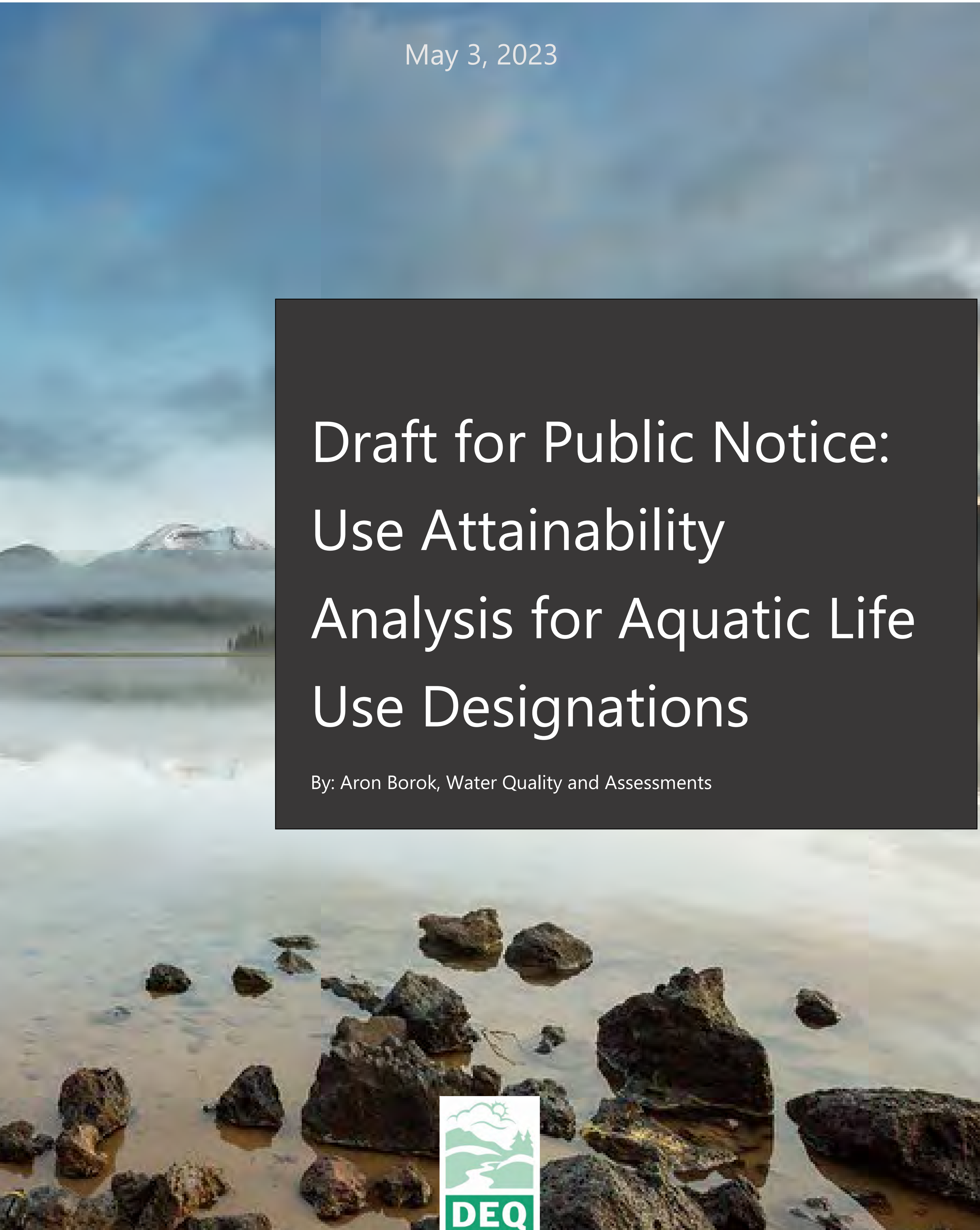

May 3, 2023

Draft for Public Notice: Use Attainability Analysis for Aquatic Life Use Designations

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Table of Contents

1 Introduction

1.1 Legal and policy background for use attainability analyses

'Beneficial' uses are the in-stream or out-of-stream uses of a waterbody that are protected under the Clean Water Act. Designated uses are the beneficial uses that have been designated for each water body or segment. 'Designated' uses may also include uses that are not currently attained but represent a goal for the water body.[1] Section 101(a)(2) of the Clean Water Act and water quality standard regulations at 40 CFR Section 131 specify that fish, aquatic life, wildlife and recreational uses are a goal, wherever attainable. States and tribes also may designate subcategories of these uses to protect specific species or life stages of species. 'Existing uses' are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.

In 2015 updates to the Water Quality Standard regulations, EPA provided clarification on existing uses:

> "Specifically, EPA explained that existing uses are known to be ''actually attained'' when the use has actually occurred and the water quality necessary to support the use has been attained. EPA recognizes, however, that all the necessary data may not be available to determine whether the use actually occurred or the water quality to support the use has been attained. When determining an existing use, EPA provides substantial flexibility to states and authorized tribes to evaluate the strength of the available data and information where data may be limited, inconclusive, or insufficient regarding whether the use has occurred and the water quality necessary to support the use has been attained."[2]

States and authorized tribes cannot remove a designated use (or use subcategory) or change a designated use to a use with less stringent criteria if it is an existing use, unless a use requiring more stringent criteria is added; or will be attained by implementing effluent limits required by the Clean Water Act and cost-effective and reasonable best management practices for nonpoint source control. If a state proposes to remove a designated use or use subcategory or change a designated use or use subcategory to a less stringent use, it must demonstrate that the use or use subcategory is not attainable through a use attainability analysis. A UAA is a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act, specifically the protection and propagation of fish, shellfish, wildlife or recreation in or on the water.

[1] 40 CFR 131.3

[2] 80 F.R. 162, p. 51027.

In order to justify the removal of a use or change a use to a less stringent use in a UAA, a state or authorized tribe must demonstrate that attaining the use is not feasible due to one of the following six factors:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.[3]

The State or authorized tribe must provide sufficient data and analysis to show that one of these factors is met and, as a result, the designated use is not attainable.

The State must then establish for the waterbody the highest attainable use, which is the modified aquatic life, wildlife or recreation use that is: 1.) closest to the previously designated use; and 2.) attainable, based on the evaluation of the factor that precludes attainment of the use.

[3] 40 CFR 131.10(g)

2 Approach to use attainability analysis for aquatic life use updates

Oregon has defined several subcategories of fish and aquatic life use depending on the most sensitive fish species and life stage present and their water quality needs (Table 2-1). The aquatic life use subcategories are protected by the water quality temperature criteria at OAR 340-041-0028. Uses were designated through a public rulemaking process and adoption by the Environmental Quality Commission. EQC initially designated fish and aquatic life use subcategories in 2003, and they were approved by the U.S. Environmental Protection Agency in 2004.

Table 2-1. Aquatic life use subcategories that apply to Oregon's water quality standard for temperature

Aquatic Life Use Subcategory	Associated Biologically based Numeric Criterion (measured as 7-day Average of the Daily Maximum, unless otherwise stated)
Bull Trout Spawning and Juvenile Rearing	12 ℃
Salmon and Steelhead Spawning (seasonal use)	13 ℃
Core Cold Water	16 ℃
Salmon and Steelhead Rearing and Migration	18 ℃
Migration Corridor	20 ℃
Redband Trout	20 ℃
Lahontan Cutthroat Trout	20 ℃
Cool Water Species	No temperature increase that would impair cool water species
Borax Lake Chub	No decrease in temperature of greater than 0.3 ℃ below natural conditions

In its approval EPA stated:

> *"It is the intent of both Oregon and EPA that if new data is provided that demonstrates a need for revisions to Oregon's water quality standards, including the mapping of the designated uses, Oregon will revise their water quality standards. … a use refinement to specify where and when sub-categories of uses occur or potentially occur is not removing those uses that were not yet established… the interdependent suite of new salmonid uses adopted by Oregon work together to protect and support salmonid populations as a whole consistent with 101(a)(2) of the CWA and therefore a use attainability analysis is not needed as per 40 C.F.R. § 131.10(k)."* [4]

Since 2003, the Oregon Department of Fish and Wildlife and other natural resource agencies and scientists have vastly improved our understanding of where and when various fish life uses occur. Moreover, these agencies and many public and private groups have worked to restore habitat

[4] EPA 2004, Support Document for EPA's Action Reviewing New or Revised Water Quality Standards for the State of Oregon. March 2, 2004. p.81-82

conditions and remove barriers to fish passage. DEQ also can map those uses more accurately with improved Geographic Information System capabilities, specifically through adoption of the National Hydrography Dataset, which can map at a finer scale than the StreamNet layer used in 2003.

The currently proposed updates to aquatic life use subcategory maps result in no changes to uses in the vast majority of Oregon waters (Figure 2-1). In many other cases, DEQ is proposing more stringent uses based on improved data. DEQ is newly designating seasonal Salmon and Steelhead Spawning Use where stream restoration efforts or dam improvements or removals have resulted in opening fish passage to spawning habitats. In some waters, DEQ has determined that the aquatic life use subcategory designated in 2003 is not an existing nor attainable use. For these waters, DEQ has prepared UAAs, as presented in this document.

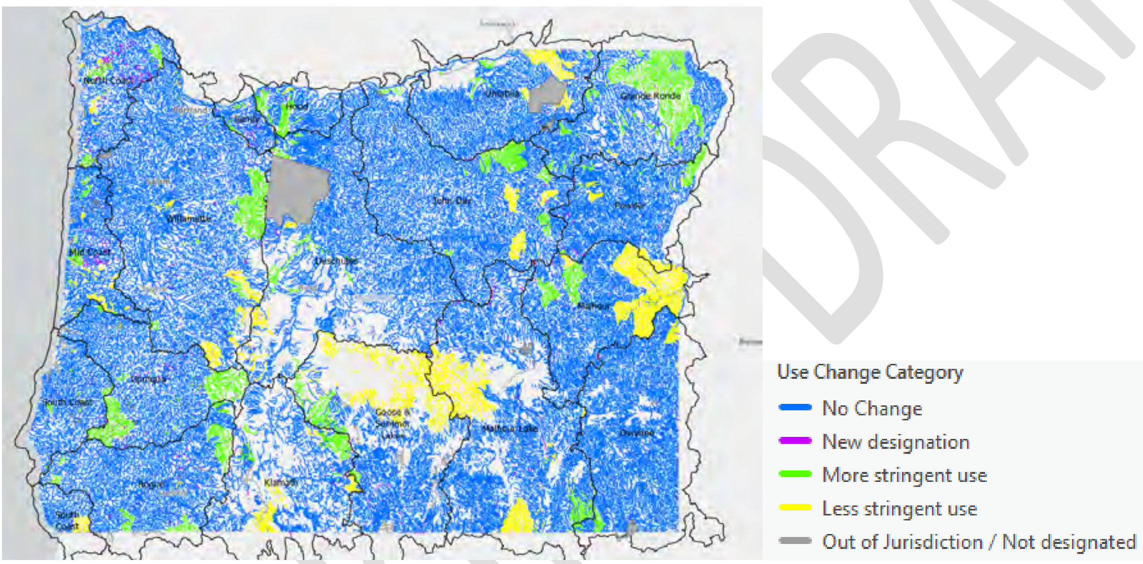

Figure 2-1. Year-round aquatic life use subcategory revisions, 2023.

In this document, DEQ presents the best available data and information to support why a currently designated use is not attainable and to identify the highest attainable use. The information is organized by use subcategory and stringency of the associated biologically based temperature criteria from most to least stringent. EPA states in the Water Quality Standards handbook that states may conduct generic use attainability analyses for groups of water body segments provided that the circumstances relating to the segments in question are sufficiently similar to make the results of the generic analyses reasonably applicable to each segment.[5] To the extent possible, DEQ has done so. For example, DEQ has grouped updates to Redband Trout Use because the changes are all based on UAA Factor 5, "Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses."

For each bin, DEQ provides its justification according to the following structure:

1. Protection of existing uses.
2. Reason for the use update.
3. UAA factor and supporting documentation.
4. Highest attainable use and supporting documentation.
5. Maps and inventory of use updates

A general description of each topic is provided in Sections 2.1-2.5.

Use of the Fish Habitat Database

In order to designate aquatic life use subcategories, DEQ relies primarily on fish habitat distribution data collected and compiled by ODFW in its Fish Habitat Database. The FHD is the authoritative database on fish habitat distribution in Oregon, compiling literature and survey reports dating back to the 1940s, more recent habitat surveys, and best professional judgment of biologists from ODFW and other organizations that have in-depth knowledge of fish habitat in Oregon gained through years of research and surveying. The FHD uses a robust data standard to ensure that fish habitat classification reflects the best available information.[6] This section provides a background on how the FHD is developed and updated to ensure it incorporates the current state of knowledge regarding current and historical habitat.

Since 2002, ODFW has continued to update the FHD. In many cases, updated data are due to replacement of best professional judgment in the original FHD with verified observation of accessible and suitable habitat, or because habitat has become accessible when it wasn't, due to improvement or removal of fish passage barriers. Information from various reports developed by ODFW, such as periodic

[5] U.S. EPA. 2012. Water Quality Standards Handbook. Chapter 2: Designation of Uses. See page 14. Available at https://www.epa.gov/sites/default/files/2014-10/documents/handbook-chapter2.pdf

[6] ODFW, 2020. Oregon Fish Habitat Distribution Data Standard Version 4.0 (March 2020). See page 4.

fish status reports, are incorporated into FHD.[7] ODFW also has revised mapping of potential bull trout habitat based on input from regional Bull Trout Working Groups, as described in Section 3.2.

Where DEQ is proposing a revise a use to a less stringent use based on updated information in the FHD, it is not because the existing use has changed, but because our understanding of uses has changed. For these use changes, DEQ has attempted to provide available information on why the water or waters cannot support the use. For the most part, these changes are because either the physical conditions of the waterbody cannot (and never did) support the use, or that naturally occurring temperatures, based on DEQ TMDL models or other models, are such that the use is (and always has been) unattainable. In DEQ's presentation of its UAA, it has provided available information to support these assertions. DEQ has relied upon the following sources of additional information to identify why uses designated in 2003 are not attainable:

1. U.S. Fish and Wildlife Service Final Bull Trout Critical Habitat Designation (September 30, 2010)[8],
2. U.S. Forest Service NorWeST Stream Temperature Regional Database[9,] and Oregon statewide assessment temperature database have been used to ensure that DEQ is not removing uses from waters where that use is attainable. [10]
3. U.S. Forest Service Cold Water Climate Shield database has been used as supporting information for predicting occurrence of Bull Trout.[11]
4. The NHD Plus database includes layers showing intermittent and ephemeral streams, stream velocity and flow and stream order, which are used in determining use attainability specific to physical conditions.[12]
5. The National Land Cover Database and online maps of the NLCD provided by the Multi-Resolution Land Characteristics Consortium has been used to examine levels of disturbance

[7] Many references are included at the following website: https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=refid. Reference numbers not available there are available by contacting the ODFW GIS Coordinator.

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

[9] Isaak, D., S. Wenger, E. Peterson, J. Ver Hoef, D. Nagel, C. Luce, S. Hostetler, J. Dunham, B. Roper, S. Wollrab, G. Chandler, D. Horan, S. Parkes-Payne. 2017. The NorWeST summer stream temperature model and scenarios for the western U.S.: A crowd-sourced database and new geospatial tools foster a user community and predict broad climate warming of rivers and streams. Water Resources Research, 53: 9181-9205.

[10] https://orwater.deq.state.or.us/DataAnalysisIndex.aspx

[11] https://www.fs.usda.gov/rm/boise/AWAE/projects/ClimateShield.html.

[12] https://www.usgs.gov/national-hydrography/nhdplus-high-resolution

for some use revisions.[13]

More site-specific information also is utilized, such as watershed-specific Fish Status Reports generated by ODFW, which are relied upon in developing the FHD.

2.1.1 Reason for the Use Update

As noted above, DEQ originally designated aquatic life use subcategories associated with the temperature standard in 2003. DEQ is updating the use subcategory designations primarily to ensure they are accurate based on improved data and information. The 2003 fish use mapping was completed in a few short months based on the best available data at the time in response to a court order. Since then, ODFW has implemented a rigorous process to update its database (see the discussion in the introductory section of this chapter). In addition, corrections are being made based on the more finely scaled National Hydrography Dataset, now Oregon's standard for mapping waterways, as well as additional temperature data and other new data sources. For each proposed use change described in this document, DEQ provides information explaining why the use was originally designated in 2003 and why that use subcategory is no longer accurate and is not attainable.

2.1.2 Protection of Existing Uses

Oregon cannot change a designated use subcategory to a less stringent use if it is an existing use. An existing use means the use and the water quality conditions need to support the use have been attained on or since November 28, 1975. Based on the information relied upon in the UAA and the FHD, no change to less stringent criteria described in this document removes an existing use. As noted in the previous section, the FHD database is a compilation of the best available data on existing fish uses. This together with the other data sources identified ensures that DEQ is protecting existing uses. When DEQ developed aquatic life use subcategory maps in 2003, they were based primarily on the initial iteration of the FHD, which has since been improved. EPA approved these maps. In the approval letter, EPA stated, "Oregon's salmonid use designations provide broader protection that just protecting current or existing uses."[14]

EPA has acknowledged that all data may not be available to determine whether the use actually occurred since 1975 or the water quality to support the use has been attained. EPA provides substantial flexibility to states to evaluate the strength of the available data and information where data may be limited, inconclusive, or insufficient regarding whether the use has occurred and the water quality necessary to support the use has been attained.[15] EPA also recognizes the importance of the best

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[13] https://www.mrlc.gov/viewer/

[14] U.S. EPA, 2004. "Support Document for EPA's Action Reviewing New or Revised Water Quality Standards for the State of Oregon." See page 78.

[15] 80 F.R. 162, p. 51027 (August 21, 2015).

professional judgement of local biologists in determining existing uses.[16] The FHD represents the best available information about current and historic habitat that is accessible and suitable to various fish species and life stages. Over the past 20 years, ODFW has replaced much of the opinion-based fish use mapping with protocol-based mapping for many of the species and uses. ODFW has not been able to fully survey waters with uses based on best professional opinion. Where survey-based data is unavailable, the FHD is based on best professional judgement, as EPA suggests is acceptable in determining existing uses.

DEQ is refining and updating the uses based on improved data and mapping capabilities. The proposed changes do not reflect any situation where a use that existed in the waterbody in 2003 is no longer present due to habitat degradation or fish passage that has become blocked since that time. If the FHD or other data source indicates that a use has existed since 1975, DEQ is not proposing to revise the use to a subcategory with a less stringent criterion.

For example, DEQ is only removing the Bull Trout spawning and juvenile rearing use designation in areas where:

1. Neither DEQ's bull trout work group, ODFW nor USFWS have identified Bull Trout spawning as existing since 1975,[17]
2. The waterbody is not designated as critical habitat for Bull Trout spawning by USFWS, *and*
3. the current Bull Trout Working Groups, which consist of the state and federal experts on bull trout and the agencies responsible for ESA recovery, have concluded that the reach does not have the potential to become Bull Trout spawning and juvenile rearing habitat through restoration or reintroduction.
4. Cold Water Climate Shield modeling[18] indicates no probability of Bull Trout presence based on 1980 conditions, or, if it does indicate presence, physical conditions or naturally occurring temperatures indicate that the waters never could support Bull Trout Spawning and Juvenile Rearing Use specifically.

Similarly, DEQ is not removing salmon and steelhead spawning use if ODFW data indicates that a manmade barrier is blocking spawning habitat and that barrier could be feasibly removed. And DEQ is not removing Core Cold Water Use if temperature data indicates that 16 °C is attainable in the warmest

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[16] U.S. EPA. 2012. Water Quality Standards Handbook. Chapter 2: Designation of Uses. See page 17. Available at https://www.epa.gov/sites/default/files/2014-10/documents/handbook-chapter2.pdf

[17] There are a few waters where DEQ is proposing to change Bull Trout Spawning and Rearing Use and which FHD has classified as historical habitat since it began mapping historical habitat in 2010. These are waters where Bull Trout have not spawned since 1975 and likely well before because of accessibility. These waters both: 1.) are not in the USFWS final critical habitat rule; and 2) are not considered potential habitat for restoration/reintroduction according to the Bull Trout Working Groups.

[18] https://www.fs.usda.gov/rm/boise/AWAE/projects/ClimateShield.html

part of the year, using either field data, NoRWeST modeled weekly maximum temperatures for 1993-2011 or modeled temperature from TMDLs developed by DEQ.

2.1.3 UAA Factor

Each proposed use change described below identifies which UAA factor from 40 CFR 131.10(g) precludes the attainment of the currently designated use and provides data and information to justify why the use cannot be attained. As noted in the introduction to this chapter, the FHD maps whether habitat is both **suitable** and **accessible** for a given species and life stage. This information together with additional available supporting information is used to justify why the currently designated use is not attainable.

Habitat suitability indicates whether the physical conditions of the waterbody or waterbody segment in question can support the life stage. For many of the waters DEQ is updating uses to a less use subcategory, the physical conditions needed to support the previously designated use do not exist in that location. As a result, these updates generally support a UAA based on Factor 5 ("Physical conditions related to natural features of the waterbody, such as the lack of a proper substrate, cover flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attaining aquatic life protection uses.").

For example, the generally small adjustments to the spatial and temporal extent of spawning are justified because ODFW biologists, in surveying spawning grounds, have determined that one or more of the physical features (accessibility, flow, substrate, or slope) required to support spawning or access to spawning habitat is not available. For the relatively larger adjustments to Redband Trout use, there is insufficient flow to support Redband Trout use during the warm summer months due to stream intermittency or the use was designated in irrigation canals, which do not have physical features (generally substrate) to support Redband Trout use and federal fisheries agencies are attempting to exclude redband trout in these reaches through diversion screens. In addition, there are some waters that USFWS incorrectly identified as critical habitat for spawning and rearing in its proposed critical habitat rule, or the Bull Trout working groups as potential Bull Trout spawning and rearing habitat in 2003, but additional data collection indicates that these waters do not have physical conditions to support Bull Trout spawning, either because of too much or too little flow, slope or substrate. Additional information supporting these determinations are provided in the appropriate sections of this document.

In some cases, habitat is unsuitable because natural temperatures of the waterbody cannot attain the biologically based temperature criterion associated with the aquatic life use subcategory. These determinations support a UAA based on Factor 1 ("Naturally occurring pollutant concentrations prevent attaining the use"). In these waters, DEQ has provided information indicating that the waterbody cannot attain the numeric temperature criterion corresponding to the aquatic life use subcategory, even without anthropogenic influences. For such waters, DEQ has provided available temperature modeling for the waterbody or nearby waters. DEQ has supplemented that information with available temperature data and modeled current (1990 to present) temperature data from the NorWeST stream temperature model developed by the US Forest Service.

In one waterbody, habitat is unsuitable due to the presence of a dams, which created conditions that do not support Bull Trout spawning. For this water, UAA Factor 4 ("Dams, diversions, or other types of hydrologic modifications preclude attaining the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way which would result in attainment of the use.") is the appropriate factor.

2.1.4 Highest Attainable Use

When a state removes an aquatic life use or use subcategory or changes the use to a subcategory with less stringent criteria, it must designate the highest attainable use, based on the evaluation of factors that preclude attainment of the use and other information or analysis that were used to evaluate attainability. For the use updates described in this UAA, DEQ relies on the detailed aquatic life use subcategory framework adopted in Oregon's water quality standards. These subcategories provide a gradation of temperature criteria that protects the most sensitive species in the use category (Table 2-1). For most of the use updates, the highest attainable use is the next most stringent year-round use (i.e., waters are being revised from "Bull Trout Spawning and Rearing Use" to "Core Cold Water Use"). However, there are a few exceptions, which are described in the appropriate section of this document.

2.1.5 Maps and inventory tables

DEQ has included maps illustrating the use updates in Appendices A-E. DEQ also has created and inventory tables in separate Microsoft Excel documents that includes stream name, the Reach Code used in the National Hydrography Database layer, the current designated use, the UAA factor that precludes attainment of the designated use, a reference to the section in this document with supporting information justifying the use update, and the proposed highest attainable use.

3 Updates to ‘Bull Trout Spawning and Juvenile Rearing’ use

3.1 Updates to align with USFWS Bull Trout critical habitat designations

3.1.1 Reasons for these updates

When DEQ developed Oregon’s fish use designation maps in 2003, USFWS had published draft proposed critical habitat for Bull Trout for public comment.[19] Due to a court-imposed deadline, DEQ was required to designate the states’ fish uses before USFWS could finalize a Bull Trout critical habitat rule. DEQ included the draft proposed critical habitat in our Bull Trout Spawning and Juvenile Rearing use designations with the expectation that DEQ would revise the designations to align with the final federal critical habitat rule when it was completed.[20] DEQ convened a “where and when” technical workgroup that included EPA, ODFW, USFWS, NMFS and CRITFC to assist with the fish use designations. The workgroup, including EPA, agreed with and appreciated this precautionary approach.

USFWS published a final Bull Trout critical habitat rule in 2010.[21] Critical habitat includes currently occupied habitat as well as additional habitat for species recovery that is not currently occupied. In the justification for its final rule, USFWS noted that it designated critical habitat for spawning and rearing in “stream reaches and associated watershed areas that provide all habitat components necessary for spawning and juvenile rearing for a local Bull Trout population.”[22]

[19] 67 Federal Register 71235. November 29, 2002.

[20] See DEQ 2003. EQC Staff Report, Rule Adoption: Water Quality Standards, Including Temperature Criteria, OAR Chapter 340, Division 41, December 4, 2003, EQC Meeting, Attachment H: A Description of the Information and Methods Used to Delineate the Proposed Beneficial Fish Use Designations for Oregon’s Water Quality Standards. 5 pp.

[21] 75 Federal Register 63898. October 18, 2010.

[22] USFWS 2010. Bull Trout Critical Habitat Final Rule Justification. Idaho Fish and Wildlife Office, Boise, Idaho, Pacific Region, Portland, OR. 1035 pp. The portions of the document relevant to the corrections to the designation include those for the Upper Willamette Critical Habitat Unit (starting on page 217), Klamath River Basin CHU (p. 303), John Day River CHU (p. 371), Umatilla River CHU (p. 397), Walla Walla River CHU (p. 409), Grande Ronde River CHU (p. 447), Powder River CHU (p. 511), and Malheur River CHU (p. 587).

In their 2002 proposed critical habitat rule, USFWS had included all reaches that warranted further review. Many reaches were removed from the final rule following further evaluation and input from a peer review panel and technical input from States and other partners, to incorporate site-specific biological expertise with Bull Trout.[23] The USFWS concluded that the waters removed did not include a sufficient number of elements essential to conservation of the species. These elements include space for individual and population growth and for normal behavior; food, water, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.[24] In some cases, waters were removed from critical habitat designation for Bull Trout in the final rule. In other cases, waters that were proposed as critical spawning and rearing habitat, were instead designated as foraging, migration, and overwintering habitat in the final rule.

USFWS has provided the available site-specific information regarding changes to Bull Trout spawning and rearing critical habitat designation between the proposed 2002 rule and final 2010 rule. In some cases, USFWS was not able to provide documentation for their decision to remove certain waters from as critical spawning habitat in the final rule. DEQ has provided additional information, where available, to support the use change.

DEQ cross-checked waters that were not included in the final Bull Trout critical habitat designation with ODFW data on current and potential Bull Trout spawning and juvenile rearing habitat. DEQ is only proposing to remove the Bull Trout spawning use designation for those streams that state and federal agency biologists agree are not spawning habitat. They are not federal critical habitat for Bull Trout Spawning and Rearing *and* the ODFW does not identify the water as either current Bull Trout spawning habitat FHD or potential spawning habitat (Section 3.2.1). In addition, all reaches that DEQ proposes to remove were reviewed by current interagency Bull trout working groups and we are only removing reaches they concur do not have the potential to become bull trout spawning habitat through habitat restoration or reintroduction. For example, Strawberry Creek in the John Day Basin was removed in the final critical habitat rule, but ODFW still considers the stream and its tributaries as potential habitat. As a result, DEQ is not proposing to update the Bull Trout Spawning and Juvenile Rearing use in these waters.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout Spawning and Juvenile Rearing use in 2003 only because they are upstream of reaches that were proposed as critical habitat. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on the 2002 Bull trout work group, the current ODFW FHD or the final critical habitat rule, nor do these waters show any probability of showing Bull Trout presence in the USFS Climate Shield Model (see Section 3.1.2).

[23] See Final Critical Habitat rule *at* 75 FR 63899 and 63902.

[24] USFWS 2010. Additional Information, Final Critical Habitat Designation for Bull Trout in Idaho, Oregon, Washington, Montana and Nevada. 11 pp.

3.1.2 Protection of existing uses

The updates to Bull Trout Spawning and Juvenile Rearing use described in this section do not remove an existing use. DEQ is updating these uses because Bull Trout spawning and rearing use is not attainable due to naturally occurring temperatures in excess of the 12 °C criterion for Bull Trout Spawning Use or because physical conditions do not support the use. These conditions pre-date 1975.

Bull trout are in the char genus within the salmonid family, and Oregon is at the southern end of the char range in the coastal region. Char are more abundant in the colder inland climates of Idaho and Montana and further north in Canada and Alaska. Bull Trout spawning and juvenile rearing use typically takes place between August and October and requires very cold water. Bull Trout generally do not spawn in waters with maximum temperatures above 12 °C. Bull trout in Oregon are adfluvial and may migrate long distances in the winter to feed in mainstem rivers and large lakes. Therefore, while they may be present in warmer low elevation streams and rivers, they are using those waters for foraging, migration and overwintering during the sub-adult and adult life stages, not for spawning and juvenile rearing. DEQ protects foraging, migration and overwintering use through its Core Cold Water criterion of 16°C as a 7-day average maximum.

Oregon's water quality criterion is 12°C, which must be attained as a 7-day average maximum during the maximum temperature period in the summer. For some streams, DEQ has information that the temperature conditions needed to support the use, 12°C as a 7-day average maximum, are not present and that it is highly unlikely the stream has attained 12°C at any time since 1975. This information is presented as part of the justification under Factor 1 below. The same temperature information used to show that a stream cannot attain 12° under natural conditions supports the conclusion that it also has not attained 12° at any time since 1975.

In other streams, DEQ has information that physical conditions needed to support Bull Trout Spawning, are not present and have never present. This information is presented as part of the justification under Factor 1 below. Bull Trout Spawning takes place principally in third and fourth order streams with low gradient areas (less than 2%), gravel/cobble substrate and water depths between 0.1 and 0.6 meters and velocities from 0.09 to 0.61 m/sec. Proximity of cover for adult fish before and during spawning is an important habitat component.[25] The distribution of waters that naturally maintain these conditions in Oregon is very limited.

In addition, the USFS Climate Shield model provides additional relevant information on existing use.[26] Climate Shield is a model that predicts the likelihood of Bull Trout presence in the years 1980, 2040 and

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[25] Camefix, G. 2003. Bull Trout Species Description, American Fisheries Society, Montana Chapter website. https://units.fisheries.org/montana/science/species-of-concern/species-status/bull-trout/. Visited February 28, 2023.

[26] Isaak, D.J., M.K. Young, D.E. Nagel, D.L. Horan and M.C. Groce. 2015. The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century. Global Change Biology 21, 2540–2553. Online

2080 based on predictively modeled NorWeST temperature data, stream slope and flow (see Figure 3-1 for an example). For the 1980 scenario, temperature predictions were set to a baseline of 1970-1999 data. In waters where the Climate Shield 1980 scenario indicates no probability of Bull Trout presence and the FHD agrees, DEQ has a high level of certainty that Bull Trout is not an existing use. DEQ is retaining the bull trout spawning use in most waters where the Climate Shield data indicates a greater than 0% probability of Bull Trout presence in 1980. This is a conservative assumption because the possible presence of Bull Trout does not necessarily indicate that the waters supported Bull Trout spawning use, which has more narrow habitat requirements than Bull Trout foraging, migration and overwintering. In some cases, these waters do not have the physical characteristics (described below) to support Bull Trout spawning or the 12 °C criterion is not attainable. In these waters, DEQ has provided available evidence indicating why the physical conditions or natural temperatures of the waters do not support Bull Trout spawning use and have not since 1975.

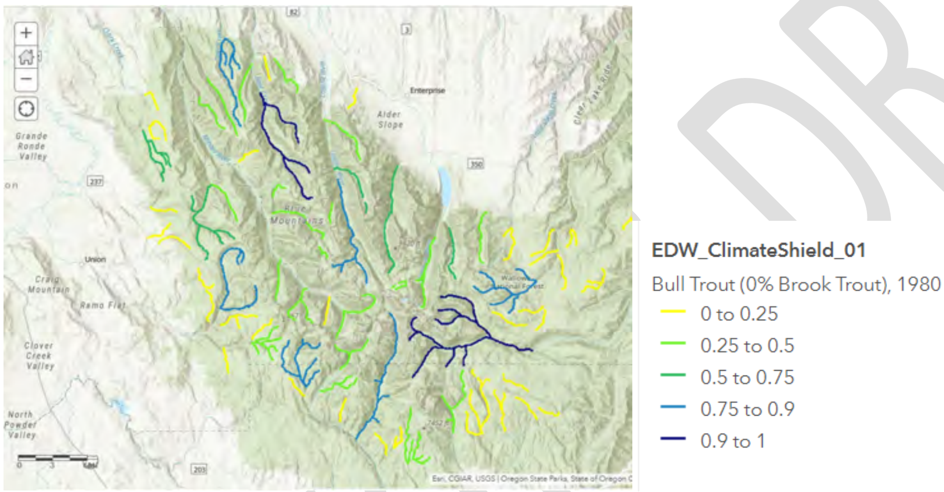

Figure 3-1. Example Climate Shield model output.

3.1.3 UAA Factor that precludes attainment of use

3.1.3.1 UAA Factor 1

Bull Trout Spawning and Juvenile Rearing Use is not attainable in the waters described below based on 40 CFR 131.10(g), Factor 1: “Natural occurring pollutant concentrations prevent attaining the use.” In these waters, either modeled temperature based on natural thermal potential or extrapolations from NTP models done in nearby waters together with more recent temperature data, support the conclusion that the Bull Trout Spawning and Juvenile Rearing criterion of 12℃ is not attainable.

John Day Basin (Figure A-1 in Appendix A)

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maps of Climate Shield outputs are available at: https://apps.fs.usda.gov/arcx/rest/services/EDW/EDW_ClimateShield_01/MapServer.

Canyon Creek from its mouth to Vance Creek and Pine Creek to upstream of Bear Creek. Canyon Creek and Pine Creek, two watersheds of the upper John Day River, were proposed as unoccupied spawning critical habitat in the proposed 2002 Critical Habitat rule. These streams were identified as historical habitat in the initial publication of the FHD (2002) and were only designated as Bull Trout Spawning and Rearing Habitat in 2003 because they were included in the USFWS proposed critical habitat rule. The likely reason USFWS did not designate these streams as critical habitat after further analysis is that no Bull Trout have been detected in the area despite continued stream restoration work in the basin.[27] Neither DEQ's Bull trout work group nor ODFW identify these waters as current or potential Bull Trout spawning and rearing habitat.

DEQ is retaining Bull Trout Spawning and Rearing Use in the Canyon Creek watershed upstream of Vance Creek because Climate Shield data indicate that there was a 0-25% likelihood in Vance Creek and other tributaries, and a 25-50% likelihood in Crazy Creek, that stream conditions supported Bull Trout presence in the 1980 scenario.[28] Much of the Canyon Creek watershed upstream of Vance Creek shows 0% probability of Bull Trout presence in the 1980 scenario. DEQ is retaining Bull Trout spawning and rearing use in these waters as a precautionary approach. DEQ also is retaining Bull Trout Spawning and Rearing Use in the Pine Creek watershed upstream of Bear Creek because Climate Shield data indicate that there was at least some likelihood that stream conditions in Pine Creek supported Bull Trout presence in the 1980 scenario.

Bull Trout spawning and juvenile rearing is not attainable in the lower reach of Canyon Creek and its tributaries because natural conditions do not support this use. In addition to the ODFW and USFWS determinations, DEQ has made this conclusion based on modeled current (1993-2011) temperatures from the NorWeST model and natural thermal potential modeling from the John Day River Temperature TMDL. The NorWeST data for Canyon Creek are shown in Table 3-1.

Table 3-1. Modeled current (1993-2011) temperatures in Canyon Creek, based on NorWeST database.

Location	Modeled (1993-2011) 7-DADM Temp., ℃
Canyon Creek at John Day River	26.43
Canyon Creek d/s Sheep Gulch	23.57
Canyon Creek u/s Cherry Creek	22.61
Canyon Creek d/s Vance Creek	21.56

[27] Gunckel, Stephanie. *Personal communication.* March 18, 2021, citing the 2002 Proposed Critical Habitat Rule (67 Federal Register 71235. November 29, 2002) and Buchanan, D.V., M. L. Hanson and R. M. Hooton. 1997. Technical Report: Status of Oregon's Bull Trout. U.S. Bonneville Power Administration, Report Number DOE/BP-34342-5.

[28] Isaak, D.J., M.K. Young, D.E. Nagel, D.L. Horan and M.C. Groce. 2015. The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century. Global Change Biology 21, 2540–2553. Online maps of Climate Shield outputs are available at: https://apps.fs.usda.gov/arcx/rest/services/EDW/EDW_ClimateShield_01/MapServer.

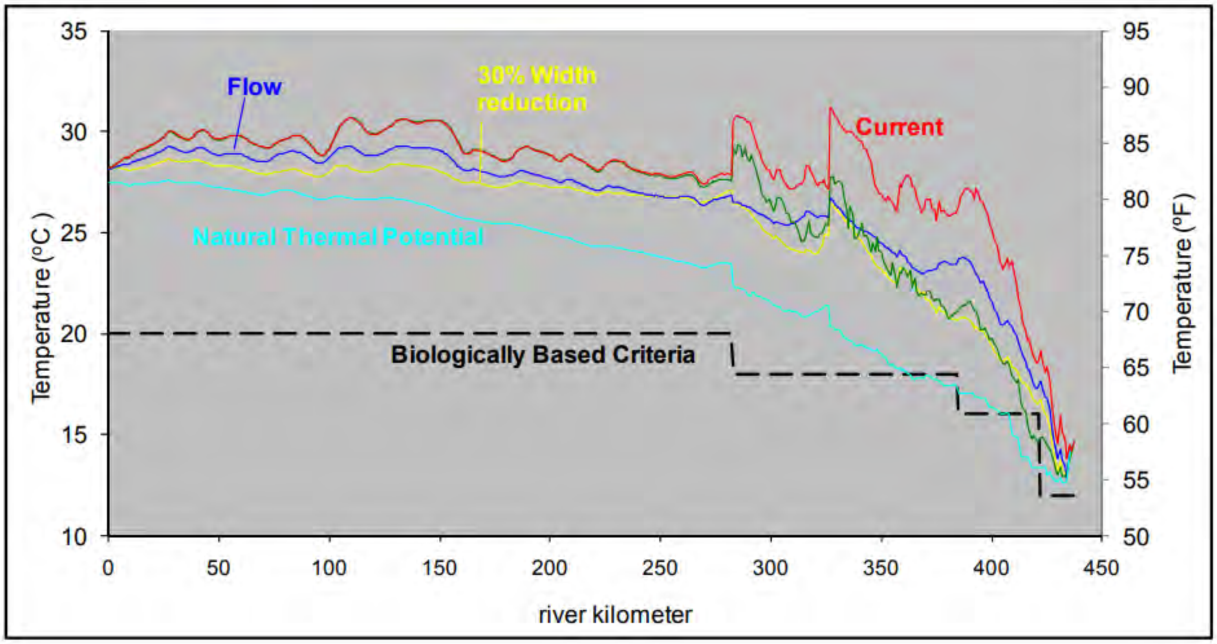

Figure 3-2. Predicted maximum 7DADM temperature profiles of the John Day River resulting from scenarios during the model period, 2004. Source: DEQ, 2010. John Day River Basin TMDL Appendix B: Temperature Model Scenario Report. P. 6.

DEQ extrapolated NTP results from the John Day temperature TMDL to the modeled temperatures to examine if the Bull Trout Spawning and Rearing Criterion of 12℃ is attainable. The John Day Temperature TMDL modeled NTP in the John Day River from its headwaters to its mouth. The NTP scenario modeled stream temperatures that result from restored vegetation, flow and channel morphology and compared them to current temperatures (Figure 3-2). In the area of Canyon Creek (approximately RM 385 of the John Day River), the difference between NTP temperature and current temperature is approximately 10 ℃ (18 ℉). Conservatively, DEQ extrapolated 10 ℃ as the maximum potential difference between the current 7-DADM temperatures and attainable temperature in Canyon Creek, which is a conservative assumption. As a result, DEQ is updating the Bull Trout Spawning and Rearing Use in stream reaches with modeled NorWeST 7-DADM temperatures greater than 22.0 °C. This includes all of Canyon Creek downstream of Berry Creek. DEQ also is updating the use from Berry Creek upstream to Vance Creek, where Climate Shield data indicate a 0-25% likelihood of Bull Trout presence in its 1980 scenario. Although the modeled temperatures in this reach are less than 22.0 °C, the temperature difference between NTP and natural temperatures would be less than 10 ℃, because it is generally under Forest Service management, where there is more shade. Programmed timber harvest is prohibited and impacts from cattle grazing limited due to the Forest Service Management Plan for this area.[29] See, for example, the NTP model for the North Fork John Day (Figure 3-3), which indicates a

[29] USDA Forest Service, Northwest Division. 2018. Draft Record of Decision for the Malheur, Umatilla, and Wallowa-Whitman National Forests Revised Land Management Plans.

much smaller difference between current and naturally occurring temperatures in a forested watershed managed to protect water quality.

DEQ conducted a similar temperature analysis for Pine Creek. In the area of Pine Creek (approximately RM 397) the difference between NTP temperature and current temperature is similarly approximately 10 ℃. NorWeST modeled current (1993-2011) 7-DADM temperatures in this reach of Pine Creek range from 19.5 ℃ at the upper reach to 24.7℃ at the mouth. DEQ is updating the Bull Trout Spawning and Rearing Use in stream reaches with modeled NorWeST 7-DADM temperatures greater than 22.0 ℃, which includes Pine Creek from its mouth upstream to approximately Gwyn Creek. DEQ also is updating the Bull Trout Spawning and Rearing Use further upstream to upstream of Bear Creek, where Climate Shield data indicate a 25-50% possibility of Bull Trout presence. Although the modeled temperatures in the reach of Pine Creek from Gwyn Creek upstream to Bear Creek reach are less than 22.0 ℃, the temperature difference between NTP and natural temperatures would also be less than 10 ℃, because it is generally under Forest Service management, where there is more shade, meaning that these temperatures are naturally above 12 ℃.

Granite Creek from North Fork John Day River to Granite, Oregon. USFWS changed the designation in the final critical habitat rule for this stretch of Granite Creek from Spawning and Rearing to Foraging, Migration and Overwintering. ODFW classifies this reach as “Rearing” habitat for Bull Trout. The entirety of this stretch of Granite Creek is within the Wallowa-Whitman National Forest. Most of it borders or lies within the North Fork John Day River Wilderness Area. The most recent USFS Management Plan emphasizes forest and riparian restoration.[30] The Climate Shield 1980 Scenario shows that this reach has no probability of Bull Trout presence; therefore, DEQ is not removing an existing use.

DEQ is updating the use in this stretch of Granite Creek and its tributaries because NTP temperatures indicate that the Bull Trout criterion is unattainable. DEQ has made this conclusion based on modeled current temperatures based on the NorWeST model and extrapolation of NTP modeling from the John Day River Temperature TMDL. DEQ examined NorWeST data in Granite Creek measured in 7-day average maximum temperatures. Modeled current temperatures along this reach are largely consistent, ranging from a low of 22.84 at the upstream end to 24.78 near the center of the reach, before cooling slightly to 23.4 degrees at the downstream end.

The John Day Temperature TMDL modeled NTP temperatures in the North Fork John Day River from its headwaters to its mouth. NTP scenario incorporated restored vegetation, flow and channel morphology and compared them to current temperatures (Figure 3-3). In the area of Granite Creek, which flows into the North Fork John Day at RM 141, the difference between NTP temperature and current temperature is less than 1 ℃. Based on extrapolating that difference to the modeled temperatures in this section of Granite Creek, which is similarly undisturbed, the natural summer temperatures of this waterbody would exceed 20℃ and thus do not support Bull Trout Spawning and Juvenile Rearing Use.

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[30] USDA Forest Service, Northwest Division. 2018. Draft Record of Decision for the Malheur, Umatilla, and Wallowa-Whitman National Forests Revised Land Management Plans.

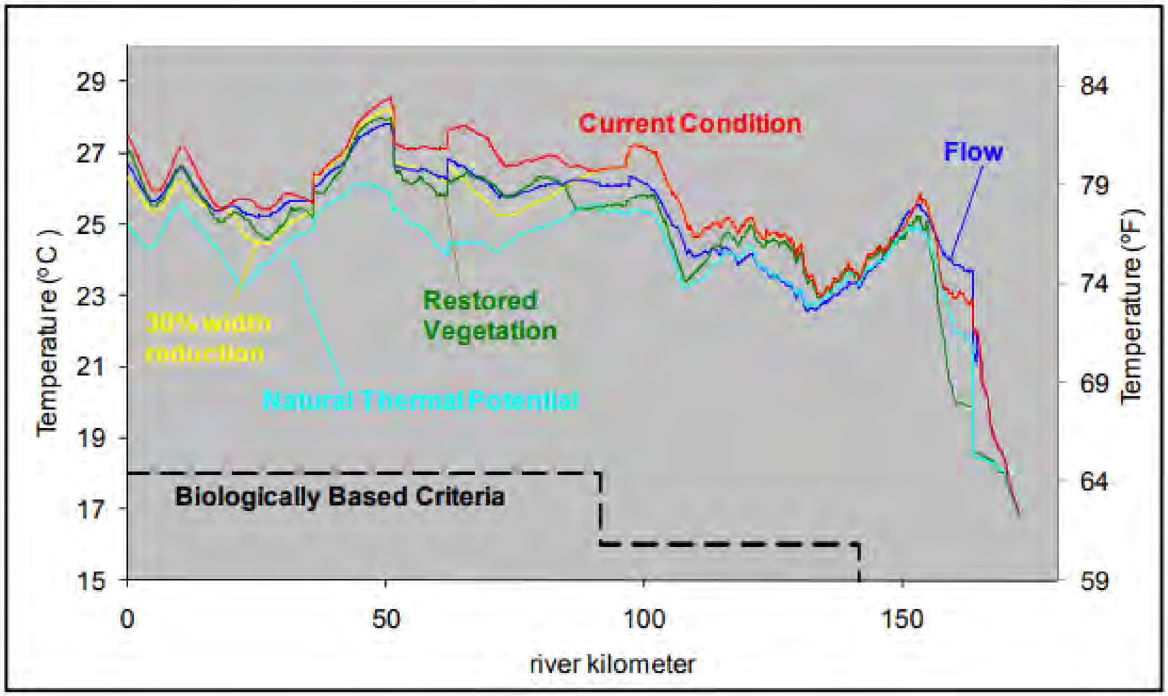

Figure 3-3. Predicted maximum 7DADM temperature profiles of the North Fork John Day River resulting from scenarios during the model period, 2004. Source: DEQ, 2010. John Day River Basin TMDL. P. 62.

Grande Ronde Basin (Figure A-2)

Catherine Creek. The critical habitat designation was changed from SR to FMO in the final Critical Habitat Rule based on professional opinion of Paul Boehne (fish biologist, U.S. Forest Service).[31] The FHD similarly considers that this reach doesn't support spawning based on a 2021 concurrence of professional opinion between the ODFW and the Confederated Tribes of the Umatilla Indian Reservation.[32] Specifically, the concurrence of professional opinion cites the professional knowledge of the fish biologists and temperature data that indicates this stretch of Catherine Creek supports Bull Trout FMO use, not spawning use. Climate Shield did not identify this reach as having any probability of Bull Trout presence based on 1980 assumptions.

The NorWeST model, indicates that current 7-DADM temperatures, based on 1993-2011 data, range from 21.0 ℃ in the upper reach of Catherine Creek to 25.2 ℃ at the lower reach. DEQ extrapolated natural thermal potential results from the Upper Grande Ronde River Basin temperature TMDL to the NorWest temperatures to examine if the Bull Trout Spawning and Rearing Criterion of 12℃ is attainable. The TMDL modeled natural thermal potential temperatures in the Upper Grande Ronde River

[31] Sausen, Gretchen A. *Personal communication.* December 16, 2021.

[32] Bowers, J. 2021. RefID 53798. https://docs.cbfwl.org/StreamNet_References/ORsn53798.pdf. Visited March 7, 2023.

from its headwaters to River Mile 80. The NTP scenario incorporated restored vegetation, flow and channel morphology and compared the resulting temperatures to current temperatures (Figure 3-4). In the area of Catherine Creek, which flows into the Grande Ronde River at RM 116, the difference between NTP temperature and current temperature is approximately 15 °F, or approximately 8.3 °C. Conservatively, DEQ extrapolated 8.3 °C as the maximum potential difference between current modeled temperatures and NTP in Catherine Creek.[33] A decrease of 8.3 °C would result in a 7-DADM temperature of 12.7°C at the upper end of this reach and 16.9°C at the lower end. Based on this information, this reach would not be able to attain 12 °C under natural conditions.

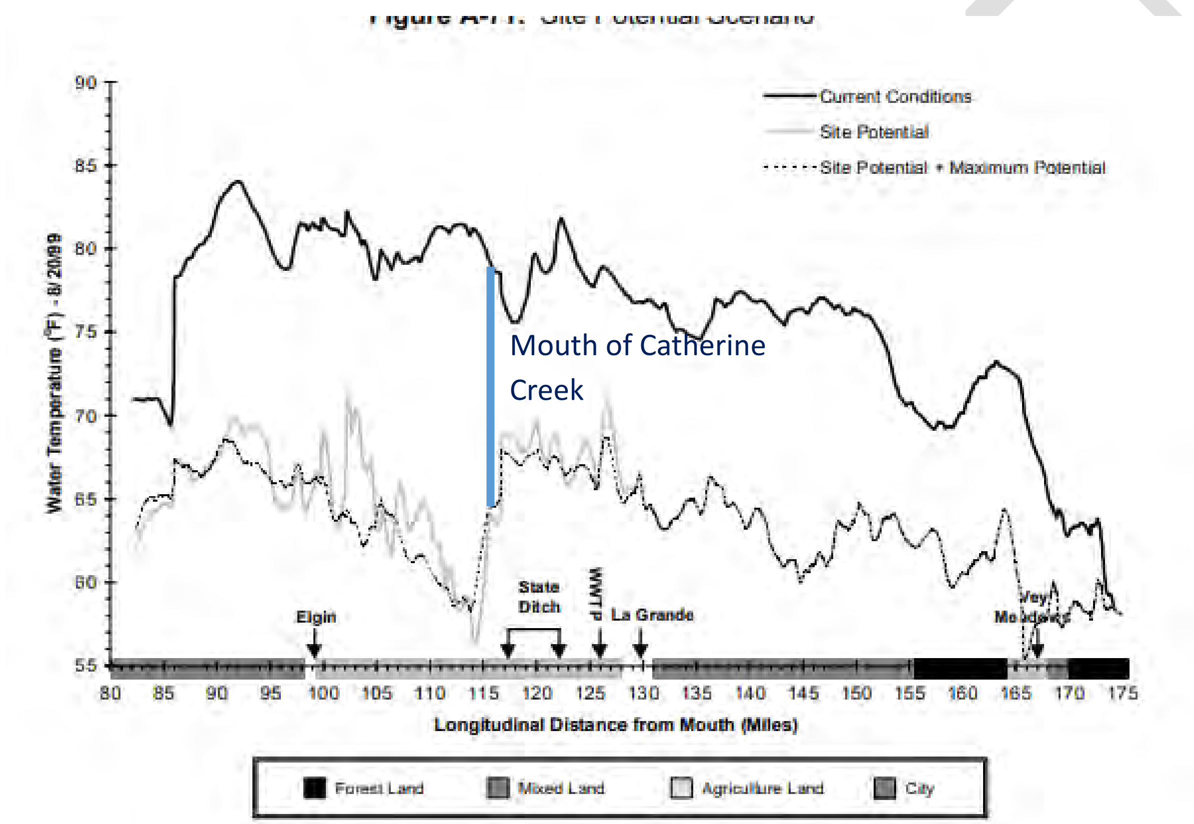

Figure 3-4. Predicted 7DADM temperature profiles of the Grande Ronde River resulting from scenarios during the model period, 1999. Source: DEQ, 2000. Upper Grande Ronde River Basin TMDL, Appendix A: Temperature Scenarios. P. A-93.

Umatilla Basin (Figure A-3)

Meacham Creek and tributaries. DEQ is updating the Bull Trout Spawning and Rearing Use to portions of Meacham Creek from just above Line Creek upstream to its confluence with North Fork Middle Creek.

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[33] In reality, the difference between NTP and current temperatures is much less, particularly in the upper reaches of this section, as Catherine Creek is generally cooler than the Grande Ronde at its mouth and thus the likely difference between NTP and current temperatures is lower than 8.3 °C.

USFWS designated this area as critical habitat for FMO use because "the maintenance of a migratory corridor to the Umatilla River is critical to the viability of the local {Bull Trout} population in North Fork Meacham Creek. If restored, Meacham Creek could serve as an adult overwintering habitat in the future."[34] In the final critical habitat rule, USFWS has identified this reach as having the physical characteristics for FMO use, not for spawning use, as it is lower in the watershed than Bull Trout spawning habitat occurs.

The NorWeST model, indicates that current 7-DADM temperatures, based on 1993-2011 data, range from 24°C at the upper reach to 25.61 °C at the lower reach. DEQ has not modeled this reach of the Umatilla Basin. However, DEQ has modeled temperature in the mainstem Umatilla River. DEQ extrapolated NTP results from the Umatilla River temperature TMDL to the modeled temperatures to examine if the Bull Trout Spawning and Rearing Criterion of 12℃ is attainable in Meacham Creek. The John Day Temperature TMDL modeled NTP in the John Day River from its headwaters to its mouth, including a scenario that included flow augmentation. The NTP scenario modeled stream temperatures that result from restored vegetation, flow and channel morphology and compared them to current temperatures (Figure 3-5). At the mouth of Meacham Creek (approximately RM 78.8), the difference between NTP temperature and current temperature is approximately 5℃ (9 ℉). Conservatively, DEQ extrapolated 5 ℃ as the maximum potential difference between the current 7-DADM temperatures and attainable temperature in Meacham Creek, which is a conservative assumption, as this reach lies almost exclusively in the Umatilla National Forest. Based on this extrapolation, this portion of Meacham Creek would not be able to attain 12 ℃, even under an even more conservative assumption.

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[34] USFWS 2010. Bull Trout Critical Habitat Final Rule Justification. Idaho Fish and Wildlife Office, Boise, Idaho, Pacific Region, Portland, OR. 1035 pp. Discussion of streams included as FMO habitat in the Upper Willamette Critical Habitat Unit start on p. 217.

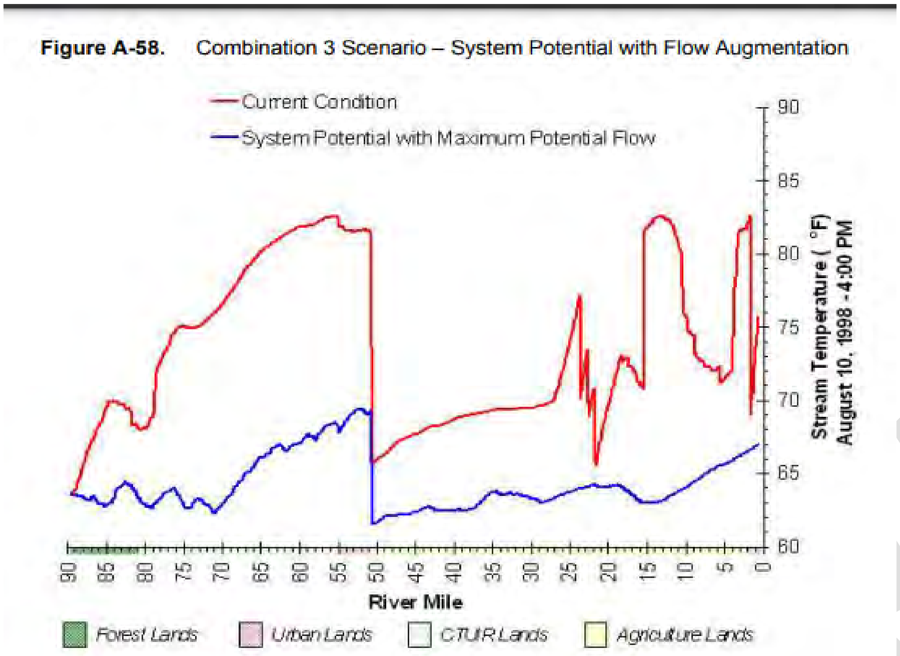

Figure 3-5. Umatilla River System Potential Temperature Including Augmented Flow. Source: DEQ, 2001. Umatilla River TMDL.

3.1.3.2 UAA Factor 5

Bull Trout Spawning and Juvenile Rearing Use is not attainable in the waters described below based on 40 CFR 131.10(g), Factor 5: “Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses.”

Final USFWS critical habitat designations were based in part on the best available information regarding physical habitat characteristics that support Bull Trout spawning. Because Bull Trout spawning has the most sensitive habitat requirements, this analysis focuses on the attainability of spawning.[35] Compared to other salmonids, Bull Trout have narrow habitat requirements that influence their distribution and abundance, particularly in spawning waters. Spawning Bull Trout they require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and, because they are adfluvial, unblocked migratory corridors. Watersheds must have specific physical characteristics to provide successful spawning and rearing habitat. Bull Trout Spawning takes place principally in third and fourth order streams with low gradient areas (less than 2%), gravel/cobble substrate and water depths between 0.1 and 0.6 meters and velocities from 0.09 to 0.61 m/sec. Proximity of cover for adult fish

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[35] See discussion on p. 10 of McPhail, J.D. and J.S. Baxter. 1996. A Review of Bull Trout (*Salvelinus confluentus*) Life-History and Habitat Use in Relation to Compensation and Improvement Opportunities. Fisheries Management Report No. 104, Dept. of Zoology, Univ. of British Columbia, Vancouver, BC.

before and during spawning is an important habitat component.[36] Spawning begins August 15 to September 1 in eastern Oregon basins and hatch occurs by the end of April or May. Streamflow in these reaches is often at their its lowest in August and September. Activities that affect channel stability or alter stream flow during this time may decrease egg and young juvenile survival.[37]

USFWS biologists determined that the following waters do not "provide all the habitat components necessary for spawning and juvenile rearing for a local Bull Trout population."[38] These habitat components are described in the previous paragraph. DEQ has included available information from as to why these waters were removed from critical habitat designation in the final rule. ODFW agrees that these waters do not provide suitable or accessible habitat – in other words, that these waters do not have the physical conditions necessary to support Bull Trout Spawning and Juvenile Rearing Use.

Deschutes Basin (Figure A-4)

Little Deschutes River. The Little Deschutes River was initially proposed for critical habitat in the 2002 Proposed Rule from its confluence with Crescent Creek to its headwaters as unoccupied FMO habitat essential for recovery of the species. However, these waters were removed from the final rule. USFWS has not been able to provide DEQ specific data or documents supporting their decision.[39] DEQ has retained the Bull Trout spawning and juvenile rearing use from the headwaters of the Little Deschutes River to its confluence with Clover Creek, and in Clover Creek, based on Climate Shield model, which indicates there was a 50-75% probability that Bull Trout were present based on 1980 conditions.

ODFW classifies the Little Deschutes as historical Bull Trout habitat but does not specify what portion of the river was spawning habitat versus foraging, migration and overwintering use. ODFW has concluded

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[36] Camefix, G. 2003. Bull Trout Species Description, American Fisheries Society, Montana Chapter website. https://units.fisheries.org/montana/science/species-of-concern/species-status/bull-trout/. Visited February 28, 2023.

[37] See discussion of Bull Trout habitat characteristics on page 53 of U.S. Fish and Wildlife Service 2014. Biological Opinion/Letter of Concurrence/Conference Concurrence on US EPA Approval of Oregon Water Quality Standards for Temperature and Intergravel Dissolved Oxygen. FWS reference: 01EOFWO0-2014-F-0087. Oregon Fish and Wildlife Office. Portland, OR. 303 pp.

[38] USFWS 2010. Bull Trout Critical Habitat Final Rule Justification. Idaho Fish and Wildlife Office, Boise, Idaho, Pacific Region, Portland, OR. 1035 pp. The portions of the document relevant to the corrections to the designation include those for the Upper Willamette Critical Habitat Unit (starting on page 217), Klamath River Basin CHU (p. 303), John Day River CHU (p. 371), Umatilla River CHU (p. 397), Walla Walla River CHU (p. 409), Grande Ronde River CHU (p. 447), Powder River CHU (p. 511), and Malheur River CHU (p. 587).

[39] Gunckel, Stephanie. *Personal communication.* March 18, 2021.

that reintroduction of Bull Trout to the Little Deschutes River is technically infeasible, due to competition from introduced Brook and Brown Trout, among other reasons.[40]

Bull Trout Spawning and Juvenile Rearing Use is unattainable in the Little Deschutes River downstream from its confluence with Clover Creek due to physical conditions. Specifically, flow conditions do not support Bull Trout Spawning Use. As noted in the introduction to this section, Bull Trout tend to spawn in third and fourth order streams with velocities between 0.09 and 0.61 ft/sec. DEQ analyzed modeled stream velocity information for the Little Deschutes found in the National Hydrography Database Plus Version 2 dataset. NHD Plus Version 2 includes an estimate of streamflow data based on a USGS national water balance model including an estimate of monthly mean streamflow. [41] DEQ evaluated monthly mean streamflow in August, which is the beginning of spawning season for Bull Trout and a good estimate of minimum flow. As a conservative estimate, DEQ used a threshold of 0.07 and 0.70 ft/sec as an acceptable range of velocities that would support Bull Trout Spawning. As shown in Figure 3-6, the entire Little Deschutes River has stream velocity higher than this threshold. Velocities in the reach where DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use range from 0.98 to 1.05 ft/sec, which is outside the range of stream velocities that would support Bull Trout Spawning and Juvenile Rearing Use.

In the upper portion of the Little Deschutes River, substrate also does not support Bull Trout Spawning. This portion of the Little Deschutes is a Wild and Scenic River, where no planned timber harvest is allowed and commercial livestock grazing is prohibited along the riparian corridor.[42] ODFW notes that in the upper portion of this section (above Highway 58), sand is the dominant substrate.[43] Since Bull Trout require clean gravel to support spawning, the presence of sand as the dominant substrate precludes Bull Trout spawning.

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[40] Fies, T., J. Fortune, B. Lewis, M. Manion, S. Marx. 1996. Upper Deschutes River Subbasin Fish Management Plan. Prepared by Upper Deschutes Fish District, Oregon Department of Fish and Wildlife. 383 pp.

[41] https://www.epa.gov/waterdata/get-nhdplus-national-hydrography-dataset-plus-data.

[42] Deschutes National Forest. 2001. Big Marsh Creek & The Little Deschutes River Wild and Scenic Rivers Management Plan. Crescent Ranger District. 30 pp.

[43] Fies, T., J. Fortune, B. Lewis, M. Manion, S. Marx. 1996. Upper Deschutes River Subbasin Fish Management Plan. Prepared by Upper Deschutes Fish District, Oregon Department of Fish and Wildlife. See page 161.

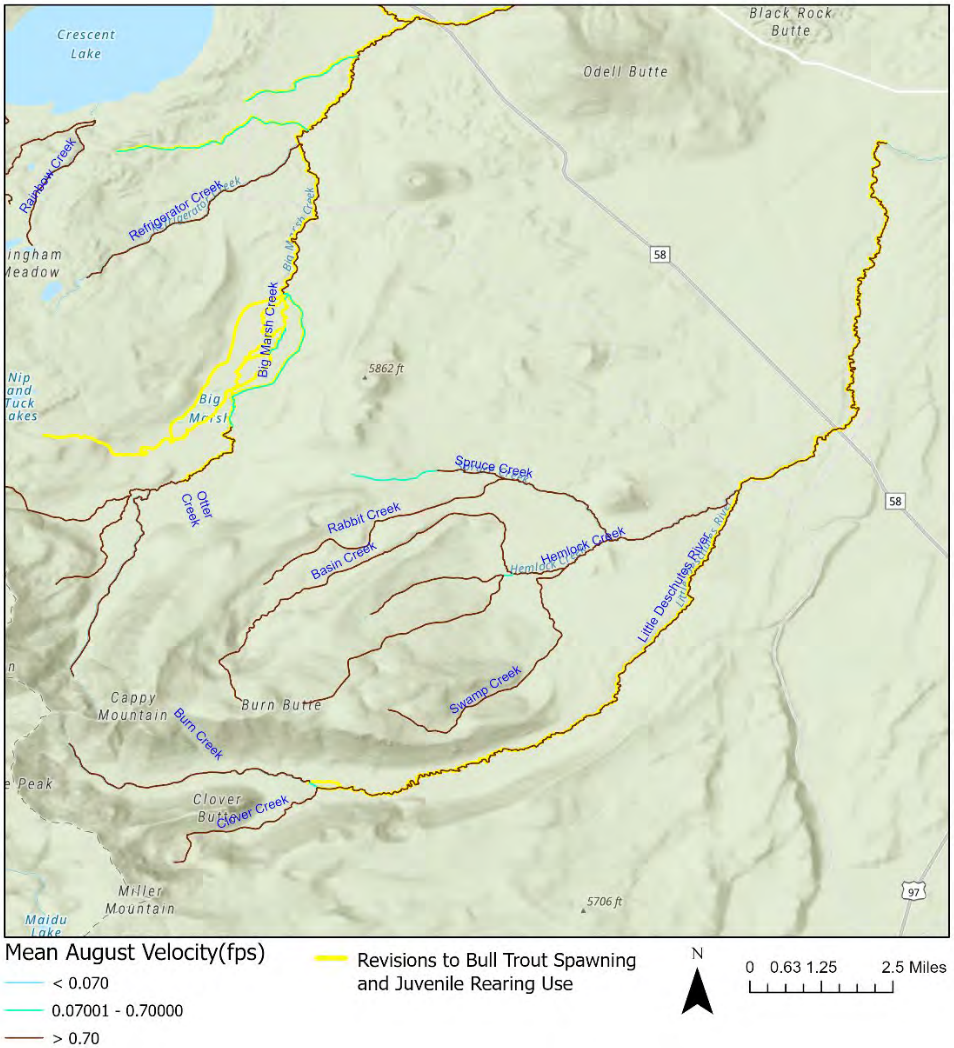

Figure 3-6. Mean August Velocity, Little Deschutes River and tributaries. Source: NHD Plus Version 2.

Malheur Basin (Figure A-5)

Little Malheur River and tributaries. USFWS agreed to propose the Little Malheur from its headwaters to its confluence with Camp Creek as critical habitat for spawning and rearing in response to public comments. However, upon further analysis, USFWS biologists determined this was not critical habitat. USFWS was not able to provide DEQ specific data or documents supporting their decision.[44] In documenting the distribution of Bull Trout in the Malheur Basin, Buchanan, et al. (1997) note populations in the North and South Forks of the Malheur River, but not in the Little Malheur.[45] Two

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[44] Gunckel, Stephanie. *Personal communication.* March 18, 2021.

[45] Buchanan, D.V., M. L. Hanson and R. M. Hooton. 1997. Technical Report: Status of Oregon's Bull Trout. U.S. Bonneville Power Administration, Report Number DOE/BP-34342-5. See pp. 139 and forward.

radio tagged bull trout were tracked one kilometer into the Little Malheur River in May or early June of 1998 and 1999, after which they returned to the North Fork Malheur River.[46] This presence indicates use of the Little Malheur as FMO habitat, meaning Core Cold Water Use is the appropriate use. ODFW does not identify these waters as either current or historic habitat. DEQ's Bull Trout technical work group, which included members from ODFW, USFWS, the U.S. Forest Service, the Burns Paiute Tribe, the Bonneville Power Administration and the Bureau of Reclamation did not identify these waters as either current or potential bull trout spawning habitat. The Climate Shield model indicates there was a 25-50% probability of Bull Trout presence in Elk Flat Creek, the Little Malheur River from its headwaters to the confluence with Elk Flat Creek, and an unnamed tributary to Elk Flat Creek, and a 0-25% probability of presence in Rock Creek and South Bullrun Creek in 1980. However, based on the professional judgement of USFWS biologists, the Bull Trout Working Group for this area, which, and the literature used to develop FHD (in particular, Buchanan, et al. 1997 and Schwabe 2000) these streams are not current or potential spawning habitat.

As noted earlier, Bull Trout tend to spawn in streams with slopes having less than a 2% gradient. DEQ analyzed stream slope on the upper portion of the Little Malheur. As a conservative estimate, DEQ used a threshold of 3%. Based on this analysis, it appears that almost all of the upper Little Malheur River and tributaries have a greater than 3% slope, with the exception of the upper portions of Elk Flat Creek. These conditions would not support Bull Trout spawning and juvenile rearing use (Figure 3-7).

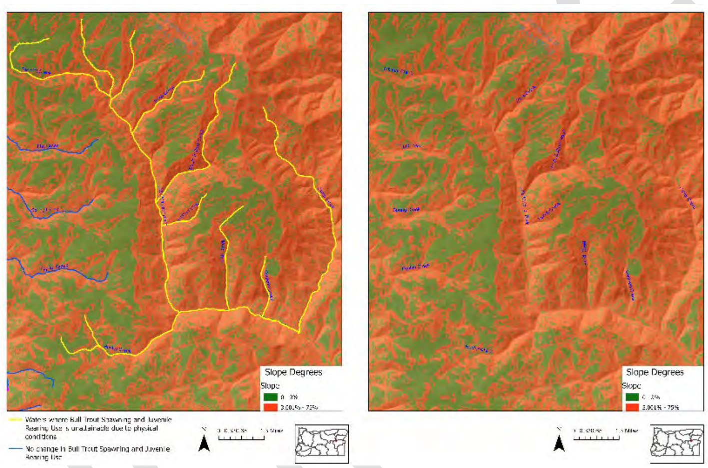

Figure 3-7. Slope analysis of upper Little Malheur River.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are *upstream* of reaches that were proposed as critical habitat for spawning; they were never proposed as critical habitat themselves. No

[46] Schwabe, L., M. Tiley and R. Perkins. 2000. Malheur River Basin Cooperative Bull Trout/Redband Trout Research Project, FY1999 Annual Report. Report to Bonneville Power Administration, Contract No. 00006313, Project No. 199701900, 120 pp. (BPA Report DOE/BP-00006313-1).

current or historical Bull Trout spawning habitat has been identified in the tributary itself by the 2002 or current Bull trout work groups, the FHD data or the proposed or final critical habitat rule. In other words, these waters have never been identified as Bull Trout spawning habitat. according to either USFWS or ODFW.

Powder River Basin (Figure A-6)

Salmon, Pine, Rock & Big Muddy Creeks. The lower reaches of these four waters were included as draft critical habitat for spawning and juvenile rearing in the USFWS 2002 proposed critical habitat rule but upon further analysis, USFWS biologists determined they were not critical habitat. The Climate Shield model indicates that these waters had no probability of supporting Bull Trout presence in 1980. The FHD does not identify these waters *historical habitat, nor did the* 2002 Bull trout Work Group nor the current interagency Bull Trout working groups identify these areas as **current or potential** Bull Trout habitat. Upstream reaches of these waters, where DEQ is maintaining the Bull Trout Spawning and Juvenile Rearing Use, support resident populations of Bull Trout (Figure 3-8).[47]

USFWS provided the following information to support removal of these reaches as critical habitat in the final rule:

1. Bull Trout occupancy of these streams is extremely limited & uncertain, with no connectivity.
2. These are small, isolated, relatively low-elevation drainages with very limited Bull Trout spawning habitat potential and no opportunities for expansion.
3. Lower sections of these creeks run through a broad alluvial valley (Baker Valley) where the channels have been highly altered by surrounding agricultural land uses. Many reaches are entirely devoid of riparian overstory & most of the streamflow is diverted for irrigation in the summer months. Restoration of the lower reaches of these creeks would be difficult to achieve because they run through a large number of private farms & ranches, which rely on the creeks water to irrigate their fields. [48]

The upper reaches of these waters, before they reach Baker Valley, are high gradient streams draining the eastern edge of the Elkhorn Mountains. As noted in the introduction to this chapter, Bull Trout tend to spawn in streams with slopes having less than a 2% gradient. DEQ analyzed stream slope on the upper portion of these waters. As a conservative estimate, DEQ used a threshold of 3% gradient. Based on this analysis, it appears that almost all of the upper reaches of these waters have a greater than 3% slope. These conditions would not support Bull Trout spawning and juvenile rearing use (Figure 3-9).

[47] Northwest Power and Conservation Council. 2004. Powder River Subbasin Plan. 282 pp.

[48] Sausen, Gretchen A. *Personal communication.* December 16, 2021.

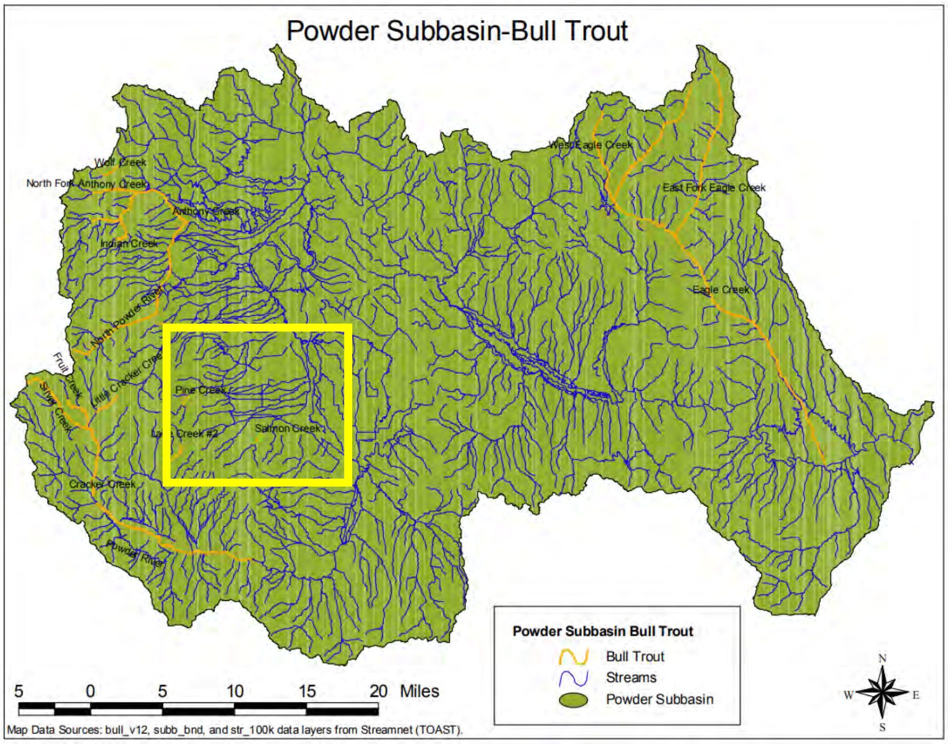

Figure 3-8. Bull Trout occupancy in Powder River Basin. Yellow box indicates waters where DEQ is updating Bull Trout Spawning and Rearing Use. DEQ is NOT revising the use where data indicates presence of Bull Trout, but only in downstream areas where there is no evidence of Bull Trout presence.

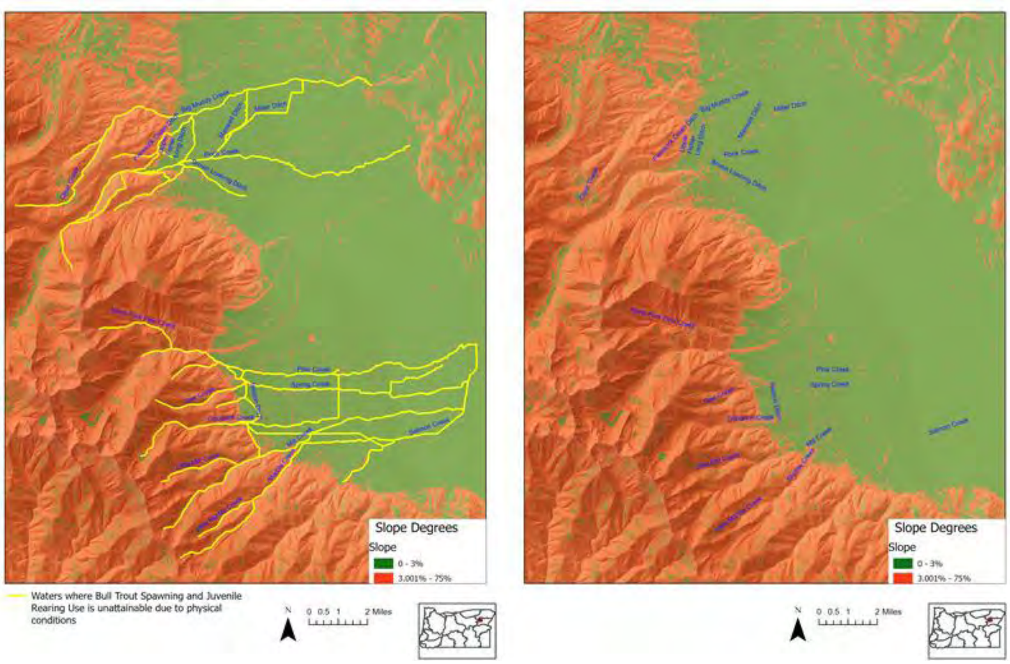

Figure 3-9. Slope analysis of Powder River tributaries. Red indicates slopes greater than 3%, which does not support Bull Trout spawning and juvenile rearing use.

The lower reaches of these waters are located in a broad alluvial valley. The geology of the valley is dominated by alluvium, defined as, "mainly valley fill and stream channel deposits consisting of unconsolidated silt, sand and gravel."[49] As noted in the introduction of this section, to support spawning, Bull Trout require a gravel/cobble substrate, which does not exist in the lower reaches of these waters. As a result, the physical conditions of these waters don't support, and never supported Bull Trout spawning.

Pine Creek Tributaries. DEQ is updating the Bull Trout Spawning and Rearing Use to portions of Clear Creek, Fish Creek and Little Elk Creek, three tributaries to Pine Creek, which is a tributary to the Snake River. DEQ designation of these three waters for Bull Trout Spawning and Juvenile Rearing use was likely an error in 2003. USFWS included these three creeks as FMO use in both its proposed and final critical habitat rule, not spawning habitat, meaning that these creeks do not have the habitat features that support spawning use. The Climate Shield model indicates that these waters had no probability of supporting Bull Trout presence in 1980 and only noted any possibility of presence much further upstream.

The portion of these three creeks that DEQ is updating are in lower portions of the watershed. The portion of Clear Creek where DEQ is revising the use has geology dominated by alluvium, defined as, "mainly valley fill and stream channel deposits consisting of unconsolidated silt, sand and gravel."[50] As noted in the introduction of this section, to support spawning, Bull Trout require a gravel/cobble substrate, which does not exist in this portion of Clear Creek. As a result, the physical conditions of this portion of Clear Creek do not support, and never supported Bull Trout spawning. The portions of Fish Creek and Little Elk Creek where DEQ is revising the use are confined to the lower portions of these waters, which are in areas generally suited to FMO use, as highlighted by the Critical Habitat designation, rather than Spawning and Rearing Use.

Given the information provided, it is reasonable and defensible to conclude that Bull Trout Spawning and Rearing Use is not feasibly attainable in these reaches, as these waters have habitat features, such as substrate (for Clear Creek) and elevation (for all three creeks) that do not support such use.

Umatilla/Walla Walla Basin (Figure A-7)

Walla Walla River and tributaries. These waters include a portion of the mainstem Walla Walla River from upstream of Milton Freewater to the North Fork Walla Walla River, and a portion of the North Fork Walla Walla River from its mouth to just upstream of Cup Gulch. These waters are considered primarily rearing habitat in the FHD. This reach was not designated a critical habitat in the final rule based on the professional opinion of USFWS biologists regarding the presence of habitat components necessary for

[49] Brooks, H.C., J.R. McIntyre and G.W. Walker. 1976. Geology of the Oregon Part of the Baker 1° by 2° Quadrangle. State of Oregon Department of Geology and Mineral Industries Geology Map Series GMS-7. 28 pp.

[50] Brooks, H.C., J.R. McIntyre and G.W. Walker. 1976. Geology of the Oregon Part of the Baker 1° by 2° Quadrangle. State of Oregon Department of Geology and Mineral Industries Geology Map Series GMS-7. 28 pp.

Bull Trout spawning. USFWS has not been able to provide DEQ specific data or documents explaining why it was proposed critical spawning habitat or their decision not to designate it in the final rule.[51] The Climate Shield model indicated zero probability of these waters supporting Bull Trout presence in its 1980 scenario. Buchanan, et al. (1997) noted that there was no spawning found in the North Fork Walla Walla River, nor further downstream in the mainstem Walla Walla River during spawning surveys conducted from 1994-1996.[52] The 2002 DEQ Bull Trout Technical workgroup did not identify these waters a current or potential bull trout spawning habitat.

The physical conditions of these waters, due to both stream velocity and substrate, do not support Bull Trout Spawning and Juvenile Rearing Use. Substrate does not support spawning and juvenile rearing use because the geology of these areas is characterized by younger alluvium, which is characterized by gravel and gravelly silt underlying flood plains.[53] As noted in the introduction of this section, to support spawning, Bull Trout require a gravel/cobble substrate, which does not exist in these waters.

Flow conditions also do not support Bull Trout Spawning Use. As noted in the introduction to this section, Bull Trout tend to spawn in third and fourth order streams with velocities between 0.09 and 0.61 ft/sec. DEQ analyzed modeled stream velocity information from the NHD Plus Version 2 dataset. DEQ evaluated monthly mean streamflow in August, which is the beginning of spawning season for Bull Trout and a good estimate of minimum flow. As a conservative estimate, DEQ used a threshold of 0.07 and 0.70 ft/sec as an acceptable range of velocities that would support Bull Trout Spawning. As shown in Figure 3-10, mean August velocities in both the mainstem Walla Walla River and North Fork Walla Walla River have stream velocities higher than this threshold. Velocities in the reach of these waters where DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use range from 0.76 to 1.34 ft/sec, which is outside the range of stream velocities that would support Bull Trout Spawning and Juvenile Rearing Use.

[51] Gunckel, Stephanie. *Personal communication.* March 18, 2021.

[52] Buchanan, D.V., M. L. Hanson and R. M. Hooton. 1997. Technical Report: Status of Oregon's Bull Trout. U.S. Bonneville Power Administration, Report Number DOE/BP-34342-5. See pp. 96.

[53] Newbomb, B.C. 1965. Geology and Ground-water Resources of the Walla Walla River Basin, Washington-Oregon. Water Supply Bulletin No. 21. Washington State Division of Water Resources. 162 pp.

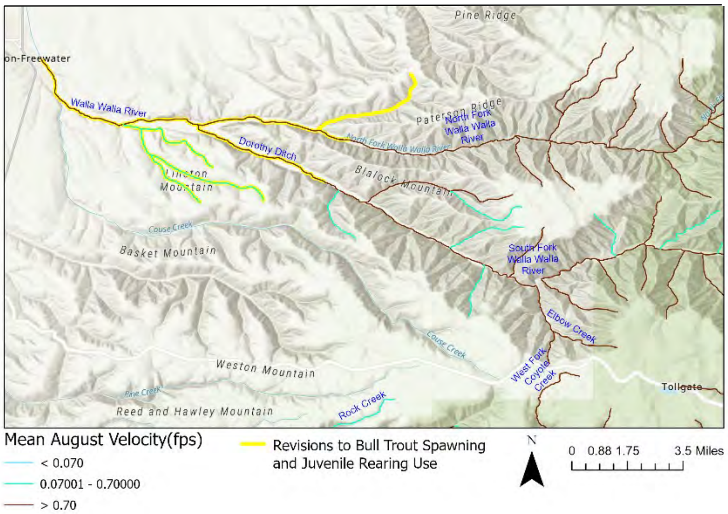

Figure 3-10. Estimated Stream Velocity Data, Walla Walla River and North Fork Walla Walla River. Source: NHD Plus Version 2.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of critical habitat for SR. In these cases, ODFW never considered these waters to be suitable for Bull Trout spawning and juvenile rearing, nor did USFWS determine that these waters supported Bull Trout Spawning and Rearing. They were designated only because they are upstream of reaches that were proposed as critical habitat. These waters do not support Bull Trout spawning and juvenile rearing according to either USFWS or ODFW, nor is such use an existing use based on best available information.

Willamette Basin (Figure A-8)

Middle Fork Willamette River upstream of Hill Creek Lake. The FHD indicates that these waters are primarily rearing, with some migration, rather than supporting habitat. ODFW observed a Bull Trout near the confluence of the McKenzie and the Willamette in 2004 indicating FMO use.[54]

DEQ is maintaining the Bull Trout Spawning and Juvenile Rearing Use in the following streams based on Climate Shield data, which indicates at least some probability of Bull Trout occurrence in these streams based on modeled 1980 conditions: Echo Creek, Noisy Creek and upstream portions of Staley Creek, as well as in the mainstem Middle Fork Willamette River from Noisy Creek downstream to Staley Creek, but no probability in reaches where DEQ is revising the use.

Bull Trout Spawning and Juvenile Rearing use is unattainable due to physical conditions. Specifically, flow conditions in the Middle Fork Willamette River do not support Bull Trout Spawning and Juvenile Rearing Use. As noted in the introduction to this section, Bull Trout tend to spawn in third and fourth order streams with velocities between 0.09 and 0.61 ft/sec. DEQ analyzed modeled stream velocity information from the NHD Plus Version 2 dataset. DEQ evaluated monthly mean streamflow in August, which is the beginning of spawning season for Bull Trout and a good estimate of minimum flow. As a

[54] Streif, Bianca. 2004. “Changes to Critical Habitat form: Middle Fork Willamette River.”

conservative estimate, DEQ used a threshold of 0.07 and 0.70 ft/sec as an acceptable range of velocities that would support Bull Trout Spawning. As shown in Figure 3-11, mean August velocities in the Middle Fork Willamette River are higher than this threshold. Velocities in the reach of these waters where DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use range from 1.16 to 1.25 ft/sec, which is outside the range of stream velocities that would support Bull Trout Spawning and Juvenile Rearing Use.

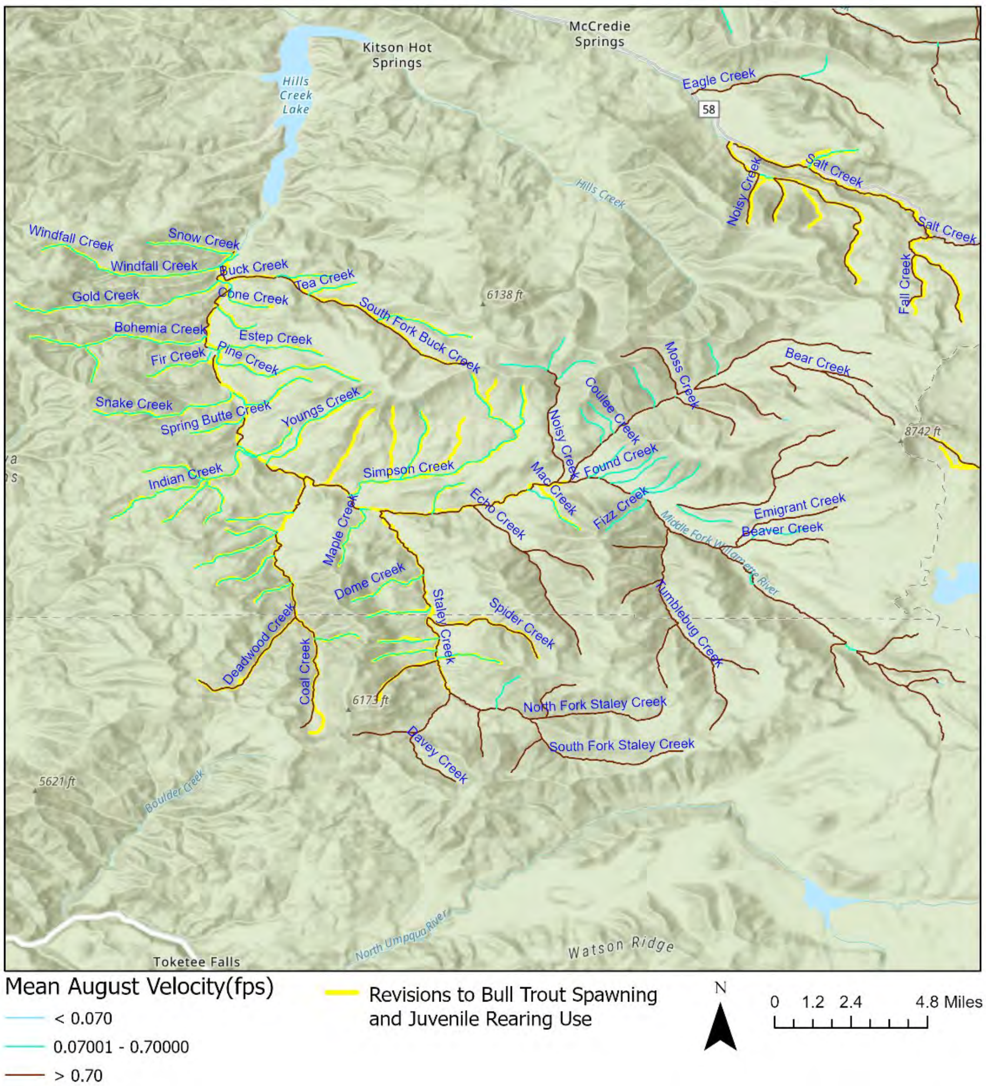

Figure 3-11. Estimated Stream Velocity Data, Middle Fork Willamette River. Source: NHD Plus Version 2.

DEQ is updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of critical habitat for SR. In these cases, there was no current, historical, or potential Bull Trout spawning habitat in these tributaries based on FHD data or the final critical habitat rule, nor in the modeled Climate Shield 1980 scenario. In other words, these waters do not and have never had the physical conditions to support Bull Trout spawning and juvenile rearing habitat. They were designated only because they are upstream of reaches that were proposed as critical habitat. These waters do not support Bull Trout spawning and juvenile rearing according to either USFWS or ODFW, nor is such use an existing use based on best available information.

3.1.4 Highest Attainable Use

For the waters described above in the Deschutes, Malheur, Walla Walla and Willamette basins, the highest attainable use for all waters described here is Core Cold Water Habitat, which is he next most stringent year-round use after Bull Trout Spawning and Juvenile Rearing use. Core Cold Water Habitat use protects sub-adult and adult Bull Trout use and FMO critical habitat. Core Cold Water Habitat use doesn't have as stringent habitat requirements, as described in 3.1.3.1 and 3.1.3.2 (stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors.) In addition, the temperature criterion for Core Cold Water Use is 16° rather than 12°C, and therefore more likely to be attainable in mountain and foothills streams under natural conditions.

For the waters in the John Day basin, the highest attainable use is Salmon Rearing and Migration Use. According to ODFW, these waters do not have suitable habitat to support Bull Trout FMO use in the summer months, which is the trigger for core cold water use. Nor can they attain the Core Cold Water Criterion of 16℃ throughout the summer. For waters in the John Day basin (including lower portions of Canyon Creek and Pine Creek), DEQ's NTP models indicate that 16℃ isn't attainable in the mainstem John Day River at the mouths of these creeks (see discussion in Section 3.1.3.1). Thus, such temperatures are unlikely to be attainable in the lower sections of these creeks as well. As a result, Core Cold Water Use is not attainable in these waters. However, these waters do support suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. As a result, Salmon and Trout Rearing and Migration is the highest attainable use based on the best information available.

For the waters in the Powder River Basin, the highest attainable use is Redband Trout. Factor 131.10(g)(5) precludes attainment of Bull Trout Spawning and Juvenile Rearing Use, as described above. The next two most stringent uses, Core Cold Water Use and Salmon and Trout rearing and migration use, require the presence of anadromous fish. Anadromous fish have not been present in the basin since before 1967, when the Hells Canyon Dam was constructed. Because the basin does not have salmon or steelhead, Redband Trout is the next highest use. These waters do support Redband Trout, the native resident trout species in this area.

3.1.5 Maps

Maps and an inventory table indicating the waters where the Bull Trout Spawning and Juvenile Rearing Use is not attainable are included in Appendix A.

3.2 Reclassification of Bull Trout spawning use based on changes to the ODFW Fish Habitat Database for current or potential habitat

3.2.1 Reasons for This Update

DEQ is updating Bull Trout Spawning and Juvenile Rearing use based on the best available information from ODFW and the Bull Trout Working Groups regarding the location of current or potential Bull Trout spawning habitat. ODFW has found that these waters are not potential habitat for Bull Trout Spawning and Juvenile Rearing. These updates occur in the Deschutes, Klamath, and Willamette River basins.

To update use maps, DEQ engaged with the Statewide Bull Trout Working Groups (Table 3-2) to review the potential habitat identified in 2003 and provide the professional opinion of the biologists on the current state of the science and conservation goals, including considering the suitability of habitat to support Bull Trout Spawning and Juvenile Rearing. The statewide working groups are organized jointly by ODFW and USFWS and coordinated for the agencies by Stephanie Gunckel. They are comprised of Bull Trout biologists from state, federal, tribal, academic, and private institutions.

The current Bull trout working groups reviewed the potential Bull Trout spawning habitat that DEQ designated because it was identified by DEQ's 2003 Bull Trout Technical Work Group as potential, not current, spawning habitat.[55] The current working groups provided input on which habitats have high potential for spawning restoration and reintroduction, which habitats do not have potential for restoration or reintroduction (i.e., where reintroduction is not attainable), and any additional habitats that should be considered as potential spawning habitat.

Table 3-2. Bull Trout Working Groups - Membership and Meeting Dates

Working Group	Meeting Date	Participating Agencies
Klamath Basin	February 7, 2022	ODFW, USFWS, USGS, USFS, TNC, NPS, Klamath Tribe, Green Diamond Resource Company, Klamath Watershed Partnership
Upper Willamette	April 14, 2022	ODFW. *Not discussed a formal working group meeting. Conference of ODFW district and research biologists only.
Clackamas	February 23, 2022	ODFW, USFWS, USFS, PGE, TU
Hood	March 7, 2022	ODFW, USFWS, USFS, CTWSR, MFID, HRWC, Meridian Environmental
Upper & Lower Deschutes	January 31, 2022	ODFW, USFWS, USFS, CTWSR, PGE, Mt Hood Environmental
Odell Lake	March 8, 2022	ODFW, USFWS, USFS, Native Fish Society
John Day	February, 2022	ODFW, USFWS, BLM, CTUIR, USFS, CTWSR
Umatilla – Walla Walla	December 6, 2021	ODFW, USFWS, USFS, CTUIR, BOR, ACOE, WDFW, OSP, Tri-State Steelheaders, OWRD, SRSRB

[55] Simpson, M. 2003. Bull Trout Habitat Designation: Technical Work Group Recommendations. Water Quality Division, Oregon Department of Environmental Quality. 51 pp.

Grande Ronde – Imnaha	January 12, 2022	ODFW, USFWS, USFS, PGE, CTUIR, Nez Perce, IPC
Powder – Pine	January 11, 2022	ODFW, USFWS, USFS, BOR, IDFG, IPC
Malheur	April 14, 2022	ODFW, USFWS, USFS, Burns Paiute Tribe, BPA, BOR

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of potential habitat. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on FHD data or the USFWS critical habitat rule. They were designated only because they are upstream of reaches that were proposed as potential habitat. These waters do not support Bull Trout spawning and juvenile rearing according to either USFWS or ODFW, nor is such use an existing use based on best available information.

3.2.2 Protection of Existing Uses

The updates to Bull Trout Spawning and Juvenile Rearing use described in this section do not remove an existing use. DEQ is updating this use almost exclusively because Bull Trout spawning and rearing use is not attainable due to naturally occurring temperatures in excess of the 12 °C criterion for Bull Trout Spawning Use or because physical conditions do not support the use. These conditions pre-date 1975.

Bull trout are in the char genus within the salmonid family, and Oregon is at the southern end of the char range in the coastal region. Char are more abundant in the colder inland climates of Idaho and Montana and further north in Canada and Alaska. Bull Trout spawning and juvenile rearing use typically takes place between August and October and requires very cold water. Bull Trout generally do not spawn in waters with maximum temperatures above 12 °C. Bull trout in Oregon are adfluvial and may migrate long distances in the winter to feed in mainstem rivers and large lakes. Therefore, while they may be present in warmer low elevation streams and rivers, they are using those waters for foraging, migration and overwintering during the sub-adult and adult life stages, not for spawning and juvenile rearing. DEQ protects foraging, migration and overwintering use through its Core Cold Water criterion of 16°C as a 7-day average maximum.

Oregon's water quality criterion is 12°C, which must be attained as a 7-day average maximum during the maximum temperature period in the summer. For some streams, DEQ has information that the temperature conditions needed to support the use, 12°C as a 7-day average maximum, are not present and that it is highly unlikely the stream has attained 12°C at any time since 1975. This information is presented as part of the justification under Factor 1 below. The same temperature information used to show that a stream cannot attain 12° under natural conditions supports the conclusion that it also has not attained 12° at any time since 1975.

In other streams, DEQ has information that physical conditions needed to support Bull Trout Spawning, are not present and have never present. This information is presented as part of the justification under Factor 1 below. Bull Trout Spawning takes place principally in third and fourth order streams with low gradient areas (less than 2%), gravel/cobble substrate and water depths between 0.1 and 0.6 meters and velocities from 0.09 to 0.61 m/sec. Proximity of cover for adult fish before and during spawning is an important habitat component.[56] The distribution of waters that naturally maintain these conditions in Oregon is very limited.

In one instance, DEQ is adjusting the use to align with more precise habitat mapping in a one mile stretch of Lake Billy Chinook that had previously been classified as a river. The habitat in this stretch has existed as such since the construction of the Round Butte Dam in 1964.

The USFS Climate Shield model provides additional relevant information on existing use.[57] Climate Shield is a model that predicts the likelihood of Bull Trout presence in the years 1980, 2040 and 2080 based on predictively modeled NorWeST temperature data, stream slope and flow. For the 1980 scenario, temperature predictions were set to a baseline of 1970-1999 data. In waters where the Climate Shield 1980 scenario indicates no probability of Bull Trout presence and the FHD agrees, DEQ has a high level of certainty that Bull Trout is not an existing use. DEQ is retaining the bull trout spawning use in most waters where the Climate Shield data indicates a greater than 0% probability of Bull Trout presence in 1980. This is a conservative assumption because the possible presence of Bull Trout does not necessarily indicate that the waters supported Bull Trout spawning use, which has more narrow habitat requirements than Bull Trout foraging, migration and overwintering. In some cases, these waters do not have the physical characteristics (described below) to support Bull Trout spawning or the 12 °C criterion is not attainable. In these waters, DEQ has provided available evidence indicating why the physical conditions or natural temperatures of the waters do not support Bull Trout spawning use and have not since 1975.

3.2.3 UAA Factor that precludes attainment of use

3.2.3.1 Updates based on UAA Factor 1

DEQ is updating uses in certain waters in the Deschutes River Basin and Klamath Basin from Bull Trout spawning and juvenile rearing use to core cold water use. DEQ also is updating waters upstream of Bull Trout spawning habitats, which were designated to protect the upstream cold water. These updates are justified under 40 CFR 131.10(g), Factor 1: “Naturally occurring pollutant concentrations prevent the attainment of the use.” Site-specific information for these waters is provided below.

[56] Camefix, G. 2003. Bull Trout Species Description, American Fisheries Society, Montana Chapter website. https://units.fisheries.org/montana/science/species-of-concern/species-status/bull-trout/. Visited February 28, 2023.

[57] Isaak, D.J., M.K. Young, D.E. Nagel, D.L. Horan and M.C. Groce. 2015. The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century. Global Change Biology 21, 2540–2553. Online maps of Climate Shield outputs are available at: https://apps.fs.usda.gov/arcx/rest/services/EDW/EDW_ClimateShield_01/MapServer.

Deschutes River Basin (Figure A-9)

Crescent Creek. The Upper and Lower Deschutes Bull Trout Working Group determined that temperatures in Crescent Creek are not suitable for Bull Trout spawning. Crescent Creek is the outlet from Crescent Lake, a large natural lake lying high on the east slope of the Cascades at an elevation of 4839 feet. [58] The lake is in surrounded by thick coniferous forest. There are no known point or nonpoint sources of anthropogenic warming of Crescent Creek. The surrounding watershed consists almost entirely of the Diamond Peaks wilderness area and the Oregon Cascade Recreation Area, which is managed as a substantially undeveloped area.[59]

Climate Shield data indicate no probability that Bull Trout presence occurred in Crescent Creek based on modeled 1980 conditions. Climate Shield data does indicate a greater than 0% probability of Bull Trout presence in tributaries to Crescent Lake. DEQ has retained the Bull Trout Spawning and Juvenile Rearing Use in those streams.

Although Crescent Lake is a natural lake, it has been modified for irrigation use. A dam was initially constructed in Crescent Creek at the outlet of Crescent Lake in 1922 to provide water to the Tumalo Irrigation District. After the dam began to fail, the Bureau of Reclamation reconstructed the Crescent Lake Dam in 1955. The lake continues to provide irrigation water for grain, alfalfa, hay and pastureland in central Oregon.

Water quality in Crescent Lake is distinctly oligotrophic. The lake is sometimes exposed to strong winds, which produce a relatively deep (50 to 60 feet) thermocline during summer stratification. The thermocline contributes to high temperatures in the lake and at its outlet to Crescent Creek, which rise well above the 12 °C Bull Trout Spawning and Juvenile Rearing criterion during the summer (Figure 3-12). Dam withdrawals increase flow to Crescent Creek, cooling summer water temperatures along Crescent Creek and further downstream in the Little Deschutes River.[60] Thus, removing the water releases, would likely increase temperatures in Crescent Creek above those shown in Figure 3-12. In addition, given the elevation and the forested setting, it would not be possible to reduce the stream temperatures through increased shade to meet 12°C. As a result, Bull Trout Spawning and Juvenile Rearing Use is unattainable in Crescent Creek due to natural thermal conditions.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation two side channels of Crescent Creek. In these cases, there was no Bull Trout spawning and juvenile rearing habitat in the tributaries based on FHD data or the USFWS critical habitat rule. They were designated only because

[58] Information taken from Johnson, et al. 1985. *Atlas of Oregon Lakes*.

[59] Deschutes National Forest. 1990. Deschutes Forest Plan. See map for selected alternative: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5347258.pdf

[60] See DEQ, 2012. Upper and Little Deschutes Subbasins TMDLs: Context for Reviewing Watershed Sciences Temperature Modeling Reports. P. 29.

they are upstream of reaches that were proposed as potential habitat. These waters are not critical habitat for Bull Trout spawning and juvenile rearing according to USFWS. ODFW does not and never has considered them suitable habitat for potential restoration.

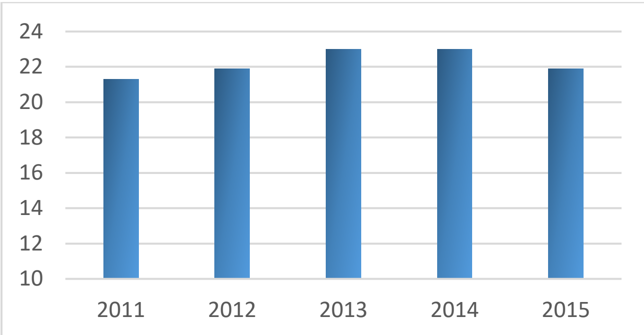

Figure 3-12. Maximum 7-day Average Daily Temperature (°C), Crescent Creek, 2011-2015. Data provided by Upper and Lower Deschutes Bull Trout Working Group.

Big Marsh Creek. DEQ is updating Bull Trout Spawning and Juvenile Rearing Use in the lower portion of Big Marsh Creek. Climate Shield data indicate no probability that Bull Trout presence occurred in this portion of Big Marsh Creek based on modeled 1980 conditions. This reach was identified as potential Bull Trout spawning habitat in 2003, but the current Bull Trout Working Group for the Deschutes basin does not consider it potential habitat. Big Marsh Creek is a Wild and Scenic River from its headwaters to its mouth at Crescent Creek. The Management Plan for Big Marsh Creek has prohibited livestock grazing and planned timber harvest since at least 2010, if not before.[61] The current stream conditions are not degraded and are close to its expected natural condition. Therefore, the attainable condition is not expected to be significantly different from it's current condition.

A 1997 Deschutes National Forest Report indicated that there is a marsh in this reach because the river channel doesn't have the capacity to carry all of the water in the stream.[62] As a result, excess water spreads out within the marsh. Due to the higher retention time, water temperatures in the area where DEQ is updating the use are warm and thus would not support Bull Trout Spawning (Figures 3-13 and 3-14), except in south of the marsh, which will maintain the Bull Trout Spawning and Juvenile Rearing Use designation. The report notes that this section of the river likely supported Bull Trout foraging and migration, but not spawning. NorWeST model data, which indicates that 7-DADM temperatures are 17.74 °C in the south of the marsh, 20.86 °C in the middle of the marsh and 21.51 °C in the north of the marsh. In short, temperatures in this portion of Big Marsh Creek, which is in relatively undisturbed condition due to its status as a Wild and Scenic River, are historically higher than temperatures that support Bull Trout Spawning and Juvenile Rearing use (12°C or 54°F).

[61] Crescent Ranger District, Deschutes National Forest. 2010. Big Marsh Creek and the Little Deschutes River, Wild and Scenic Rivers Management Plan. 30 pp.

[62] Crescent Ranger District, Deschutes National Forest. 1997. Modified Level II Stream Inventory, Big Marsh Creek. 20 pp.

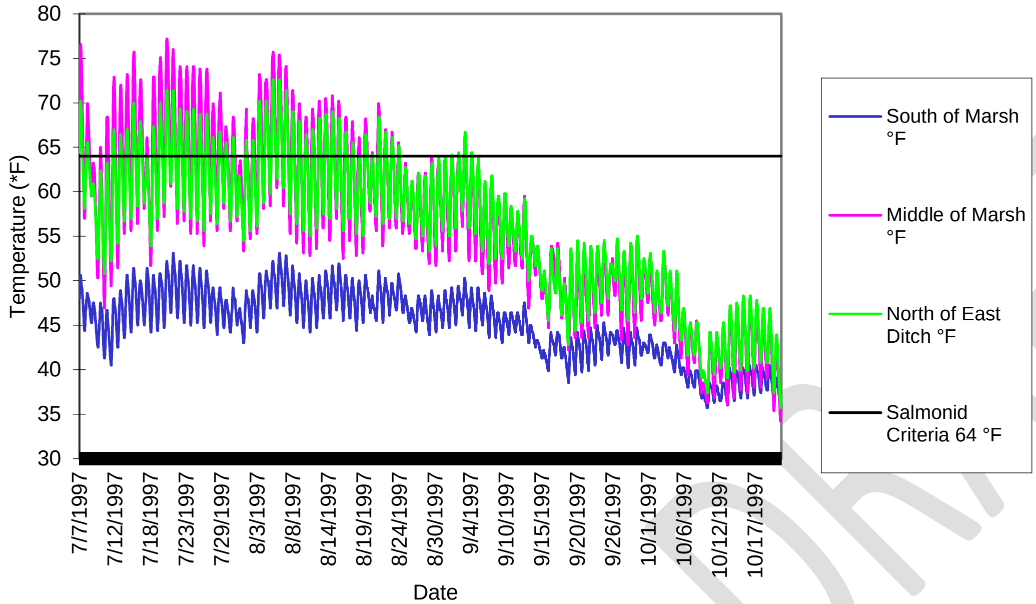

FIGURE 12. Temperatures in Big Marsh Creek from 7/7/97-10/11/97.

Figure 3-13. Water Temperatures, Big Marsh Creek. Source: Crescent Ranger District, Deschutes National Forest. 1997. Modified Level II Stream Inventory, Big Marsh Creek.

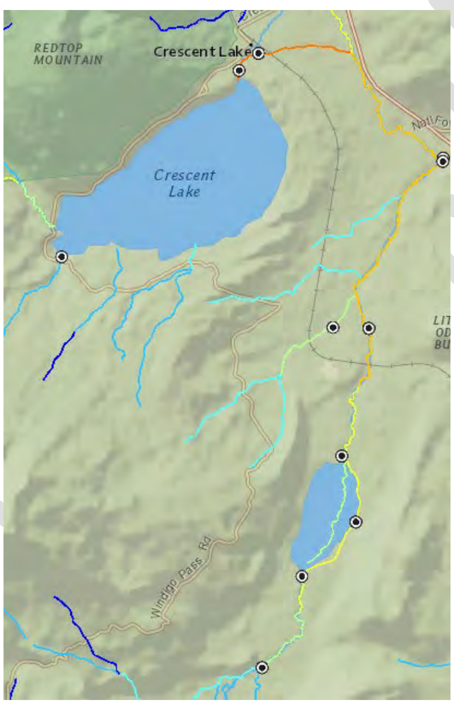

Figure 3-14. Presumed locations of North (Green), Middle (Pink) and South (Blue) locations of Big Marsh Creek data in Figure 3-6. The 1997 report did not include a map, but there is matching 1997 data in the NorWeST database at these locations.

Crane Prairie Reservoir, Wickiup Reservoir, and Deschutes River (Figure A-10). DEQ is proposing to update the Bull Trout Spawning and Rearing Use designation to Salmon and Trout Rearing and Migration in Crane Prairie Reservoir, Wickiup Reservoir and the stretch of the Deschutes River between the two reservoirs, and from Little Lava Lake to Crane Prairie Reservoir. The Upper Deschutes Bull Trout Working Group determined that these reservoirs and river reaches are not potential Bull Trout Spawning and Rearing habitat. DEQ is maintaining the Bull Trout Spawning and Juvenile Rearing Use in several tributaries to the two reservoirs because Climate Shield data indicate the potential presence of Bull Trout based on modeled 1980 conditions.

The Bureau of Reclamation constructed the Wickiup Dam on the Deschutes River in 1949, creating Wickiup Reservoir. Local irrigation districts built the Crane Prairie Dam on the Deschutes River in 1922, which was then rebuilt by the U.S. Bureau of Reclamation in 1940, creating Crane Prairie Reservoir. Both reservoirs are primarily used for irrigation by several irrigation districts, as well as for recreation. The Deschutes River flows from its headwaters near Lava Lake downstream to Crane Prairie reservoir and then again between the two reservoirs. Streamflow in the Deschutes River is affected by the two dams.[63] Summer temperature is also affected by high permeability of upper Deschutes Basin geology, which results in waters having particularly low flow during the summer months once snowmelt has subsided.[64]

Temperature data and modeling indicate that the Bull Trout spawning and juvenile rearing criterion is not attainable in these reaches of the Deschutes River. even absent the reservoirs and with full flow. Temperature data provided by the Upper and Lower Deschutes Working Group indicate that maximum summer 7-DADM temperatures are much higher than 12℃ in the waters where DEQ is updating Bull Trout spawning use (Table 3-3). Current NorWeST data in these streams range from 17.1 ℃ near the mouth of Little Lava Lake to 23.1°C in and just downstream of Crane Prairie Reservoir.

A 2008 report presented modeling conducted using Heat Source in the mainstem Deschutes River (Figure 3-15). The modeling included a “Natural Flow” scenario that removed reservoir and irrigation influences. Based on that scenario, peak 7-DADM temperatures cannot attain the 12℃ temperature that supports Bull Trout spawning throughout the river, including in its headwaters at Little Lava Lake.

The model did not account for impacts of increased shade. However, the Deschutes National Forest manages much of this area for “intense recreation,” which prohibits programmed timber harvest and limits livestock use, while improving fish habitat.[65] As a result, impacts of stream vegetation disturbance are minor, particularly in the upper portion of the area, and this reach is in a relatively undisturbed

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63 Watershed Sciences, Inc. and MaxDepth Aquatics, Inc. 2008. Deschutes River, Whychus Creek, and Tumalo Creek Temperature Modeling. Prepared for Oregon DEQ. 93 pp.

64 Gannett, M.W., Lite, Jr., K.E., Morgan, D.S., and Collins, C.A., 2001, Ground-water hydrology of the upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 00-4162, 74 p.

65 Deschutes National Forest. 1990. Land Resource Management Plan. See pages 4-135 – 4-139.

condition with little potential for restoration that would reduce stream temperature. Based on this information, the Bull Trout Spawning and Rearing standard of 12°C is unattainable in these waters.

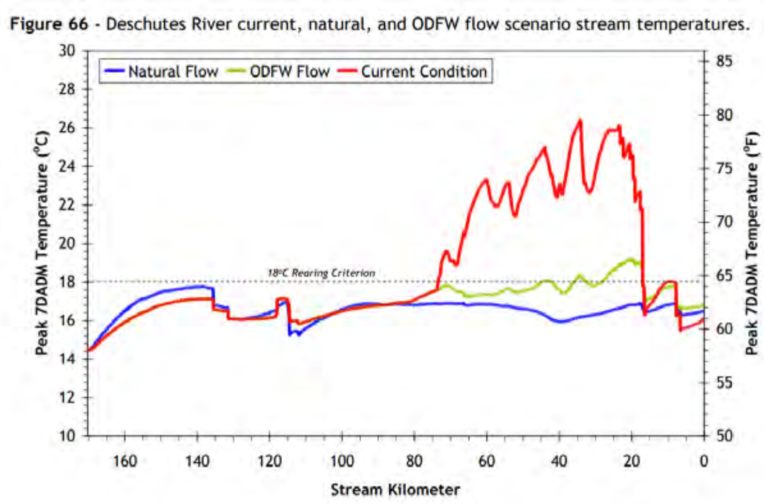


Figure 3-15. Temperature modeling for the Deschutes River. Excerpted from Watershed Sciences, Inc. and MaxDepth Aquatics, Inc. 2008. Deschutes River, Whychus Creek, and Tumalo Creek Temperature Modeling. Prepared for Oregon DEQ. 93 pp.

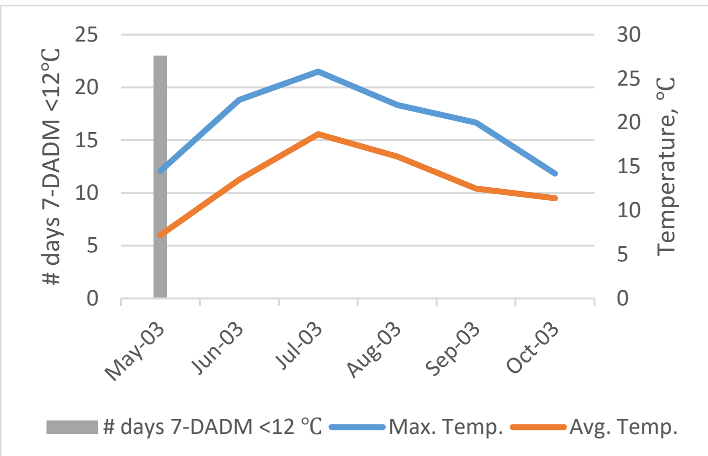
Table 3-3. Temperature data, Upper Deschutes River. Provided by Upper and Lower Deschutes Bull Trout Working Group.

	Maximum Yearly 7-Day Average Daily Temperature (°C)		
	Deschutes River at Cow Meadow Campground	*Deschutes River at Blue Pool*	*Deschutes River at Brown's Crossing*
2008			*21.8*
2010			*22.9*
2011	*16.7*		
2012	*17.3*		
2013	*19.0*	*18.4*	
2014	*18.5*	*14.2*	

Klamath River Basin

South Fork Sprague River and tributaries (Figure A-11). ODFW classified these waters as potential Bull Trout spawning habitat in 2003. The current Klamath Basin Bull Trout Working Group does not consider the South Fork Sprague River potential Bull Trout spawning habitat because thermal conditions are not suitable for Bull Trout spawning. As shown in Figure 3-16, maximum 7-DADM stream temperatures far exceed the 12°C criterion associated with the Bull Trout Spawning and Rearing Use. DEQ temperature modeling in the Upper Klamath Lake Drainage Temperature TMDL supports the conclusion that the 12° criterion is unattainable. Modeling indicates that, besides the uppermost 2-3 miles, the South Fork Sprague River has a maximum natural temperature greater than 12.0 °C (53.6 °F), accounting for potential channel width, site cover and flow (Figure 3-17). There are no point sources to the South Fork Sprague River.[66]

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of reaches that were proposed as potential habitat and is now being update. There was no Bull Trout spawning habitat in the tributary itself based on FHD data or the USFWS critical habitat rule. These waters were never proposed to be critical habitat for Bull Trout spawning and juvenile rearing according to USFWS. ODFW does not and never has considered them accessible or suitable habitat for such use based on their physical conditions.



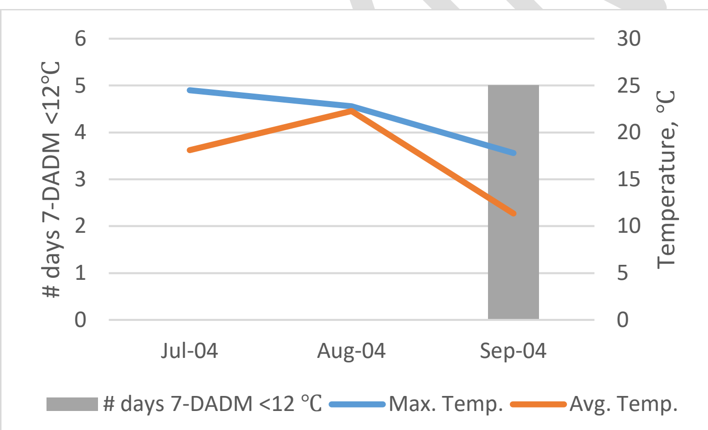


Figure 3-16. Stream temperature, South Fork Sprague River upstream of confluence with Brownsworth Creek, 2003-2004. Data provided by Klamath Basin Bull Trout Working Group. Note: 2003 data runs from May 1 - Oct. 7. 2004 data runs from Jul. 12-Sept. 30.

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[66] Oregon DEQ. 2002. Upper Klamath Lake Drainage TMDL and Water Quality Management Plan.

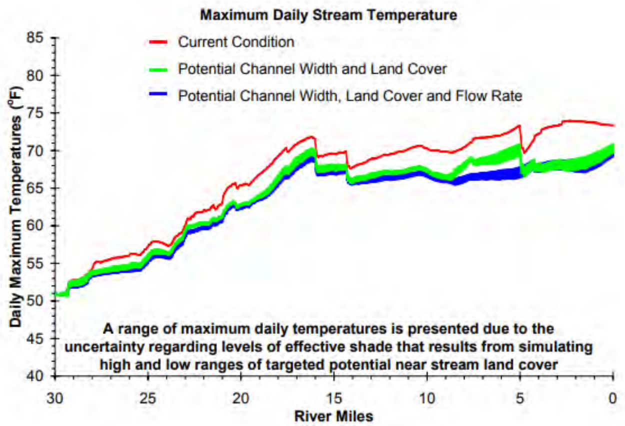

Figure 3-17. Maximum daily temperature, South Fork Sprague River under current condition and modeled conditions. Source: Oregon DEQ. 2002. Upper Klamath Lake Drainage TMDL and WQMP. The blue column represents system potential condition with no measurable surface water temperature increase resulting from anthropogenic conditions including modifications to channel width, land cover and flow.

3.2.3.2 Updates based on UAA Factor 4: dams, diversions or other types of hydrologic modifications preclude attaining the use

Metolius River/Lake Billy Chinook. (Figure A-12)

In 2003, DEQ designated Bull Trout spawning and juvenile rearing use in the Metolius River. The designation began just upstream of Lake Billy Chinook, based on ODFW data. Lake Billy Chinook was formed by construction of the Round Butte Dam, a hydroelectric dam, in 1965. The dam is jointly operated by Portland General Electric and the Confederated Tribes of Warm Springs. It was relicensed in 2004 with requirements for several improvements for water temperature and fish passage.

When DEQ initially designated the waters upstream of the reservoir for Bull Trout Spawning and Rearing Use, ODFW did not have accurate information regarding the upper extent of the Metolius arm of Lake Billy Chinook or the lower extent of the Metolius River. As a result of improved surveying, the location of suitable spawning habitat in ODFW's distribution database has shifted upstream by approximately one mile. Climate Shield data indicate no probability of Bull Trout presence in this reach based on modeled 1980 conditions. DEQ is updating the extent of Bull Trout Spawning and Juvenile Rearing use to align with the survey data and not include this one mile stretch now known to be part of the reservoir. The reservoir reach does not have appropriate physical habitat conditions, such as gravel substrate, cover, channel stability and streamflow velocities to support Bull Trout spawning.

It is not feasible to restore original conditions in this one mile stretch of the river. The Round Butte dam is the largest hydropower complex completely in Oregon and is needed to provide energy to Oregon residences and businesses. It is not currently feasible to modify operations to allow spawning in the one mile stretch of the waters where DEQ is updating Bull Trout Rearing and Migration use. The project already has significantly modified operations to allow for salmon restoration. These improvements included construction of a selective water withdrawal tower. The withdrawal tower creates currents that attract salmon and steelhead into collection facilities so they can be transported around the dams. The facility allows the water released below the dam to more closely match thermal and flow conditions that would be expected absent the dam, while continuing to allow electricity generation.[67] Further modifications to restore Bull Trout Spawning Use to a one mile stretch of would require lowering the lake level and would impact these efforts.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for three tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of this reach of Lake Billy Chinook. Climate Shield data indicate the potential presence of Bull Trout in upper reaches of both Street Creek and Spring Creek. However, there is no Bull Trout spawning habitat in the tributaries based on FHD data or the USFWS critical habitat rule, nor is the habitat considered historical habitat in FHD. These tributaries were designated only because they are upstream of reaches that were proposed as potential habitat. As a result, DEQ is updating the use in these tributaries. These waters do not support Bull Trout spawning and juvenile rearing according to either USFWS or the Bull Trout Working Group for the lower Deschutes, nor is such use an existing use based on best available information.

3.2.3.3 Updates based on UAA Factor 5

The following updates are justified under 40 CFR 131.10(g), Factor 5: “Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses.”

Because Bull Trout spawning has the most sensitive habitat requirements, this analysis focuses on the attainability of spawning.[68] Compared to other salmonids, Bull Trout have narrow habitat requirements that influence their distribution and abundance, particularly in spawning waters. Spawning Bull Trout they require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and, because they are adfluvial, unblocked migratory corridors. Watersheds must have specific physical characteristics to provide successful spawning and rearing habitat. Bull Trout Spawning takes place principally in third and fourth order streams with low gradient areas (less than 2%), gravel/cobble substrate and water depths between 0.1 and 0.6 meters and velocities from 0.09 to 0.61 m/sec.

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67 https://assets.ctfassets.net/416ywc1laqmd/3XGy89Dj28GqLCJzh8jzDa/362c67509c368b5d871e6be4eb42c1d6/selective-water-withdrawal-tower.pdf. Visited April 12, 2022

68 See discussion on p. 10 of McPhail, J.D. and J.S. Baxter. 1996. A Review of Bull Trout (*Salvelinus confluentus*) Life-History and Habitat Use in Relation to Compensation and Improvement Opportunities. Fisheries Management Report No. 104, Dept. of Zoology, Univ. of British Columbia, Vancouver, BC.

Proximity of cover for adult fish before and during spawning is an important habitat component.[69] Spawning begins August 15 to September 1 in eastern Oregon basins and hatch occurs by the end of April or May. Streamflow in these reaches is often at their its lowest in August and September. Activities that affect channel stability or alter stream flow during this time may decrease egg and young juvenile survival.[70]

These waters are not currently Bull Trout spawning and juvenile habitat. ODFW previously identified these waters as potential Bull Trout spawning and juvenile rearing habitat in 2003. The Bull Trout Working Groups determined that the physical conditions of the habitat are not suitable or accessible in order to support Bull Trout spawning and juvenile rearing use. ODFW provided supporting information from the Bull Trout Working Groups regarding why the physical conditions of these streams and reservoirs do not support Bull Trout spawning. DEQ has included additional supporting information.

Deschutes Basin (Figure A-13)

North Davis Creek, Whitefish Creek and tributaries to Crane Prairie Reservoir. DEQ is updating the Bull Trout Spawning and Juvenile Rearing Use in a number of streams in the Upper Deschutes Basin that are intermittent or have insufficient flow to support Bull Trout spawning. As noted earlier in this chapter, to support spawning, Bull Trout typically spawn between August and October and require water depths between 0.1 and 0.6 meters and velocities from 0.09 to 0.61 m/sec. Many smaller tributaries in the upper Deschutes basin are intermittent during the spawning period, due to the high permeability of the Deschutes Formation, which prevents discharge until groundwater hits the low permeability rock of the John Day formation in the area by Pelton Dam.[71] DEQ compared streams in the upper Deschutes to the intermittent data layer in NHD Plus. See Figures 3-18 to 3-20. Streams currently designated for Bull Trout Spawning and Juvenile Rearing Use that are intermittent are indicated by the yellow lines with brown outlines. Almost all of the waters west of Crane Prairie reservoir are intermittent. The exception is the lower portion of Cultus Creek and Little Cultus Lake and portions of its tributaries. However, there is no connectivity between Little Cultus Lake to downstream areas, precluding the Bull Trout Spawning and Juvenile Rearing Use due to lack of access. Moreover, ODFW has noted that the lack of flow precludes

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[69] Camefix, G. 2003. Bull Trout Species Description, American Fisheries Society, Montana Chapter website. https://units.fisheries.org/montana/science/species-of-concern/species-status/bull-trout/. Visited February 28, 2023.

[70] See discussion of Bull Trout habitat characteristics on page 53 of U.S. Fish and Wildlife Service 2014. Biological Opinion/Letter of Concurrence/Conference Concurrence on US EPA Approval of Oregon Water Quality Standards for Temperature and Intergravel Dissolved Oxygen. FWS reference: 01EOFWO0-2014-F-0087. Oregon Fish and Wildlife Office. Portland, OR. 303 pp.

[71] Gannett, M.W., Lite, Jr., K.E., Morgan, D.S., and Collins, C.A., 2001, Ground-water hydrology of the upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 00-4162, 74 p.

fall spawning in Deer and Cultus Creek.[72] Upstream of Crescent Lake, a portion of Whitefish Creek is not intermittent; however, ODFW notes that the flow of Whitefish Creek is 0.5 ft^3/s during the summer and may go subsurface, which would preclude Bull Trout spawning.[73]

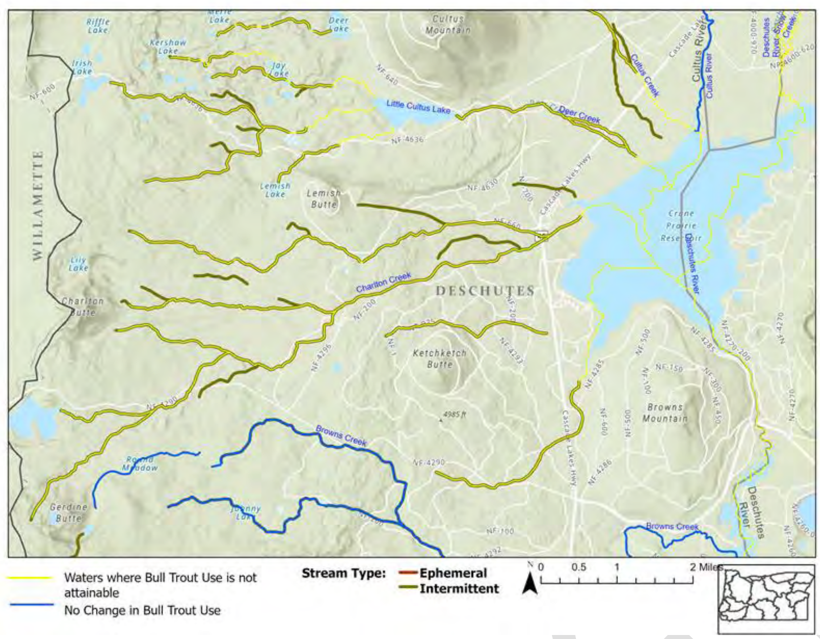

Figure 3-18. Intermittent streams near Crane Prairie Reservoir.

[72] Fies, T., J. Fortune, B. Lewis, M. Manion, S. Marx. 1996. Upper Deschutes River Subbasin Fish Management Plan. Prepared by Upper Deschutes Fish District, Oregon Department of Fish and Wildlife. See p. 124.

[73] Fies, T., J. Fortune, B. Lewis, M. Manion, S. Marx. 1996. Upper Deschutes River Subbasin Fish Management Plan. Prepared by Upper Deschutes Fish District, Oregon Department of Fish and Wildlife. See p. 172.

Figure 3-19. Intermittent streams near Crescent Lake Reservoir.

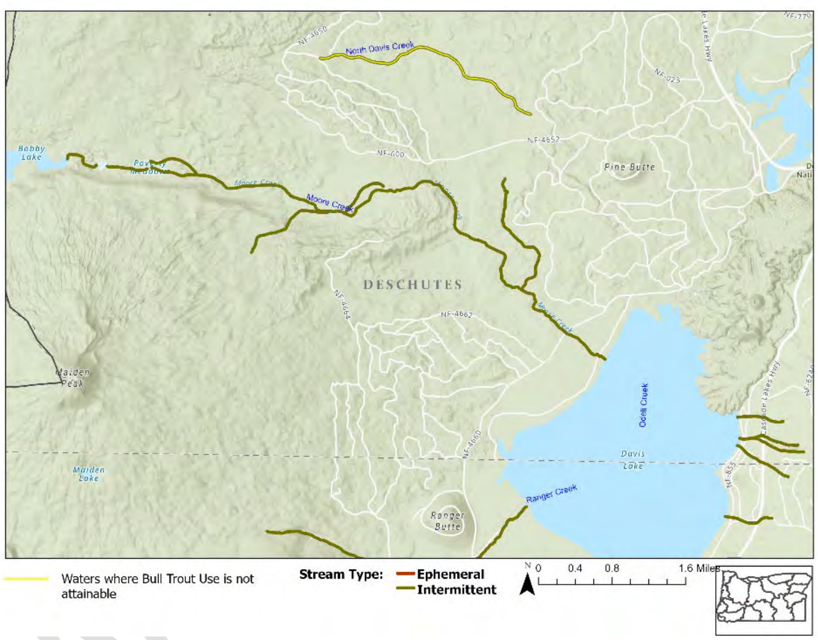

Figure 3-20. Intermittent stream, North Davis Creek.

Odell Lake. DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use in Odell Lake. It is unclear why this lake was designated for Bull Trout Spawning and Juvenile Rearing Use in 2003.

Odell Lake is a moderately large, deep natural lake located in the Oregon Cascades Range, adjacent to Willamette Pass. The lake was formed as a glacial trough during the ice-age approximately 11,000 years ago. Three major tributaries and several intermittent streams flow into Odell Lake. The lake's surface water discharges through the outlet at Odell Creek on the east end. As noted in the introduction to this section, Bull Trout spawning and juvenile rearing requires stable stream channels, moderate flow, clean spawning and rearing gravel, and complex and diverse cover. These physical conditions do not exist in a natural lake. As a result, Bull Trout Spawning and Juvenile Rearing Use is not attainable in Odell Lake.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for certain tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of Odell Lake. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on Bull Trout Working Group input. ODFW does not and never has considered these tributaries as accessible or suitable bull trout spawning habitat based on their physical conditions. To be conservative, DEQ is retaining the Bull Trout Spawning and Juvenile Rearing use in tributaries where Climate Shield data indicate a possibility of Bull Trout presence based on modeled 1980 conditions, including Wharf Creek and a small portion of Crystal Creek near its mouth.

Klamath River Basin (Figure A-14)

Sycan River Core Area. In 2003, DEQ designated waters in the Sycan River subbasin for Bull Trout spawning based on the best information available at the time regarding spawning distribution in the area. Since then, ODFW expended significant effort to monitor Bull Trout migratory behavior and Brook Trout (a competitor to Bull Trout) distribution.[74] While there are Bull Trout upstream of Sycan Marsh, ODFW did not monitor Bull Trout within the marsh, as it does not have the appropriate gravel substrate or flow velocity to support Bull Trout spawning. Climate Shield data indicate no probability of Bull Trout presence in this area based on modeled 1980 conditions.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of potential habitat. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on FHD data or the USFWS critical habitat rule. They were designated only because they are upstream of reaches that were proposed as potential habitat. These waters are not critical habitat for Bull Trout spawning and juvenile rearing according to USFWS. ODFW does not and never has considered them accessible or suitable habitat for such use based on their physical conditions.

Willamette River Basin (Figure A-15)

McKenzie River watershed. In 2003, these streams were identified as "primarily spawning" in the FHD based on ODFW's best professional judgment. These streams have coarse substrates, strong flows, and little holding water, which are not habitat conditions that support Bull Trout spawning.[75] ODFW staff

[74] ODFW. 2005. Oregon Native Fish Status Report – Volume II: Assessment Methods & Population Results. 573 pp. Discussion of Bull Trout in the Klamath Lake Species Management Unit begins on page 463.

[75] *Pers. Comm.,* Stephanie Gunckel, Statewide Bull Trout Coordinator, Oregon Department of Fish and Wildlife, April 1, 2022.

have conducted spawning surveys around the basin and have not documented spawning activity in these sections of the river. As a result, the "primarily spawning" designation in FHD was reclassified to "primarily rearing" in the FHD. These waters serve as rearing habitat for sub-adult and adult Bull Trout, not for juvenile Bull Trout. This designation is consistent with the USFWS Critical Habitat rule, which classifies these waters as critical habitat for FMO, but not for spawning and rearing.[76]

Bull Trout Spawning and Juvenile Rearing use is unattainable in these waters due to physical conditions. Specifically, flow conditions do not support Bull Trout Spawning and Juvenile Rearing Use. As noted in the introduction to this section, Bull Trout tend to spawn in third and fourth order streams with velocities between 0.09 and 0.61 ft/sec. DEQ analyzed modeled stream velocity information from the NHD Plus Version 2 dataset. DEQ evaluated monthly mean streamflow in August, which is the beginning of spawning season for Bull Trout and a good estimate of minimum flow. As a conservative estimate, DEQ used a threshold of 0.07 and 0.70 ft/sec as an acceptable range of velocities that would support Bull Trout Spawning. As shown in Figure 3-21, mean August velocities in these waters have stream velocities higher than this threshold. Velocities in the reach of the McKenzie River and Horse Creek where DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use range from 0.95 to 1.71 ft/sec, which is outside the range of stream velocities that would support Bull Trout Spawning and Juvenile Rearing Use.

[76] USFWS 2010. Bull Trout Critical Habitat Final Rule Justification. Idaho Fish and Wildlife Office, Boise, Idaho, Pacific Region, Portland, OR. 1035 pp. Discussion of streams included as FMO habitat in the Upper Willamette Critical Habitat Unit start on p. 217.

[76] See Final Critical Habitat rule *at* 75 FR 63899 and 63902.

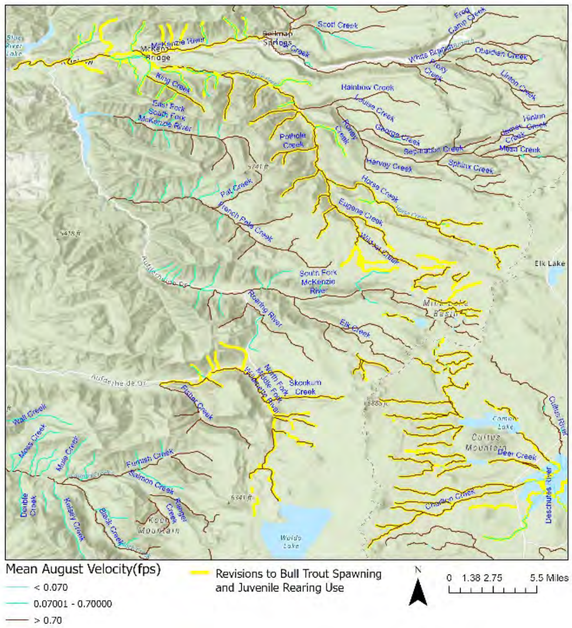

Figure 3-21. Mean August Stream Velocity, McKenzie River Basin and North Fork Middle Fork Willamette River. Source: NHD Plus Version 2.

The area where DEQ is updating Bull Trout Spawning and Juvenile Rearing Use includes much of the Horse Creek sub-watershed, other than Separation Creek and its tributaries. In addition to flow velocity, substrate in the upper Horse Creek watershed upstream of Separation Creek, does not support Bull Trout spawning use. Specifically, the substrate, which is influenced by glacial deposits from the Sisters Wilderness, is dominated by boulders and large cobble, rather than gravel.[77] As such, this portion of Horse Creek does not support Bull Trout spawning, which requires gravel.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of reaches that were proposed as potential habitat. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on FHD data or the USFWS critical habitat rule. These waters are not critical habitat for Bull Trout spawning and juvenile rearing according to USFWS. ODFW does not and never has considered them accessible or suitable habitat for such use based on their physical conditions.

North Fork Middle Fork Willamette River watershed (Figure A-15). ODFW conducted a thorough study of streams in the N.F. M.F. Willamette River, Salmon Creek and Salt Creek subbasins to see which waters could support reintroduction of Bull Trout.[78] The study involved field investigations examining habitat

[77] Willamette National Forest. 1997. Horse Creek Watershed Analysis. Prepared by McKenzie Ranger District. See pages 8-9.

[78] Zymonas, N.D., J.V. Tranquilli, M.J. Hogansen, M.P. Scheur and A.S. Harrison. 2021. Bull Trout Research and Monitoring in the Upper Willamette Basin. ODFW Progress Report Series. Oregon Department of Fish and Wildlife. Corvallis, OR. 158 pp.

suitability and determined that Bull Trout Spawning and Juvenile Rearing was not supported in many of these waters due to physical conditions. In the study, ODFW did the following:

- Assessed existing information on historical and recent conditions to identify general areas and some specific tributaries potentially having cold water temperatures.
- Collected point water temperatures mid-day during July or August to characterize summertime high temperatures throughout watersheds and identify specific tributaries and reaches having sufficiently cold water and assess discharge and general habitat conditions at each site.
- For the subset of tributaries having potentially sufficient cold spring-dominated flow to support Bull Trout spawning and early rearing:
  - Identified barriers to upstream migration from the mainstem.
  - Characterized habitat throughout the accessible reaches.
  - Installed temperature loggers to collect year-round water temperature data; and
  - Characterized the fish assemblage in the reaches potentially most suitable for Bull Trout.

Based on these field investigations, ODFW revised its previous assessment of suitable Bull Trout spawning and juvenile rearing habitat in the N.F. M.F. Willamette Basin. Specifically, ODFW determined that the N.F. M.F. Willamette River and lower portions of Salt Creek and Salmon Creek cannot support Bull Trout and Juvenile Rearing due to physical conditions. DEQ is proposing to revise its use maps accordingly.

In addition, DEQ's analysis of flow conditions suggest that they do not support Bull Trout Spawning and Juvenile Rearing Use in the North Fork Middle Fork Willamette. As noted in the introduction to this section, Bull Trout tend to spawn in third and fourth order streams with velocities between 0.09 and 0.61 ft/sec. DEQ analyzed modeled stream velocity information from the NHD Plus Version 2 dataset. DEQ evaluated monthly mean streamflow in August, which is the beginning of spawning season for Bull Trout and a good estimate of minimum flow. As a conservative estimate, DEQ used a threshold of 0.07 and 0.70 ft/sec as an acceptable range of velocities that would support Bull Trout Spawning. As shown in Figure 3-21 in the previous section, mean August velocities in these waters have stream velocities higher than this threshold. Velocities in the reach of the North Fork Middle Fork Willamette River where DEQ is revising the Bull Trout Spawning and Juvenile Rearing Use range from 1.04 to 1.41 ft/sec, which is outside the range of stream velocities that would support Bull Trout Spawning and Juvenile Rearing Use.

DEQ is also updating the Bull Trout Spawning and Juvenile Rearing use designation for tributaries that were designated for Bull Trout spawning in 2003 only because they are upstream of potential habitat. In these cases, there was no Bull Trout spawning habitat in the tributary itself based on FHD data or the USFWS critical habitat rule. They were designated only because they are upstream of reaches that were proposed as potential habitat. These waters are not critical habitat for Bull Trout spawning and juvenile rearing according to USFWS. ODFW does not and never has considered them accessible or suitable habitat for such use based on their physical conditions.

3.2.4 Highest attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for all waters described above, other than most waters of the Deschutes basin, is core cold water habitat. Core Cold Water Habitat Use is the most stringent year-round use besides Bull Trout Spawning and Juvenile Rearing. Core Cold Water Use protects sub-adult and adult Bull Trout use and other cold water biota. In the Deschutes basin, waters of Lake Billy Chinook and tributaries, the upper Deschutes River from its headwaters to Crane Prairie Reservoir, and Odell Lake and tributaries also have the highest attainable use of Core Cold Water habitat. Factor 131.10(g)(1) (for the Deschutes River upstream of Crane Prairie Reservoir and the North Fork Sprague River and tributaries), Factor 131.10(g)(4) (for the Metolius River/Lake Billy Chinook) and (5) (for all other waters) precludes the Bull Trout Spawning and Juvenile Rearing use but it doesn't preclude Core Cold Water Habitat use, which doesn't require as stringent habitat requirements, as described in 3.2.3.2 (stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors.) In addition, the temperature criterion for Core Cold Water Use is 16° rather than 12°C, and therefore attainable in more mountain and foothills streams under natural conditions.

In other areas of the Deschutes Basin, the highest attainable use is Salmon and Trout Rearing and Migration, which is the next most stringent use after Core Cold Water Use. Factor 131.10(g)(1) precludes Bull Trout Spawning and Juvenile Rearing Use. According to FHD, these waters are not suitable habitat (i.e., do not have sufficient physical conditions) to support Bull Trout FMO use, which is a trigger for core cold water use. Nor do they support early Spring Chinook spawning, another trigger for core cold water. In addition, the Core Cold Water Criterion of 16℃ is not attainable based on the information provided in Section 3.2.3.1. As a result, Core Cold Water Use is not attainable. However, these waters do support suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. As a result, Salmon and Trout Rearing and Migration Use is attainable based on current information available.

3.2.5 Maps

Maps and an inventory table indicating the waters where the Bull Trout Spawning and Juvenile Rearing Use is being updated is included in Appendix A.

4 Updates to Seasonal Salmon and Steelhead Spawning Use

4.1 Spatial extent refinements to Salmon and Steelhead Spawning designations due to change in GIS hydrography or improved ODFW data

4.1.1 Reason for the Use Update

DEQ is refining the spatial extent of the state's Salmon and Steelhead Spawning Use designations in many locations as a result of changing the GIS hydrography base layers DEQ uses for mapping Oregon's streams. Oregon has transitioned from using the StreamNet hydrography in 2003 (1:100,000 scale) to the of NHD-High Resolution National Hydrography Data Set (1:24,000 scale). This is now the Geospatial Framework standard for all state mapping involving hydrography and is therefore consistent with ODFW's mapping hydrography. In 2003, DEQ and its partners did not have the ability to split segments in the StreamNet hydrography to match the extent of ODFW's spawning habitat. If even a small portion of spawning habitat overlapped with a segment, the entire segment was classified as spawning habitat on DEQ's maps. Now that DEQ is using NHD, which contains finer segmentation, use maps can more accurately depict the spawning reach endpoint specified by ODFW (Figure 4-1). The actual upstream extent of spawning habitat has not changed in these streams from that identified by ODFW in 2003. The extent of the original designation is an artifact of the GIS mapping capability and rendering of the maps, not information about the actual condition or use of those portions of the waterbodies. Therefore, these revisions are simply refining the spatial extent of the spawning designation based on the ability to map the use at a finer scale.

DEQ is proposing updates to the spatial extent of Salmon and Steelhead Spawning Use designations based on ODFW data that has been revised since 2003. Since DEQ initially designated Salmon and Steelhead Spawning Use in 2003, ODFW has done additional surveying of spawning habitat and adjusted the upstream extent of spawning habitat in many streams. DEQ is updating Salmon and Steelhead Spawning Use to be consistent with these changes, resulting in some waters where spawning use is being removed and many waters where it is being added

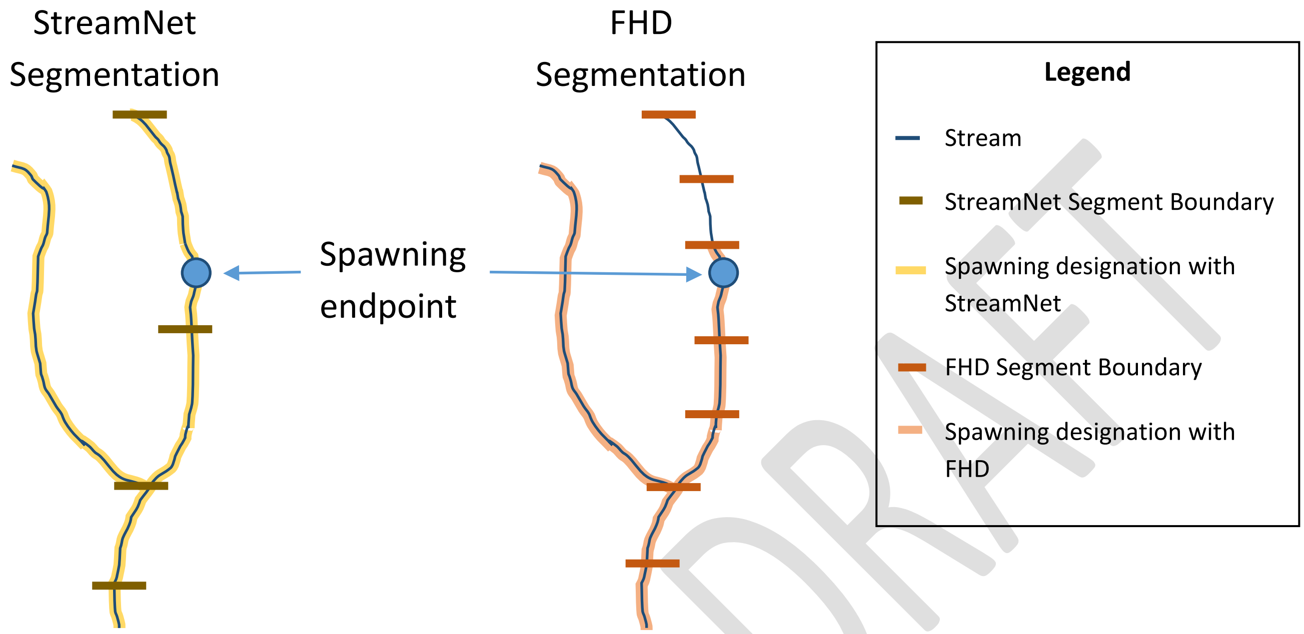

Figure 4-1. Illustration depicting spawning endpoints using StreamNet (1:100000 scale) vs. NHD (1:24000 scale). The ODFW data has not changed, but DEQ's maps can now more accurately match the ODFW data.

4.1.2 Protection of existing uses

The refinements to the spatial extent of the Salmon and Steelhead Spawning Use designations described in this section do not remove existing uses. The data on the extent of spawning use has not changed for these designations since the 2003 mapping. Most of the refinements described here are simply corrections to extent of Salmon and Steelhead Spawning use based on improved GIS hydrography and locate the upstream extent of spawning more precisely. In most cases, the upstream extent is defined by a physical fish passage barrier, such as waters with high gradients, a waterfall, or waters with insufficient flow. To the extent the fish passage barrier is manmade, DEQ did not update the use (see discussion in Section 4.1.3). As a result, the only reason for an update is to more precisely locate a physical passage barrier above which salmon or steelhead cannot spawn and which existed prior to 1975.

For waters where DEQ is updating the use based on improved ODFW data, it is only because ODFW has better survey data indicating the upstream extent of spawning. The reason that spawning cannot extend further upstream is due to the presence of a fish passage barrier, such as waters with high gradients, a waterfall, or waters with insufficient flow. If the change to the upstream extent is due to the presence of a manmade fish passage barrier, DEQ did not update the use (see discussion in Section 4.1.3).

4.1.3 UAA Factor That Precludes Attainment of the Use

These updates to Salmon and Steelhead Spawning Use are justified based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses." Spawning use is not attainable in these waters either because they lack the physical habitat features required for spawning or because they are not accessible due to a natural barrier.

When surveying salmon and steelhead spawning habitat, in addition to identifying spawning fish and redds, ODFW considers the physical habitat characteristics of spawning habitat to determine whether the habitat is suitable and accessible. This information includes an evaluation of upstream migration barriers, spawning gravel ranking (from "none" to "high") and distribution, and a habitat ranking, which considers gravel size, quantify, flow, tail outs, and gradient. The survey form also includes a space for general comments about habitat.[79] At some point in the headwaters of every watershed, the streams will become too steep, shallow, or narrow to support salmon and steelhead spawning. This information is compiled and considered by ODFW district biologists to identify the upstream extent of spawning habitat, which is then documented in the FHD. Above this point, the physical characteristics, whether flow, gravel size or the presence of a barrier, preclude attainment of the use.

In some cases, upstream spawning habitat endpoints coincide with fish passage barriers, which are located in ODFW's database on fish passage barriers. These barriers may be natural, such as waterfalls or steep gradients, or manmade, such as culverts. This information is available in the FHD Fish Passage Barrier layer. In streams where manmade blockages, such as culverts or small dams, block fish passage, DEQ is not changing the spawning use designation. It may be feasible to replace the culvert and restore passage in the future through ODFW's fish passage barrier program, thus allowing spawning further upstream. In these waters, DEQ will maintain Salmon and Steelhead Spawning use in order to protect the water quality in such waters as potential future spawning habitat. DEQ has included a description of the procedure it used to identify manmade versus natural barriers in Appendix B.

4.1.4 Highest Attainable Use

In waters where the seasonal Salmon and Steelhead Spawning Use does not occur and the designation is being removed, the year-round use remains as the highest attainable designated use. Factor 131.10(g)(5) precludes attainment of the seasonal Salmon and Steelhead Spawning Use but does not preclude the year-round use. To the extent that DEQ is proposing updates to the year-round use in any of these streams or stream segments, those changes are documented in the appropriate sections of this document.

4.1.5 Maps and Inventory Table

[79] Oregon Department of Fish and Wildlife. 2016. Oregon Adult Salmonid Inventory and Sampling (OASIS) Project: Salmon Spawning Survey Procedures Manual. 110 pp. Spawning survey and instructions found on page 37.

Maps and a table with an inventory of stream reaches for which Salmon and Steelhead Spawning Use designations have been corrected due to improved hydrography or changes in ODFW data is included in Appendix B, including the year-round use that remains in place for these waterbodies.

4.2 Spatial updates to Salmon and Steelhead Spawning Use due to improved mapping of estuarine waters and tidally influenced freshwaters

4.2.1 Reason for the Use Update

DEQ is correcting the geographic extent of spawning use designations located within estuarine and tidally influenced reaches. There was no intent in 2003 to designate reaches below head of tide for spawning use. Spawning is not an attainable use in these reaches because habitat conditions do not support salmon and steelhead spawning, except in site-specific cases it is identified as spawning habitat by ODFW in the current FHD. In 2003, when DEQ developed the initial aquatic life subcategory use maps, there was insufficient information to accurately delineate the extent of tidal influence in coastal streams. Therefore, ODFW had to estimate where this occurred when identifying spawning distribution in the FHD. and, as a result, DEQ designated some reaches for spawning use in error that are now known to be in tidally influenced waters and are not spawning habitat.

ODFW and DEQ currently use the Coastal and Marine Ecological Classification Standard implemented for Oregon in the Coastal Atlas by the Department of Land Conservation and Development, to identify estuarine waters and tidally influenced reaches. CMECS is a federal classification standard developed jointly by the USGS, NOAA, and the EPA to delineate estuary zones and is used to implement multiple coastal management programs by federal, state and local agencies.[80] Additional information is provided in the ODEQ document, *Methods for Delineating Estuarine Water Type for Mapping Beneficial Uses and Applying Criteria (2017).* Oregon's water quality standards (340-041-0002 (22) define "estuarine waters" as extending to the point of oceanic water intrusion inland, and both the temperature and dissolved oxygen standards have criteria that apply to "estuarine waters". The CMECS categories "Estuarine Coastal", "Estuarine Coastal – Diked", "Estuarine Open Water", and "Estuarine Open Water Subtidal" delineate the point of intrusion of brackish waters of varying depth with a salinity gradient greater than 0.5 parts per trillion at least 90% of the time. DEQ uses these categories to define the extent of estuarine waters. In addition, CMECS delineates tidally influenced freshwaters. These reaches, while not saline, also do not provide suitable spawning habitat due to the lack of flow velocity and substrate to support and aerate salmonid spawning redds.

[80] See https://iocm.noaa.gov/cmecs/ and https://www.coastalatlas.net/documents/cmecs/PhaseI/EPSM_CoreGISMethods.pdf for additional information.

4.2.2 Protection of Existing Uses

The updates to Salmon and Steelhead Spawning Use described in this section do not remove an existing use. The changes described here are corrections to spawning use based on improved estuarine mapping, not because data has changed since 2003. Waters described here cannot attain Salmon and Steelhead Spawning Use due to the physical conditions described in the following sections, which existed prior to 1975.

4.2.3 UAA Factor That Precludes Attainment of the Use

These corrections are justified based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

Salmon and steelhead spawning is not attainable in most tidally influenced waters for several reasons. Stream reaches influenced by tides have slowed flow velocities, or even no or reserved flow, during a significant portion of each day, and they tend to be depositional reaches. Therefore, the substrate is generally sand, fines or soft mud, rather than the gravel substrate needed for redd construction. Moreover, sand and sediment deposition can clog redds, decreasing the dissolved oxygen needed for embryo survival.[81] The riffle habitats needed for spawning are not present and flow velocities in tidal waters are not sufficient to aerate redds. Salmonid redds are typically bowl-shaped depressions with a deeper, more abrupt depth gradients at the leading edge (upstream), gradually tapering to shallower depths on the tail end (downstream). This redd geometry facilitates intrusion of oxygenated water from the overlying flow into the redd and its gravels (Figure 4-2). The slack water or flow reversal that occurs in a tidally influenced river or stream, does not achieve the flow conditions necessary to adequately circulate the intergravel water. In addition, estuarine waters and marine waters are generally lower in dissolved oxygen than free flowing upland waters.

Within some tidally influenced reaches, salmonid spawning is known to occur in some microhabitats, such as side channels and gravel bars. DEQ has retained or added Salmon and Steelhead Spawning use where it is known to occur in these areas at the time that spawning occurs and expected to remain stable throughout the egg incubation through emergence period.

[81] Burril, S.E., Zimmerman, C.E., and Finn, J.E., 2010, Characteristics of fall chum salmon spawning habitat on a mainstem river in Interior Alaska: U.S. Geological Survey Open-File Report 2010-1164, 20 p.

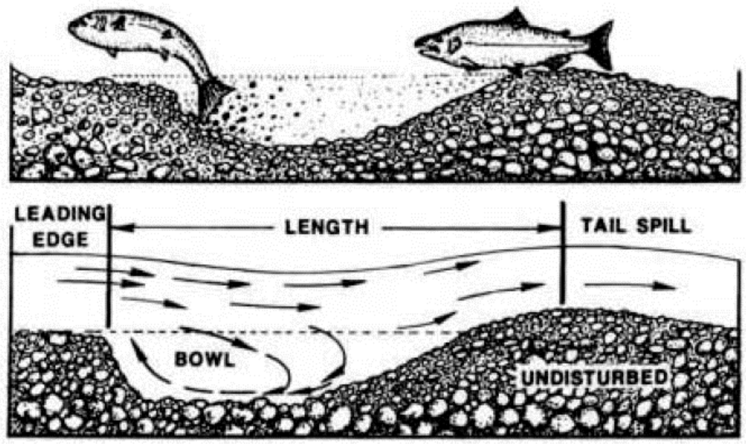

Figure 4-2. From: Lorenz and Eiler 1989. Spawning habitat and redd characteristics of Sockeye Salmon in the Glacial Taku River, British Columbia and Alaska. Transactions of the American Fisheries Society, 118: 495-502

4.2.4 Highest Attainable Use

In waters described here where the seasonal Salmon and Steelhead Spawning Use does not occur and is being removed, the year-round use remains the designated use. Factor 131.10(g)(5) precludes attainment of the seasonal Salmon and Steelhead Spawning Use but does not preclude attainment of the year-round use; to the extent that DEQ is proposing updates to the year-round use in any of these streams or stream segments, those changes are documented in the appropriate sections of this document.

For the tidally influence fresh waters, the year-round use is Salmon and Steelhead Rearing and Migration. In waters within the geographic boundary of a bay, the year-round use is "oceans and bays" for purposes of applying the temperature standard. For estuarine waters, the year-round use is estuarine aquatic life for purposes of applying the dissolved oxygen standard.

4.2.5 Maps

Maps and an inventory table of waters for which Salmon and Steelhead Spawning Use designations have been updated as described in this section is included in Appendix B, including the year-round use that remains in place for these waterbodies.

4.3 Refinements to temporal extent of seasonal Salmon and Steelhead Spawning Use based on changes to ODFW Fish Habitat Database timing tables or the use designation

4.3.1 Reason for Use Change

DEQ is proposing revisions to the timing of Salmon and Steelhead Spawning Use designations in some waters. These updates reflect revisions to the ODFW timing tables for salmon and steelhead spawning based on new data, as well as revisions to the decision rules for timing of salmonid spawning designation. The resulting changes more accurately characterize the actual timing of when spawning through egg incubation occurs. Timing information was relatively new and was still being assembled and reviewed when than the use maps were developed in 2003.

In 2003, when initially designating aquatic life use sub-categories specific to the water quality standard for temperature, DEQ designated seasonal Salmon and Steelhead Spawning Use, which is protected by a 13.0 ℃ criterion. The start of spawning was based on the ODFW life-stage activity-timing data available at the time if the spawning began before Oct. 15, or a date of Oct. 15 to simplify the number of spawning date ranges. The database shows salmon or steelhead spawning through egg incubation for each species and each timing unit (Figure 4-3). Sometimes this resulted in more than 30 different spawning date ranges for one administrative basin. Because this approach seemed overly complicated to designate and implement, and because DEQ and EPA assumed that the 13° spawning criterion would be attainable in all waters by October 15, DEQ applied a simplification procedure developed by the Interagency Team in 2003 to generalize the spawning time periods rather than the use all the specific dates in ODFW's life stage activity timing tables (Figure 4-4).

Refinements to the timing of salmon and steelhead spawning result from additional data compiled since 2003 and changes in decision rules, as described below.

Refinements to timing of salmon and steelhead use due to changes in ODFW data. Since DEQ initially designated Salmon and Steelhead Spawning Use in 2003, ODFW has conducted additional surveys of spawning habitat. This additional survey work has resulted in refining timing tables that identify when spawning occurs for Coho, spring and fall Chinook, Sockeye and Chum Salmon and winter and summer steelhead. The timing tables are based on documented and undocumented occurrences of spawning based on surveys and professional opinion. The timing data is identified by timing unit, which can be a relatively large area. If spawning begins within the timing unit, it will be noted even though some reaches may begin later or end earlier.

Refinements to spawning start date due to changes in decision rules. In 2003, DEQ used a default start date of no later than October 15. This was done to simplify the number of date ranges. The October 15 date was based primarily on information about spring Chinook spawning available at the time. Also, DEQ assumed, absent wide availability of fall temperature data for waterbodies across the state, that most waterbodies in Oregon would attain the spawning criterion by this date anyway. 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 that Oct. 15 is approximately the median start date for salmon populations across the state. Many populations of salmon including fall Chinook, and especially Coho and Chum, begin spawning on Nov. 1 or later. To use the increased availability of information on the actual start of spawn timing for salmon populations since 2003, DEQ proposes to start spawning on the actual start of peak spawning use or two weeks after the start of lesser use, but no later than November 1, whichever is earlier according to ODFW's updated timing table information.

Refinements to spawning end date due to changes in decision rules. DEQ has revised the spawning through emergence end date for fall spawning salmon populations by April 30. Where steelhead are present, which includes the majority of spawning streams, the emergence end dates have not changed; they are May 15, or June 15 if the year-round use for the reach is Core Cold-Water. Using ODFW’s improved habitat distribution data and life-stage timing information, DEQ has identified multiple reaches where spring spawning steelhead populations do not co-occur with fall spawning salmon populations. Therefore, DEQ is proposing to apply the spawning use end date of April 30 in reaches with only fall spawning populations. Analysis of statewide timing of egg incubation through fry emergence in ODFW's 2022 timing table database showed the emergence for fall-spawning salmon populations, including Chinook, Chum, Coho, and Sockeye Salmon, is concluded before April 30.

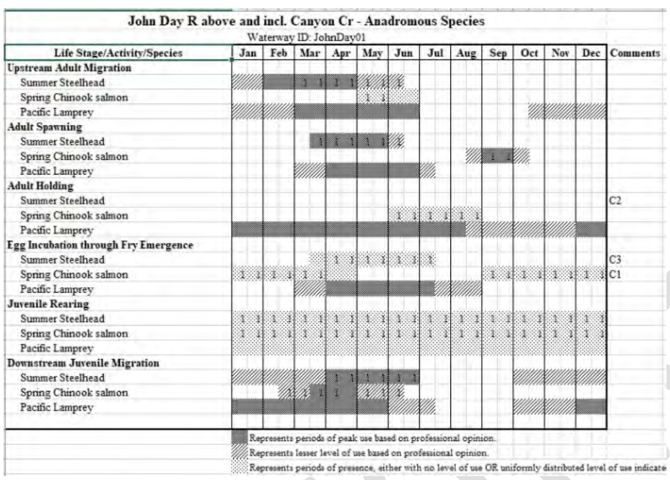

Figure 4-3. Example ODFW spawning timing table.

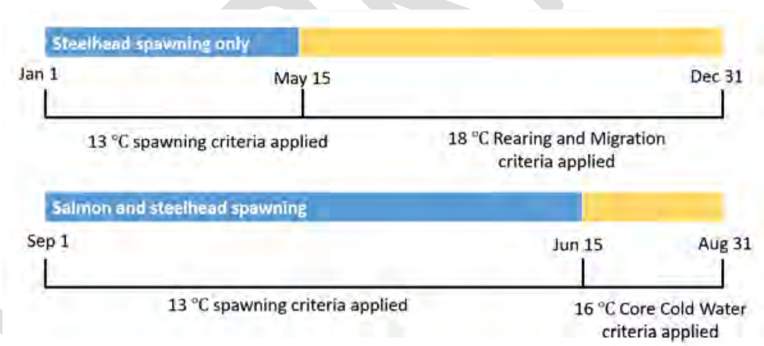

Figure 4-4. Examples of Salmon and Steelhead Spawning Use timing, John Day River from Canyon Creek to Indian Creek (upper graphic) and from Indian Creek to Reynolds Creek (lower graphic)

4.3.2 Protection of Existing Uses

The updates to the timing of Salmon and Steelhead Spawning Use described in this section do not remove an existing use. DEQ relies on the ODFW timing tables for the best available data on the timing of spawning through egg incubation. The changes described here are corrections to the temporal extent of spawning use in the waterbody based on improved ODFW data. The timing of upstream migration from the ocean is a hereditary trait of Pacific salmon that has developed through natural selection over generations.[82] Conditions thought to trigger upstream migration may include day length, river temperature and flow. [83] River temperature in mainstem streams are thought to be important for triggering upstream migration of salmon.[84] Migration into low-order channels typically occurs during periods of higher flow, often correlated with the first fall rains. [85] These conditions have generally not changed since 1975.

4.3.3 UAA Factor That Precludes Attainment of the Use

These refinements are based on either 40 CFR 131.10(g), Factor 1: "Naturally occurring pollutant concentration prevent attaining the use," or 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

The timing of upstream migration from the ocean is a hereditary trait of Pacific salmon that has developed through natural selection over many generations.[86] Conditions thought to trigger upstream migration include day length, river temperature and flow. [87] River temperature in mainstem streams are

[82] Quinn, TP. 2018. The behavior and ecology of Pacific salmon and trout. 2nd edition. Seattle, WA: University of Washington Press.

[83] Dusek Jennings, E. and A. N. Hendrix. 2020. Spawn Timing of Winter-run Chinook in the Upper Sacramento River. San Francisco Estuary and Watershed Science. 18(2). 16 pp.

[84] Bergendorf, D. 2002. The Influence of In-stream Habitat Characteristics on Chinook Salmon (*Oncorhynchus tshawytscha*). Report prepared for Northwest Fisheries Science Center, National Oceanic and Atmospheric Association. Seattle, WA. 46 pp.

[85] Beechie T, Moir H, Pess GR. 2008. Hierarchical physical controls on salmonid spawning location and timing. American Fisheries Society Symposium 65:83–101.

[86] Quinn, TP. 2018. The behavior and ecology of Pacific salmon and trout. 2nd edition. Seattle, WA: University of Washington Press.

[87] Dusek Jennings, E. and A. N. Hendrix. 2020. Spawn Timing of Winter-run Chinook in the Upper Sacramento River. San Francisco Estuary and Watershed Science. 18(2). 16 pp.

thought to be important for triggering upstream migration of salmon.[88] Migration into low-order channels typically occurs during periods of higher flow, often correlated with the first fall rains. [89] Because these use refinements are based on the best available information, DEQ concludes that the spawning is not attainable because physical conditions, such as low streamflow, do not support spawning during the times they were previously designated for spawning, or because naturally occurring stream temperatures had not yet cooled sufficiently to trigger upstream migration and spawning.

4.3.4 Highest Attainable Use

The year-round use continues to apply in streams when the seasonal spawning through emergence use does not occur. For example, if the spawning start date has been refined from October 15 to November 1, the year-round use is the most sensitive use until November 1, after which the Salmon and Steelhead Spawning Use will be the most sensitive use. Factor 131.10(g)(5) precludes attainment of the seasonal Salmon and Steelhead Spawning Use during those times but does not preclude attainment of the year-round use. To the extent that DEQ is proposing updates to the year-round use in any of these streams or stream segments, those changes are documented in the appropriate sections of this document.

4.3.5 Maps and Inventory Table

Maps and a table with an inventory of stream reaches for which Salmon and Steelhead Spawning Use designations have been updated as described in this section is included in Appendix B, including the year-round use that remains in place for these waterbodies.

[88] Bergendorf, D. 2002. The Influence of In-stream Habitat Characteristics on Chinook Salmon (*Oncorhynchus tshawytscha*). Report prepared for Northwest Fisheries Science Center, National Oceanic and Atmospheric Association. Seattle, WA. 46 pp.

[89] Beechie T, Moir H, Pess GR. 2008. Hierarchical physical controls on salmonid spawning location and timing. American Fisheries Society Symposium 65:83–101.

5 Updates to Core Cold Water Use

5.1 Updates to Core Cold Water Use because naturally occurring pollutant concentrations prevent attaining the use (Factor 1)

5.1.1 North Fork Smith River Watershed (South Coast Basin)

5.1.1.1 Reason for this use update

DEQ is updating Core Cold Water use in the waters of the North Fork Smith River basin in the South Coast Basin (Figure C-1). In 2003, DEQ designated the North Fork Smith River for Core Cold Water Use because ODFW data indicated that Spring Chinook Salmon spawned prior to September 15, one of the triggers for designating Core Cold Water Use. Based on current ODFW information, there is uncertainty regarding whether Spring Chinook Salmon spawn in these waters and, if they do, when spawning begins. Moreover, waters throughout the basin, do not attain 16℃ as a 7-DADM despite being in a mostly undisturbed condition (see Section 5.1.1.3). As a result, DEQ is updating the aquatic life use subcategory from Core Cold Water Use to Salmon and Trout Rearing and Migration Use, as these waters cannot attain sufficiently cold temperatures to attain the use.

5.1.1.2 Protection of Existing Uses

The updates to Core Cold Water Use described in this section do not remove existing uses. In the waters of the North Fork Smith River, Core Cold Water use is not attainable and was never attainable as a result of naturally occurring temperatures, which have occurred since before 1975 based on the best available information. See section 5.1.1.3 for additional information.

5.1.1.3 UAA Factor That Precludes Attainment of the Use

These use updates are justified under 40 CFR 131.10(g), Factor 1: "Naturally occurring pollutant concentrations prevent attaining the use." Temperatures throughout the North Fork Smith River watershed cannot attain the Core Cold Water Criterion of 16 ℃, despite the watershed being in an undisturbed, reference condition.

The North Fork Smith River, located in the dry warm southwest corner of Oregon, is a Wild and Scenic River. Approximately one-third of the NF Smith River Basin watershed lies within the Kalmiopsis Wilderness Area. The Forest Service has designated the rest of the watershed as a Late-Successional Reserve, to protect and enhance conditions of late-successional and old-growth forest ecosystems. About 80% of the Late-Successional Reserve area is classified as a roadless area where timber harvest is prohibited with very limited exceptions. Forest Service management goals prohibit mineral extraction and tree harvest in the watershed except for train maintenance and public safety, and road development for maintenance. In addition, there are no active grazing allotments. As a result of these protections, the watershed is a wilderness or roadless area with almost no anthropogenic influence beyond limited, low-impact recreational use. DEQ designated all waters of the watershed as the state's first Outstanding Resource Water in 2017.[90]

DEQ analyzed available summer temperature data taken at various locations within the North Fork Smith River watershed (Table 5-1 and Figure 5-1), as well as NorWeST modeled 7-DADM temperatures. Weekly maximum temperatures throughout the watershed exceed the core cold water criterion of 16.0 °C in almost all locations and years where the NorWeST had field temperature data. Modeled data indicate that current temperatures are well above 16.0 °C throughout the watershed. These data account for forest canopy.[91] As there are no point sources or nonpoint sources of pollution in the watershed, these data are indicative of reference conditions and indicate that the 16.0 °C Core Cold Water criterion is not attainable throughout the watershed.

Table 5-1. Maximum Weekly Maximum Temperature, North Fork Smith River and Tributaries. The modeled temperatures are from NorWest statistical model.

Station ID	Station Name	Years sampled	Weekly Maximum T (°C)	Modeled 1993-2011 7-DADM Temperature (°C)
1767	Chrome Creek	1999	Data unavailable	21.4
2966	Baldface Creek	1994, 1996-1998	24.1-26.3	23.0
5327	NF Smith River at Baldface Creek	2014	21.3	22.0
5331	Baldface Creek (upper)	2014	21.6	20.9
5332	NF Smith River below Hardtack Creek	2014	20.3	22.0
5344	NF Smith River above Acorn Creek	2014	18.6	19.6
5361	Horse Creek	2014	16.7	17.2
5362	Cedar Creek	1999	14.1	17.0
5374	NF Smith River at California Border	2015	24.3	23.9
5390	Cedar Creek	2015	18.8	18.9
5392	Acorn Creek	2015	17.7	17.6
5396	Cedar Creek	2000	12.3	17.2

[90] Oregon DEQ, 2017. EQC Staff Report: North Fork Smith River Outstanding Resource Water Rulemaking. 153 pp.

[91] Isaak, D., S. Wenger, E. Peterson, J. Ver Hoef, D. Nagel, C. Luce, S. Hostetler, J. Dunham, B. Roper, S. Wollrab, G. Chandler, D. Horan, S. Parkes-Payne. 2017. The NorWeST summer stream temperature model and scenarios for the western U.S.: A crowd-sourced database and new geospatial tools foster a user community and predict broad climate warming of rivers and streams. Water Resources Research, 53: 9181-9205.

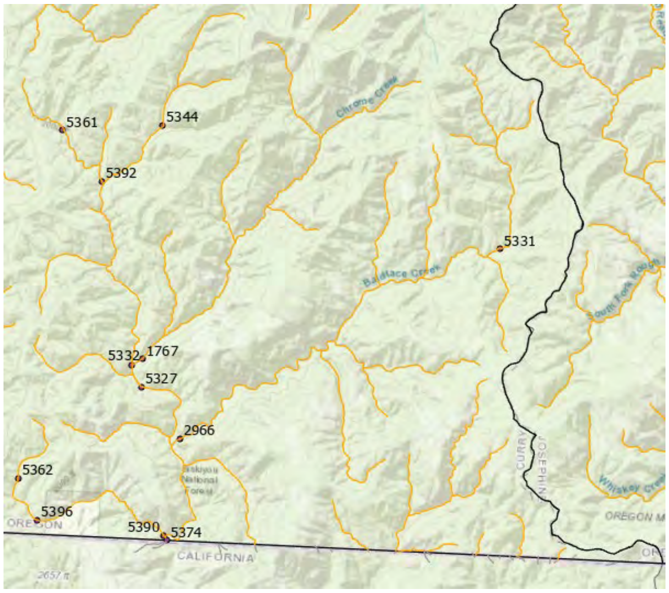

Figure 5-1. North Fork Smith River Temperature Data Stations.

5.1.1.4 Highest Attainable Use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use in the waters described here is Salmon and Trout Rearing and Migration, which is protected by a criterion of 18℃ and is the next most stringent use after Core Cold Water Use. Factor 131.10(g)(1) precludes attainment of Core Cold Water Use in these waters but does not preclude attainment of Salmon and Trout Rearing and Migration Use. Criteria associated with Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. This use designation also protects other cold-water biota that co-occur with salmonids.

5.1.1.5 Map and Inventory Table

A map and inventory table indicating where DEQ is proposing updates to Core Cold Water Use is included in Appendix C.

5.1.2 John Day and Umatilla Basin

5.1.2.1 Reasons for the Use Update

DEQ is updating Core Cold Water Use in certain waters in the John Day and Umatilla Basins because the best available information indicates the habitat does not support FMO or rearing habitat for Bull Trout during July and August, which was the basis for designating the waters for Core Cold Water Use.

When DEQ developed fish use designation maps in 2003, USFWS had published draft proposed critical habitat for the Klamath River and Columbia River Bull Trout populations. Critical habitat was proposed for Bull Trout FMO use.[92] DEQ designated Core Cold Water Habitat as the use where Bull trout FMO habitat was proposed as critical habitat by USFWS if ODFW's timing tables indicate the use, or bull trout sub-adult rearing, occurs during the summer. Due to the court-imposed deadline, DEQ had to designate uses as part of the temperature standard revisions before USFWS could finalize their Bull Trout critical habitat rule. As a result, DEQ included the draft proposed critical habitat with the expectation that DEQ would correct our use designations to align with the final federal critical habitat rule when it was completed. [93] In its letter approving the fish use designations, EPA acknowledged the intent to align uses with the final federal critical habitat rule once it was available.[94]

DEQ is proposing to update CCW designation for those streams that both USFWS *and* ODFW agree do not support Bull Trout FMO or sub-adult rearing habitat during the summer *and* where DEQ data or models indicate that 16℃ as a 7dAM is not attainable through the summer.

5.1.2.2 Protection of Existing Uses

The updates to Core Cold Water Use described in this section do not remove an existing use. Based on TMDL modeling that DEQ has conducted for the waterbodies described below, these waters have naturally occurring pollutant concentrations that exceed the 16°C criterion and therefore do not support Core Cold Water Habitat Use. The modeled natural condition temperatures account for system potential shade, natural or augmented flow, and changes in stream morphology. DEQ did not update the use if temperature data or modelling evaluated as part of this project indicated that the Core Cold Water Use criterion of 16℃ has been or can be attained (i.e., is an existing use).

5.1.2.3 UAA Factor That Precludes Attainment of the Use

These updates are justified based on 40 CFR 131.10(g), Factor 1: "Naturally occurring pollutant *concentrations prevent attainment of the use."*

<u>Upper John Day River</u>

DEQ is updating Core Cold Water Use on the upper John Day River between Canyon Creek (RM 384.70) and Indian Creek (RM 400.05) (Figure C-2). Temperature modeling that DEQ has conducted for the John

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[92] 67 Federal Register 71235. November 29, 2002.

[93] See DEQ 2003. EQC Staff Report, Rule Adoption: Water Quality Standards, Including Temperature Criteria, OAR Chapter 340, Division 41, December 4, 2003, EQC Meeting, Attachment H: A Description of the Information and Methods Used to Delineate the Proposed Beneficial Fish Use Designations for Oregon's Water Quality Standards. 5 pp.

[94] See page 82 of EPA 2004, Support Document for EPA's Action Reviewing New or Revised Water Quality Standards for the State of Oregon. March 2, 2004. 110 pp.

Day River TMDL indicates that the upper John Day River in this section of river cannot attain the Core Cold Water criterion of 16℃, which protects Bull Trout FMO use (Figure 5-3). This is consistent with the final USFWS critical habitat rule, which did not designate this portion of the John Day River as Bull trout FMO habitat, and the Bull Trout Working Groups (see Section 3-2), which determined that this portion of the John Day doesn’t support FMO use during the summer.

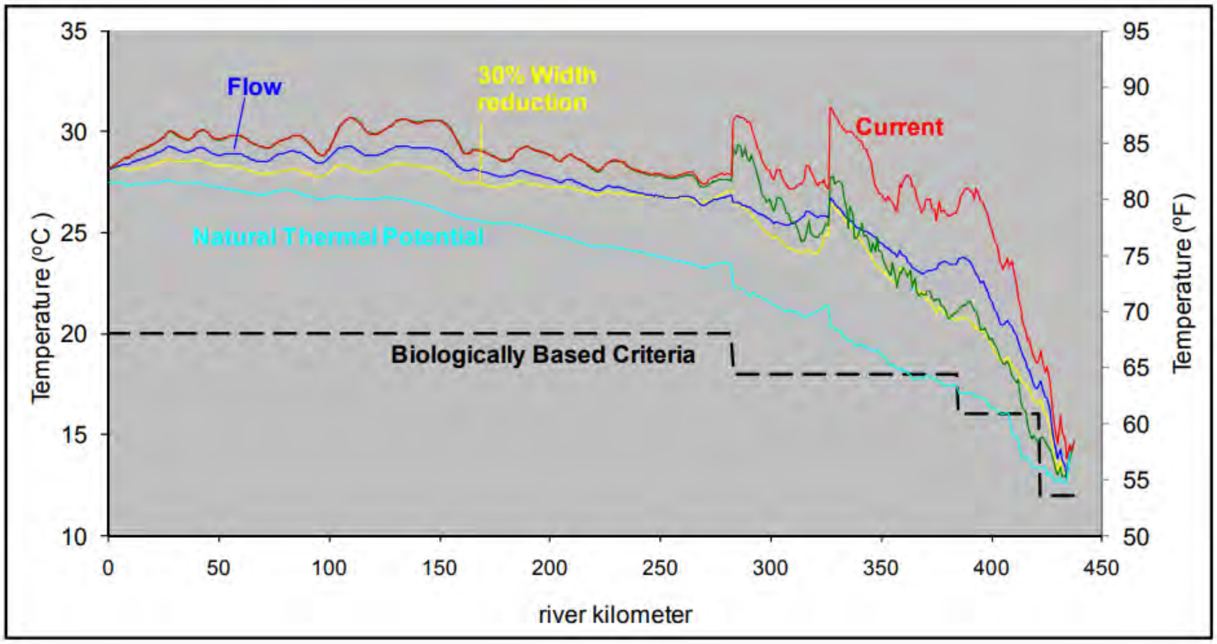

Figure 5-2. Predicted maximum 7DADM temperature profiles of the John Day River resulting from scenarios during the model period, 2004. Source: DEQ, 2010. John Day River Basin TMDL Appendix B: Temperature Model Scenario Report. P. 6.

<u>Middle Fork John Day River</u>

DEQ is updating Core Cold Water Use on the Middle Fork John Day River between Granite Creek and Cross Hollow (Figure C-2). Temperature modeling that DEQ conducted for the John Day River TMDL indicates that this section of the Middle Fork John Day River cannot attain the Core Cold Water criterion of 16℃ (Figure 5-4). Modeling indicates that the criterion is not attainable throughout the Middle Fork John Day; however, DEQ is maintaining the Core Cold Water Use upstream of Cross Hollow, because ODFW timing tables indicate that those waters support Bull Trout FMO use in July or August.

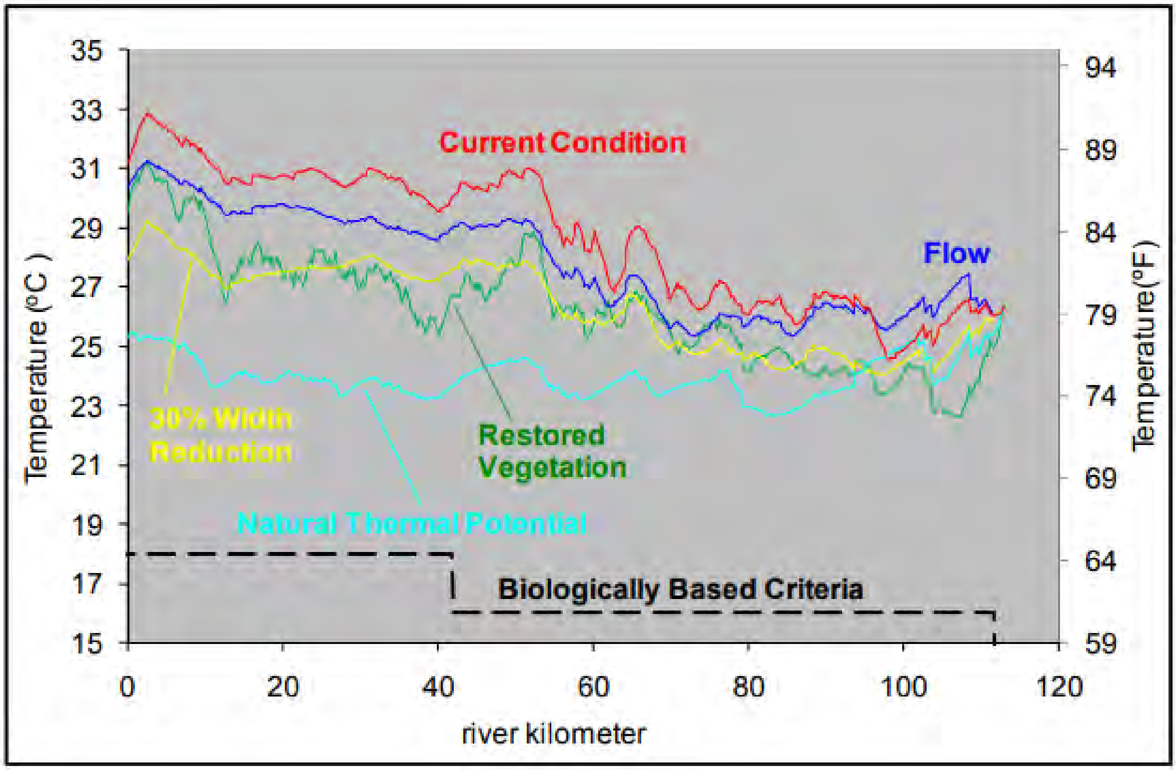

Figure 5-3. Predicted maximum 7DADM temperature profiles of the Middle Fork John Day River resulting from scenarios during the model period, 2002. Source: DEQ, 2010. John Day River Basin TMDL Appendix B: Temperature Model Scenario Report. P. 33.

<u>Umatilla River</u>

DEQ is updating Core Cold Water Use in the Umatilla River near Pendleton, Oregon (Figure C-3). These waters were designated for Core Cold Water Use in 2003, although they are isolated from other Core Cold Water streams. Natural condition temperature modeling that DEQ has conducted for the Umatilla River TMDL indicates that the Umatilla River in this section of river cannot attain the Core Cold Water criterion of 16 ℃ (Figure 5-5).[95] System thermal potential parameters include tributary temperatures that are less than 64 ℉, site potential vegetation and near-stream disturbance zone widths, and targeted channel width-to depth ratios. DEQ calculated three different flow scenarios based on current flow, natural flow and augmented flow. Even under the augmented flow condition, which imports water from the Columbia River or from groundwater wells into the Umatilla, no portion of the Umatilla River attains a temperature of 16 ℃ (60.8 ℉), indicating that the Core Cold Water Use is unattainable under natural conditions.

[95] Oregon DEQ, Umatilla Basin Watershed Council and Confederated Tribes of the Umatilla Indian Reservation, 2001. Umatilla River Total Maximum Daily Load and Water Quality Management Plan. 420 pp.

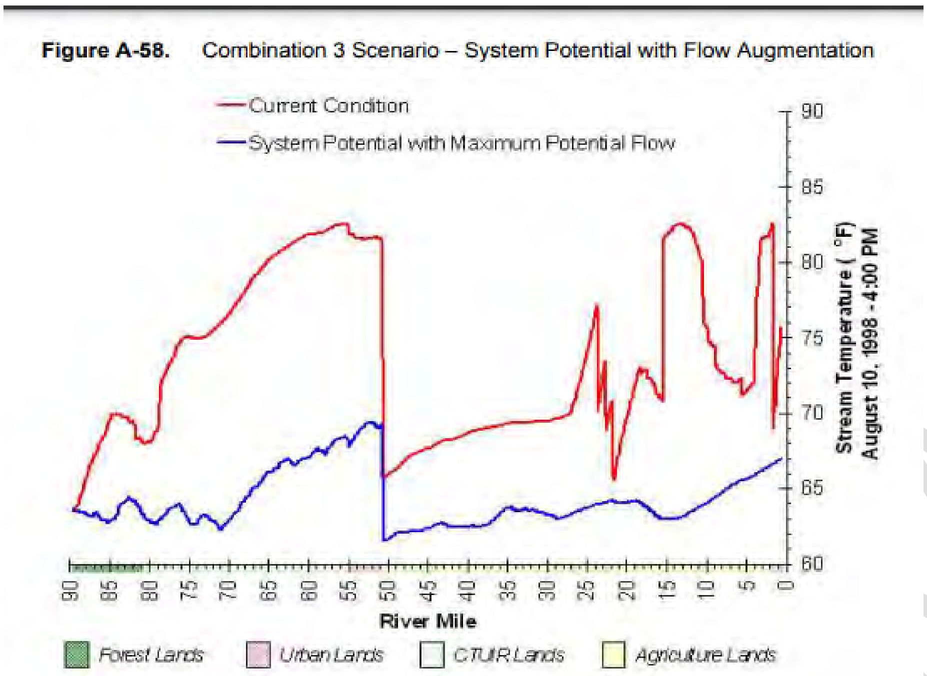

Figure 5-4. System Potential with Flow Augmentation Scenario, Umatilla River. Source: Umatilla River TMDL (2001).

DEQ is revising Core Cold Water Use from tributaries to reaches of the three waters described here. These tributaries were only designated for Core Cold Water Use because they are upstream of those waters. These tributaries do not support Bull Trout FMO Use according to the final critical habitat rule, nor do they support or potentially support such use according to ODFW.

5.1.2.4 Highest Attainable Use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable use in the waters described here is Salmon and Trout Rearing and Migration, which is protected by a criterion of 18°C and is the next most stringent use after Core Cold Water habitat. Factor 131.10(g)(5) precludes attainment of Core Cold Water Use but does not preclude attainment of Salmon and Trout Rearing and Migration Use as discussed in this section. Criteria associated with Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. This use designation also protects other cold-water biota that co-occur with salmonids.

5.1.2.5 Maps and Inventory Table

Maps and an inventory table of all waters where Core Cold Water Use is being updated to Salmon and Trout Rearing and Migration Use as described in this section is included in Appendix C.

5.2 Updates to Core Cold Water Use Because Physical Conditions Preclude Attaining Aquatic Life Uses

5.2.1 Updates to Core Cold Water Use in "Anchor Habitat"

5.2.1.1 Reason for the Use Change

DEQ is updating Core Cold Water habitat use to Salmon and trout rearing and migration in several waters in the North Coast and Mid Coast Basins (Figures C-4 and C-5). DEQ designated these waters for Core Cold Water use in 2003.[96]

One of the triggers for the year-round Core Cold Water habitat use designation is early (pre-September 15) Spring Chinook spawning, which could indicate the presence of colder water. Outside of the spawning season, Core Cold Water habitat is the designated use. For streams where spring Chinook spawning occurs later than September 15, Salmon and Trout Rearing and Migration is the year-round designated use. In both cases, salmon and steelhead spawning, which is a seasonal use, applies at the times specified on the spawning maps.

In 2003, when DEQ was developing the fish use maps, DEQ used information from an Ecotrust and Wild Salmon Center study, "A salmon conservation strategy for the Tillamook and Clatsop State Forest."[76] (Referred to as the "Anchor Habitat Study.") The Anchor Habitat Study identified waters as core juvenile rearing habitat for Coho Salmon, steelhead and Chinook Salmon in the Tillamook and Clatsop State Forests. The purpose behind the Anchor Habitat Study was to protect the most critical areas for production of salmon in the Clatsop and Tillamook State Forests, while allowing for some timber harvest. Ecotrust provided DEQ with GIS files showing anchor habitat in these areas and the Siuslaw River basin in the Midcoast Basin.[97] Anchor habitat in the Ecotrust study is not defined the same as DEQ's Core Cold Water habitat use subcategory and did not use the same trigger or identifier, i.e., early spring chinook spawning. Some waters were considered anchor habitat because they had high productivity values that support salmonid rearing, which can thrive in higher temperatures than Core Cold Water use. Neither thermal condition nor thermal potential were part of EcoTrust's habitat evaluation. These waters with higher productivity are more appropriately classified as the Salmonid Rearing and Migration criterion of 18°C 7dAM. The colder waters protected by the CCW criterion (16°C 7dAM) have lower productivity and lower juvenile salmon growth rates.

5.2.1.2 Protection of Existing Uses

[96] Ecotrust, Oregon Trout, and The Wild Salmon Center. 2000. A salmon conservation strategy for the Tillamook and Clatsop State Forest.

[97] Steinback, Chris, Ecotrust. *Personal communication with ODEQ,* October 30, 2003.

The updates to Core Cold Water Use described in this section do not remove an existing use. The use is being updated because the original designations did not consider whether there was early spring Chinook timing in these waters. ODFW has concluded that these waters do not provide suitable habitat for early spring Chinook spawning and there is no information indicating that these waters have supported early Spring Chinook spawning since 1975. The technical workgroup convened for the Aquatic Life Use Updates project supported these changes and did not raise concerns that the timing of Spring Chinook spawning has shifted in these waters since 1975. Moreover, DEQ retained the Core Cold Water habitat designation if temperature data evaluated as part of this project indicated that the water could attain 16℃ all summer.

5.2.1.3 UAA Factor That Precludes Attainment of the Use

These updates to Core Cold Water Use are based on either 40 CFR 131.10(g), Factor 1: "Naturally occurring pollutant concentration prevent attaining the use," or 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

The timing of upstream migration from the ocean is a hereditary trait of Pacific salmon that has developed through natural selection over generations.[98] River temperature in mainstem streams are thought to be important for triggering upstream migration of Chinook salmon.[99] Conditions thought to trigger upstream migration may include day length, river temperature and flow. [100] Spring Chinook migrate in mid-to-late spring and hold throughout the summer near their spawning habitat, and so are the first anadromous species to initiate spawning when thermal conditions are right in the fall.

In the waters described here, there is no indication that Spring Chinook do not begin spawning prior to September 15. As a result, there is no indication that stream temperatures are likely to remain at or below 16°C throughout the summer. Because these use refinements are based on the best available information, DEQ concludes that the reasons spawning isn't occurring in these waters is because physical conditions, such as flow, do not support spawning during the times they were previously designated for spawning, or because naturally occurring temperatures are too warm in summer to classify the water as core cold water habitat or landscape scale cold water refuge.

[98] Quinn, TP. 2018. The behavior and ecology of Pacific salmon and trout. 2nd edition. Seattle, WA: University of Washington Press.

[99] Bergendorf, D. 2002. The Influence of In-stream Habitat Characteristics on Chinook Salmon (*Oncorhynchus tshawytscha*). Report prepared for Northwest Fisheries Science Center, National Oceanic and Atmospheric Association. Seattle, WA. 46 pp.

[100] Dusek Jennings, E. and A. N. Hendrix. 2020. Spawn Timing of Winter-run Chinook in the Upper Sacramento River. San Francisco Estuary and Watershed Science. 18(2). 16 pp.

DEQ retained Core Cold Water Use in some "anchor habitat" waters, due to one of three reasons: 1.) ODFW indicate that the waters support early Spring Chinook spawning; 2.) measured temperature data indicates that 16 °C is attainable; or 3.) NorWeST 7-DADM temperatures indicate that 16 °C is attainable.

5.2.1.4 Highest attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use in the waters described here is Salmon and Trout Rearing and Migration, which is protected by a criterion of 18°C and is the next most stringent use after Core Cold Water Use. Factor 131.10(g)(5) precludes attainment of Core Cold Water Use but does not preclude attainment of Salmon and Trout Rearing and Migration Use. Criteria associated with Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. This use designation also protects other cold-water biota that co-occur with salmonids.

5.2.1.5 Maps

Maps and an inventory table of waters where Core Cold Water Use is being updated as described in this section is included in Appendix C.

5.2.2 Updates to core cold water use related to changes to "early" Chinook spawning

5.2.2.1 Reasons for the Use Change

DEQ is updating Core Cold Water Use in waters of the Willamette River basin because updated information from ODFW indicates that early Chinook spawning does not occur in these streams and has not since 1975 based upon best available information. Marion Creek and tributaries to Marion Creek (itself a tributary to the North Santiam River) were initially classified as Core Cold Water use in 2003 because the best available data indicated that they were waters where either: 1.) Spring Chinook salmon spawning occurs early (prior to September 15), or 2.) were upstream of such waters and were not designated for the more stringent Bull Trout Spawning and Juvenile Rearing Use. Updated data from ODFW indicate that Spring Chinook spawning occurs after September 15 in Marion Creek. FHD data indicates that all tributaries to Marion Creek do not support spawning and historically never supported spawning.

The timing of the spawning designation in DEQ's spawning use maps was based on the ODFW life-stage activity-timing database available at the time. The database shows salmon or steelhead spawning through egg incubation and emergence for each species and each timing unit. In some waters updates to Core Cold Water Use reflect revisions to the timing tables for Chinook Salmon spawning in ODFW's Fish Habitat database based on current information, which relies on more extensive habitat surveys than existed in 2003. In other waters, updates reflect revisions to the FHD indicating that Spring Chinook

Salmon spawning does not occur at all. DEQ retained Core Cold Water Use in streams where data indicates they currently attain 16 °C.

5.2.2.2 Protection of Existing Uses

The updates to Core Cold Water Use described in this section do not remove an existing use. The changes described here rely on FHD information regarding "early" spring Chinook spawning (i.e., waters where spring Chinook Salmon spawn prior to September 15). The use is being updated in these waters because ODFW's database now has more accurate data regarding spawning location and timing. Early spawning does not occur in these waters, nor is there information that early spawning ever occurred in these waters. This is likely because Marion Creek headwaters are located in the North Santiam River valley and are thus primarily fed by rain and groundwater, whereas other streams in the basin are fed by snowmelt and are thus likely much cooler. This is supported by NoRWeST temperature data, as discussed in the following section.

5.2.2.3 UAA Factor That Precludes Attainment of the Use

These refinements are based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

The waters where Core Cold Water Use is being updated include Marion Creek and tributaries to Marion Creek (Figure C-6). FHD indicates that Marion Creek does not support early Spring Chinook spawning and that tributaries do not support Spring Chinook spawning at all.

The timing and location of upstream migration from the ocean is a hereditary trait of Pacific salmon that has developed through natural selection over generations.[101] Conditions thought to trigger upstream migration may include day length, river temperature and flow. [102] Migration into low-order channels typically occurs during periods of higher flow, often correlated with the first fall rains. [103] River temperature in mainstem streams are thought to be important for triggering upstream migration of Chinook salmon.[104] This is particularly true for Spring Chinook salmon, which typically spawn in late

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[101] Quinn, TP. 2018. The behavior and ecology of Pacific salmon and trout. 2nd edition. Seattle, WA: University of Washington Press.

[102] Dusek Jennings, E. and A. N. Hendrix. 2020. Spawn Timing of Winter-run Chinook in the Upper Sacramento River. San Francisco Estuary and Watershed Science. 18(2). 16 pp.

[103] Beechie T, Moir H, Pess GR. 2008. Hierarchical physical controls on salmonid spawning location and timing. American Fisheries Society Symposium 65:83–101.

[104] Bergendorf, D. 2002. The Influence of In-stream Habitat Characteristics on Chinook Salmon (*Oncorhynchus tshawytscha*). Report prepared for Northwest Fisheries Science Center, National Oceanic and Atmospheric Association. Seattle, WA. 46 pp.

summer and early fall. Spring Chinook hold throughout the summer near their spawning habitat, and so are the first anadromous species to initiate spawning when thermal conditions are right in the fall.

As noted above, Marion Creek has headwaters lower in the basin than other portions of the North Santiam Basin (including the North Santiam River), which have headwaters in the western Cascade mountains. As a result, temperatures in Marion Creek tend to be higher than in other parts of the basin. NoRWeST modeled temperatures indicate 7-DADM temperatures in Marion Creek range from 21.7 - 22.2, whereas the 7-DADM temperatures of the North Santiam River in the area of Marion Creek (which supports Spring Chinook spawning) is slightly lower (Figure 5-5). Temperatures are considerably lower further upstream.

Figure 5-5. Current 7-DADM temperatures from NoRWeST 1993-2011 scenario, Marion Creek and North Santiam River.

5.2.2.4 Highest attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use in the waters described here is Salmon and Trout Rearing and Migration, which is protected by a criterion of 18℃ and is the next most stringent use after Core Cold Water Use. Factor 131.10(g)(5) precludes attainment of Core Cold Water Use but does not preclude attainment of Salmon and Trout Rearing and Migration Use. Criteria associated with Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. This use designation also protects other cold-water biota that co-occur with salmonids.

5.2.2.5 Maps and Inventory Table

Maps and an inventory table indicating where DEQ is proposing updates to Core Cold Water Use according to this section is included in Appendix C.

5.2.3 Updates to Core Cold Water Use in waters that do not support Bull Trout Foraging, Migration, and Overwintering or Subadult Rearing in the summer.

5.2.3.1 Reason for the Use Update

DEQ is proposing to update Core Cold Water Use designation for three tributaries to the Hood River: Indian Creek, Cedar Creek, and an unnamed tributary (NHD Reach Code 17070105000864) (Figure C-7). These three tributaries enter Hood River within four miles of its mouth on the Columbia River.

In 2003, DEQ mistakenly designated these three tributaries for CCW use because they are upstream of Hood River, which USFWS considers FMO habitat to its mouth. Upstream tributaries support Bull Trout FMO use in the Hood River by providing cold water fed by glacial melt from Mt. Hood. The physical conditions of these three low basin tributaries do not support Bull Trout FMO use. All three have headwaters in agricultural or urban areas in the lower Hood River Valley. Their relative flow volume and warmer temperature regime means they do not provide cold water to the mainstem Hood River. These tributaries are not bull trout FMO habitat, cannot attain 16 °C throughout the summer.

5.2.3.2 Protection of Existing Uses

The updates to Core Cold Water Use described in this section do not remove an existing use. The waters described here do not currently support Bull Trout FMO Use, nor is there any information from ODFW or USFWS that they ever did. The Climate Shield model developed by USFWS did not calculate any probability of Bull Trout occurrence in these streams in 1980 based on modeled temperature, flow and slope. One of the three waters described here is an unnamed drainage to Hood River with ephemeral flow. Cedar Creek runs entirely through developed portions of Hood River, beginning at the airport, which was initially developed in 1928.[105] The third tributary, while longer, runs through agricultural and developed portions of Hood River and has since well before 1975. The physical conditions of these creeks do not support FMO use.

5.2.3.3 UAA Factor That Precludes Attainment of the Use

These updates are justified based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

Indian Creek has headwaters in the hills west of Hood River at approximately 700' elevation, then flows through the city of Hood River before entering Hood River at approximately river mile 1.5. Cedar Creek

[105] Port of Hood River, History of Ken Jarmstedt Airport. Available at https://web.archive.org/web/20101023091713/http://www.portofhoodriver.com/airport/history.php. Visited March 22, 2023.

is a 2.5 kilometer stream that begins near the Ken Jernstedt Airfield in Hood River and runs along a divide between an urban and agricultural area before entering Hood River at approximately river mile 2.5. The unnamed tributary is likely itinerant or a buried stream; a stream channel is not noticeable in aerial photography of the urban area where it appears in the GIS maps. As a result, these creeks are not typical of the high elevation, cold waters with clean gravel that support Bull Trout spawning and juvenile rearing or the larger cool rivers that typify Bull Trout foraging, migration and overwintering habitat.

Cedar Creek and the unnamed tributary do not have any flow to support Bull Trout FMO Use in the summer, which is one of the triggers that Core Cold Water Use is designed to protect. DEQ analyzed the intermittent and ephemeral stream layer that is included in the National Hydrography Database. Both of these tributaries are considered intermittent (Figure 5-6).

Indian Creek, while perennial, likely has little to no flow during the summer, due to the generally dry summer conditions east of the Cascades. Since there are no flow gauges on Indian Creek, DEQ examined the flow gauge at Mosier Creek, a tributary to the Columbia directly east of Hood River. Mosier Creek is located in a similar geographic location as Indian Creek described in this section. Specifically, Mosier Creek begins at 3800', a low elevation as compared to waters that are fed by glacial melt on Mount Hood. As such, it is more likely to be fed by rainwater and groundwater than glacial melt, similar to what Indian Creek would experience. DEQ examined mean daily flow in Mosier Creek between 1970 and 1975, as well as between 2017 and 2022 (Figure 5-7). As shown in the figure, summer flow of Mosier Creek falls to near 0 cfs during the summer. DEQ expects that Indian Creek has similar hydrography with very little flow during the summer due to Oregon's climate. As a result, it does not have sufficient flow to support Bull Trout FMO Use during the summer. There is no evidence that FMO use occurs in Indian Creek even during periods of high flow. Climate Shield modeling does not predict any Bull Trout presence based on modeled conditions.[106]

[106] https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=a64ca6b777f44633bb036b5bfeb9ad7d. Visited March 23, 2023.

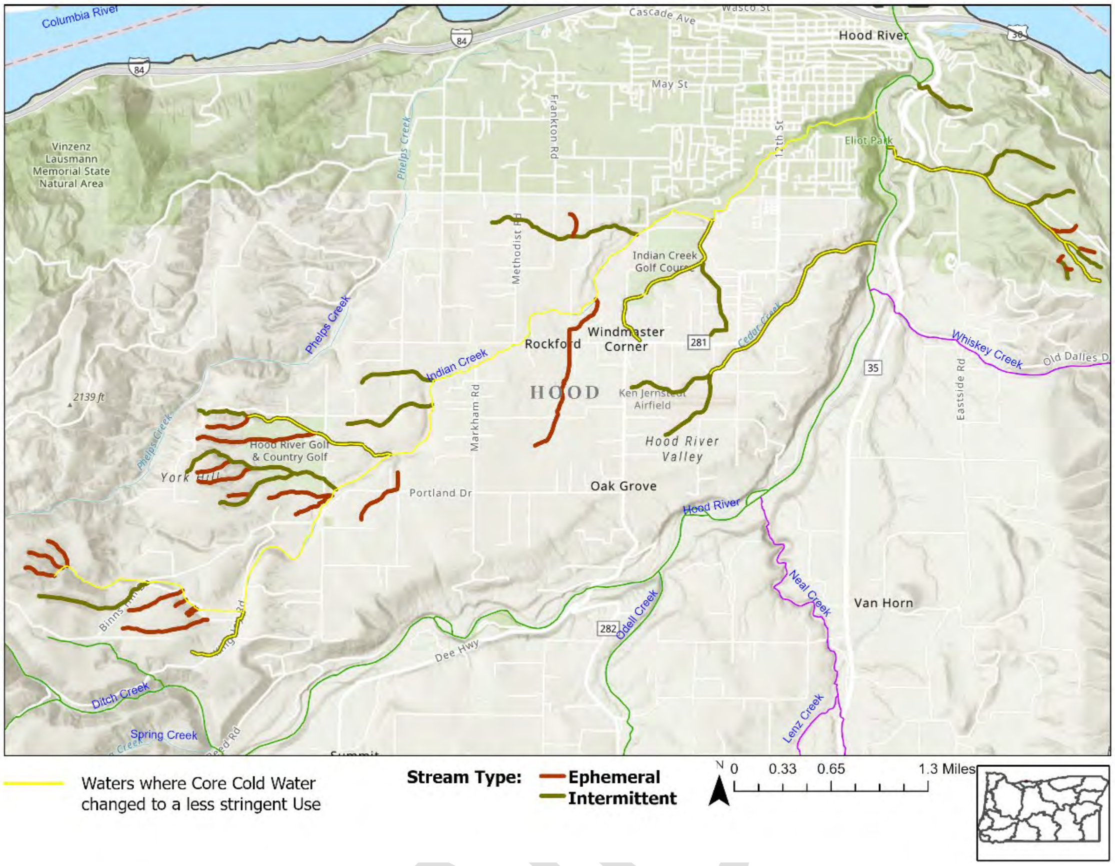

Figure 5-6. Intermittency analysis for Hood River tributaries. Yellow lines with olive outline indicates waters where DEQ is proposing to revise Core Cold Water Use in intermittent streams.

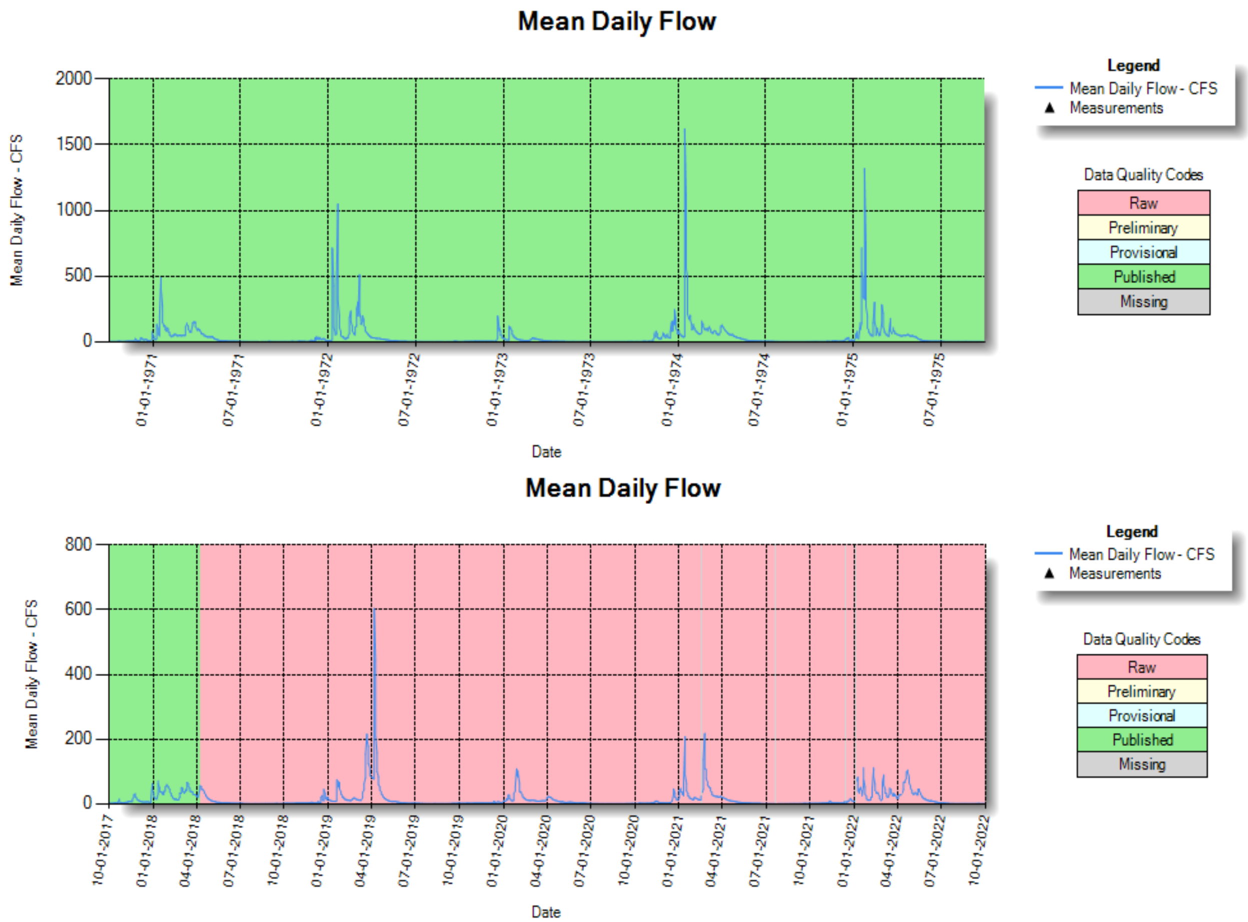

Figure 5-7. Mean Daily Flow, Mosier Creek, October 1970 – September 1975 (above) and October 2017 to September 2022 (below). Source: Oregon Water Resources Department, Near Real Time Hydrographics Data.

5.2.3.4 Highest Attainable Use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for all waters described here is salmon and trout rearing and migration, which is the next most stringent use after Core Cold Water Use. Factor 131.10(g)(5) precludes attainment of Core Cold Water Use but does not preclude attainment of Salmon and Trout Rearing and Migration Use. Criteria associated with this use designation protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. This use designation also protects other cold-water biota that co-occur with salmonid fishes.

5.2.3.5 Map

A map and inventory table of all waters where DEQ is updating Core Cold Water Use as described in this section is included in Appendix C.

6 Changes to 'Salmon and Trout Rearing and Migration use'

6.1 Updates to Salmon and Trout Rearing and Migration Use because naturally occurring pollutant concentrations prevent attaining the use

6.1.1 Update to Salmon and Trout Rearing and Migration Use in the Santiam River, Willamette Basin

6.1.1.1 Reason for this Use Change

DEQ is updating Salmon and Trout Rearing and Migration use in the lower approximately 9.8 miles of the Santiam River to Migration Corridor use (Figure D-1). Modeling conducted for the 2006 Willamette River TMDL indicates that these waters cannot attain the Salmon and Trout Rearing and Migration Use criterion of 18℃ under natural thermal conditions throughout the summer. This is consistent with FHD data, which indicates that these waters do not support salmon rearing during the summer. The presence of cool water species in these waters also indicates that these waters do not fully support Salmon and Trout Rearing and Migration use. Migration corridors may have incidental salmon and trout rearing, particularly as juveniles are moving downstream through the system. But they do not provide prime rearing conditions, and they are not the habitats where juveniles would rear and grow throughout the summer prior to smolting and beginning their downstream migration to the ocean. The primary use for these waters is migration.

6.1.1.2 Protection of Existing Uses

The updates to Salmon and Trout Rearing and Migration Use described in this section protect existing uses. According to FHD, these waters do not currently or historically support suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead throughout the summer. Moreover, these waters cannot achieve the Salmon and Trout Rearing and Migration Use criterion of 18℃ under DEQ's best estimate of natural conditions. The technical workgroup convened for the Aquatic Life Use Updates project supported these changes.

6.1.1.3 UAA Factor That Precludes Attainment of the Use

This update is justified based on 40 CFR 131.10(g), Factor 1: "Natural occurring pollutant concentrations prevent attaining the use."

The natural thermal potential for this reach of the Santiam River was modelled for the Willamette Basin TMDL. This modeling determined that under system potential, the reach naturally exceeds 18°C in July and August up to river mile 9.8 (Figure 6-1). The modeling for this scenario measured the impact of achieving system potential conditions without changing upper boundary flow rates or temperatures. These compare model calculated temperatures for 2002 system potential conditions to model calculated temperatures for 2002 current conditions. Figure 6.1 shows system potential assuming no point sources and system potential near stream land cover and effective shade.[107] The modeling does not account for the impacts of dams upstream of this reach of the Santiam River. However, USGS has modeled the impact of dam removal, which indicates that peak summer water temperatures without the dam may be warmer than temperatures with the dam, likely due to decreased flow (Figure 6-2).[108] The likely outcome is that dam removal may increase stream temperatures further downstream where DEQ is proposing to update the use, indicating that temperatures under natural conditions may be even higher than what is shown in Figure 6-1 and further indicating that natural thermal conditions prevent use attainment.

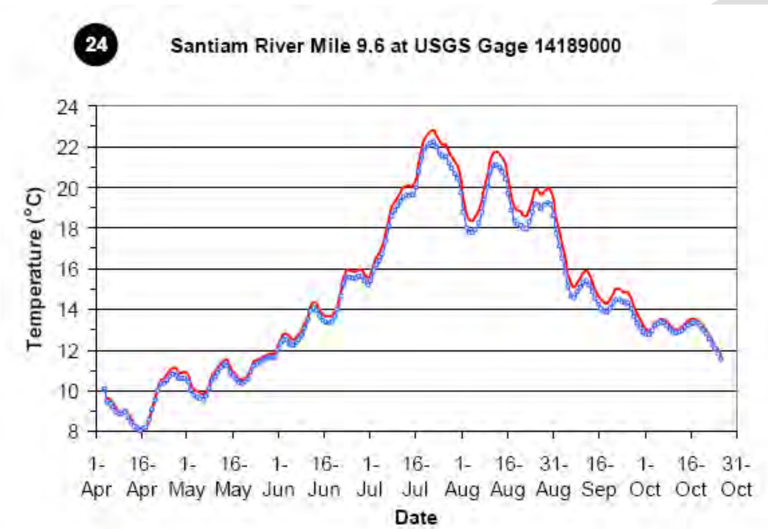

Figure 6-1. 2003 temperatures (Red) and System Potential Temperatures (Blue), Santiam River Mile 9.6. Sources: Willamette Basin Temperature TMDL (2006).

[107] Oregon DEQ, 2006. Willamette Basin Total Maximum Daily Load, Chapter 4: Willamette Basin Temperature TMDL. See discussion in Willamette Temperature TMDL, page 4-158 and forward.

[108] Rounds, S.A., 2010, Thermal effects of dams in the Willamette River basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2010-5153, 64 p. This study does not model the temperatures in the reach of the Santiam River where DEQ is revising the use, but further upstream. Figure 6-2 indicates that water releases from the dams likely decrease river temperatures downstream during the summer, indicating that system potential temperatures downstream may be higher than actual measured temperatures.

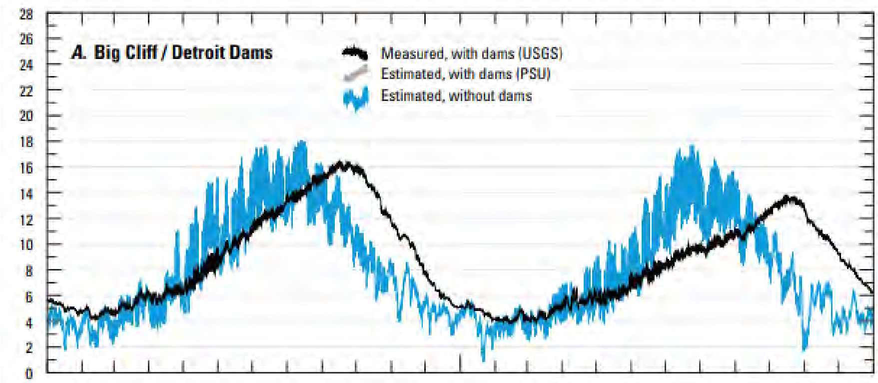

Figure 6-2. Measured and estimated water temperatures for conditions with and without upstream dams at the Big Cliff dam sites in the Willamette River basin, Oregon, 2001–02. (Note: x-axis is time in months, beginning in January 2001). Source: Rounds (2010).

6.1.1.4 Highest attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for these waters is "migration corridor," which is the next most stringent use after Salmon and Trout Rearing and Migration. 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 and may rear in these reaches, primarily during other times of the year or in microhabitats. There may be some cold-water fish use during the summer, such as juvenile rearing or out migration, but these are not spawning streams and do not provide optimal juvenile rearing conditions during the summer. The presence of native cool water species, such as speckled dace, redside shiner, largescale sucker and mountain sucker, also supports a migration corridor designation. Factor 131.10(g)(1) precludes attainment of Salmon and Trout Rearing and Migration Use but does not preclude attainment of Migration Corridor Use based on existing information.

6.1.1.5 Maps

Maps and an inventory table of all waters where Salmon and Trout Rearing and Migration Use is being updated to Migration Corridor Use as described in this section is included in Appendix D.

6.1.2 Update to 'Salmon and Trout Rearing and Migration Use' in Multnomah Channel

6.1.2.1 Reason for this Use Update

DEQ is updating Salmon and Trout Rearing and Migration use in Multnomah Chanel to Migration Corridor use (Figure D-2). Modeling conducted for the 2006 Willamette River TMDL indicates that these waters cannot attain the Salmon and Trout Rearing and Migration Use criterion of 18°C under natural conditions. This is consistent with data from FHD, which indicates that these waters do not support salmon rearing during the summer. The presence of cool water species in these waters also indicates that they do not fully support Salmon and Trout Rearing and Migration use. Migration corridors may have incidental salmon and trout rearing, particularly as juveniles are moving downstream through the system. But they do not provide prime rearing conditions, and they are not the habitats where juveniles would rear and grow throughout the summer prior to smolting and beginning their downstream migration to the ocean. The primary use for these waters is migration.

6.1.2.2 Protection of Existing Uses

The updates to Salmon and Trout Rearing and Migration Use described in this section protect existing uses. According to FHD, these waters do not currently or historically provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, or adult pre-spawn holding? for salmon and steelhead. Moreover, these waters cannot achieve the Salmon and Trout Rearing and Migration Use criterion of 18℃ under natural conditions. The technical workgroup convened for the Aquatic Life Use Updates project supported these changes.

6.1.2.3 UAA Factor That Precludes Attainment of the Use

This update is justified based on 40 CFR 131.10(g), Factor 1: "Natural occurring pollutant concentrations prevent attaining the use."

Current temperatures in these waters exceed 18-20°C as a mean August maximum temperature.[109] The current water temperatures of these reaches are similar to the nearby Willamette River and Columbia River, which are designated for migration corridor use. These reaches were not modeled in the 2006 Lower Willamette basin TMDL. However, these reaches receive water from both the Willamette River and Columbia River, where TMDL modeling indicates natural thermal potential exceeds 18°C in July and August (Figures 6-3 to 6-6) and the designated aquatic life use is Salmon and Steelhead Migration Corridor. The natural thermal potential model assumes no point source loads, potential near stream land cover and effective shade. The lower Willamette model also removed the diversion to the McKenzie River from the Eugene Water and Electric Board and the concrete cap and flashboards from the Willamette Falls Hydroelectric Project. The model reflects the current channel and boundary condition temperatures and flows from U.S. Army Corps of Engineers reservoirs on the Willamette and the Clackamas River Hydroelectric Project and tributary inflow temperatures from 2001 and 2002. As the TMDL notes, flow augmentation from the USACE results in cooler water temperatures than would be experienced naturally, although the river may not cool as quickly in the fall.[110] The 2006 Willamette TMDL did not model impacts of channel modification that has occurred over the last 150 years; however, the TMDL noted that the greatest loss of channel complexity is upstream of Albany and thus not in the area where DEQ is proposing the use change. Moreover, the lower Willamette River and

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[109] U.S. EPA, 2017. Memorandum: *Evaluation of the potential cold water refugia created by tributaries within the Lower/Middle Columbia River based on "NorWeST" temperature modeling project, February 21, 2017*.

[110] ODEQ. 2006. Willamette River Mainstem TMDL. See page 4-27.

Multnomah Channel area has a confining bedrock channel and lacks off-channel features such as alcoves and side channels that are likely to support colder temperatures, further supporting the notion that temperatures under natural conditions do not support the Salmon and Trout Rearing and Migration in Multnomah Channel and Scappoose Bay in the summer months and that the use is not attainable.[111]

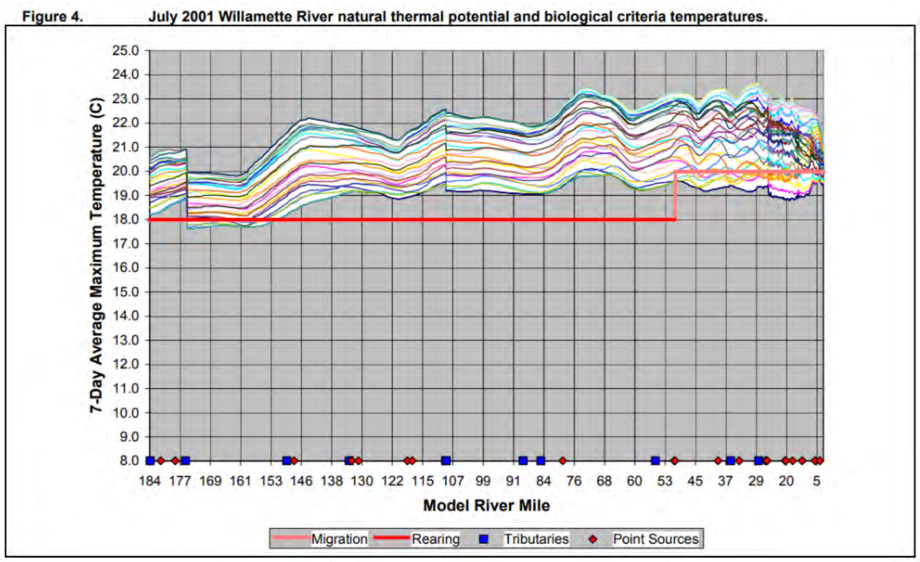

Figure 6-3. Natural thermal potential scenarios, Willamette River, July 2001. Source: Oregon DEQ. 2006. Willamette River Temperature TMDL.

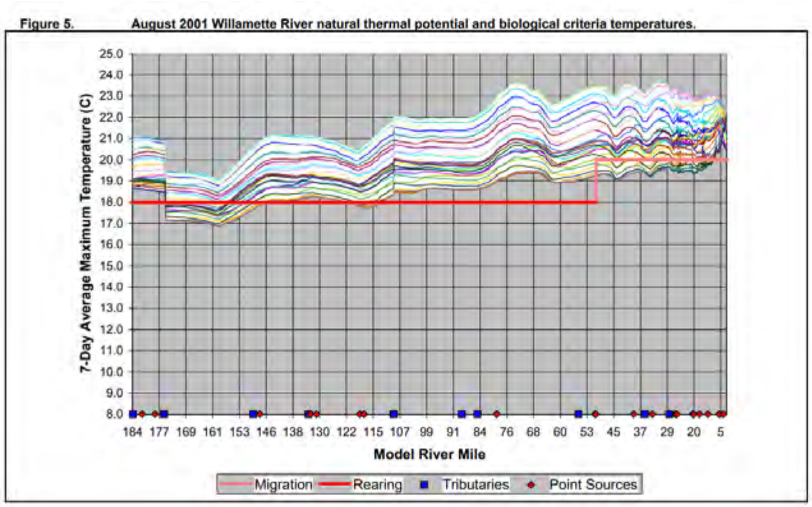

Figure 6-4. Natural thermal potential scenarios, Willamette River, August 2001. Source: Oregon DEQ. 2006. Willamette River Temperature TMDL.

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[111] See discussion on page 24 in Mangano, J.F., Piatt, D.R., Jones, K.L, and Rounds, S.A., 2018, Water temperature in tributaries, off-channel features, and main channel of the lower Willamette River, northwestern Oregon, summers 2016 and 2017: U.S. Geological Survey Open-File Report 2018-1184, and page 43 in Oregon DEQ, 2020. Lower Willamette River Cold-Water Refuge Narrative Criterion Interpretation Study.

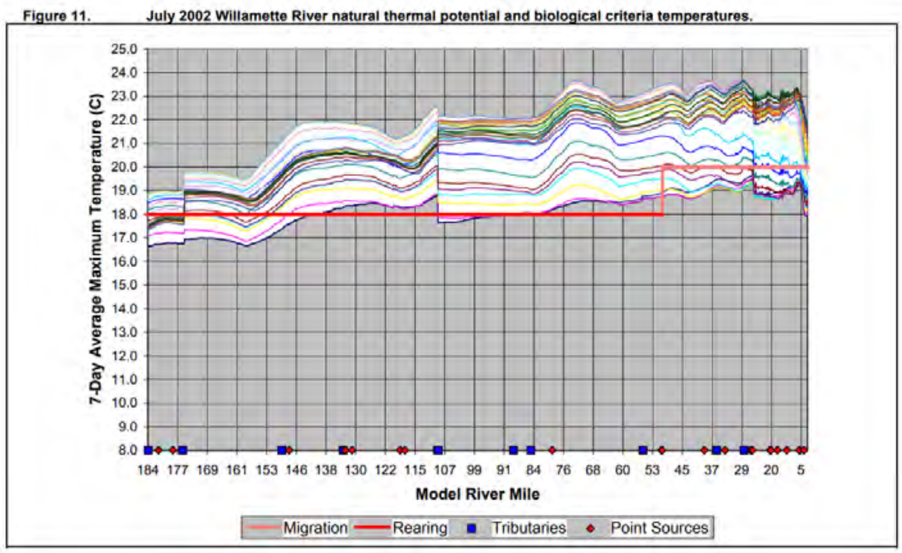

Figure 6-5. Natural thermal potential scenarios, Willamette River, July 2002. Source: Oregon DEQ. 2006. Willamette River Temperature TMDL.

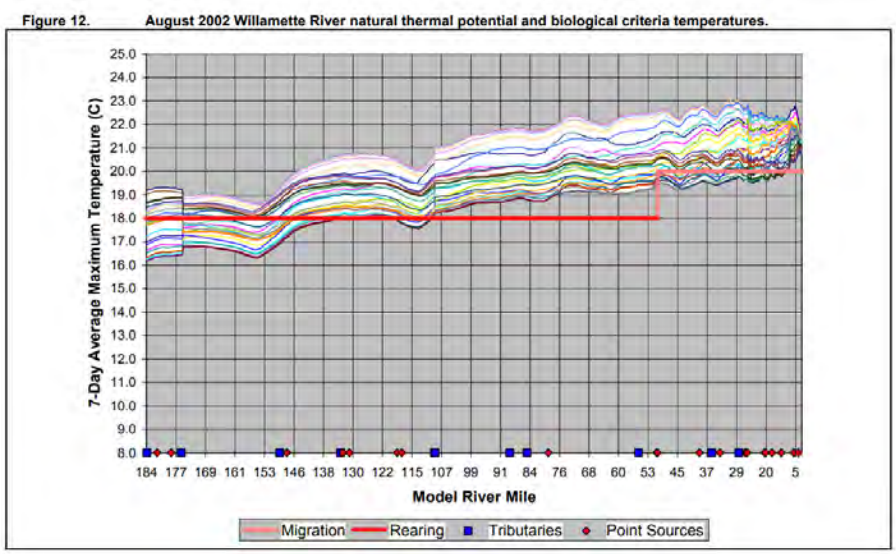

Figure 6-6. Natural thermal potential scenarios, Willamette River, August 2002. Source: Oregon DEQ. 2006. Willamette River Temperature TMDL.

6.1.2.4 Highest Attainable Use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for Multnomah Channel and Scappoose Bay is “Migration Corridor,” which is the next most stringent use after Salmon and Trout Rearing and Migration. The “Migration Corridor” is defined as "waters that are predominantly used for salmon and steelhead migration during the summer and have little or no anadromous salmonid rearing in the months of July and August.[112]" Anadromous or adfluvial species migrate through and may rear in these reaches, primarily during other times of the year. There may be limited cold-water fish use during the summer, such as juvenile rearing or out migration, but these waters do not provide optimal juvenile rearing conditions during the summer. The presence of native cool water species, such as speckled dace, redside shiner, largescale sucker and mountain sucker, also supports a migration corridor designation. Factor 131.10(g)(1) precludes attainment of Salmon and Trout Rearing and Migration Use but does not preclude attainment of Migration Corridor Use based on existing information.

6.1.2.5 Maps and Inventory Table

Maps and an inventory table of all waters where Salmon and Trout Rearing and Migration Use is being updated to Migration Corridor Use as described in this section is included in Appendix D.

6.1.3 Update to Salmon and Trout Rearing and Migration Use in D River

6.1.3.1 Reason for the Update

DEQ is updating salmon and trout rearing and migration use in the D River, Mid Coast Basin, to migration corridor use (Figure D-3). Updated information collected since these waters were designated for Salmon and Trout Rearing and Migration Use indicate that these waters do not support the use due to natural occurring temperatures.

6.1.3.2 Protection of Existing Uses

The updates to Salmon and Trout Rearing and Migration Use described in this section protect existing uses. Criteria associated with the Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead during the summer months. According to FHD, these waters do not currently or historically support such uses during the summer, nor do natural occurring temperatures support such uses. The technical workgroup convened for the Aquatic Life Use Updates project supported these changes and did not raise concerns that aquatic life use in these waters supported Salmon and Trout Rearing and Migration Use at any time since 1975.

6.1.3.3 UAA Factor

This update is justified based on 40 CFR 131.10(g), Factor 1: "Natural occurring pollutant concentrations prevent attaining the use." D River is a 440 foot long river draining Devil's Lake, which was formed when

[112] OAR 340-041-0002(37)

sand dunes and beach deposits blocked the valley formed by D River. The river is the only outflow from Devil's Lake and drops to the Pacific Ocean. Devil's Lake has a retention time of 2 months, indicating that solar radiation during the summer is able to significantly warm the lake. Information from the Oregon Lakes Atlas indicates that summer temperatures exceed 20℃ at the surface and 18 ℃ at its depth.[113] Because these warm lake waters feed the D River, stream temperatures naturally exceed the Salmon and Trout Rearing and Migration Use criterion of 18 ℃. Current NorWeST temperature modeling indicates that current temperatures are 19.5 ℃. Given the short length of D River, there is no possibility of cooling the water sufficiently to meet the Rearing and Migration Use criterion before the water discharges to the Pacific Ocean.

6.1.3.4 Highest Attainable Use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for these waters is Migration Corridor use which is the next most stringent use after Salmon and Trout Rearing and Migration. Factor 131.10(g)(1) precludes attainment of Salmon and Trout Rearing and Migration Use but does not preclude attainment of Migration Corridor Use based on existing information. 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 and may rear in 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 spawning streams and do not provide optimal juvenile rearing conditions during the summer.

6.1.3.5 Maps and Inventory Table

Maps and an inventory table of all waters where Salmon and Trout Rearing and Migration Use is being updated to Migration Corridor Use as described in this section is included in Appendix D.

6.2 Updates to Salmon and Trout Rearing and Migration Use because physical conditions prevent attaining the use

6.2.1 Updates to Salmon and Trout Rearing and Migration Use in the Walla Walla Basin

6.2.1.1 Reason for the Use Update

[113] Atlas of Oregon Lakes: Devil's Lake. 1985. https://aol-backend.wdt.pdx.edu/api/document/380/ includes a copy of the print version of the Atlas that includes water quality data for the lake.

DEQ is updating salmon and trout rearing and migration use in several lower tributaries of the Walla Walla River located in Oregon (Figure D-4).[114] Information collected since these waters were designated for Salmon and Trout Rearing and Migration Use in 2003 indicate that these waters are not suitable habitat to support salmonid rearing, as described in Section 6.2.1.3 below.

6.2.1.2 Protection of Existing Uses

The updates to Salmon and Trout Rearing and Migration Use described in this section protect existing uses. Criteria associated with the Salmon and Trout Rearing and Migration Use protect waters that provide suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, and upstream adult pre-spawn migration for salmon and steelhead. The waters described here do not support such uses and have not historically supported such uses, but do support Redband Trout use, as noted in the FHD. They do not support such uses due to intermittent or low flow, which do not provide rearing habitat for these species. These physical conditions unrelated to water quality that have existed since before 1975 because these waters are in an arid area with little precipitation.

6.2.1.3 UAA Factor Precluding Attainment of the Use

This update is based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

In 2003, DEQ designated these waters for salmon and trout rearing and migration because the mainstem Walla Walla River, downstream of these waters, is considered habitat for steelhead. However, these lower tributaries are not suitable habitat for steelhead spawning, rearing, or migration according to FHD and have never historically supported such use. Like other anadromous salmonids, steelhead require cold, free-flowing water, and clean gravel for spawning. The area where DEQ is updating the use, located primarily west and south of Milton-Freewater, is arid and warm with average maximum stream temperatures since 1928 of 89.3 °F in July and 87.5 °F in August. Average annual precipitation in the area since 1928 is 14.5 inches with averages of less than ½ inch of precipitation per year in July and August.[115] Almost all of the waters described here are intermittent (Figure 6-7). Pine Creek, which flows from the border south through Weston is perennial, but only due to the presence of the Poplar Springs Reservoir near Weston, which regulates the flow of the river. Without the presence of the dam, Pine Creek downstream of the reservoir would be intermittent, similar to those reaches upstream of the reservoir, and thus has not historically provided suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout, nor does it currently according to ODFW. The only other perennial waters in the area are irrigation ditches or canals, which do not have appropriate substrate to support rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout.

[114] Administratively, these waters are included as part of the Umatilla Basin (OAR 340-041-0310).

[115] Western Region Climate Center. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?or5593. Visited March 22, 2023.

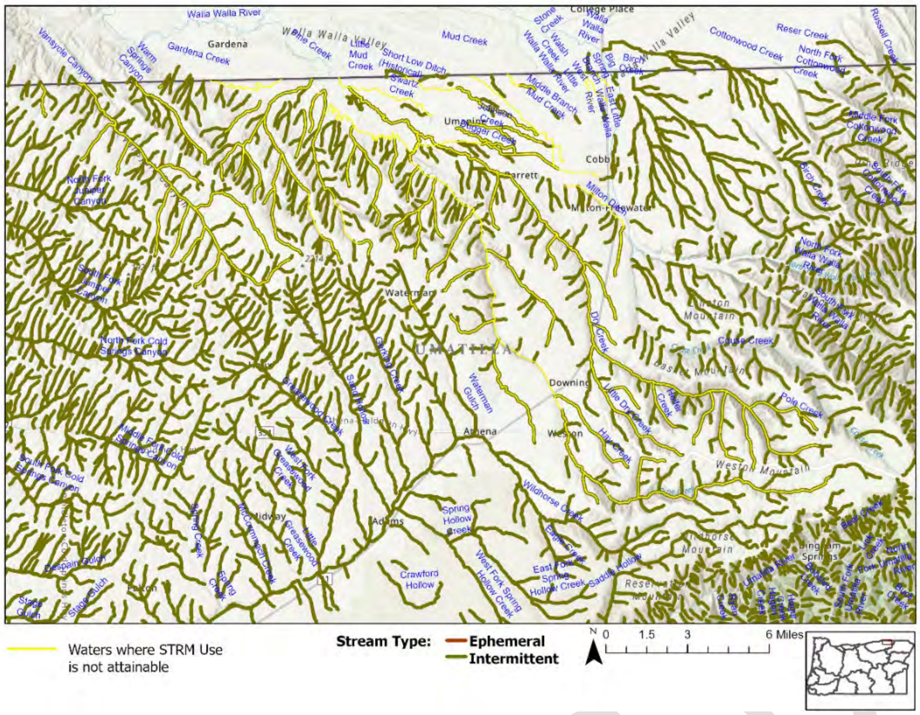

Figure 6-7. Stream intermittency, Walla Walla Basin.

6.2.1.4 Highest attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for these waters is Redband Trout Use, which is, along with Migration Corridor Use, the next most stringent use after Salmon and Trout Rearing and Migration Use. Factor 131.10(g)(5) precludes attainment of Salmon and Trout Rearing and Migration Use but does not preclude attainment of Redband Trout use. These waters have appropriate physical conditions to support Redband Trout when there is sufficient precipitation to do so, as opposed to rainbow or coastal cutthroat trout. ODFW FHD data categorizes Dry Creek and Pine Creek, two of the major tributaries in this area, as foraging, migration and overwintering habitat for Redband Trout.

6.2.1.5 Maps

Maps and an inventory table of all waters where Salmon and Trout Rearing and Migration Use is being updated to Redband Trout Use as described in this section is included in Appendix D.

7 Updates to 'Redband Trout' use

7.1.1 Reason for this Use Update

DEQ is updating numerous waters in the Klamath, Goose and Summer Lakes, Malheur Lake, Malheur River, Owyhee, and Powder River Basins from Redband Trout Use to Cool Water Species Use (Figures E-1 to E-4). In 2003, ODFW had little information regarding the distribution of Redband Trout or cool water species in Oregon, particularly for the inland basins of southeastern Oregon. The previous focus was on anadromous fish and ESA listed species. As a precautionary approach, DEQ applied a conservative assumption where data was unavailable and broadly designated entire administrative basins for Redband Trout with the intention of updating these uses when ODFW had better information about their distribution. Since 2003, ODFW has significantly improved its understanding of distribution of Redband Trout, including timing of when Redband Trout occurs in various waters. Specifically, DEQ is updating the Redband Trout designations based on new and improved data because Redband Trout do not reside in many of the waters previously designated and ODFW biologists have concluded that the habitat is not suitable or is not accessible. This includes numerous waters that are intermittent and thus do not have flow during the summer. It also includes irrigation canals where the neither the substrate nor the flow support Redband Trout use and where natural resource agencies are actively screening diversions to exclude Redband Trout and other salmonid species from entering the canals as part of restoration efforts.

7.1.2 Protection of Existing Uses

The updates to Redband Trout Use described in this section protect existing uses. Criteria associated with the Redband Trout Use protect waters that provide suitable habitat for Redband Trout during the summer months. The waters described here either do not support Redband Trout or do not support trout use in the summer. These streams do support Cool Water Species use. The waters described here are either irrigation canals, which do not have substrate to support Redband Use, or they are intermittent or ephemeral streams which typically only have flowing water during early spring snowmelt and thus do not have any flow to support Redband Trout during the summer.

7.1.3 UAA Factor That Precludes Attainment of the Use

These updates are justified based on 40 CFR 131.10(g), Factor 5: "Physical conditions related to the natural features of the waterbody, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality preclude attaining aquatic life protection uses."

Redband trout include several subspecies of *Oncorhynchus mykiss*, or rainbow trout, that live in the interior of many western states. Interior Redband Trout live above anthropogenic or natural barriers where anadromous migration is not possible.[116] In high elevation waters of the interior Columbia River Basin, Redband Trout prefer pools, rather than flowing waters. In lowland desert waters, Redband Trout prefer shaded and cooler reaches of stream.[117] Redband can have adfluvial, fluvial or resident life histories depending on their location.

[116] U.S. Forest Service. 2016. Conservation Strategy for Interior Redband (*Oncorhynchus mykiss subsp.*) in the States of California, Idaho, Montana, Nevada, Oregon and Washington.

[117] Discussion on page 7 of 2016 Conservation Strategy cited above.

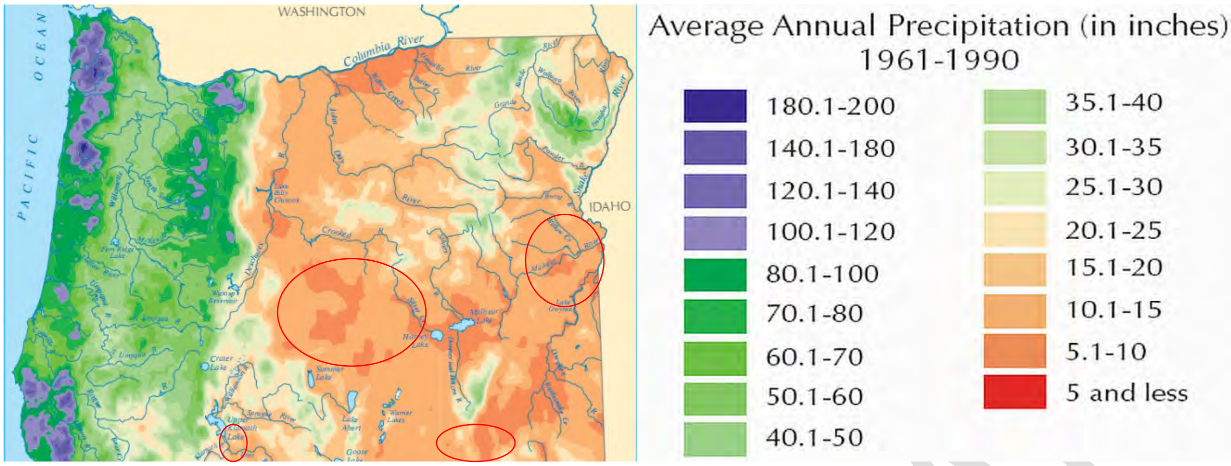

Figure 7-1. Average Annual Precipitation in Oregon. Circled areas roughly correspond to areas where DEQ is updating Redband Trout use to cool water species use.

Redband Trout occur in very dry areas of the state, with annual average rainfall (based on 1961-1990 data) less than 15” and often less than 10”, with little precipitation during the summer. (Figures 7-1 and 7-2). ODFW notes that, “where suitable habitat and water flow are available, Redband Trout are likely to be present.” Most of the waters where DEQ is updating the use are ephemeral or intermittent drainages that are dry except during precipitation or snowmelt. Many Redband Trout populations are naturally isolated from other populations or from large water bodies due to the drying of the pluvial lakes thousands of years ago. [118]

DEQ broadly categorizes the waters where DEQ is updating Redband Trout use into two groups. For each group, Redband Trout use is unattainable due to physical conditions in the waterbodies, however for different reasons.

The first group of waters includes irrigation canals and ditches that obtain water from diversions from the Klamath River upstream of the Keno Dam. FHD data and professional opinion from ODFW district biologists and staff indicate that these irrigation canals and ditches do not have and never have had the physical conditions that make such habitat suitable for Redband Trout. There is no suitable substrate and there is often insufficient flow to support Redband Trout.[119] Under the Klamath Reservoir Reach Restoration Prioritization Plan, there are current efforts to place diversion screens to exclude fish passage to these diversions to ensure successful restoration of salmon habitat to natural waterways.[120]

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[118] Oregon Department of Fish and Wildlife, 2008. Oregon Native Fish Status Report – Volume II. Pp. 368-412. Available at: https://www.dfw.state.or.us/fish/onfsr/docs/final/08-redband-trout/rb-methods.pdf.

[119] *Personal communication, Bill Tinniswood, Assistant District Fish Biologist, ODFW, January 5, 2023.*

[120] O’Keefe, C., Pagliuco, B., Scott, N., Cianciolo, T., Holycross, B. Klamath Reservoir Reach Restoration Plan: A Summary of Habitat Conditions and Restoration Actions in the Mainstem Klamath River and Tributaries Between

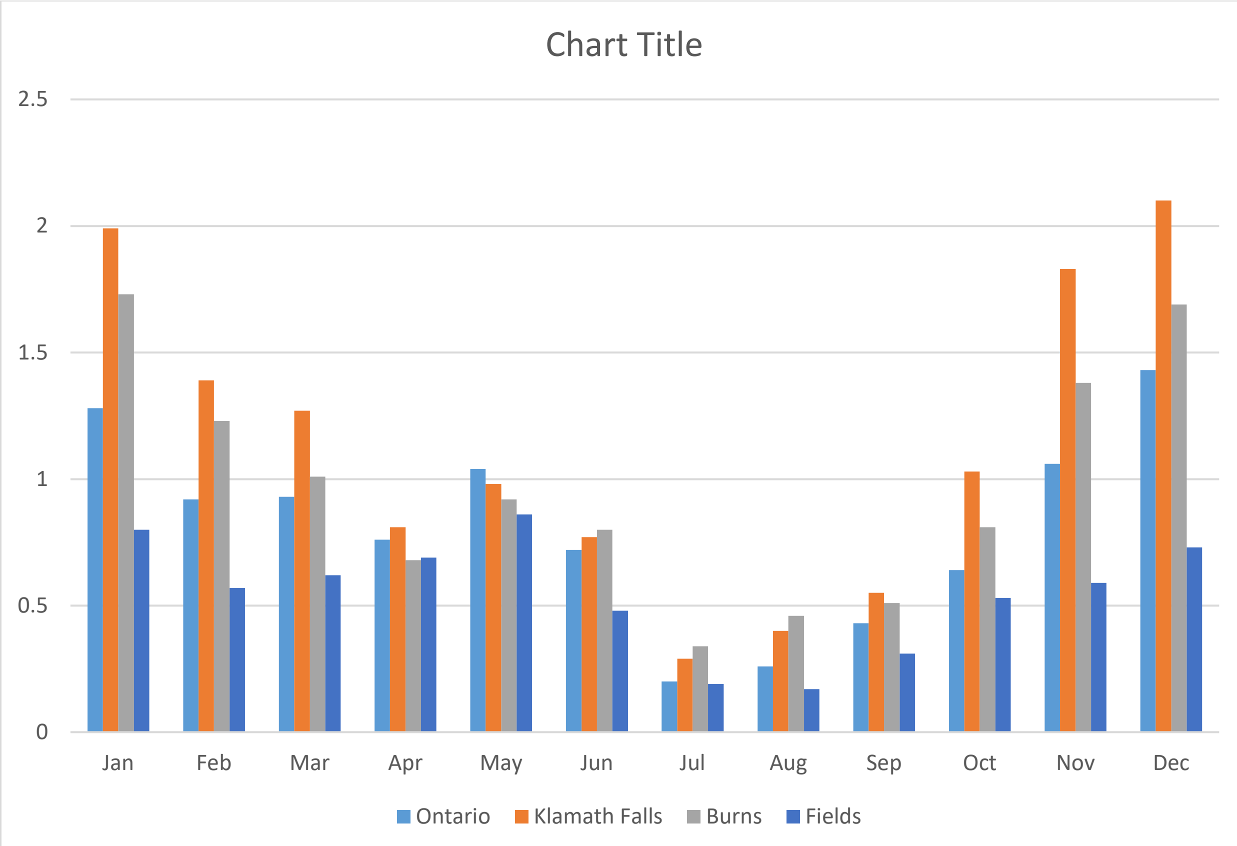

Figure 7-2. Long-term average precipitation in southeastern Oregon. Data from Western Regional Climate Center. https://wrcc.dri.edu/summary/Climsmor.html.

The second group of waters are intermittent or ephemeral streams that have no flow during much of the year, except during snowmelt or precipitation events. During the summer, when there is almost no precipitation, these waters will have no flow. ODFW notes that an average wetted width of 2.5 meters over a minimum of 10 km are needed to sustain a minimum Redband Trout abundance of 100 reproductive individuals.[121] These conditions do not exist in such waters. These findings are consistent with the professional opinion of ODFW biologists who have been surveying these streams for 20 years or more, have evaluated the habitat conditions and have not detected Redband Trout in these waters.

DEQ used the intermittent and ephemeral streams layers included in the NHD Plus hydrography to determine which waters do not have year-round flow to support Redband Trout Use. See Figures 7-3 – 7- 6. In these maps, the olive color corresponds to streams with intermittent flow and red corresponds to waters with ephemeral flow. Yellow lines (with corresponding olive or red outlines) are waters where

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Iron Gate Dam and Link River Dam. 2022. Prepared by NOAA Fisheries, Pacific States Marine Fisheries Commission, and Trout Unlimited.

[121] Oregon Department of Fish and Wildlife, 2008. Oregon Native Fish Status Report – Volume II. Pp. 368-412. Available at: https://www.dfw.state.or.us/fish/onfsr/docs/final/08-redband-trout/rb-methods.pdf.

DEQ is proposing to revise the Redband Trout use to Cool Water Species Use. DEQ retained Redband Use in perennial streams unless they are canals or irrigation ditches. Specifically, DEQ retained Redband Trout Use in Trout Creek, Little Trout Creek and Cottonwood Creek in the southern Malheur Lake basin because data indicated these waters are perennial and thus Redband Trout Use may be attainable in these waters.

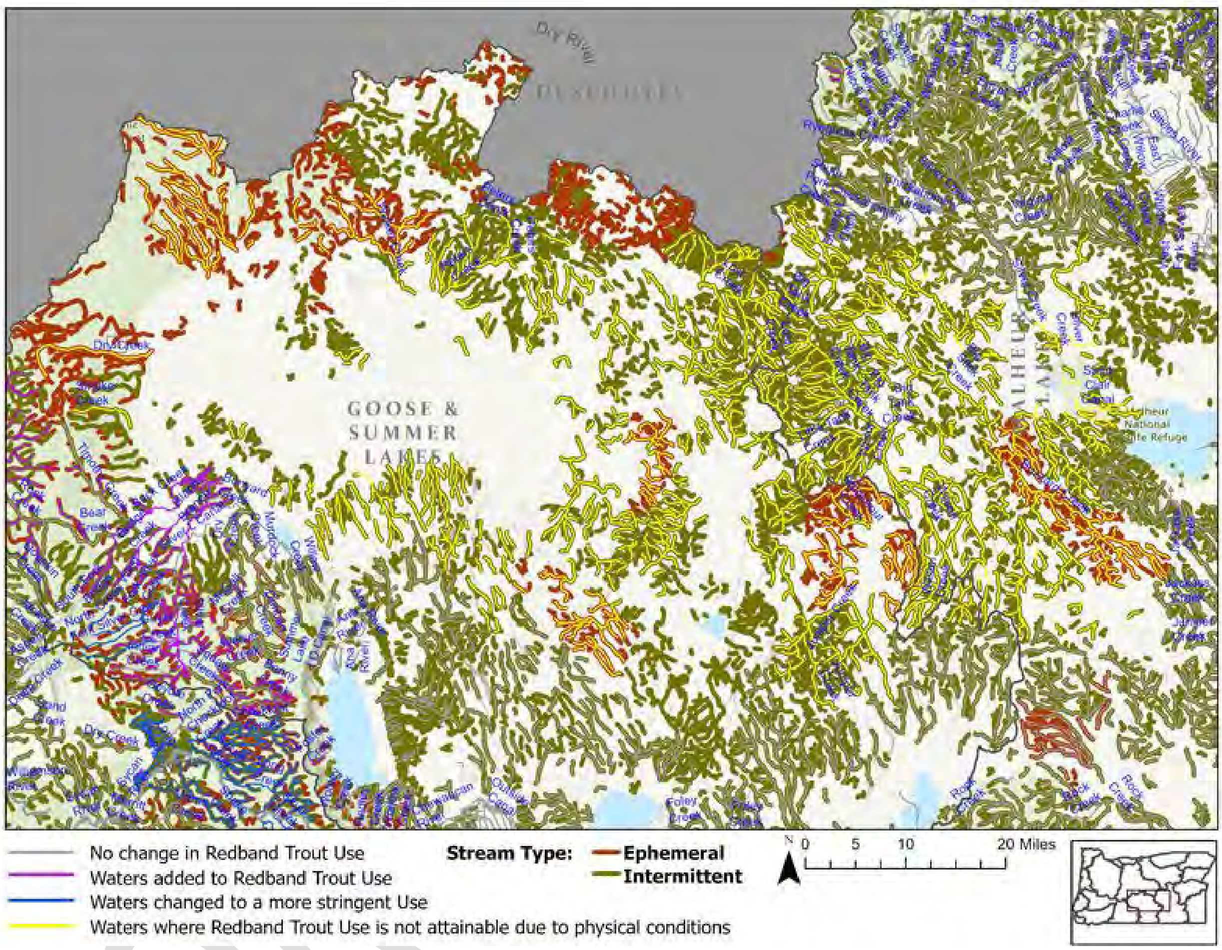

Figure 7-3. Intermittent and ephemeral waters, Christmas Valley area (Goose & Summer Lakes and Malheur Lakes Basins). Yellow lines correspond to waters DEQ is proposing to revise from Redband Trout Use to Cool Water Species use. All of these waters are either intermittent or ephemeral.

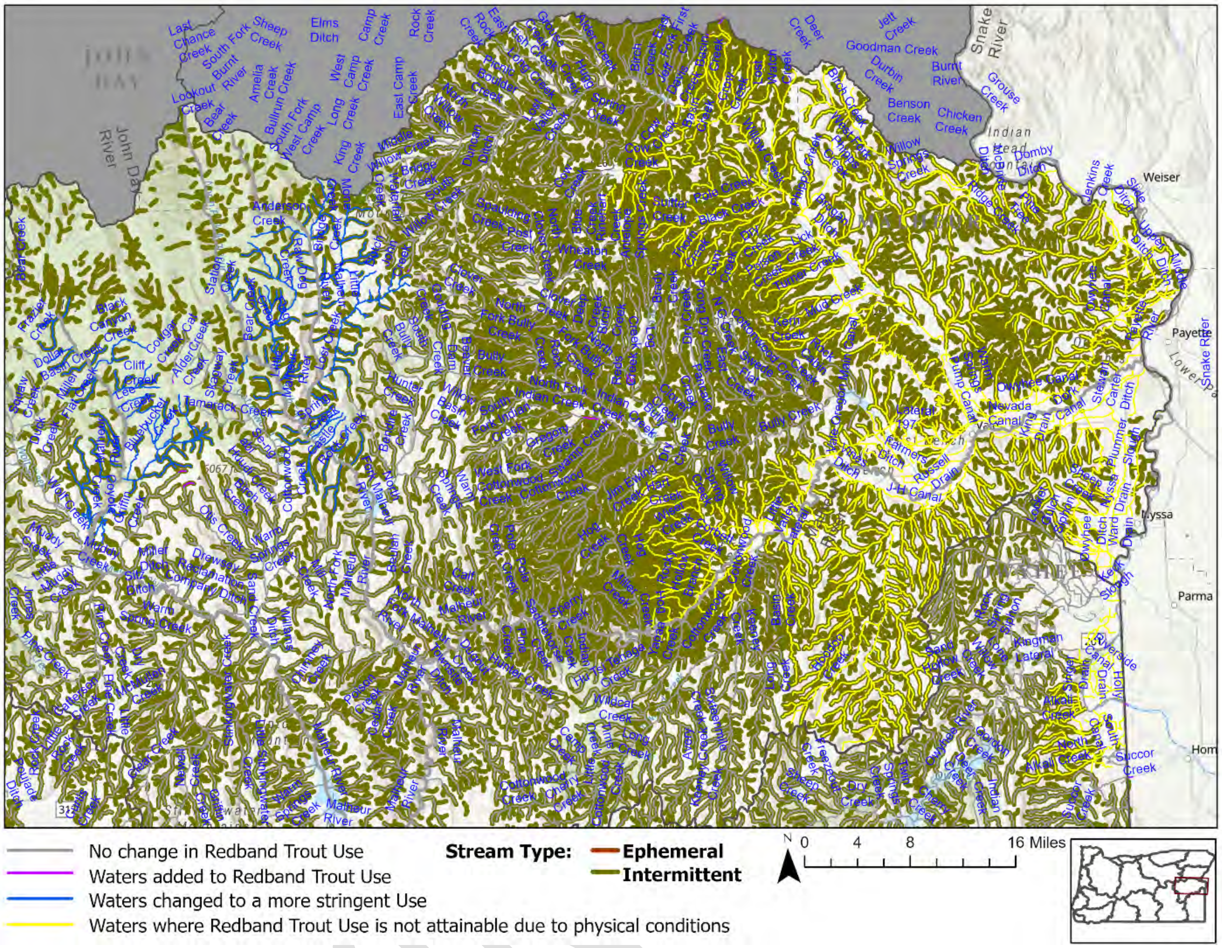

Figure 7-4. Intermittent and ephemeral waters, Malheur Basin. Yellow lines correspond to waters DEQ is proposing to revise from Redband Trout Use to Cool Water Species use. Most waters are intermittent. Those that are not intermittent are manmade canals or irrigation ditches that do not support Redband Trout Use.

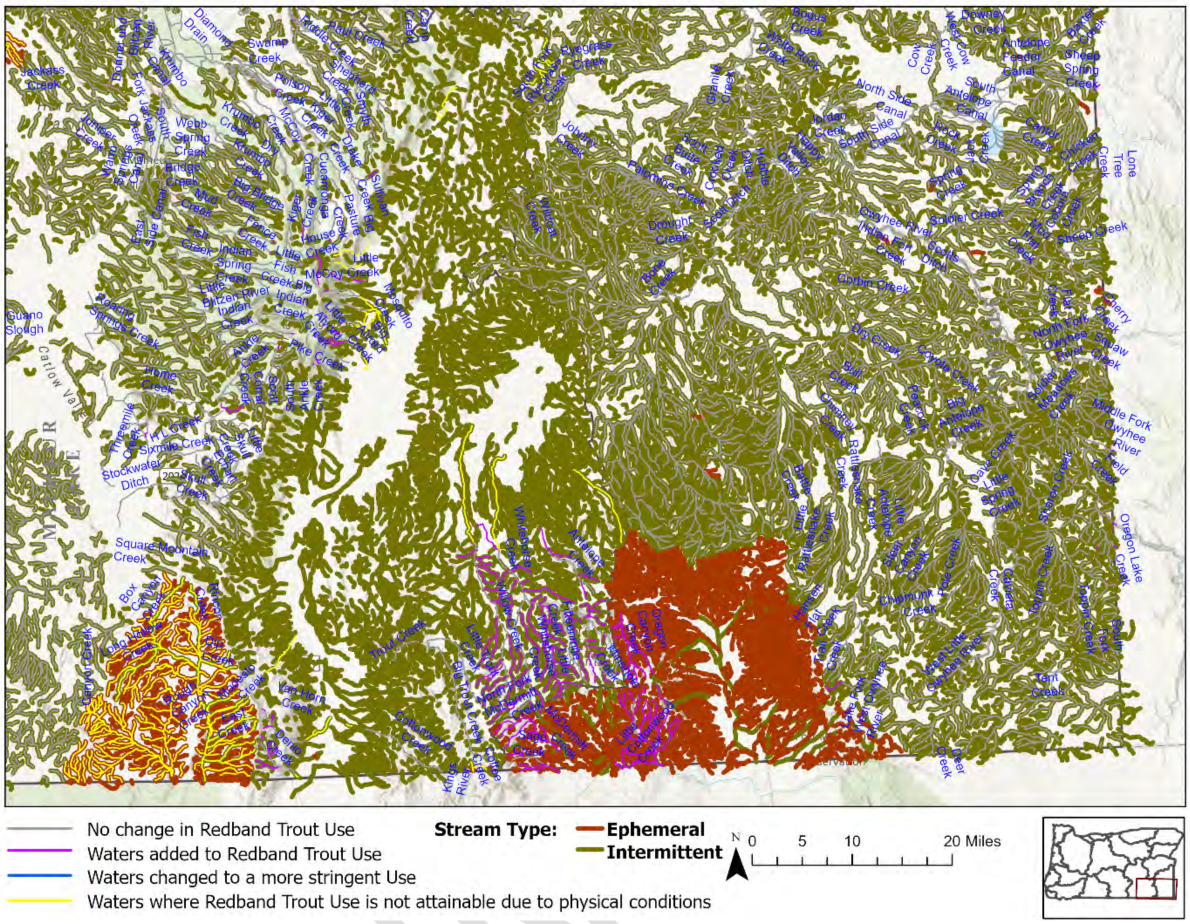

Figure 7-5. Intermittent and ephemeral waters, southern Malheur Lakes Basin. Yellow lines correspond to waters DEQ is proposing to revise from Redband Trout Use to Cool Water Species use. All of these waters are ephemeral or intermittent, with the exception of Trout Creek. DEQ is retaining Redband Trout Use in Trout Creek.

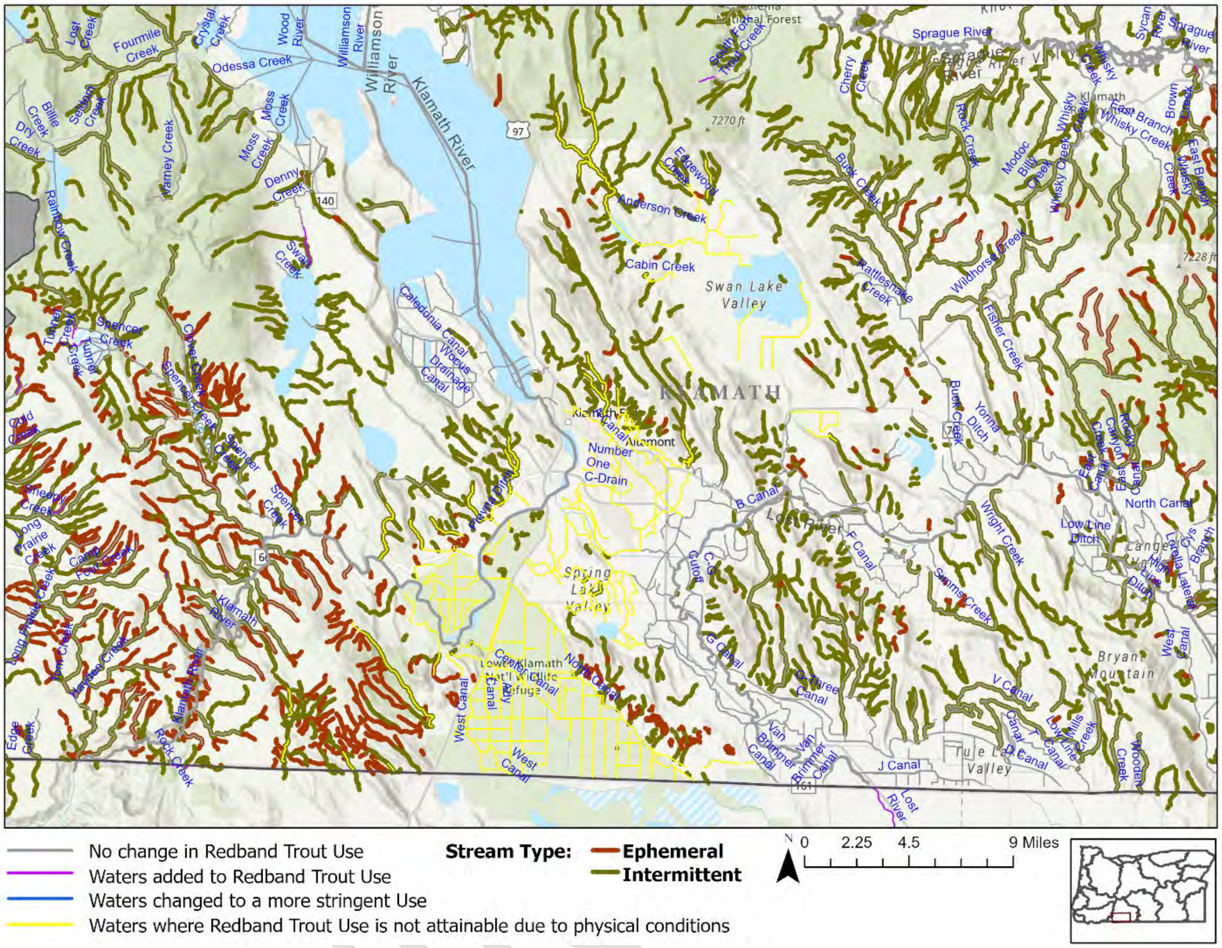

Figure 7-6. Intermittent and ephemeral waters, Klamath Basin. Yellow lines correspond to waters DEQ is proposing to revise from Redband Trout Use to Cool Water Species use. A few of these waters are ephemeral or intermittent. Those that are not irrigation ditches or canals where Redband Trout is unattainable because substrate does not support Redband Trout Use and ODFW biologists have not detected Redband Trout in these waters.

7.1.4 Highest Attainable use

Based on the best available data and the decision rules used for this rulemaking, the highest attainable year-round use for these waters is Cool Water Species use, which is the next most stringent use after Redband Trout Use. Factor 131.10(g)(5) precludes attainment of Redband Trout Use but does not preclude attainment of Cool Water Species Use. Based on current information, Redband Trout have not used these areas historically because physical conditions preclude attainment of the use as detailed in section 7.1.3. Designation of these waters for cool water species is consistent with the decision rules for the aquatic life use update project, which is to designate cool water species use in any waters not identified as primary migration or rearing habitat for any resident or anadromous salmonid fish in July or August, unless ODFW identifies the waters as having salmon or steelhead “primary migration” use. This is the same “decision rule" that was used for the 2003 fish use designations.

7.1.5 Maps and Inventory Table

Maps and an inventory table of all waters where Redband Trout Use is being updated to Cool Water Species Use as described in this section is included in Appendix E.