

WDFW Puget Sound Steelhead Advisory Group Minority Report

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As a member of the Puget Sound Steelhead Advisory Group (PSSAG), Washington’s Department of Fish and Wildlife (WDFW) asked me to share my knowledge, experience, and perspectives on advancing ESA-listed Puget Sound Steelhead recovery while improving recreational fishing opportunities for them. To that end I attended meetings for three years, finding common ground with 12 fellow advisors – all passionate recreational fishermen - where I could. While there are some Advisory Group recommendations that I do support (those reducing impacts from existing fishery and hatchery programs, and addressing the acknowledged lack of data necessary for effective science-based management and recovery planning), there are significant recommendations in the group’s report “QuickSilver – Restoring Puget Sound Steelhead & Fisheries¹” that I respectfully do not support for the reasons provided in this minority report. My dissent with the Advisory Group is largely informed by three recent WDFW publications² which, despite their relevance, were not provided to the group by WDFW. The intent of this minority report is to capture the key concerns that keep me from supporting some of the Advisory Group’s recommendations, and to identify the recommendations which I do support. I also provide a constructive alternative to the Quicksilver’s perspective that the path to saving steelhead that are threatened with extinction is through increasing hatchery production and recreational fishing opportunities. I appreciate that PSSAG respected my alternative perspective and included this report as an Appendix to the QuickSilver report.

My advice to WDFW is to strive for environmental, ethical, scientific, and fiscal responsibility – let’s effectively manage the steelhead hatcheries and fisheries we have before adding more. To be clear, I share QuickSilver’s vision for a “...future in which wild Puget Sound steelhead are no longer threatened with extinction and are healthy enough to support fishing.” As an angler myself, I believe there is a time and a place for the privilege of recreational fishing. WDFW currently provides a diversity of recreational angling opportunities for salmon, trout, steelhead, and other sport fishes. When monitored and managed responsibly, recreational fisheries can be sustainable even as angler demand grows – but that requires precautionary management in the face of uncertainty. Over the past few decades recreational fishing and fish-viewing

¹ https://wdfw.wa.gov/sites/default/files/2020-05/quicksilver_pssag_report_final_draft_5-5-20.pdf

² WDFW Steelhead at Risk Report (2018). <https://wdfw.wa.gov/publications/02070>
A Review of Hatchery Reform Science in Washington State (2020). <https://wdfw.wa.gov/publications/02121>
WDFW Hatchery and Fishery Reform Policy Implementation Assessment (2020). <https://wdfw.wa.gov/publications/02133>

opportunities have suffered as fish populations declined from cumulative impacts of habitat loss; human population growth; climate change; ocean productivity; and data-limited fishery and hatchery management which have been slow to respond to changing conditions.

As WDFW looks to increase fish-related recreational opportunities, the agency must be realistic and recognize that today's recreational anglers should be willing to make sacrifices to meet conservation obligations for future generations. Decisions we make today for ourselves affect opportunities for our kids and grandkids. Expectations established previously when steelhead were more abundant are no longer appropriate, especially when steelhead population status reviews show continued declines. Fish populations threatened with extinction are not ones that should be targeted for expanded recreational fishing pressure. Instead, existing hatchery programs and associated recreational fisheries impacting threatened fish populations should be critically reviewed and monitored to ensure they align with the best available science, and changed if the benefits they provide to wild fish recovery don't far exceed the risks they pose to wild fish recovery.

One of the primary lessons the Advisory Group learned together is that WDFW needs better information than currently available to manage steelhead responsibly. State, federal, and tribal steelhead managers are making decisions about harvest and hatchery management with insufficient data, and with models that do not account for crucial aspects of steelhead biology and ecology. Funding is needed to obtain critical wild steelhead population data, hatchery data, and fishery data to develop models that more accurately predict the effects of various management actions and enable better goal-setting. The entire Advisory Group accepted this as true, and that is a Quicksilver recommendation I wholeheartedly support. Of particular concern is the lack of real-time escapement and harvest data that enable responsive management when modeled expectations are not being realized. Matching Oregon Dept. of Fish and Wildlife's ability to provide online updates of 7-14 day Oregon Coast steelhead and salmon spawning surveys as they occur is an appropriate goal for WDFW. The fact that we still lack fundamental steelhead data 13 years after Puget Sound Steelhead were listed as Threatened under the Endangered Species Act is indicative of a management culture whose institutional priorities and fiscal constraints cause it to prioritize fishing today ahead of science-based fishery management that will provide for future generations.

With this observation comes the question "how then do we move forward to restore wild steelhead and the fisheries they can support?" QuickSilver describes a diverse collection of new Puget Sound Steelhead hatchery and fishery programs – an experiment in increasing fishing opportunities with 'minimal impact' on wild steelhead recovery. An effective experiment requires specific testable hypotheses informed by previous studies; a rigorous, repeatable, and well-funded study design built on a strong understanding of the system we're studying; experimental controls; an evaluation of data prior to implementation (i.e. pre-treatment period);

controlled manipulation of multiple independent variables; close measurement of their effect on multiple dependent variables; an adequate sample size to provide sufficient statistical power; an understanding of cumulative impacts from other (commercial, tribal) fisheries, non-WDFW hatchery programs, ocean conditions, and climate change; and sufficient post-implementation time periods to address substantial uncertainty and natural variability in fish responses. We don't need all those details right now, but to support this experiment I must have confidence that they are attainable. Considering the history of fishery and hatchery management in Washington, I don't have that confidence. It was the absence of these necessary scientific components that are highlighted in WDFW's 2018 Steelhead at Risk report, and that thwarted WDFW's efforts in 2019 to perform a quantitative analysis of the effectiveness of WDFW's Hatchery and Fishery Reform Policy c3619, as discussed below.

Adding new pressures on wild steelhead as an 'experiment' at this point in the arc of Puget Sound Steelhead decline is irresponsible. We don't know enough about steelhead to know which – if any - of their populations are expendable. The risks are too high, the state's budget too uncertain, the state's commitment to effectively monitor and adaptively manage its fisheries and hatchery programs is as yet unproven. Instead WDFW should employ a responsibly precautionary approach: prioritize the commitment to science stated in their existing policies and permits, develop a statewide monitoring plan and collect and analyze the overdue data needed for responsible management of its existing fishery and hatchery programs, use the data to responsibly manage their programs consistent with hatchery and fishery reform science, and follow the recommendations of their own science staff³ to perform a scientific evaluation of whether higher-risk actions – such as expanding hatchery and fishery programs - are necessary or appropriate.

Context

Puget Sound Steelhead were listed as threatened with extinction under the Endangered Species Act in 2007, and with few exceptions have been in continued decline ever since. We likely have between 2% and 5% of the abundance of Puget Sound Steelhead that we had at the beginning of the 20th century. Climate change is increasingly confounding steelhead recovery efforts, making fishery impacts and the unintended but documented genetic, ecological, and infrastructural impacts of hatchery programs all the more counterproductive to wild steelhead recovery. Investments in important fish habitat protection and restoration efforts are undermined by unaccounted fishery and hatchery impacts. The persistence of Washington's state fish is on the line. Until steelhead populations are sufficiently recovered, we cannot afford to increase the magnitude of actions we know harm them, even incrementally. It's not even enough to hold the line at current levels of impact. To achieve our shared goal of recovering threatened Puget Sound

³ Joseph H. Anderson, George R. Pess, Richard W. Carmichael, Michael J. Ford, Thomas D. Cooney, Casey M. Baldwin & Michelle M. McClure (2014) Planning Pacific Salmon and Steelhead Reintroductions Aimed at Long-Term Viability and Recovery, North American Journal of Fisheries Management, 34:1, 72-93, DOI: 10.1080/02755947.2013.847875

Steelhead we must protect and restore more habitat and *reduce* – not increase - existing fishery and hatchery impacts.

My tolerance for risk and uncertainty – as it applies to wild steelhead - is different than that of my fellow PSSAG advisors. I do not accept the existing WDFW-led fishery and hatchery programs that, absent sufficient monitoring, continue to threaten Puget Sound Steelhead. Based on the viable salmonid population (VSP) data (and lack thereof) available, Puget Sound Steelhead are on the brink of an “endangered” listing under the Endangered Species Act. We need a bold new vision, founded in science, to recover wild steelhead populations; it is not enough to aim to hold the line on their decline using more of the approaches that have contributed to their demise. The sooner we do this, the greater our chances of success; the longer we wait, the more challenging and expensive steelhead recovery becomes. A recent NOAA climate vulnerability assessment⁴ found that migration barriers, habitat degradation, and hatchery influences have reduced the adaptive capacity of most wild steelhead and salmon populations; and that enhancing adaptive capacity is essential to mitigate for the increasing threat of climate change. Now is not the time to expand steelhead hatchery and fishery programs that threaten wild steelhead recovery by rationalizing them as an experiment. When Puget Sound Steelhead populations are no longer threatened with extinction, increased recreational fishing opportunities and responsibly managed and monitored hatchery programs may be appropriate. Until then, the risks to the region’s wild fish heritage and our responsibility to future generations are too great.

That PSSAG membership was based on a very narrow slice of Washington’s demography provides additional context relevant to this minority report. PSSAG members were selected by WDFW because of our passion for recreational fishing. There was no effort by WDFW to solicit advisors who represented a broader range of community interests, like members of the non-fishing public motivated by their non-consumptive conservation ethic to protect and recover wild steelhead populations because of their intrinsic value. We 13 members of PSSAG are all male, 12 are Caucasian, and none are tribal members. Few have professional experience in fish biology, ecology, or genetics that extends beyond angling, guiding, and the fishing tackle industry. The Advisory Group is comprised of recreational fishermen led by the Special Assistant to the Director of WDFW - an agency funded in part through the sale of fishing licenses and substantially invested in managing one of the most extensive and expensive networks of salmon and steelhead hatchery infrastructure in the United States. WDFW never claimed PSSAG membership was otherwise, and QuickSilver states clearly that it was written by recreational anglers. I only raise the point because the WDFW Advisory Group pamphlet provided to the group states “WDFW typically selects members to advisory committees who represent a broad range of perspectives and who reflect the state’s geographic and demographic

⁴ Crozier LG, McClure MM, Beechie T, Bograd SJ, Boughton DA, Carr M, et al. (2019) Climate vulnerability assessment for Pacific Salmon and steelhead in the California Current Large Marine Ecosystem. PLoS ONE 14(7): e0217711. <https://doi.org/10.1371/journal.pone.0217711>

diversity.” Readers of QuickSilver should understand the limited perspectives represented in the PSSAG. Guided by WDFW’s Fish Program, a small, passionate, and vocal group of recreational anglers is making recommendations to the Department that are to shape the future of Washington’s state fish. From an environmental justice and equity standpoint, and considering that WDFW’s mission and responsibility extends to all the citizens of Washington, this seems an inherently narrow and flawed approach.



Puget Sound Steelhead Advisory Group (PSSAG) meeting, May 10, 2018.

New information not considered by PSSAG

Over the three years since the PSSAG’s first meeting, significant new information has emerged regarding WDFW’s hatcheries, fisheries, and the state of the science regarding their impacts on wild steelhead recovery. In some cases, the new information was provided by WDFW to the PSSAG; in the references provided here, it was not. This is not a comprehensive list of new reports relevant to PSSAG’s objectives, but it includes several that, for me, tipped the balance for the risks and benefits to steelhead that PSSAG was weighing. This information consistently demonstrates that in most Puget Sound watersheds WDFW still does not have the basic steelhead monitoring data – genetic and ecological - required to responsibly manage their existing steelhead hatchery and fishery programs despite Puget Sound Steelhead being listed as threatened since 2007. The data and perspectives in this new information, and the fact that they were not provided to and discussed by the PSSAG, significantly informs this minority report.

1. WDFW Steelhead at Risk Report (Oct. 2018, <https://wdfw.wa.gov/publications/02070>). This report was an overdue update on the status of Washington’s wild steelhead populations as required by the Statewide Steelhead Management Plan (SSMP). The SSMP was identified by WDFW as a foundational document to the Advisory Group, as described in PSSAG’s Mission Statement. The Steelhead at Risk Report identifies threats to Washington’s steelhead population viability and recommends actions to improve their status and reduce extinction risks. From my perspective this WDFW report couldn't be more relevant to PSSAG’s conservation objectives if

we were indeed asking WDFW to apply the scientific method (an “experiment”) to adaptively manage their hatchery and fishery programs in a manner that supports Puget Sound Steelhead recovery. However, the Department never brought the report to the attention of its advisors. In addition to identifying watershed-specific threats to wild steelhead from current hatchery and harvest practices, the WDFW Steelhead at Risk Report includes the following relevant statements which illustrate WDFW’s acknowledged failure to adequately monitor their *existing* steelhead fishery and hatchery impacts despite policy and legal commitments to do so:

- “The lack of robust monitoring data was one of the most ubiquitous impediments to conducting the wild steelhead status assessments statewide, and therefore poses a risk of harm to populations because of the high uncertainty of management action effectiveness.”
- “Without pHOS or other estimates of genetic interactions of hatchery and wild steelhead, WDFW cannot prove compliance with HGMP requirements or SSMP policies.”
- “Currently, threats from segregated hatchery programs exist in Skykomish, Stillaguamish and Green rivers, and from integrated programs in White, Green, Skokomish, Duckabush, Dewatto, and Elwha rivers.”
- “Data gaps in harvest monitoring include few or no current wild steelhead release mortality estimates for sport fisheries and net drop-out mortality estimates for tribal fisheries, and a lack of uncertainty estimates for wild steelhead mortality in other fisheries. The catch record card system used to estimate harvest of hatchery steelhead currently does not provide any information on harvest or release mortality of wild steelhead.”
- “Gene flow assessment problems are substantially exacerbated for integrated programs where hatchery and wild fish are essentially genetically identical. Relative proportions of integrated hatchery and wild steelhead can only be assessed through visual identification of mass marked and unmarked adults on the spawning grounds, which is often difficult due to survey conditions during spawning, or through genetic parentage data collection, which typically requires dams or other sampling locations that enable capture of large proportions of adults. Thus, for most western Washington populations no methods currently exist with which to obtain the hatchery monitoring data required to ensure that integrated programs are being managed consistent with the Fishery and Hatchery Reform Policy (Hatchery Scientific Review Group (HSRG) 2009) and program-specific HGMPs.”

This acknowledged lack of data calls into question the appropriateness of the Department’s extensive reliance on models (All-H-Analyzer (AHA), among others) to characterize and “minimize” the Advisory Group’s proposed new suite of hatchery and fishery programs. The AHA model used by WDFW to develop the QuickSilver fishery and hatchery portfolio is only as good as the data entered into it – a fundamental modeling concept known as ‘garbage in, garbage

out.’ Further, the AHA model does not include any evaluation of hatchery programs’ ecological (competition and predation) impacts on wild steelhead, which can be significant⁵ especially when affecting already depressed demographically independent populations. Finally, WDFW’s use of data-limited models to propose programs that minimally comply with ESA harvest-related take limitations and thresholds is fundamentally different than working proactively to achieve steelhead recovery plan goals and associated de-listing targets.

2. WDFW Hatchery and Fishery Reform Policy and Scientific Review.

In June 2018, the Fish and Wildlife Commission (FWC) directed WDFW to review and update its Hatchery and Fishery Reform Policy (C-3619). Adopted in 2009, the policy was intended to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of science-based hatchery and fishery reform. Hatchery reform is defined as the scientific and systematic redesign of hatchery programs to help recover wild salmon and steelhead and support sustainable fisheries. In ordering the review, the FWC simultaneously suspended policy guidelines 1, 2, and 3 for salmon species, freezing WDFW’s commitment to use “the principles, standards, and recommendations of the Hatchery Scientific Review Group (HSRG) to guide the management of hatcheries operated by the Department. In particular, promote the achievement of hatchery goals through adaptive management based on a structured monitoring, evaluation, and research program.”

Two WDFW reports from the FWC policy 3619 review are now available:

- a. [A review of hatchery reform science in Washington State](#) (Prepared by WDFW, guided by WA State Academy of Sciences, 2020). Of direct relevance to PSSAG recommendations to expand hatchery production, this WDFW report synthesizes extensive research on hatchery reform and recognizes:
 - “Hatcheries have potential for large magnitude ecological impacts on natural populations that are not well understood, not typically evaluated and not measured.”
 - “Hatchery risks include fishery risks, ecological risks and genetic risks. Fisheries targeting abundant hatchery runs can unintentionally increase mortality of co-mingled natural populations.”
 - “Research on ecological [HxW] interactions lags far behind the attention devoted to genetic risks of hatcheries. Importantly, research suggests the potential for ecological interactions in marine environments shared between multiple hatchery and natural populations, yet very little is known

⁵ Kostow, K. Factors that contribute to the ecological risks of salmon and steelhead hatchery programs and some mitigating strategies. *Rev Fish Biol Fisheries* **19**, 9–31 (2009). <https://doi.org/10.1007/s11160-008-9087-9>

Pearsons TN (2008) Misconception, reality, and uncertainty about ecological interactions and risks between hatchery and wild salmonids. *Fisheries* 33(6):278–290. doi:[10.1577/1548-8446-33.6.278](https://doi.org/10.1577/1548-8446-33.6.278)

about the likelihood or magnitude of population-scale ecological impacts of hatcheries.”

- “Studies comparing the number of offspring produced by hatchery-origin fish and natural-origin fish when both groups spawn in the wild (relative reproductive success, RRS) have demonstrated a general pattern of lower reproductive success of hatchery-origin fish.”
- “Hatchery reform [in Washington] is largely aimed at reducing risk in a relative but not absolute sense.”
- “We recommend crafting a stand-alone monitoring and adaptive management plan for each [existing] hatchery program that quantifies both benefits and risks, and explicitly links hatchery performance metrics to potential operational changes.”
- “In WDFW’s hatchery system, a focus on efficiency and maximizing abundance prevents widespread implementation of risk reduction measures.”
- Understanding the role of life history diversity on hatchery-wild ecological interactions and ecosystem stability is a significant research need.”
- “It is important to note that hatcheries also introduce a number of risk-risk trade-offs whereby reducing one risk simultaneously increases another risk (Waples and Drake 2004). For example, releasing smolts rather than pre-smolt fry might reduce the ecological risk of competition with natural-origin fish in shared rearing environments, but increase the risk of domestication selection due to a longer exposure to the hatchery selective environment. Similarly, curtailing fisheries targeting hatchery-origin fish to reduce incidental mortality to natural-origin fish simultaneously increases the genetic risks of high PHOS. We suggest such risk-risk tradeoffs are common in hatchery management.”
- “We recommend a more rigorous, consistent and intentional evaluation of cumulative hatchery effects across multiple hatchery programs operating within a geographic region.”
- “WDFW invests considerable effort into population monitoring, yet this information does not often achieve its potential as a hatchery evaluation tool because analysis, reporting, and synthesis are typically underfunded. Furthermore, for many hatchery programs, the absence of a clear framework for application of monitoring data in decision making (Murdoch et al. 2019) precludes clearly articulated risk tolerance thresholds.”

- b. Draft [WDFW Hatchery and Fishery Reform Policy Implementation Assessment](#) (WDFW 2020). The FWC directed WDFW in 2018 to review the performance of WDFW's Hatchery and Fishery Reform Policy c3619, enacted in 2009. The apparent FWC question was "we've used hatchery reform science for ten years now – how well is it working to achieve wild fish recovery?" However, for reasons described in the report beginning on page 3, WDFW found the data necessary to answer that question were unavailable or insufficient to the task. Consequently, WDFW re-focused their assessment to evaluate whether and to what extent the agency had actually implemented the fishery and hatchery reform actions mandated in the 2009 policy c3619. Among the many findings in this report, these are particularly relevant to my concerns related to hatchery and harvest recommendations in the Quicksilver proposal: A lack of funding was a common reason that prevented implementation of some guidelines; a lack of quantifiable harvest program goals and a comprehensive statewide monitoring and evaluation program are areas of special concern; and defining program success and collecting and analyzing data to adaptively manage our programs are critical missing components. By my estimation the 'report card' rollup on page 8 gives WDFW a solid C-, and I have to question some of the higher grades awarded (Guideline #3 in particular).

'Major strides toward implementation' aside, the report summary states:

"Despite this enormous investment in our hatchery infrastructure, no salmon populations have been delisted and harvest opportunities remain constrained. The benefits and risks of WDFW hatchery programs have not been quantified, and as a result, adaptive management (i.e., reform actions) has been more reactive than prescriptive."

Conclusion:

Over the course of three years PSSAG learned from the WDFW, NOAA, and the Hatchery Science Review Group (HSRG) that preventing hatchery and wild steelhead interactions (genetic and ecological) is paramount to wild steelhead recovery and subsequent recreational steelhead fisheries. To this end, WDFW committed to PSSAG that it will take steps to minimize fishery and hatchery impacts on wild populations by closely monitoring hatchery and wild populations and adaptively managing them using fishery and hatchery reform science. These are the same principles and recommendations that the Department committed to, but as yet has failed to achieve, in fishery and hatchery reform policy 3619 and in some federally-approved hatchery genetic management plans (HGMPs) for existing Puget Sound Steelhead hatchery programs. And no wonder – monitoring is a hugely expensive and largely unappreciated endeavor that takes funding away from hatchery production and can lead to unpopular reductions in fishing opportunities.

The PSSAG QuickSilver report correctly states “To work, the portfolio requires extensive monitoring of wild steelhead populations, fisheries, and hatcheries to identify and evaluate management actions” (p. 5). However, WDFW and the FWC have fallen short on existing policy and regulatory commitments to monitoring and adaptive management that are critical to wild steelhead recovery, as addressed in the above-referenced reports and acknowledged in the QuickSilver report (p. i), which states:

“One of the primary lessons we have learned together is that we need better information than we currently have to improve our ability to manage steelhead. State and federal steelhead managers often must make decisions about harvest and hatchery management with limited data, and with models that do not account for crucial aspects of steelhead biology and ecology. Additional resources are needed to obtain critical data and develop life-cycle models that more accurately predict the effects of various management actions and enable better goal-setting.”

Given what is at stake, I support QuickSilver recommendations that reduce hatchery and harvest impacts on wild steelhead, and address the acknowledged lack of data necessary for effective management and recovery planning. I can’t in good conscience recommend new steelhead hatchery programs and fisheries until WDFW demonstrates it can meet its policy commitments and legal obligations to account-for and address impacts from existing ones. It is not enough for me to be told that WDFW will use monitoring and adaptive management to follow HGMP commitments, the SSMP, and HSRG principles *this* time. WDFW senior science staff, the draft WDFW 2020 Strategic Plan, and WDFW’s FWC policy 3619 review efforts emphasize the perils of not using science, and acknowledge that a statewide hatchery monitoring and evaluation program is necessary to minimize risk to wild stocks, but is absent.

My skepticism aside, even if WDFW intends a meaningful commitment to statewide hatchery and harvest monitoring and adaptive management, given the state of the State’s economy, their budget and capacity to do so is uncertain at best. The PSSAG correctly states that to work, a new hatchery and fishery portfolio would require extensive monitoring to evaluate and adjust management actions. If WDFW again neglects the required monitoring and adaptive management (whether by prioritizing hatchery jobs and fish production over monitoring, or because the state budget simply can’t support it), the experiment fails and we risk further impacts to the few wild steelhead we have remaining. In response to the coronavirus pandemic and its significant impacts to the state economy, in May 2020 the Governor’s Office of Financial Management (OFM) requested that WDFW identify options for substantial budget reductions for fiscal year 2021. In June WDFW submitted to OFM a FY2021 list of savings that includes cuts to hatchery improvements and equipment totaling over \$2.7M. The Department anticipates additional reduction exercises for the next biennium in the coming weeks.

In the interest of the conservation, recovery, and sustainable fishing central to the PSSAG, I am supportive of increased wild steelhead VSP monitoring efforts; a timely filling of known data gaps from commercial, recreational, and tribal harvest (directed and incidental impacts), including data from anglers on the numbers of wild steelhead caught and released annually by stream (as accomplished in British Columbia sport catch record cards). I am supportive of transparent management strategy evaluations of wild steelhead populations that fully consider risks and uncertainties to evaluate whether and when they could support responsible catch and release fisheries. I am also supportive of advocating for resources to help WDFW meet *and exceed* the steelhead monitoring and adaptive management requirements for existing federally-permitted hatchery programs that currently contribute to a diversity of recreational fishing opportunities. Expanding data-limited fisheries and hatcheries that have negative impacts on wild steelhead recovery, even with efforts to incrementally ‘minimize’ those impacts, is not the same as proactively working to achieve recovery. WDFW’s focus should be on returning wild steelhead to healthy and harvestable levels. When recreational fishers are reliant on the health of wild steelhead populations to provide the privilege of angling, WDFW may be more motivated to find the will and the resources to more fully invest in wild steelhead recovery for sustainable fisheries well into the future.