

Viability Summary, Emerging Issues, & Adaptive Management Recommendations

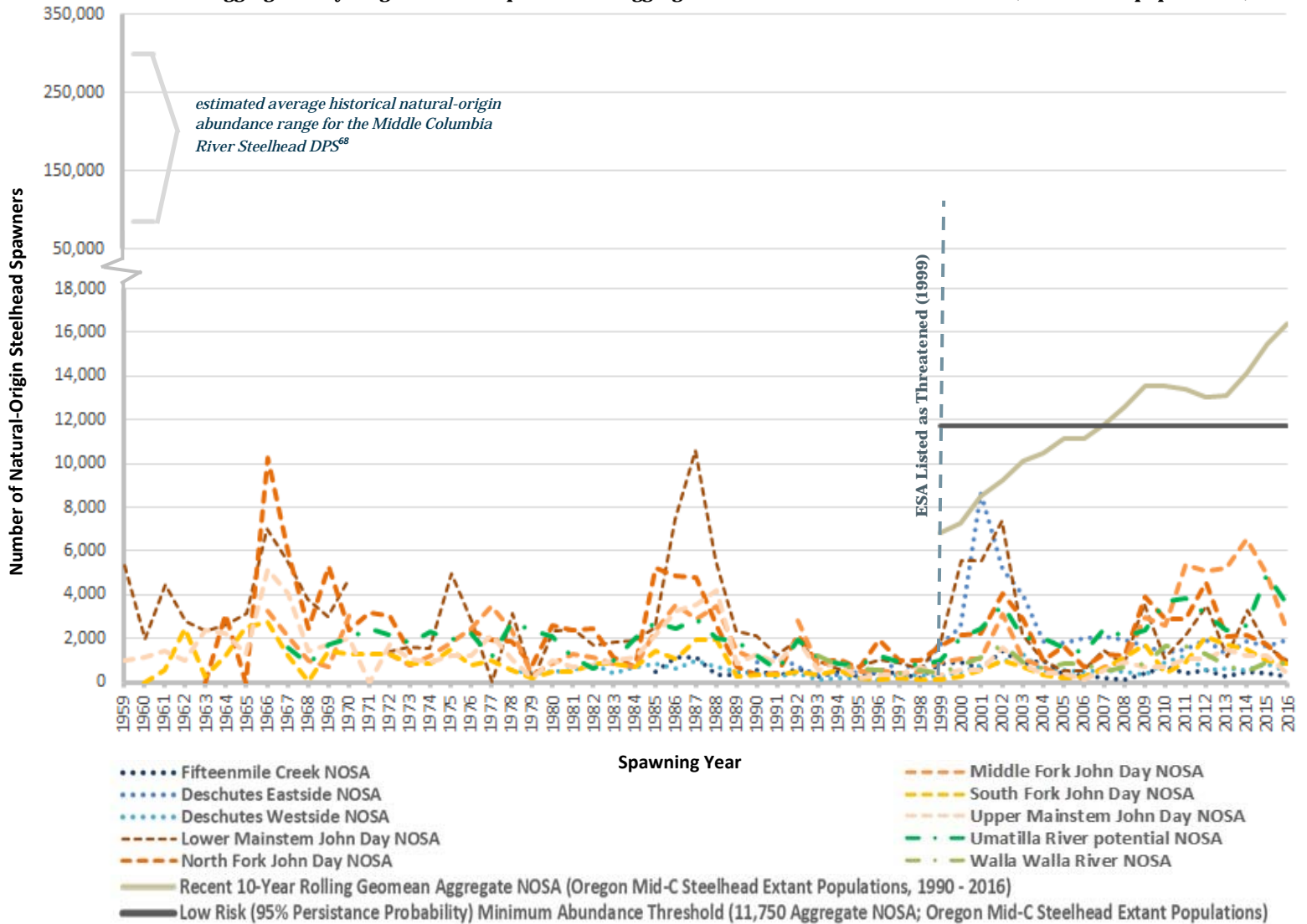
Oregon Middle Columbia River Steelhead Viability Status Summary

% of Viable Mid-C Steelhead Populations in Oregon
40%

Based on data through 2016, only four of Oregon’s 10 extant Middle Columbia steelhead populations are meeting or exceeding viable (low risk extinction) status: Deschutes River Eastside, North Fork John Day River (the only highly viable population in the Mid-C Steelhead DPS), Middle Fork John Day River, and South Fork John Day River. Five populations are maintained (5-25% extinction risk): Fifteenmile Creek, Lower Mainstem John Day River, Upper Mainstem John Day River, Umatilla River, and Walla Walla River. The Deschutes River Westside population remains at high (>25%) extinction risk status. The John Day River wild summer steelhead MPG, the only MPG entirely within Oregon, is not meeting viable (low extinction risk) status³.

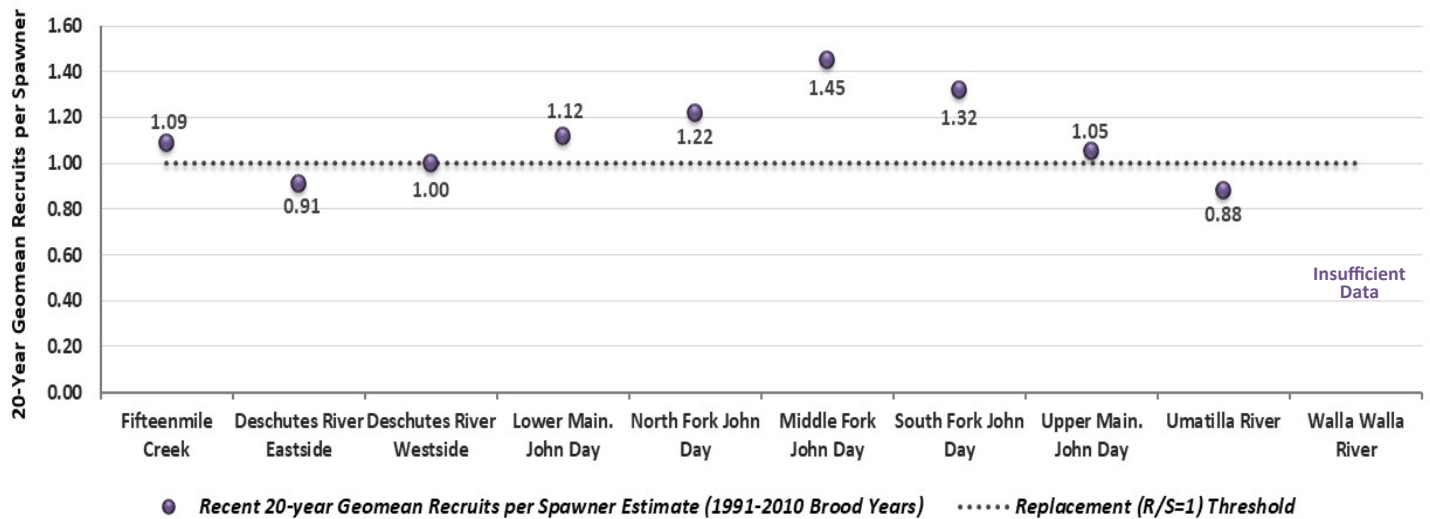
- Oregon Mid-C summer steelhead aggregate geomean abundance has increased since ESA listing (**Figure 89**). However, five populations (Fifteenmile Creek, Deschutes Westside, Lower and Upper Mainstem John Day, and Walla Walla) remain below their designated minimum abundance recovery thresholds for low risk extinction (pp. 4-35).
- Hatchery effects remain a key concern for the Deschutes Eastside and Lower Mainstem John Day populations (pp. 8, 9, 14-16, 17, 27-28).
- For the majority of Oregon’s Mid-C steelhead populations, 20-year geomean adult recruits per spawner estimates are above population replacement (R/S=1) (**Figure 90**), but remain below the designated minimum productivity recovery thresholds for recovery (pp. 4-35).
- For each Oregon Mid-C population, additional monitoring is needed to effectively evaluate current steelhead population diversity and distribution in major and minor spawning areas (pp. 4-35; Appendix A).

Figure 89. Oregon Mid-C Steelhead Populations’ Natural-Origin Abundance: estimated historic abundance range, annual abundance by population, and recent aggregate 10-year geomean compared to the aggregate minimum abundance threshold (N=10 extant populations)^{1,6}



Viability Status, continued

Figure 90. Adult Recruits per Spawner Estimates (20-year geomean) for Oregon’s Mid-C Steelhead Extant Populations: 1991-2010 Brood Years^{1,6}



Emerging Issues & Adaptive Management Recommendations

Adaptive management is crucial for salmonid recovery programs because of the length and complexity of the salmonid life cycle, and the uncertainties involved in improving salmonid survival and status¹. Under adaptive management, research and monitoring of Mid-C steelhead populations provides managers and restoration partners with the best available information to learn, adjust, and optimize recovery decisions through time⁶⁹. Pages 14-16, 27-29, and 34-35 of this report provide detailed descriptions of the near-term, highest priority recovery recommendations specific to Oregon’s Mid-C summer steelhead populations in the Cascades Eastern Slope Tributaries, John Day River MPG, and Umatilla/Walla Walla Rivers MPGs, respectively. Overarching recovery issues and management recommendations for Oregon’s populations of Middle Columbia River Steelhead include:



Tributary Overshoot Emerging Limiting Factor

Monitoring data indicates that a large percentage of natural-origin adult steelhead from the Mid-Columbia River DPS that pass Bonneville Dam, overshoot their natal tributaries and ascend upstream Federal Columbia River Power System (FCRPS) Dams; and only a portion of these overshoots successfully migrate downstream (fallback) to their natal tributaries to spawn^{8-11,32-34,48,49,52,70-73}. Oregon Mid-C steelhead with the highest overshoot rates include the Fifteenmile Creek, John Day, Umatilla, and Walla Walla populations (**Table 1**)^{8-11,32-34,49,52,73}. The Fifteenmile Creek and John Day River populations exhibit the highest upstream dam overshoot rates (**Table 1**) and the lowest mean return success rates (Fifteenmile: 53.7%, run years 2012-2015; John Day: 49.6%, run years 2008-2015)³⁴; impacts that likely constrain the recovery potential of these six, wild-only Oregon Mid-C summer steelhead populations^{8-11,32-34,73}. Highest priority actions to address tributary overshoot include: 1) improving surface water downstream passage routes through the FCRPS (see the Mainstem Columbia River Hydrosystem section below); 2) increased juvenile tagging and tributary monitoring to assess the critical uncertainties of overshoot behavior and its effects on population viability; and 3) developing and testing effectual management strategies to improve wild steelhead survival and spawning success^{11,52,72,73}.

Tributary monitoring is needed to improve estimates of intra- and inter-population effects: pre- and post-overshoot trends, overshoot causal mechanisms (i.e., all “H” threats: hydrosystem, habitat, harvest, hatchery), homing and straying rates, the fates of overshoot steelhead that do not return to their natal tributaries, quasi-extinction risk associated with overshoot, and the effectiveness of overshoot management actions^{11,52,70-73}.

Table 1. Mean overshoot rates for Oregon’s returning adult wild Mid-C summer steelhead.

Oregon Mid-C Summer Steelhead Population(s)	Mean Overshoot Rates ^a (associated upstream dam(s) and run years)
Fifteenmile Creek (wild only population)	78.1% (Dalles Dam; run years 2014-2016) ⁸⁻¹¹
	7.4% (McNary Dam; run years 2006-2015) ³⁴
Deschutes River (2 populations; natural-origin adults)	0.5% (McNary Dam; run years 2007-2015) ³⁴
John Day River (5 wild only populations)	53.3% (McNary Dam; run years 2005-2015) ^{11,32-34}
Umatilla River (natural-origin adults)	43.6% (McNary Dam; run years 2005-2015) ³⁴
Walla Walla River (natural-origin adults)	37.0% (Ice Harbor or Priest Rapids Dam; run years 2005-2015) ³⁴

^aOvershoot Rate: percentage of adult steelhead detected at Bonneville Dam that migrate past their natal streams (overshoot) and ascend an upstream dam(s).

Mainstem Columbia River Hydrosystem Actions

Additional hydrosystem management actions, beyond the NMFS NMFS Federal Columbia River Power System Biological Opinion Reasonable and Prudent Alternatives (FCRPS BiOp RPAs)⁷⁴, are necessary to achieve recovery of ESA-listed salmon and steelhead, including Oregon’s Middle Columbia River steelhead populations^{1,75,76}. Research and monitoring to determine the impact of Columbia River hydropower operations on the viability of Mid-Columbia steelhead populations has been partially implemented to date (Appendix A Tables). Some related data is currently generated through PIT-tagging studies evaluating adult survival rates and mortality between the dams. However, additional monitoring and management actions are needed to improve fish passage, latent mortality, smolt-to-adult survival (SAR), and critical habitat quality in the mainstem Columbia River and Snake River. High priority action recommendations include:

- Funding the collection and systematic PIT-tagging of steelhead smolts originating from Oregon’s Mid-Columbia tributaries (see hydrosystem monitoring objectives in Appendix A);
- Reducing powerhouse passage rates by maximizing the volume of total river (kcfs) spilled (while not exceeding current state water quality regulations) for juvenile passage benefits and improved SAR;
- Providing more non-powerhouse routes available for downstream migration of adults and juveniles, including March spill at FCRPS dams to improve adult steelhead fallback of tributary overshoot fish;
- Improving PIT instrumentation of non-powerhouse routes to monitor survival (e.g., life cycle and performance metrics);
- Mitigating for critical habitat loss in the FCRPS and mainstem Columbia River including areas upstream of stream of origin; and
- Monitoring the effectiveness of hydrosystem-related actions in improving steelhead viability^{1,8,10,11,33,49,70,72,73,76}.

Lack of Funding and Full Implementation of High Priority Population Viability and Threats Monitoring Actions

As defined by the Middle Columbia River Steelhead DPS Recovery Plan², implementation encompasses both the strategic management actions and research and monitoring actions prioritized in the Plan. Although numerous recovery plan management actions have been funded and implemented since 2010, quantitative evidence of threat amelioration and critical habitat improvement is undetectable at this time. Measurable baseline limiting factor and threats (LFTs) criteria are not identified in the Recovery Plan. Alternatively, the Mid-Columbia Steelhead Recovery Research, Monitoring, and Evaluation (RM&E) Plan identifies high priority monitoring objectives to evaluate the steelhead population viability criteria, LFT status and trends, fish-LFT relationships, and recovery action implementation effectiveness^{1,2}. However, the majority of the Plan’s highest priority research actions have neither been fully funded nor, consequently, fully executed to

Emerging Issues & Adaptive Management Recommendations, *continued*

date. Additionally, population viability status and threats monitoring funding will be eliminated (e.g., Fifteenmile Creek Life History Project and Deschutes River Subbasin Hatchery Stray Study) or significantly reduced for Oregon's Middle Columbia steelhead populations. Funding and implementing the high/highest priority Mid-C Steelhead RM&E actions is needed to effectively evaluate population status, trends, and threats, and inform NMFS' 5-year ESA status reviews (see Appendix A). Securing state/federal funding and leveraging models and technologies (life-cycle models, remote-sensing tools, etc.) to support comprehensive Mid-C steelhead monitoring efforts at the population scale is highest priority.

Tributary Habitat Protection and Restoration Actions

Approximately 1,715 partners, including private landowners, completed 1,559 Mid-C Steelhead Recovery Plan habitat protection/restoration actions during 2010-2016; predominant actions included improving fish passage and screening, and protecting/restoring riparian vegetative communities (see Appendix B). However, juvenile steelhead rearing habitat availability and freshwater productivity remains limited in Oregon's Mid-C steelhead population areas due to critically low streamflows, high water temperatures, and reduced habitat connectivity (instream-riparian-floodplain)^{1,3,9,31,32,39-41,45,46,48}.

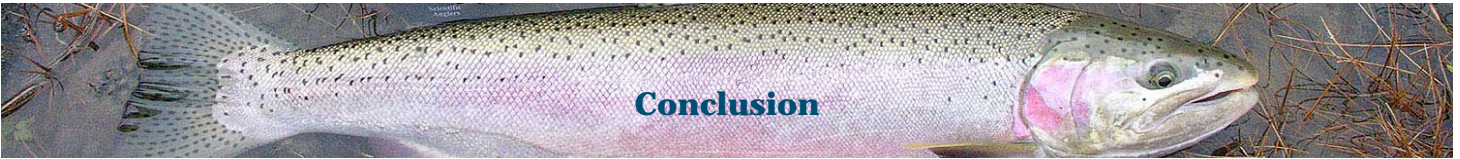
Implementing recovery actions that demonstrably (1) protect and conserve high quality steelhead habitats, (2) proactively manage water use to reduce the occurrence of low streamflows and high instream water temperatures, and (3) increase juvenile rearing and migration habitat extent are highest priority. Furthermore, basin-wide actions that restore watershed processes such as channel-floodplain connectivity, stream flow regimes, and riparian communities will likely bolster steelhead resiliency and adaptation to future climatic conditions^{39,43,44,47,77-79}. To the extent possible, restoration actions should target cold-water sources and expand the footprint of current steelhead spawning and rearing strongholds^{1,39,40,47,77}. Habitat inventories and steelhead viability monitoring are necessary, corresponding priorities to habitat restoration activities to identify fish-habitat use relationships, quantify the ecological effectiveness of protection and restoration actions, and strategically guide future management actions at the population scale.

Recovery Plan Implementation Tracking and Reporting

Middle Columbia River steelhead population viability status and trends data is evaluated annually and uploaded to the [ODFW Salmon and Steelhead Recovery Tracker](#) and [Coordinated Assessments Data Exchange](#) websites. Priority recovery action status will be reassessed as new completed protection/restoration project data becomes available. Best available population viability and recovery action status information will be submitted to NOAA-NMFS for the 2021 ESA Status Review Report. Any significant changes in Middle Columbia River steelhead viability, threat and limiting factors, and/or priority recovery action status will be reported in future implementation progress reports.



Photo: Gary Vonderohe (ODFW)



Overall, the first seven years (2010-2016) of Oregon's Middle Columbia River Steelhead Conservation and Recovery Plan implementation do not indicate a significant change in viability status and threat amelioration for Oregon's 10 extant Mid-C steelhead populations. Hydrosystem operations and facilities, tributary habitat alteration, and hatchery effects remain primary threats for Oregon Mid-C summer steelhead.

The top two limiting factors for the majority of Oregon's Mid-C populations include: (1) high tributary overshoot and loss rates of adult natural-origin steelhead in the FCRPS portion of the mainstem Columbia River (i.e., abundance impact), and (2) lack of sufficient freshwater tributary habitat (water quantity and quality) for juvenile steelhead rearing and migration (i.e., productivity and spatial structure impacts).

Tributary habitat protection and restoration efforts since 2010 highlight the significant on-the-ground capacity (partners and funding) involved in implementing the plan's actions. Collaborative partnerships between agencies (state, federal, tribal), restoration practitioners (SWCDs, watershed councils, non-profits), and private landowners are essential to improving summer steelhead habitat and watershed resiliency. Focused investment partnerships, such as the Deschutes Partnership and John Day Basin Partnership, provide a framework for developing and implementing a shared vision to accelerate the pace and scale of summer steelhead and native fish recovery and landscape restoration to meet ecological and socio-cultural watershed goals. Linking habitat actions with fish-habitat monitoring is key to evaluating action effectiveness (i.e., measuring ecological results) and adapting future habitat restoration strategies to increase the likelihood of measurably improving summer steelhead habitat quantity and quality, and population viability.

Highest priority recovery plan monitoring actions remain insufficiently funded and executed, with future funding reductions proposed for Mid-C steelhead research and monitoring programs. Effective adaptive management requires the integration of research, monitoring, and management actions⁶⁹ to (a) improve our certainty of Mid-C steelhead extinction risk, (b) optimize conservation decision-making, and (c) expedite the recovery of Oregon's Middle Columbia steelhead populations to abundant, productive, and diverse levels^{1,79,80}.

The recommendations in this report reflect the highest management and monitoring priorities through 2022 to advance Mid-C steelhead recovery long-term.

Full implementation of the management and monitoring recommendations in this report (pages 14-16, 27-29, 34-35, and 39-42) are expected to provide long-term benefits to Oregon's Middle Columbia River Steelhead Populations by:

- Increasing steelhead migration and survival through the FCRPS in the mainstem Columbia and Snake Rivers;
- Increasing detection of steelhead threats and viability status and trends;
- Identifying and quantifying relationships between habitat availability, fish use, and restoration effectiveness;
- Improving connectivity, quantity, and quality (i.e., spatial structure) of steelhead tributary spawning, rearing, and migration habitat; and
- Promoting population representation, redundancy, and resiliency (i.e., abundance, productivity, spatial structure, and diversity) to future socio-ecological conditions^{1,80}.