Memorandum **March 3, 2020**

To: **Ken Helm, Chair, and Members of the Oregon House Water Committee**
Fr: **David A. Moskowitz, The Conservation Angler - Executive Director**
Re: **Protecting Columbia River Salmon and Steelhead and Cold Water Refugia**

The purpose of this memo is to highlight EPA Recommendations regarding the importance and significance of establishing sanctuary areas where ESA-listed salmonids are protected from angling encounters when take up residence in cold water refugia when the Columbia water temperatures rise.

The Rational for Protecting Cold Water Refugia: It is a Regulatory Requirement
Oregon and Washington have established temperature water quality standards for the Lower Columbia to protect migrating salmon and steelhead, including a 20°C (68°F) numeric criterion for limiting the maximum water temperatures. Oregon DEQ includes a narrative temperature standard that stipulates the Lower Columbia River:

> "must have cold water refugia that's sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body."

Oregon defines cold water refugia as:

> "those portions of a water body where, or times during the diel temperature cycle when, the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well mixed flow of the water body" (OAR 340-041-0002(10))

A Brief Legal History: In 2004, EPA approved Oregon's temperature water quality standards for the Lower Columbia, including the 68f maximum numeric criterion and the cold water refugia narrative provision. EPA then consulted with NOAA Fisheries under ESA requirements to ensure EPA's approval would not jeopardize the continued existence of ESA-listed wild salmon and steelhead. The ESA consultation on the Oregon DEQ temperature standards was completed in 2004 but invalidated by Oregon's Federal District Court in 2012. ESA consultation was re-initiated and resulted in a new NOAA Biological Opinion in 2015.

NOAA Fisheries concluded that Oregon's Lower Columbia temperature standards were likely to jeopardize the survival and recovery of ESA listed salmon and steelhead because the cold water refugia narrative standard was not being implemented and determined that the cold water refugia narrative standard was critical to the 68f numeric criterion. Thus, to avoid jeopardizing ESA listed salmon and steelhead, NOAA directed EPA to develop the Columbia River Cold Water Refuges Plan.

Summary of the Cold Water Refugia Plan
The EPA Draft CWR Report identified 191 water sources entering the Columbia River mainstem between Buoy 10 and the Snake River. 35 of these CWR are warmer than the Columbia in August. EPA's research, collaboration and prioritization found 23 significant cold water refugia areas along the Columbia. Based on refined prioritization and research on how fish used the CWR, EPA prioritized 12 of these refugia as critical to wild salmon and steelhead survival, including the following (listed downstream to upstream):

A. Below Bonneville: Cowlitz River (WA), Lewis River (WA), Sandy River (OR), Tanner Creek (OR)
B. Above Bonneville: Eagle Creek (OR), Herman Creek (OR), Wind River (WA), Little White Salmon (WA), White Salmon River (WA), Hood River (OR), Klickitat River (WA)
C. Above The Dalles Dam: Deschutes River (OR)

When the Columbia River warms to 64F, salmon and steelhead begin to feel the effects of the temperature. When the Columbia reaches 68F, all cool water refugia, no matter the size or volume of water, will attract migrating wild salmon and steelhead.

Historic water temperature measurement data at Bonneville Dam indicate that the total warming of the river since the late 1930s in August (on average) is approximately 3.6F, rising from below 68F to near 71.6F. This increase incorporates all factors in river warming, including dam construction in the middle decades of the century and climate change affects from 1960 to 2000.

Table 4-1: Summary of temperature effects to migrating adult salmon and steelhead in the Lower Columbia River (EPA 2003; McCullough 1999, Richter and Kolmes 2005)

Temperature Range	Effects
Less than 18°C	• Minimal effects to salmon and steelhead
18-20°C	•Elevated disease risk • Low proportion of steelhead seek CWR • Slight increase in sockeye mortality
20-21°C	• Significant disease risk • Increased stress and energy loss • Majority of steelhead seek CWR • Significant sockeye mortality • Low proportion of Chinook seek CWR
21-22°C	•High disease risk • High stress and energy loss • High percentage of steelhead move into CWR • Very high sockeye mortality • Moderate proportion of Chinook seek CWR
22-23°C	• Very high disease risk • Very high stress and energy loss • Very high percentage of steelhead move into CWR • Near complete sockeye mortality • Significant proportion of Chinook seek CWR
23-24°C	• Very high disease risk • Very high stress and energy loss • High avoidance behavior for steelhead and all salmon • High mortality for steelhead and salmon species

Low returns of many ESA-listed wild salmon and steelhead populations migrating up the Columbia and Snake River face conditions adverse to their success in reaching and spawning successfully in their natal rivers. The adverse conditions include predation (from fishing and marine mammals), ecological conditions (water flows and water temperatures) and passage challenges at dams and fishways. EPA found that the presence, distribution and water temperatures within the Columbia River CWR provide an advantage to migrating steelhead and salmon in terms of energy savings required to complete migration, pre-spawn staging and spawning. However, the correlation between increased Columbia River temperature and decreased migration survival of adult steelhead and fall Chinook in the Lower Columbia is likely associated with increased fishing

harvest in CWR at warmer Columbia River temperatures. Fishing pressure within CWR also makes it difficult to directly measure the benefits of CWR to migrating adult salmon and steelhead.

The migration success of steelhead that used CWR versus those that did not use CWR was evaluated and that study found that migration success to spawning tributaries for those steelhead (wild and hatchery) using CWR was about 8% less than steelhead that did not use CWR. This initially suggests CWR use is not beneficial. However, the study also indicated that fishing pressure within CWR explained the decreased survival as wild steelhead using CWR, which must be released when caught, experienced a 4.5% decrease in survival during migration to their spawning tributaries compared to wild steelhead that did not use CWR. The increased mortality could be associated with catch and release mortality and incidental catch of wild steelhead in tribal harvest fisheries.

Combined with recent downturns in adult return abundance in numbers insufficient to sustain, maintain or re-build their numbers have given rise to grave concerns concerning the impacts of angling on migrating wild salmon and steelhead within the CWR.

Proposals to establish no fishing sanctuaries are aimed directly at the negative effects of encounters in the fisheries (both indirect and direct) which can and do have impacts on salmonid fitness, survival and productivity. Returning anadromous fish have a finite store of energy which is reserved for migration and spawning, but which can be drained by encounters in the fishery as well as by dam passage.

Specific Scientific and Policy Supporting Designation of No Fishing Sanctuaries Within CWR

1: Areas where cold or cooler waters create vitally critical thermal gradients in the concurrently managed Columbia River are well known, identifiable and recognizable to the angling public.

2: Steelhead migration is different and their reliance on thermal gradients is well documented.

3: Steelhead using thermal gradients are vulnerable to multiple fishing-related encounters based on extensive and extended residencies within cold water refugia that deplete stored energy reserves.

4: Existing Oregon Administrative Rules already identify “sanctuaries” where commercial fishing is not permitted, and these areas are well-defined and well understood by the public. (ORS 635-042-0005)

5: Snake River ESA Recovery Plans (2018) directly state that they will not recover spring chinook or Summer steelhead, yet marine and lower and mid-Columbia River fisheries directly take these species.

6: Oregon does not have river-specific management regimes to accurately estimate or secure river-specific abundance for wild steelhead. There is no plan to establish goals or monitor attainment so spawning escapement and egg deposition criteria are set and met.

7: The EPA released a Draft Plan in October 2019 and closed a public comment deadline on December 6, 2019. Intentions to release a final Plan in January 2020 were ambitious based on those comments. However, EPA has completed much essential research and analysis of the importance of CWR, the extent and significance of fish use, the likely degradation of future water quality and the implications on wild salmon and steelhead migration in the future, as well as a set of recommendations for protecting each cold-water source that make each CWR significant.

8: ODFW (as well as other Oregon and Federal agencies) must make it a Departmental Priority to work with all land and resource managers and owners to ensure the cold water sources are managed,

protected and enhanced so that the array of CWR in the Columbia River remains a critical advantage for migratory survival of returning wild salmon and steelhead.

9: ODFW must also move forward with plans to protect the wild fish that use the identified refugia. Adverse effects of angling within CWR require that permanent rules are crafted to reduce encounters and stress for migrating wild salmon and steelhead.

10: The Oregon Fish and Wildlife Commission has shown leadership in providing a measure of protection to wild steelhead during their migration to natal rivers by establishing sanctuaries from angling in areas of thermal refugia in specifically defined areas or under certain environmental conditions in Oregon and concurrent waters.

Procedural Action Options:

A. The Oregon Fish and Wildlife Commission has the authority to establish protective thermal refugia regulations in the Columbia River in waters under Oregon jurisdiction, and can work collaboratively within concurrent waters managed jointly with Washington to establish protective thermal refugia regulations in joint state waters.
B. The Commission has, on its own accord, directed ODFW to conduct a rulemaking to establish protective thermal sanctuary regulations, specifically in the Columbia Basin, and also statewide.
C. The Commission has directed ODFW Staff to enact temporary rules establishing sanctuaries when conditions and run-sizes warranted additional conservation measures in 2018 and in 2019.
D. The Commission and ODFW staff have the authority to implement temporary rules establishing so-called “hoot-owl” closures where specific river reaches are closed to all fishing during afternoon and evening hours when water temperatures exceed 66F or 68F.

Scientific References:

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Cramer Fish Sciences. December 2010. Temperature Characteristics of Herman Creek Cove and its Function as a Cool-Water Refuge for Adult Salmon and Steelhead in the Columbia River.

Keefer et. al. University of Idaho Memo. December 15, 2011. Temperature regimes during upstream migration and the use of thermal refugia by adult salmon and steelhead in the Columbia River basin.

Fish Passage Center 2014 Annual Report, August 31, 2015.

Fish Passage Center Memo. October 28, 2015. Requested data summaries and action regarding sockeye adult fish passage and water temperature issues in the Columbia and Snake rivers.

Environmental Protection Agency, Columbia River Cold Water Refuges Draft Plan October 2019

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