts remain a recovery concern over the long term, it is unknown whether climate change impacts have changed in the few years since the last review.

Hatchery Effects

Hatchery programs can provide short-term demographic benefits, such as increases in abundance during periods of low natural abundance. They also can help preserve genetic resources until limiting factors can be addressed. However, the long-term use of artificial propagation may pose risks to natural productivity and diversity. The magnitude and type of the risk depends on the status of affected populations and on specific practices in the hatchery program.

Within the MCR steelhead DPS, hatchery programs have not changed substantially since the previous ESA status review. Those programs that were considered to be part of the DPS continue to incorporate natural-origin adults into the broodstock and are operated to conserve genetic resources. Two non-endemic hatchery programs in the Walla Walla and Touchet Rivers were evaluated under the ESA and found to not jeopardize the continued existence or recovery of the DPS. The two programs that release Skamania stock summer and winter steelhead into the White Salmon River discontinued releases in 2010. Additional information is needed to assess the potential impact of hatchery-origin fish on natural production in the Klickitat Basin and the effects of hatchery strays on natural production in the Deschutes River system.

The Yakima Basin wild steelhead kelt program continues with up to 800 steelhead adults per year captured at the Prosser Diversion Dam. About 36 percent of the kelts reconditioned survive to spawn a second time.

New information available since the last status review indicates that there have not been significant changes to these natural or manmade factors or in our knowledge of the extent to which they present risks to the persistence of the MCR steelhead DPS.

Efforts being made to Protect the Species

When considering whether to list a species as threatened or endangered, section 4(b)(1)(A) of the ESA requires that NMFS take into account any efforts being made to protect that species. Throughout the range of salmon ESUs and steelhead DPSs, there are numerous Federal, state, tribal and local programs that protect anadromous fish and their habitat. The proposed listing determinations for West Coast salmon and steelhead (69 FR 33102) reviewed these programs in detail.

In the final listing determinations for salmon (70 FR 37160) and steelhead (71 FR 834), we noted that while many of the ongoing protective efforts are likely to promote the conservation of listed salmonids, most efforts are relatively recent, have yet to demonstrate their effectiveness, and for the most part do not address conservation needs at scales sufficient to conserve entire ESUs or DPSs. Therefore, we concluded that existing protective efforts did not preclude listing several ESUs of salmon and several DPSs of steelhead.

In our above five-factor analysis, we note the many habitat, hydropower, hatchery, and harvest improvements that occurred in the past five years. We currently are working with our Federal, state, and tribal co-managers to develop monitoring programs, databases, and analytical tools to assist us in tracking, monitoring, and assessing the effectiveness of these improvements.

2.4 Synthesis

The ESA defines an endangered species as one that is in danger of extinction throughout all or a significant portion of its range, and a threatened species as one that is likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range. Under ESA section 4(c)(2), we must review the listing classification of all listed species at least once every five years. While conducting these reviews, we apply the provisions of ESA section 4(a)(1) and NMFS's implementing regulations at 50 CFR part 424.

To determine if a reclassification is warranted, we review the status of the species and evaluate the five factors, as identified in ESA section 4(a)(1): (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or man-made factors affecting a species continued existence. We then make a determination based solely on the best available scientific and commercial information, taking into account efforts by states and foreign governments to protect the species.

The updated status review completed by our Northwest Fisheries Science Center indicates that while there have been improvements in the viability ratings for some of the component populations, the MCR steelhead DPS is not currently meeting the viability criteria in the recovery plan. None of the MPGs are currently considered to be viable. Several more populations in each MPG will need improved viability ratings in order to meet the criteria. While little improvement in DPS viability has been observed over the last five years, there is also no new information to indicate that the extinction risk has increased. The Science Center concluded, after reviewing the available new information, that the biological risk category for this DPS has not changed since the time of the last status review.

Our analysis of the ESA section 4(a)(1) factors indicates that the collective risk to the MCR steelhead's persistence has not changed significantly since our final listing determination in 2006. Improvements have been made to the operation of the FCRPS and numerous habitat restoration projects have been completed in many Middle Columbia River tributaries. Harvest rates remain relatively low and stable. The protection afforded by some regulatory mechanisms, such as implementation of TMDLs, has increased. Conversely, habitat problems are still common throughout the range of this DPS and more habitat improvements are likely needed to achieve DPS viability. Many existing regulatory mechanisms could be improved to better protect steelhead habitat. In addition, predation from an increase in pinniped populations and significant avian impacts remain a concern, as do the impacts that climate change poses to long-term recovery.

After considering the biological viability of the MCR steelhead DPS and the current status of its ESA section 4(a)(1) factors, we conclude that the status of the MCR steelhead DPS has not improved significantly since it was last reviewed in 2006. However, the implementation of sound management actions in hydropower, habitat, hatcheries, and harvest are essential to the recovery of the MCR steelhead DPS and must continue. The biological benefits of habitat restoration and

protection efforts, in particular habitat restoration, have yet to be fully expressed and will likely take another five to 20 years to result in measurable improvements to population viability. By continuing to implement actions that address the factors limiting population survival and monitoring the effects of the action over time, we will ensure that restoration efforts meet the biological needs of each population and, in turn, contribute to the recovery of this DPS. The MCR Steelhead Recovery Plan is the primary guide for identifying future actions to target and address MCR steelhead's limiting factors and threats. Over the next five years, it will be important continue to implement these actions and monitor our progress.

2.4.1 DPS Delineation and Hatchery Membership

- Recent genetic analyses are inconclusive regarding the transitional boundary between the Lower Columbia River and MCR steelhead DPSs.
- The MCR steelhead hatchery programs have not changed substantially from the previous ESA status review to suggest that their level of divergence relative to the local natural populations has changed.

2.4.2 DPS Viability and Statutory Listing Factors

- The Northwest Fisheries Science Center's review of updated information does not indicate a change in the biological risk category since the time of the last status review. (Ford et al. 2010).
- Our analysis of ESA section 4(a)(1) factors indicates that the collective risk to the MCR steelhead's persistence has not changed significantly since our final listing determination in 2006.

3 ·Results

3.1 Classification

Listing status:

Based on the information identified above, we determine that no reclassification for the MCR steelhead DPS is appropriate, and therefore the MCR steelhead DPS should remain listed as threatened.

DPS delineation:

Available genetic and biogeographic information show that the Klickitat and Big White Salmon basins fall in a transition zone between the Interior Columbia and Coastal/Lower Columbia River Eco-regions. Given the lack definitive information to support adjusting the boundary of this DPS, we conclude that these populations should remain in the MCR steelhead DPS.

Hatchery membership:

The MCR steelhead hatchery programs have not changed substantially from the previous ESA status review to suggest that their level of divergence relative to the local natural populations has changed. Therefore, we conclude that no changes in hatchery membership for the MCR steelhead DPS are needed.

3.2 New Recovery Priority Number

There are no changes in the recovery priority number listed in Table 4 for the MCR Steelhead DPS.

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4 · Recommendations for Future Actions

In our review of the listing factors we identified several actions critical to improving the status of the MCR steelhead DPS. The most important actions to be taken over the next 5 years include implementation of the high-priority strategies and actions for the MPGs (Sections 7.2 and 7.3 of the recovery plan, November 2009), the 2008 Harvest Biological Opinion, the 2010 FCRPS Biological Opinion, and the completion of ESA consultations on the hatchery programs in the MCR steelhead DPS. We are currently in the process of identifying actions that address the factors contributing to the existing moderate or high risk rating for each population, since such actions have the greatest potential to improve VSP parameters at both the MPG and DPS levels.

We are directing our efforts at populations that need viability improvement according to DPS-, MPG-, and population-level recovery criteria, the best available scientific information concerning DPS status, the role of the independent populations in meeting DPS and MPG viability, limiting factors and threats, and the likelihood of action effectiveness to guide our recommendations for future actions. NMFS is coordinating with the Federal, state, tribal, and local implementing entities during this prioritization process to ensure that risk factors and actions identified in the recovery plan, and the actions identified in the Harvest Biological Opinion, the FCRPS Biological Opinion, and the ESA consultations on hatchery programs are addressed.

The greatest opportunity to advance recovery is to increase flows in the Yakima, Umatilla, Walla Walla, and John Day basins. Additional recommended actions include:

- NMFS and the Bureau of Reclamation completing the consultation on Bureau of Reclamation operations in the Yakima River Basin;
- Hatchery managers reducing the extent of spawning by hatchery fish, especially out-of-DPS hatchery fish, in natural spawning areas within the DPS;
- States, tribes, and private entities continuing to implement actions that restore historical passage to the upper Deschutes subbasin, including the Westside tributaries and Crooked River above Pelton Round Butte Dam (Confederated Tribes of the Warm Springs Indian Reservation of Oregon, ODFW, and PGE) the Yakima subbasin, and the White Salmon river above Condit Dam (Yakama Nation, WDFW, and PacifiCorp);
- U.S. Army Corps of Engineers and fisheries co-managers continuing to implement flow and passage improvements in the Walla Walla and Touchet Rivers;
- State and tribal fisheries co-managers continuing to develop annual estimates of wild steelhead escapement, and evaluate the effects of hatchery releases on the production of wild steelhead and implement measures as needed to reduce those impacts in Rock Creek, the Klickitat River, the Walla Walla River, the Touchet River, the Umatilla River Basin, the Naches River, Satus Creek, Toppenish Creek, and the Yakima River;

- State and tribal fisheries co-managers, and local agencies continuing to implement actions to reduce stream temperature in Rock Creek, the Umatilla River, the Walla Walla River, the Touchet River, the Naches River, Satus Creek, and the Yakama River.

5 · References

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National Marine Fisheries Service
5-Year Review

Middle Columbia River Steelhead

Conclusion:
Based on the information identified above, we conclude:

- The Middle Columbia River Steelhead DPS should remain listed as threatened

REGIONAL OFFICE APPROVAL

Northwest Regional Administrator, NOAA Fisheries

Approve:  Date: *July 26, 2011*