DISCUSSION DRAFT February, 2022

2022 Aquatic Life Use Updates: Temperature Use Subcategories

Rulemaking Advisory Committee Discussion Draft

By: James McConaghie
Mailea Miller-Pierce &
Debra Sturdevant

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This report prepared by:

Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
1-800-452-4011
www.oregon.gov/deq

Contact:
James McConaghie
503-229-5619

Debra Sturdevant
503-229-6691

Table of Contents

1 Introduction

This document contains a summary of the proposed methodology and data used to update the aquatic life use subcategories in Oregon's water quality standards for temperature. The currently effective designations are found in figures and tables in Oregon's Administrative Rules (OAR)'s under basin-specific rules at OAR-340-041-101 to OAR-340-041-345. The Department of Environmental Quality (DEQ) will use this document in advisory committee discussions in preparation for rulemaking to update the aquatic life use designations as appropriate. DEQ will propose updated use designations in the form of "fish use maps," or tables that will be adopted into the OARs. DEQ plans to propose the rule amendments for Environmental Quality Commission (EQC) adoption in November 2022.

Section 2 of this document summarizes the methodology and data used to update the aquatic life use subcategory designations consistent with the definitions and requirements of Oregon's temperature standards in OAR-340-041-0028.

Section 3 identifies where data sources and decision methods used to designate the aquatic life uses have changed from the last rulemaking in 2003, and additional methods or data sources that were considered during DEQ's technical review. A detailed inventory of data sources is provided in Appendix A.

1.1 Background

Water quality standards are comprised of a designated use that sets the goal for the waterbody and criteria for specific water quality parameters established to protect the uses from degradation and pollution. Fish and Aquatic Life is a designated use in virtually every waterbody in Oregon. The only exception is a constructed and screened irrigation water conveyance canal. Because Fish and Aquatic Life is a broad category and different species, populations, or communities of organisms can have different water quality tolerances and requirements, the Clean Water Act allows states to establish subcategories of aquatic life use with specific criteria that protect the use.

Several of Oregon's water quality standards contain multiple subcategories of Fish and Aquatic Life use. The temperature standard has criteria for subcategories of aquatic life use based on sensitive salmon, steelhead, resident trout and bull trout (char) and their life stages within flowing freshwaters. There are also separate criteria for cool water species, lakes, and oceans & bays.

In 2003, as part of the temperature standard rulemaking, DEQ mapped the waterbodies designated for each use subcategory contained in our temperature standard rule. These 'fish use maps' were required as the result of litigation because the court found that it was not clear when and where Oregon's various temperature criteria applied. The 2003 mapping effort relied primarily on data for fish species and life stage distribution and timing information provided by the Oregon Department of Fish and Wildlife (ODFW). The 2003 ODFW

database relied on the professional opinion of biologists to determine fish uses and spawning dates for many waterbodies in the absence of more comprehensive statewide availability of observation or survey data.

DEQ has not updated the fish use maps and tables since 2003, with a few exceptions. Since then, ODFW has continued to improve its information on fish habitat distribution and timing. In addition, restoration projects and dam removals have opened certain previously impassable streams to fish passage. Also, since 2003, the USFWS has adopted a Critical Habitat rule for Bull Trout, which is inconsistent with the state's bull trout use designations.

Finally, DEQ has recently adopted the NHD high-resolution (1:24,000) hydrography to align with statewide geospatial data standards. The original designation of the aquatic life use prior to 2003 was at the scale of Oregon Water Resources Department administrative basins for major rivers and tributaries. DEQ did not intend these basin level designations to indicate that the use designations applied to every stream reach within a basin. The maps adopted in 2003 greatly improved the available information, using the StreamNET hydrography at a scale of 1:100,000.

DEQ has determined there is a need to update Oregon's aquatic life use designations in order to:

1. incorporate new and improved data, especially the major improvements by ODFW to the base data used in 2003,
2. correct errors (e.g. inaccuracy resulting from different base hydrography), and
3. add habitat that is newly accessible since 2003.

These updates will ensure that the use designations in Oregon's water quality standards are accurate, up to date, and based on the best available scientific information.

1.2 Coordination

DEQ drew upon existing data sources, information and expertise to complete all aspects of the aquatic life use updates. DEQ relies primarily on ODFW's Fish Habitat Distribution (FHD) database, with some supplemental data collected by other state and federal agencies, tribal organizations, academic researchers, and other organizations to address this project's objectives. In addition, DEQ formed a technical workgroup comprised of experts from state, federal, and tribal scientific agencies and organizations.

1.2.1 Technical workgroup input and review

DEQ formed an interagency technical workgroup to assist in identifying, analyzing, and interpreting fish habitat distribution data to correct and clarify the designated aquatic life use subcategories in Oregon's water quality standards. DEQ staff coordinated the technical workgroup, which provided expertise not available within the department. Workgroup members served as peer-review experts and sometimes provided supplemental data sources to update the use designations with the latest and best available information. Members also referred DEQ to other experts on specific topics to help answer questions.

Table 1 Interagency Technical Workgroup Membership

Member	Affiliation	Title
Jon Bowers	ODFW	ODFW GIS Coordinator; Fish Habitat Distribution Data Steward
Anne Hayden-Lesmeister	ODFW	Instream Flow Specialist
Brian Bangs	U.S. FWS	Biologist, Oregon Fish and Wildlife Office
Barbara Adams	U.S. Forest Service	Threatened & Endangered Species Aquatic Biologist
Tom Skiles	CRITFC	Fisheries Biologist
Craig Contor	Confederated Tribes of the Umatilla Indian Reservation	Fisheries Habitat Project Leader
Joe Ebersole	U.S. EPA, Pacific Ecological Systems Division	Research Fisheries Biologist
Rochelle Labiosa	U.S. EPA, Region 10	Physical Scientist
John Palmer	U.S. EPA, Region 10	Senior Policy Advisor

This technical workgroup reviewed DEQ's data sources, methodology and analysis, and provided guidance, additional information, and expert professional judgement on the quality, level of certainty, and accuracy of this report's conclusions. DEQ consulted with the technical workgroup through a series of virtual meetings between fall 2020 and spring 2022. DEQ also communicated individually with workgroup members as needed on questions related to their specific research or expertise. The workgroup provided access to datasets, reviewed proposed decision rules, provided input on data display, and reviewed a draft of the technical support document. After their review, DEQ responded to the panel's comments and incorporated their input into the technical support document and draft use maps.

2 Methodology for designating aquatic life use subcategories

2.1 Information Sources

DEQ primarily relied on the Oregon Department of Fish and Wildlife (ODFW) Fish Habitat Distribution (FHD) database[1] for information on fish distribution and ODFW Timing / In-water work area mapping[2] for life-stage activity and timing information. The FHD incorporates data from multiple sources including state and federal fisheries agencies, federal land management agencies, tribal entities, watershed councils and other interested public or private organizations. Fish habitat is identified within reaches where habitat for a specific population and life-stage or activity occurs. The timing tables identify when specific life-cycle activities for different species occur throughout the year. The two data sources are complimentary and frequently used together.

DEQ also relies upon the following sources of additional information to identify the proposed designated uses:

1. U.S. Fish and Wildlife Service Final Bull Trout Critical Habitat Designation (September 30, 2010)[3],
2. U.S. Geological Survey Data Release: Occurrence locations and trait data for freshwater fishes, amphibians, and reptile's native to the state of Oregon (2018)[4],
3. U.S. Forest Service NorWeST Stream Temperature Regional Database (Isaak et al. 2019),
4. Oregon statewide assessment temperature database (ODEQ-AWQMS database, 2021)[5].
5. U.S. Environmental Protection Agency, Region 10 Columbia River Cold Water Refuges Plan (EPA-910-R-21-001, January 2021[6])

The ODFW Fish Habitat Distribution (FHD) database is the product of a multi-year effort by ODFW to develop consistent and comprehensive fish distribution data for a number of

[1] https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata
[2] https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=dataresources
[3] https://www.fws.gov/pacific/bulltrout/FinalCH2010.html
[4] Mims, M., & Hockman-Wert, D. P. (2018). *Occurrence locations and trait data for freshwater fishes, amphibians, and reptiles native to the state of Oregon* [Data set]. U.S. Geological Survey. https://doi.org/10.5066/P9F7FYYZ
[5] https://orwater.deq.state.or.us/DataAnalysisIndex.aspx
[6] https://www.epa.gov/columbiariver/columbia-river-cold-water-refuges-plan

salmonid species. This database was recently updated and includes all basins or sub-basins in Oregon that have anadromous fish, and the distribution of many resident fish species.

ODFW periodically compiles fish distribution information from a variety of sources including state and federal fishery agencies, federal land management agencies, tribal entities, watershed councils and other interested public or private groups[7]. The ODFW fish distribution data reflect fish use based on the past five life cycles for species, which ranges from the last 15 to 35 years. If no use of habitat has occurred for five generations of the species, ODFW reclassifies the habitat as historical. In addition to spatial fish distribution data that describe where a life stage use is known or likely to occur, the ODFW Timing / In Water work database also includes timing information and mapping indicating when each life stage use is known or likely to occur within specific areas of the habitat distribution.

The habitat distribution data represent the presence of habitat for known fish life stages based on a combination of documented observations of organisms, habitat surveys, and the best professional judgment of local field biologists. This judgement concerns local knowledge of where use is likely to occur based on availability of suitable habitat. For example, waters near areas of documented life stage presence on the same or proximate water bodies that have similar habitat features, such as flow volume, gradient, gravel size, and pool frequency, and no known obstructions or other reasons why the use would not also be present in these waters, are included in the habitat distribution.

The methodology ODFW uses to develop and update its database is scientifically sound and is authoritative for salmonid use designations. DEQ supplemented the ODFW distribution and timing databases with data from other sources for some use subcategories. Where DEQ used additional sources of data, they are discussed in the description of the method for each use subcategory below. The ODFW database, together with the additional sources identified below, are the best information readily available upon which to base the fish use designations. The use of both data and professional judgment is appropriate because of the practical limitations of monitoring every stream reach, and because fish distributions vary year to year for some waterbodies. Use designations are based on information about habitat availability and suitability collected over multiple years.

A detailed inventory of the data sources and variables used to designate each aquatic life use subcategory, and comparison to the data sources and variables used in the original 2003 aquatic life fish use designations, are available in Appendix A.

2.2 Beneficial Use Designations for Temperature – Year-Round Uses

Most of Oregon's basins have two maps, one representing year-round uses and the other seasonal spawning use, to represent different fish use subcategories from the temperature standard. This "Fish Use Designation" map identifies species and life stage activity uses of

[7] https://www.oregon.gov/geo/FIT%20Documents/OFHDDS_Stewardship_Plan_Version_One.pdf

the habitat that occur throughout the year. These are based on the most protective temperature for the warmest consecutive seven-day period occurring during the year (Table 2). For a typical stream in Oregon the average daily temperature for the warmest week of the year is expected to range from 1 to 3°C cooler than these criteria (McCullough et al. 2001).

Water quality criteria to protect these uses apply at all times of the year. Every water body in Oregon has a year-round fish use designated. In many cases, habitat supports multiple species with a range of thermal tolerance. For example, salmonid rearing, lamprey, and chub populations may be present in the same water body. Where a waterbody could fit into multiple year-round aquatic life use categories, DEQ designates the use based on the most sensitive use that occurs in the waterbody. DEQ has historically focused on salmonid fish uses as the most temperature sensitive species in cold or cool water aquatic communities, and for which the most data on thermal tolerance and distribution is usually available.

Table 2 Orgon's Use Subcategories and Criteria for Temperature

Aquatic Use Subcategory	Criterion (7dADM[8])	In Effect
Bull Trout Spawning and Juvenile Rearing	12°C	Year-round
Core Cold Water Habitat	16°C	Year-round
Salmon and Trout Rearing and Migration	18°C	Year-round
Salmon and Steelhead Migration Corridors	20°C	Year-round
Redband or Lohantan Cutthroat Trout	20°C	Year-round
Cool Water Species	narrative	Year-round
Borax Lake Chub	narrative	Year-round
Salmon and steelhead Spawning	13°C	During designated spawning periods

The following decision rules were used to identify the fish use designations that occur year-round, including throughout the summer, and determine what updates should be proposed.

[8] Seven-day average daily maximum temperature (7dADM) means the average of the daily maximum temperatures from seven consecutive days made on a rolling basis. The daily maximum temperature experienced during the warmest consecutive 7-day period of the year must be no higher than the criterion for a waterbody to attain the corresponding criterion. Average daily water temperatures and maximum temperatures at most other times of year will by definition be cooler than the temperature of the criterion.

1. Salmon and Trout Rearing and Migration

DEQ designates 'Salmon and Trout Rearing and Migration' use for waters where:

1. Salmon or steelhead rearing or upstream migration, occurs in July or August;
2. Rainbow Trout, Coastal Cutthroat Trout, Westslope Cutthroat Trout, or Mountain Whitefish rearing, migration, or resident activity occurs in July or August;

   AND
3. Waters upstream of the waters identified above, except those designated for the Bull Trout Spawning & Juvenile Rearing or Core Cold-Water use subcategories.

This use designation identifies waters that provide suitable rearing habitat for salmon, steelhead (anadromous Rainbow Trout), and resident trout; and upstream adult pre-spawn migration for salmon and steelhead. This use subcategory is designated where more stringent uses for core cold-water and bull trout spawning and rearing are not applicable. This use designation also protects other cold-water biota that co-occur with salmonid fishes.

2. Core Cold-water habitat

DEQ designates Core Cold-Water Habitat for waters where any of the following indicators of cold-water habitats occur:

1. Waters where Chinook salmon spawning occurs early; **begins** prior to September 15.
2. Waters where winter or summer steelhead spawning occurs late; **ends** after June 1.
3. Waters having sub-adult and adult Bull Trout presence and foraging during July or August, but are not also Bull Trout spawning and rearing streams.
4. Waters upstream of the areas identified in 1-3 above that also support salmon & steelhead rearing or provide cold water to these areas, unless those can be designated for the 'Bull Trout Spawning & Juvenile Rearing' use subcategory.
5. Waters where available water temperature data indicate that the 7-day average maximum stream temperature for the warmest week of the year is at or below 16.0°C.

This use designation identifies and ensures the protection of colder water habitats to provide thermal habitat diversity for salmon and steelhead juvenile rearing, adult salmon and steelhead pre-spawn holding, Bull Trout sub-adult and adult foraging, and to protect species that thrive in especially cold water, including certain amphibians and other cold-water biota.

Late steelhead spawning is a new indicator not used in 2003. In addition, DEQ has more temperature data in the upper portions of streams where temperatures are more likely to stay below 16°C all summer. Other agencies may have collected temperature data used as an indicator, but it must meet DEQ quality assurance requirements. DEQ use temperature data only where multiple years of data were available to evaluate interannual variability and ensure waterbodies were reliably meeting the 16°C 7-day average of daily maximum threshold.

The designation of core cold-water habitat using the indicators above will provide protection for core cold-water habitats that are known or likely to occur at this time.

3. Bull Trout Spawning and Juvenile Rearing

DEQ designates Bull Trout rearing and spawning use for:

1. Waters where ODFW indicates Bull Trout primarily spawning and early life stage rearing habitat occurs;
2. Waters identified as potential Bull Trout spawning and juvenile rearing habitat that is necessary for long-term health and viability of Bull Trout populations consistent with recovery plans and restoration goals;
3. Waters identified by the USFWS 2010 final critical habitat rule[9] as Bull Trout spawning and rearing habitat, including 33 miles of habitat USFWS asked DEQ to add in their 2015 Biological Opinion on Oregon's temperature standards[10]; and
4. Waters upstream of the reaches identified above, which support bull Bull Trout by providing cold water to the habitats where Bull Trout spawning and juvenile rearing use occurs.

In 2003, Bull Trout juvenile rearing and spawning use was designated based on DEQ's Bull Trout Habitat Designation Report: Technical Work Group Recommendations (2003) and USFWS' draft proposed critical habitat for Bull Trout juvenile rearing and spawning. DEQ included areas identified as existing and as potential Bull Trout rearing and spawning habitat (identified in the above reports) because Bull Trout habitat in the State has been greatly reduced and fragmented, and because Bull Trout are listed under the federal ESA. In order to protect Bull Trout populations in Oregon and allow for their recovery, additional habitat must be protected beyond that currently occupied.

The potential habitat identified in the 2003 report was included to allow local populations to grow to the point that they (1) are reconnected with other local populations and with foraging habitats, (2) are large enough to withstand losses due to natural stresses and events (e.g., drought); and (3) have the genetic diversity to support healthy reproduction.

DEQ proposes to align the Bull Trout designations with the most recent critical habitat designations and fish distribution datasets from USFWS and ODFW, which were updated since 2003. The potential habitat necessary for long-term health and viability of Bull Trout populations identified in 2003 will be retained unless ODFW and Bull Trout experts provide updated information and revise the potential habitat needed to be consistent with current recovery plans and restoration goals.

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[9]. https://www.fws.gov/pacific/bulltrout/crithab/FinalCH2010.html

[10]. USFWS 2015m USFWS Biological Opinion, Concurrence and Conference Concurrence on USEPA Approval of 11 Oregon Water Quality Standards for Temperature and Intergravel Dissolved Oxygen. 01EOFWO0-2014-F-0087.

4. Redband and Lahontan Cutthroat Trout

DEQ designates Redband and Lahontan Cutthroat Trout use:

1. for Redband trout (Oncorhynchus *mykiss* spp. *gairdneri*, *newberrii*, or *stonei*) in:
    a. Waters where resident *O. mykiss* occur within part or all of the following basins:
        - Goose and Summer Lakes Basin
        - Malheur Lake Basin
        - Powder Basin
        - Burnt Basin
        - Malheur River Basin
        - Owyhee Basin
        - Klamath Basin
        - Umatilla Basin
        - Walla Walla Basin

    AND

    b. Additional reaches where steelhead are not present due to a natural or permanent passage barrier.
2. for Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*) in waters where Lahontan Cutthroat Trout occur.

Redband trout are an interior resident rainbow trout species found in the arid and semi-arid portions of Oregon east of the Cascade Mountains crest. They have sufficient physiological differences from coastal rainbow trout that they are considered a distinct subspecies of *Oncorhynchus mykiss*. Lahontan Cutthroat trout are resident trout located in isolated reaches in the interior great basin area of southeastern Oregon. Only a small portion of their range is in Oregon.

Redband and Lahontan cutthroat trout are the most sensitive use in basins and sub-basins where anadromous steelhead, which have lower thermal tolerance, are absent. Due to uncertainty about admixture between populations of coastal and interior subspecies of *O. mykiss*, Redband Trout use is designated only for portions of interior basins that do not contain steelhead populations.

5. Salmon and Steelhead Migration Corridors

DEQ designates the 'Salmon and Steelhead Migration Corridor' use to waters with a multiple lines of evidence approach that include some or all of the following characteristics:

1. Migration corridor reaches designated and approved in 2003.

2. Where ODFW's FHD indicates a reach is "Primarily migration" for an anadromous salmon or steelhead species.
3. Where ODFW's life-stage activity timing tables indicate no peak salmonid rearing use or peak salmonid spawning or emergence use in July-August, inclusive of resident trout species.
4. There is evidence indicating that the reach naturally exceeds 18°C 7-dADM.

The "migration corridor" use is a seasonal cold-water use, meaning it is not optimal salmonid rearing or holding habitat during the warm summer months. Anadromous or adfluvial species migrate through or use some of these reaches, primarily during other times of the year. There may be some cold-water fish use during the summer, such as juvenile rearing or out migration, but these are not typically natal streams and do not provide optimal juvenile rearing conditions during the summer. The presence of native cool water species can also support a migration corridor designation. It is important to protect existing habitat heterogeneity and cold-water refuges within these reaches.

In this review, DEQ considered whether additional reaches qualify for the migration corridor criterion designation using the decision rules above. A full evaluation of the multiple lines of data and information considered for designating this use for waterbodies will be available for review in the draft technical support document.

6. Cool Water Species

DEQ designates the cool water species use for:

1. Waters not identified on the timing tables as primary migration or rearing habitat for any resident or anadromous salmonid fish in July or August.

BUT

2. If ODFW identifies a reach as having salmon or steelhead "primary migration" use, then the waterbody is designated as Salmon and steelhead Migration Corridors.

The cool water species use subcategory, as used in the temperature standard, includes aquatic organisms that either have a wider temperature tolerance range than cold-water organisms or are physiologically restricted to cool waters, including but not limited to, native sturgeon, , suckers, chub, sculpins and certain other species of cyprinids (minnows). DEQ uses the absence of cold water species, such as salmonids, during July or August to indicate cool waters reaches. In addition, DEQ may also use the presence of other cool water dependent fish, amphibians, or invertebrate species to support the designation for cool water species use.

7. Borax Lake Chub

DEQ designates the Borax Lake Chub use subcategory for:

1. State waters in Borax Lake, in the Alvord Lake sub-basin of the Malheur Lake Basin, supporting the Borax Lake chub.

The Borax Lake Chub use subcategory, as used in the temperature standard, protects the only native warm-water species of Oregon from excessively low water temperatures that are detrimental to this species. There are no revisions to this use designation proposed at this time.

2.3 Beneficial Use Designations for Temperature – Salmon & steelhead Spawning through Emergence (Seasonal Use)

The ODFW life-stage activity-timing database shows salmon or steelhead spawning through emergence for each species and each timing unit, sometimes resulting in more than 30 different spawning date ranges for one administrative basin. Because this approach seemed overly complicated to designate and implement, DEQ continues to apply a simplification procedure developed by the Interagency Team in 2003 to designate spawning use for a more generalized time-period than the specific dates used in ODFW's life stage activity timing tables that still protect this use (DEQ 2003, Attachment H).

DEQ used the following approach to confirm or adjust the spawning through emergence use designation locations and dates:

1. In waters identified by ODFW as "Primarily Spawning" habitat for populations of Coho, Spring Chinook, Fall Chinook, Chum, and Sockeye salmon, and summer or winter steelhead trout.
2. Spawning through emergence use shall be applied **starting** on the following dates:
    a. in reaches with fall spawning populations (Chinook, Coho, sockeye, or chum salmon), on the date specified by ODFW if it begins with a period of peak use, and 2 weeks after the date specified by ODFW if it begins with a period of lesser use. On no occasion shall spawning through emergence use for salmon be applied starting later than November 1;
    b. in reaches with spring spawning populations (summer or winter steelhead), on January 1st if fall spawning populations are not also present;
    c. in reaches designated as 'Salmon & Steelhead Migration Corridor' use, on the date specified by ODFW's timing tables. DEQ is not proposing to revise the dates of the spawning through emergence use, which are based on ODFW's timing tables or dates in the Snake River TMDL.
    d. in reaches where spring spawning populations (summer/ winter steelhead)

occur on May 15;

e. in reaches designated as “Core Cold-water habitat” use where spring spawning populations (summer or winter steelhead) occur, on June 15;

f. in reaches designated as ‘Salmon & Trout Migration Corridor’ use, on the date specified by ODFW’s timing tables.

Oregon’s framework for determining the applicable spawning date is consistent with the approach recommended by the Region 10 Temperature Guidance and Technical Support Issue Papers.(Poole et al. 2001, U.S. Environmental Protection Agency 2003). The rationale for the two-week delay after the lesser use spawning start date in 2a above is that the date shown in the ODFW timing tables applies to a "timing unit,” which in many cases is fairly large. Also, the two-week delay only applies where the spawning use is identified as “lesser use” by ODFW. Generally, ODFW considers at least 90% of the population to spawn during the “peak use” time. For some populations peak use may apply to as little as 70% of the population. Spawning use dates will begin no later than the onset of “peak” spawning use.

The reasons for using the exact ODFW timing date range for spawning through emergence in the migration corridors, as described in parts 2 and 3 above, is that spawning occurs for shorter time periods in these reaches and the extent of spawning habitat is small. These approaches to designating the dates where spawning through emergence dates apply was adopted and approved in 2003.

3 Decision Rules Evaluation

3.1 Section Introduction

This section identifies where data sources and decision methods used to designate the aquatic life uses have changed from the last rulemaking in 2003, and additional methods or data sources considered during DEQ's technical review. Detailed inventory of data sources, including variables used, literature review, and other supporting analyses are documented in the TSD.

3.2 Aquatic Life Use Subcategories for Temperature – Year round

1. **Bull Trout Spawning and Juvenile Rearing**

Updates to Data Sources

The currently effective designations are based on the *Bull Trout Habitat Designation Report: Technical Work Group Recommendations (2002*). DEQ is using habitat distribution data from the ODFW fish habitat database (FHD) (2021) and final federal critical habitat rule (2010) to update this use where the database identifies the reach as 'primarily spawning with some rearing' Bull Trout habitat.

In addition, to review the "potential Bull Trout spawning and juvenile rearing habitat that is necessary for long-term health and viability of Bull Trout populations consistent with recovery plans and restoration goals," DEQ is consulting with ODFW and the USFWS, which coordinate a statewide working group for experts in Bull Trout conservation. Pending the input of this group, the potential habitat reaches from the DEQ 2002 (BTHD3) *Technical Work Group Recommendations* continue to be included. This potential habitat coincides with some Bull Trout 'Historical' and 'Resident" Bull Trout habitats from the ODFW-FHD (2021). DEQ may propose adjustments if recommended by the statewide working group.

DEQ is also replacing the distribution of 'Spawning and rearing' (SR) habitat from the USFWS draft Bull Trout Critical Habitat Rule (67 FR 71236, November 29, 2002) with the 'Spawning and rearing' (SR) habitat from the USFWS Final Bull Trout Critical Habitat Designation (75 FR 63898, October 18, 2010)**.**

Revisions to Decision Rules

DEQ is adding 33 stream miles of Bull Trout spawning and rearing habitat specifically identified as a reasonable and prudent alternative (RPA) by the USFWS in their 2015 Biological Opinion/Letter of Concurrence/Conference Proposed Approval of Revised Oregon Water Quality Standards for Temperature and Intergravel Dissolved Oxygen.

2. Core Cold-Water Habitat

Updates to Data Sources

DEQ is updating habitat distribution data based on the most recent data in ODFW's FHD for salmon, steelhead, and Bull Trout from . Additional Bull Trout habitat distribution from the USFWS for adult 'foraging, migration, and overwintering' (FMO) from the draft Bull Trout Critical Habitat Rule (67 FR 71236, November 29, 2002) is being replaced with the 'foraging, migration, and overwintering' (FMO) habitat from the Final Bull Trout Critical Habitat Rule (75 FR 63898, October 18, 2010)**.** DEQ is also updating the life stage activity timing information provided by ODFW based on the most recent life stage activity timing tables.

DEQ's water quality database (AWQMS) provides temperature data collected by DEQ and 3rd party data submitted for the Integrated Report from other federal and state agencies, tribes, academic institutions, or other stakeholders. DEQ will use temperature data in the database through 2020. Additional temperature observations were acquired from the USFS-NorWeST stream temperature weekly summaries database for the western U.S.

Revisions to Decision Rules

DEQ is evaluating whether the Ecotrust anchor habitat study used in 2003 is an appropriate indicator of core cold-water habitat. DEQ expects to rely primarily on the updated ODFW, USFWS, and temperature data, as described above.

In addition, DEQ shall evaluate what reaches will be newly designated 'core cold-water habitat' based on waters where ODFW identifies peak steelhead spawning that occurs later than June 1.

Other Factors Considered

In response to concerns that DEQ's aquatic life use designations are too narrowly focused on salmonids, DEQ reviewed information about indicator species that could serve as additional indicators of cold-water habitats that stay below 16°C. DEQ considered several native amphibians, pacific lamprey, and native freshwater mussels, to see if they would serve as indicator species for the 'core cold-water habitat' use designation.

Upon review, DEQ did not identify any candidates among these species as suitable indicators for designating the cold-water aquatic life use subcategory, either because their thermal needs do not require temperatures below 16°, because they are not stream-obligate, or because they tend to occupy colder microhabitats and are not a good indicator of the thermal conditions of the stream as a whole. Please see Appendix A for references. The TSD includes detailed analysis of these indicator species.

3. Salmon and Trout Rearing and Migration

Updates to Data Sources

DEQ is updating habitat distribution data based on the most recent data in ODFW's FHD for Coho, Chum, Sockeye, spring and fall Chinook salmon; summer and winter steelhead; Rainbow, Redband, and Coastal Cutthroat Trout rearing. DEQ included 'primarily rearing' and 'resident' uses for these species in the 2021 ODFW-FHD. DEQ is also updating life stage activity timing information for 'juvenile rearing' for these species from ODFW's 2003 life stage activity timing tables to the recently updated 2021 version.

Revisions to Decision Rules

DEQ will expand the species used to designate Salmon and Trout Rearing and Migration to include distribution of Westslope Cutthroat Trout and Mountain Whitefish 'primarily rearing' and 'resident' uses from the 2021 ODFW-FHD.

4. Redband and Lahontan Cutthroat Trout

Updates to Data Sources

DEQ is updating habitat distribution data based on the most recent data in ODFW's FHD, which includes updated Lahontan cutthroat distribution data provided by the USFWS to ODFW. DEQ included Redband trout, or Lahontan Cutthroat Trout for 'Resident- Multiple Uses', 'Foraging', 'Migration and Overwintering', 'Primarily Rearing with some Migration', and 'Primarily Spawning with some rearing' life-stage activities from the ODFW fish habitat database compiled in 2003 to the 2021 ODFW-FHD.

Revisions to Decision Rules

No revisions to the decision rules are being considered at this time.

5. Salmon and steelhead Migration Corridors

Updates to Data Sources

DEQ is updating habitat distribution data based on the most recent data in ODFW's FHD showing where 'Primarily migration' habitat for Coho, Spring / Fall Chinook, Chum, and Sockeye Salmon and Summer / Winter steelhead; or 'primarily rearing' habitat for Rainbow Trout, Redband Trout, Coastal Cutthroat, West Slope Cutthroat, and Lahontan Cutthroat Trout, Bull Trout, and Mountain Whitefish occurs.

DEQ is also clarifying the application of multiple lines of evidence to indicate reaches for the Migration Corridor designation. Candidates must naturally exceed 18°C as a 7dAM in the summer and therefore are not optimal juvenile rearing or adult holding habitat in July or August. Additional lines of evidence considered shall specifically include HEATSOURCE model results from OR-DEQ TMDLs, temperature models published by Federal agencies, and other published studies that estimate natural thermal potential or fully restored thermal conditions.

Revisions to Decision Rules

DEQ is introducing data on fish habitat identified as "Primarily migration" in the ODFW-FHD (2021) for Coho, spring and fall Chinook, Chum, Sockeye salmon, and summer and

winter steelhead to evaluate whether additional reaches would appropriately be designated as migration corridors.

DEQ is also using the timing and location of 'peak juvenile rearing' and 'egg development through fry emergence for Coho Salmon, Spring and Fall Chinook, Chum, Sockeye Salmon, and summer and winter steelhead; Rainbow Trout, Redband Trout, Coastal Cutthroat, West Slope Cutthroat, and Lahontan Cutthroat Trout, Bull Trout, and Mountain Whitefish, from the 2021 ODFW life stage activity timing tables to identify reaches that are not optimal juvenile rearing or adult holding habitat in July or August.

Other Factors considered

No additional factors were considered at this time.

6. **Cool Water Species**

Updates to Data Sources

DEQ is updating habitat distribution data based on the most recent data in ODFW's FHD showing sub-basins where no life-stage habitat use is indicated for salmonids, including steelhead, trout, and char, in the 2021 ODFW-FHD.

DEQ is also replacing information for reaches where no salmonid life stage activities, including salmon, steelhead, char, or resident trout, occur in July or August from ODFW's 2003 life stage activity timing tables to ODFW's updated 2021 timing information.

Revisions to Decision Rules

No changes to the decision rules at this time.

Other Factors considered

DEQ evaluated the suitability of using Foothills Yellow-Legged Frog (YLF) as an additional biological indicator supporting designation of the cool water species or salmon and steelhead migration corridor use rather than salmon & trout rearing and migration uses. YLF require a warmer thermal range for reproduction than salmonids. Therefore, they are not expected to be the most sensitive use where they co-occur with salmonids. However, DEQ may point to YLF occurrence data to further support designations of the migration corridor or cool-water uses based on salmonid absence in the summer.

7. **Borax Lake Chub (Warm Water Species)**

No changes to data or decision rules for this aquatic life use subcategory are proposed at this time.

3.3 Aquatic Life Use Subcategories for Temperature – Seasonal

1. Salmon & steelhead Spawning

Updates to Data Sources

DEQ is updating habitat distribution for 'primarily spawning' habitat indicated for Coho, spring and fall Chinook, Chum, Sockeye salmon, and summer or winter steelhead trout from the ODFW fish habitat database compiled in 2003 to the 2021 ODFW-FHD.

DEQ is also updating life stage activity timing information for reaches where "adult spawning" and "egg development through fry emergence" life-stage activities from ODFW's life stage activity timing tables originally compiled in 2003 to the recently updated 2021 version.

Revisions to Decision Rules

Revised spawning start date cutoff

In 2003, DEQ used a default start date cutoff of no later than October 15. In the absence of specific data about timing for other salmon species, this date was assumed to be broadly applicable to spawn timing for other salmon populations statewide. The October 15 date was based on information about Fall Chinook spawning available at the time. It was assumed that most salmon populations would begin spawning before this date. There was also an assumption, absent wide availability of temperature data for waterbodies across the state, that most waterbodies in Oregon could attain the spawning criterion by this date.

With the increased availability and accuracy of spawning timing available from ODFW, DEQ analyzed actual start timing for spawning of native salmon populations and found the Oct. 15 (bi-week 20) is approximately the median start date for salmon populations across the state. Many specific populations of salmon including fall Chinook, and especially Coho and Chum, average a Nov. 1 start (bi-week 21) or later. (See Fig. 1. Below)

To leverage increased availability of information on the actual start of spawn timing for salmon populations since 2003, DEQ is proposing to start spawning in reaches where salmon spawning occurs on the actual start or peak spawning use or two weeks after the start of lesser use, whichever is earlier according to ODFW's updated timing table information, but no later than Nov. 1.

Spawning end date cutoff for fall spawning populations

DEQ specified the end of periods when salmon & steelhead spawning criteria would apply to reaches where spring spawning populations (winter /summer steelhead) occurred until May 15, and until June 15 if the reaches were also designated for the Core Cold-Water use subcategory. However, using ODFW's improved habitat distribution data and life-stage timing information, DEQ has identified multiple reaches where spring spawning populations do not co-occur with fall spawning populations. Therefore the spawning criteria dates extend several months beyond the end of emergence for fall-spawning salmon in those waterbodies.

DEQ is proposing to apply a spawning use end date of April 30 in these reaches to better match the emergence timing of fall spawning populations (salmon) when these are the only

species that spawn in the reach. Analysis of statewide timing of egg incubation through fry emergence in ODFW's draft 2021 timing table database showed the majority emergence for fall-spawning salmon populations Chinook, Chum, Coho, and Sockeye Salmon, are concluded by April 30 (bi-week 8). As the spawning criteria are based on thermal requirements of the more sensitive spawning adults and egg incubation stages, assigning a default spawning end date of April 30will be sufficient to protect egg incubation through emergence in these species, even if in some reaches a small number of maturing fry are present after that date.

Other Factors considered

None at this time.

Appendix A. List of data sources

Originator	Data Set	Type	Source
OR Dept. of Fish and Wildlife	Fish Habitat Distribution Database	Organismal surveys, habitat surveys, professional opinion	https://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=1167.xml
OR Dept. of Fish and Wildlife	Timing / In Water Work Unit Database	Locations of life stage timing	https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=timinggisdata
OR Dept. of Fish and Wildlife	Life stage Activity Timing Tables	Observed timing of life stage presence and habitat use	https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=timingtables
U.S. Fish and Wildlife Service	Bull Trout Critical Habitat Designation	Habitat surveys	https://www.fws.gov/pacific/bulltrout/finalcrithab/BT_FCH_GIS_2010.zip
U.S. Forest Service	NorWeST Observed Temperature Data	Observed water temperatures	https://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST/StreamTemperatureDataSummaries.shtml
U.S. Geological Survey	Occurrence locations and trait data for freshwater fishes, amphibians, and reptiles native to the state of Oregon	Observed species occurrence	https://www.sciencebase.gov/catalog/item/5bbd20f2e4b0fc368eaeb96a
U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center	Foothill yellow-legged frog (Rana boylii) surveys in Oregon 2019	Observed species occurrence and eDNA	https://www.sciencebase.gov/catalog/item/5db72623e4b0b0c58b5a48ad
Oregon DEQ Ambient Water Quality Monitoring System (AWQMS) Database	Continuous Temperature Data compiled for the Integrated Reports	Observed water temperatures	https://www.oregon.gov/deq/wq/pages/wqdata.aspx