

# Bull Trout Habitat Designation: Technical Work Group Recommendations

**Final**

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State of Oregon  
Department of  
Environmental  
Quality



# **Bull Trout Habitat Designation: Technical Work Group Recommendations**

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## Introduction

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### **Intent of the Environmental Quality Commission**

In the State of Oregon the Oregon Department of Environmental Quality (ODEQ) has responsibility for implementing most of the federal authority of the Clean Water Act (CWA) which requires protection of all public waters. In addition, Oregon's State Legislature and the Oregon Environmental Quality Commission have established state laws and regulations to protect and manage water quality. Oregon Administrative Rule (OAR) 340-041-0120(11)(a) states:

*It is the policy of the Environmental Quality Commission (EQC) to protect aquatic ecosystems from adverse surface water warming caused by anthropogenic activities. The intent of the EQC is to minimize the risk to cold-water aquatic ecosystems from anthropogenic warming of surface waters, to encourage the restoration of critical aquatic habitat, to reverse surface water warming trends, to cool the waters of the State, and to control extremes in temperature fluctuations due to anthropogenic activities...*

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### **Oregon's Water Quality Temperature Standard**

The water quality temperature standard is one of several mechanisms for protecting state aquatic ecosystems. As per the CWA, a water quality standard defines the water quality goals of a waterbody. The goal is met by designating the use or uses to be made of the water, setting either narrative or numeric criteria necessary to protect the uses, and by protecting existing water quality through an antidegradation policy. The water quality temperature standard is not a simple numeric criterion (e.g., 17.8°C/64.0°F) beyond which a water body is considered degraded or out of compliance. Rather, Oregon's temperature standard includes beneficial use(s) designated by water basin, a combined narrative criterion with numeric criteria, and an antidegradation policy, established to protect the most sensitive uses. Although individual states are allowed by the CWA to set water quality criteria, the criteria must be approved by the U.S. Environmental Protection Agency (USEPA).

In the case of water temperature, Oregon's most sensitive beneficial uses to protect are salmonid spawning and rearing. However, Oregon has both numeric and narrative criteria to achieve protection for threatened and endangered species, including bull trout (*Salvelinus confluentus*), as well as cold-water spawning and rearing. (See OAR 340 Division 041 for each basin for the complete rule language.)

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**Endangered  
Species Act  
Consultation**

As part of the Endangered Species Act (ESA) consultation between the USEPA, the National Marine Fisheries Service (NOAA Fisheries), and the U.S. Fish and Wildlife Service (USFWS) on USEPA's approval of Oregon's water quality temperature criteria in 1998, Oregon committed to eleven tasks to clarify application of its water quality temperature and dissolved oxygen criteria. These tasks were termed state conservation measures. State Conservation Measure Nine states:

*During the 1999 – 2002 Triennial Review, DEQ will identify when and where the bull trout temperature criterion will apply, and propose appropriate beneficial use designations. DEQ will work with the Services, ODFW, and others with relevant life history information to determine geographic area and time of year (including migration corridors) when application of the bull trout temperature criterion is necessary to maintain the viability of native Oregon bull trout.*

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**Oregon's  
Temperature  
Criterion for  
Bull Trout**

The current criterion for bull trout is specifically referenced in OAR 340 Division 041-<by basin> (2)(b)(A) and states:

*To accomplish the goals identified in OAR 340-041-0120(11), unless specifically allowed under a Department-approved surface water temperature management plan as required under OAR 340-041-0026(3)(a)(D), no measurable surface water temperature increase resulting from anthropogenic activities is allowed:*

*(iv) In waters determined by the Department to support or to be necessary to maintain the viability of native Oregon bull trout, when surface water temperatures exceed 50.0°F (10°C);*

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## Background

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### **Bull Trout Technical Work Group Membership**

In order to meet the commitment of State Conservation Measure Nine ODEQ formed the Bull Trout Technical Work Group which is composed of regionally recognized bull trout experts and fish biologists. Expertise was demonstrated by a combination of educational credentials, research publications, and work experience. The work group included the following members from the private sector or state, federal and tribal agencies:

- Rebekah Dodson, Confederated Tribes of the Warm Springs Reservation, Warm Springs, Oregon
- Christian Gannon, Confederated Tribes of the Warm Springs Reservation, Warm Springs, Oregon
- Mary Hanson, Oregon Department of Fish and Wildlife, Portland, Oregon
- Alan Hemmingsen, Oregon Department of Fish and Wildlife, Corvallis, Oregon
- Philip Howell, US Forest Service, La Grande, Oregon
- Donald Ratliff, Portland General Electric, Madras, Oregon
- Ron Rhew, US Fish and Wildlife Service, Vancouver, Washington
- Christian Torgersen, US Geological Survey, Corvallis, Oregon
- Manette Simpson, Oregon Department of Environmental Quality, Portland, Oregon

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### **Work Group Expertise**

The Technical Work Group members were specifically invited by ODEQ to participate on the Technical Work Group because they are regionally recognized bull trout or water quality experts. Work Group members have participated in the following activities in research and management of bull trout in Oregon:

- Conducted research projects on bull trout life history, genetics, habitat needs, population structure and relationships, population abundance, habitat characteristics and water temperature, seasonal movement of juveniles and adults using fish traps and radio telemetry;
- Conducted snorkel surveys and redd counts;
- Studied spatial patterns in stream temperature and the distribution of thermal refugia throughout eastern and western Oregon;
- Coordinated and developed bull trout conservation and recovery strategies in Oregon;
- Served as Oregon's representative on the USFWS bull trout recovery team;

- Reviewed USFWS proposed rule designating critical habitat for bull trout in Oregon;
- Prepared draft recovery plans for Oregon bull trout populations;
- Developed and implemented water quality standards;
- Authored of many research papers and assessment reports;
- Participated in many other fisheries, water quality, and habitat projects.

See Appendix A for specific reports, publications and research.

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**Objectives and Accomplishments**

The work group was charged with providing technical assistance to ODEQ to determine the geographic areas and times of year when application of the bull trout temperature criterion is necessary to maintain the viability of bull trout. In order to accomplish the objectives of the project the work group met six times in 2002 and twice in 2003. The first meeting served as an introduction of the members to each other, and to the goals of the project. Subsequent meetings included discussions that led to the development of four habitat designations for bull trout life history stages (see sections below for detailed descriptions of bull trout habitat designations). In addition, these habitat designations were applied to stream segments on maps.

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**Conceptual Framework and Recommendations**

The first task the work group undertook was to identify the current geographic distribution of bull trout, including spawning, rearing and migration life history stages. The second task was to identify additional habitat necessary to maintain a viable bull trout population. The work group discussed the following concepts and recommendations during the course of the project:

- Life stage timing requirements determine the need for year-round habitat use for spawning and juvenile rearing versus seasonal use for sub-adults and adults in migration corridors.
- Year round temperature protection should be applied to habitat where bull trout spawning occurs or where the dominant bull trout age classes include 0, 1, or 2 years, or resident adults.
- Sub-adult bull trout may move downstream to larger streams, lakes or reservoirs to forage, but fry and juveniles are more vulnerable to warmer temperatures because they are not capable of moving long distances to seek cool water.
- Feeding and foraging behavior differs substantially among fry, juvenile, sub-adult, and adult life history stages.
- Potential habitat (i.e., habitat necessary to maintain a healthy and viable population) may be difficult to designate when bull trout populations are not sustainable under present conditions.
- Connectivity among isolated bull trout populations needs to be

maintained or reestablished to reinforce small populations so that genetic exchange can occur to maintain diversity and to promote long term population health and viability.

- Habitat designations were proposed based on the following considerations: Bull trout habitat designation 1 (BTHD1) and bull trout habitat designation 2 (BTHD2) are based on occupied habitat derived from field observations and published reports. Bull trout habitat designation 3 (BTHD3) and bull trout habitat designation 4 (BTHD4) include areas that are important for connection of isolated populations but for which there is little or no current or historical data showing bull trout presence.
- Information on bull trout distribution and abundance is limited by the spatial resolution and extent of data, e.g. local experts may have data for specific study reaches but have not collected data for all streams in every basin.
- Methods for surveying bull trout populations vary spatially and temporally throughout Oregon. Thus data on bull trout presence and abundance are not entirely consistent or comparable among basins, e.g., presence is 100% certain, whereas absence is uncertain and should be viewed as a probability of occurrence. For example, a survey may not have found bull trout because (1) it was not conducted intensively where bull trout were present, or (2) it was conducted during the time of year when migrating bull trout were present elsewhere.
- Definitions of spawning and migration habitats are based on field observation and published reports. However, there are problems associated with maintaining consistency when defining spawning and migration habitats throughout Oregon.
- Regaining suitable habitat and restoring bull trout populations may not be achievable due to state and federal budgets, politics, and current land use practices. Moreover, social and cultural structures that have existed over long periods of time, combined with a lack of historical baseline data, present formidable challenges for effective bull trout management in the future.
- In spite of these difficulties it is necessary to provide a framework of goals toward which fisheries managers and resource scientists can orient recovery programs and thereby minimize human impacts on bull trout habitat that is still intact.
- Although other states have used a modeling approach based on generalized criteria to identify bull trout habitat, Oregon has made significant progress in collecting specific, field-based information that reflects the diverse range of habitats that characterize complex bull trout life history strategies.
- The Bull Trout Technical Work Group has utilized this extensive data collection effort by state, federal, and tribal agencies in order to provide a basin by basin review of all bull trout habitat designations in

Oregon. This approach, based on the most up-to-date and accurate data currently available, represents the most coordinated and comprehensive review of bull trout populations in the state.

- The goal of the work group is to provide technical information to ODEQ policy makers and resource managers about (1) the current extent of habitat utilized by bull trout habitat in Oregon and (2) the additional habitat that may be needed to sustain healthy, viable bull trout populations.

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**Bull Trout  
Habitat  
Designation  
Criteria**

The following bull trout habitat designation criteria are an integral part of the approach used by the work group to identify the extent and timing of bull trout habitat use. These criteria were developed for each of the four designations as follows:

- BTHD1 – Existing habitat where bull trout spawning occurs or where the dominant age classes include 0, 1, or 2 years, or resident adults; year round use.
- BTHD2 – Existing habitat where migration by sub-adults or adults occurs or seasonal use; seasonal use.
- BTHD3 – Habitat necessary for long-term health and viability that is not known to currently be occupied but has potential to support spawning or rearing by dominant age classes of 0, 1, or 2 years, or resident adults; year round use. These habitats may be appropriate for reestablishing populations in historical locations or expanding populations in suitable, unoccupied locations to reduce extinction risks.
- BTHD4 – Habitat necessary for long-term health and viability that is not known to currently be occupied but has potential to be used for life stages of migration by sub-adults or adults; seasonal use. These areas may include historical migratory habitat, extension of existing migratory habitats, and potential migratory habitat that connects isolated populations to reduce extinction risks in order to maintain a healthy, viable population.

Bull trout habitat designations BTHD1 and BTHD2 are based on data, (e.g., field observations and reports by state, federal, and tribal agencies, including work conducted by work group members) whereas BTHD3 and BTHD4 designations are based on USFWS draft Recovery Unit Plans, information from local biologists (ODFW, federal or tribal), personal observation by work group members or known historical use.

Note: For the purpose of meeting the tasks assigned to the work group, a sub-adult is defined as an immature bull trout (ages 2, 3, or 4 years) that has emigrated from natal habitat (migratory life history) and has not reached sexual maturity.

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## Recommendations

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### Application of Bull Trout Habitat Designations

Bull trout habitat designations have been applied to all stream segments in Oregon where bull trout are present. Designations are provided in two forms: text descriptions and as lines on a map. Both forms follow a basin by basin format. See Appendix B for maps.

As mentioned above BTHD1 and 2 designations are based on known data and BTHD3 and 4 are based on USFWS draft Recovery Unit Plans, information from local biologists (ODFW, federal or tribal), personal observation by work group members or known historical use. The following sections include bull trout habitat designations by hydrologic basin:

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### Klamath Basin

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#### Upper Klamath Lake Sub-Basin

#### Habitat designations –

BTHD1 – Threemile Creek from approximately stream mile 2.5 upstream for approximately 2 miles to the Sky Lakes Wilderness boundary

BTHD1 – Sun Creek from Crater Lake National Park boundary upstream to headwaters (Crater Lake)

BTHD2 – No designations

BTHD3 – Rock Creek from approximately RM 4 upstream to headwaters

BTHD3 – Cherry Creek from the Sky Lakes Wilderness boundary upstream to headwaters

BTHD3 – Sevenmile Creek from the confluence with Dry Creek upstream to Sky Lakes Wilderness boundary

BTHD3 – Fort Creek from mouth upstream to headwaters

BTHD3 – Sun Creek from where trees stop upstream for approximately 2 miles to Crater Lake National Park boundary

BTHD4 – Rock Creek from mouth upstream to approximately RM 4

BTHD4 – Cherry Creek from mouth upstream to the Sky Lakes Wilderness boundary

BTHD4 – Threemile Creek from mouth upstream for approximately 2.5 miles

BTHD4 – Sevenmile Creek from mouth upstream to confluence with Dry Creek

BTHD4 – Sun Creek from mouth upstream for approximately 3 miles to where trees stop

BTHD4 – Wood River from mouth upstream to confluence with Sun Creek

BTHD4 – Crooked Creek from mouth upstream to headwaters

**Timing designations –**

BTHD1 = All Year

BTHD2 = Not Applicable (No data to verify migratory habitat use)

BTHD3 = All Year

BTHD4 = September through May; Crooked River = All Year

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**Sycan Sub-Basin**

**Habitat designations –**

BTHD1 – Long Creek from falls upstream to headwaters

BTHD2 – Long Creek from mouth (junction with the marsh) upstream to falls

BTHD3 – Calahan Creek from mouth to headwaters

BTHD3 – Coyote Creek from mouth upstream to headwaters

BTHD4 – Sycan River from mouth upstream to headwaters of Sycan marsh/lake

**Timing designations –**

BTHD1 = All Year

BTHD2 = September through May

BTHD3 = All Year

BTHD4 = September through May

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**Sprague Sub-Basin**

**Habitat designations –**

BTHD1 – Boulder Creek from confluence with Dixon Creek upstream to headwaters

BTHD1 – Dixon Creek from mouth upstream to headwaters

BTHD1 – Deming Creek from mouth upstream to headwaters

BTHD1 – Leonard Creek from approximately RM 2 upstream to headwaters

BTHD1 – Brownsworth Creek from confluence with Leonard Creek upstream to headwaters

BTHD2 – Brownsworth Creek from mouth upstream to confluence with Leonard Creek

BTHD3 – North Fork Sprague River from confluence with Yaden Creek upstream to headwaters

BTHD3 – Boulder Creek from mouth upstream to confluence with Dixon Creek

BTHD3 – Sheepy Creek from mouth upstream to headwaters

BTHD3 – South Fork Sprague River from Brownsworth Creek upstream to confluence with Whitworth Creek

BTHD4 – Sprague River from mouth upstream to confluence with Sycan R.

BTHD4 – Sprague River from confluence with Sycan River upstream to confluence with North Fork Sprague River and South Fork Sprague River

BTHD4 – North Fork Sprague River from mouth upstream to confluence with Yaden Creek

BTHD4 – South Fork Sprague River from mouth upstream to confluence with Brownsworth Creek

**Timing designations –**

BTHD1 = All Year

BTHD2 = September through May

BTHD3 = All Year

BTHD4 = September through May; Sprague River from mouth upstream to confluence with the Sycan River = October through April

## Willamette Basin

### Upper Willamette Sub-Basin

BTHD4 – Willamette River from the city of Harrisburg (RM162) upstream to the confluence with the Middle Fork Willamette River

### Middle Fork Willamette Sub-Basin

**Habitat designations –**

BTHD1 – Mainstem Middle Fork Willamette from the confluence with Staley Creek (RM 65) upstream to confluence with Tumblebug Creek, approximately RM 74

BTHD1 – Numerous springs in the Middle Fork Willamette between the confluences with Swift Creek and Tumblebug Creek; includes Chuckle Springs, Iko Springs, Indigo Springs, Shadow Springs, Skunk Creek, and Found Creek

BTHD1 – Bear Creek from mouth upstream to Forest Road 2149

BTHD1 – Swift Creek from mouth upstream to the confluence with Bear Creek

BTHD1 – Echo Creek from mouth upstream to RM 1.5

BTHD2 – Mainstem Middle Fork Willamette from Hills Creek Dam upstream to Staley Creek (RM 65)

BTHD3 – North Fork of the Middle Fork Willamette from the confluence with Fisher Creek upstream to headwaters

BTHD3 – Salt Creek from confluence with South Fork Salt Creek upstream to Salt Creek Falls at approximately RM 22

BTHD3 – South Fork Salt Creek from mouth upstream to headwaters

BTHD3 – Black Creek from mouth upstream to headwaters

- BTHD3 – Wall Creek from mouth upstream to headwaters  
 BTHD3 – Salmon Creek from confluence with Wall Creek upstream to headwaters  
 BTHD3 – Middle Fork Willamette from confluence with Tumblebug Creek upstream to upper Paddy’s Valley, approximately RM 80
- BTHD4 – North Fork of the Middle Fork Willamette from mouth upstream to the confluence with Fisher Creek  
 BTHD4 – Salt Creek from mouth upstream to the Salt Creek Falls at approximately RM 22  
 BTHD4 – Middle Fork Willamette from the mouth upstream to the confluence with Hills Creek

**Timing designations-**

- BTHD1- All year  
 BTHD2- All year  
 BTHD3- All year  
 BTHD4- All year

**McKenzie Sub-Basin****Habitat designations –**

- BTHD1 –McKenzie River from the confluence with the South Fork McKenzie (RM 60) upstream to Tamolitch Falls (RM 85)  
 BTHD1 – Olallie Creek from mouth upstream for to approximately 1.5 RM to source  
 BTHD1 – Anderson Creek from mouth upstream to headwaters  
 BTHD1 – Sweetwater Creek from mouth at confluence with Trail Bridge Reservoir (approximately McKenzie RM 82.5) upstream for approximately 1.2 miles to headwaters. (Note: Sweetwater is not named on the map.)  
 BTHD1 – Deer Creek from mouth upstream to confluence with Fritz Creek, approximately 1.3 river miles  
 BTHD1 – Horse Creek from mouth upstream to confluence with Separation Creek (RM 11)  
 BTHD1 – Separation Creek from mouth upstream to confluence with Rainbow Creek, approximately 1.5 river miles  
 BTHD1 – South Fork McKenzie from Augusta Creek (RM 16) upstream to confluence with Roaring River (RM 22)  
 BTHD1 – Roaring River from mouth upstream to RM 2
- BTHD2 – McKenzie River from mouth (confluence with Willamette R.) upstream to the confluence with South Fork McKenzie River at approximately RM 60  
 BTHD2 – Blue River from mouth upstream to Blue River Dam at approximately RM 1.3  
 BTHD2 – South Fork McKenzie from mouth upstream to Cougar Dam (RM 4) and upstream to confluence with Augusta Creek (RM 22)

- BTHD2 – South Fork McKenzie from mouth to Cougar Dam (RM 4)
- BTHD3 – Lost Creek from mouth upstream to headwaters
- BTHD3 – Smith River from mouth upstream to confluence with Browder Creek (RM 5)

**Timing designations -**

- BTHD1- All year
- BTHD2- All year
- BTHD3- All year
- BTHD4- Not Applicable

**South Santiam Sub-Basin**      Need more data. Will update as information becomes available.

**North Santiam Sub-Basin**      Need more data. Will update as information becomes available.

**Clackamas Sub-Basin**      Need more data. Will update as information becomes available.

**Hood Basin**

**Hood Sub-Basin**

**Habitat designations –**

- BTHD1 – Clear Branch from Laurance Lake upstream to barrier falls at RM 3.5 (2.5 miles upstream to lake)
- BTHD1 – Pinnacle Creek from Laurance Lake upstream to 2.4 miles to impassible falls
- BTHD1 – Compass Creek from confluence with Coe Branch upstream to falls (approximately 1.35 miles)
- BTHD1 – Middle Fork Hood River from confluence with East Fork Hood River upstream to Laurance Dam
- BTHD1 – Laurance Lake (Note: No spawning, only rearing and resident use)
  
- BTHD2 – Hood River from mouth to confluence of East Fork and Middle Fork Hood River
- BTHD2 – Coe Branch from the confluence with Middle Fork Hood River upstream to falls on Compass Creek
- BTHD2 – Bear Creek from confluence with Middle Fork Hood River upstream to 0.8 miles gradient barrier

- BTHD3 – Elk Creek from confluence with the West Fork upstream to barrier
- BTHD3 – McGee Creek from confluence with West Fork upstream to barrier
- BTHD3 – Eliot Branch from mouth upstream to barrier
- BTHD3 – Tony Creek from confluence with Middle Fork upstream  
approximately 4 miles to falls
- BTHD3 – Divers Creek from confluence with Lake Branch upstream to  
barrier at 0.5 miles
- BTHD3 – Laurel Creek from confluence with Lake Branch upstream 3.6  
miles
- BTHD3 – Jones Creek from confluence with West Fork upstream for  
approximately 2.7 miles to barrier falls
- BTHD3 – Red Hill Creek from confluence with West Fork upstream for  
approximately 1.3 miles to barrier falls
- BTHD4 – West Fork Hood River from confluence with mainstem Hood River  
upstream to upstream barrier in Elk and McGee Creeks
- BTHD4 – Lake Branch Creek from the confluence with the West Fork  
upstream 4.1 miles to Divers Creek
- Timing designations –**
- BTHD1 = All Year
- BTHD2 = All Year
- BTHD3 = All Year
- BTHD4 = October through June
- 

## Deschutes Basin

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### Odell Lake

- Habitat designations –**
- BTHD1 – Trapper Creek from mouth upstream to confluence with unnamed  
tributary
- BTHD2 – Odell Lake
- BTHD2 – Fire Creek from mouth (at Odell Lake) upstream to source
- BTHD2 – Davis Lake
- BTHD3 – Crystal Creek from mouth upstream to headwaters
- BTHD3 – Odell Creek from Odell Lake to Davis Lake
- BTHD3 – Maklacs Creek from mouth to headwaters
- Timing designations –**
- BTHD1 = All Year
- BTHD2 = September through May
- BTHD3 = All Year
- BTHD4 = Not Applicable

**Upper  
Deschutes Sub-  
Basin**

**Habitat designations –**

BTHD1 – No habitat designations

BTHD2 – No habitat designations

BTHD3 – Tumolo Creek from confluence with unnamed tributary upstream to confluence w/ North Fork Tumolo Creek and Middle Fork Tumolo Creek

BTHD3 – Fall River from above Fall River Falls upstream to headwaters

BTHD3 – Deschutes River from above Wickiup Dam upstream to and including Little Lava Lake

BTHD3 – All spring fed tributaries upstream of Wickiup Dam and upstream of Crane Prairie Dam including the following:

Browns Creek from mouth upstream to source waters

Snow Creek from mouth upstream to source waters

North Davis Creek from mouth upstream to source waters

BTHD3 – Big Marsh Creek from confluence with Refrigerator Creek upstream to headwaters

BTHD3 – Refrigerator Creek from mouth upstream to head waters

BTHD3 – Hemlock Creek from mouth upstream to head waters

BTHD3 – Spruce Creek from mouth upstream to head waters

BTHD3 – Whitefish Creek from mouth upstream to head waters

BTHD4 – Tumalo Creek from mouth upstream to confluence with Tumolo Lake Creek

BTHD4 – Deschutes River from Big Falls upstream to head of Wickiup dam

BTHD4 – Little Deschutes River from mouth upstream to one mile above confluence with Hemlock Creek (approximately RM 83)

BTHD4 – Crescent Creek from mouth upstream to and including Crescent Lake

BTHD4 – Fall River from mouth upstream to Fall River Falls

BTHD4 – Big Marsh Creek from mouth upstream to confluence with Refrigerator Creek

**Timing designations –**

BTHD1 = Not applicable

BTHD2 = Not applicable

BTHD3 = All Year

BTHD4 = October through May

**Tribal Lands  
and Lower  
Deschutes Sub-  
Basin**

**Habitat designations –**

BTHD1 – Warm Springs River from confluence with Mill Creek upstream to approximately river mile 48

- BTHD1 – Bunchgrass Creek from mouth upstream to confluence w/ unnamed tributary
- BTHD1 – Shitike Creek from approximately river mile 10 upstream to headwaters
- BTHD1 – Metolius River from Lake Billy Chinook upstream to Spring Creek
- BTHD1 – Whitewater River from mouth upstream to below confluence with unnamed tributary
- BTHD1 – Mariel Creek from Metolius River to head of spring
- BTHD1 – Jefferson Creek from mouth to headwaters
- BTHD1 – Candle Creek from mouth to headwaters
- BTHD1 – Abbot Creek from mouth to headwaters
- BTHD1 – Canyon Creek from mouth to input from Roaring Springs Creek
- BTHD1 – Roaring Springs Creek from mouth upstream to headwaters
- BTHD1 – Jack Creek from mouth to headwaters
- 
- BTHD2 – Squaw Creek from mouth upstream to Alder Springs (approximately RM 4)
- BTHD2 – Lake Simtustus
- BTHD2 – Lake Billy Chinook
- BTHD2 – Deschutes River from Shearars Falls upstream to Reregulating Dam
- BTHD2 – Warm Springs River from mouth upstream to confluence w/ Mill Creek
- BTHD2 – Shitike Creek from mouth upstream to approximately RM 10
- BTHD2 – Metolius River from confluence w/ Spring Creek upstream to headwaters
- BTHD2 – Street Creek from mouth upstream to spring at approximately RM 1.6
- BTHD2 – Brush Creek from mouth to headwaters
- BTHD2 – First Creek from mouth to headwaters
- BTHD2 – Deschutes River from Lake Billy Chinook upstream to Steelhead Falls
- BTHD2 – Lake Creek from confluence with Metolius River upstream to and through Suttle Lake
- BTHD2 – Crooked River from mouth (Lake Billy Chinook) upstream to Opal Springs Dam
- BTHD2 – Deschutes River from Lake Billy Chinook upstream to Big Falls
- 
- BTHD3 – Mill Creek from Mill Canal upstream to approximately 3 miles below Trout Lake
- BTHD3 – Spring Creek (North Fork Lake Creek on map) from mouth upstream for 0.5 miles
- BTHD3 – Link Creek from mouth at Suttle Lake upstream to Blue Lake
- BTHD3 – Blue Lake
- 
- BTHD4 – Crooked River from Opal Springs Dam upstream to Prineville,

- approximately RM 48
- BTHD4 – Deschutes River from mouth upstream to Shearars Falls
- BTHD4 – Mill Creek from mouth upstream to Mill Creek Canal
- BTHD4 – Lake Creek from confluence with Middle Fork Lake Creek upstream to headwaters (at Suttle Lake)
- BTHD4 – Middle Fork Lake Creek from mouth upstream to confluence with Lake Creek
- BTHD4 – South Fork Lake Creek from mouth upstream to confluence with Lake Creek
- BTHD4 – Suttle Lake
- Timing designations –**
- BTHD1 = All Year
- BTHD2 = October through June
- BTHD3 = All Year
- BTHD4 = October through June
- 

## John Day Basin

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### Upper John Day Sub-Basin

- Habitat designations –**
- BTHD1 – John Day River from confluence with Reynolds Creek upstream to approximately one mile below headwaters (RM 283)
- BTHD1 – Reynolds Creek from mouth upstream to just upstream of confluence with unnamed tributary
- BTHD1 – North Fork Reynolds Creek from mouth upstream to headwaters
- BTHD1 – Deardorff Creek from mouth upstream to North Fork Deardorff Creek approximately one mile
- BTHD1 – Mossy Gulch from mouth upstream approximately one mile
- BTHD1 – Rail Creek from mouth upstream to approximately one mile below headwaters
- BTHD1 – Call Creek from mouth upstream to just below headwaters
- BTHD1 – Roberts Creek from mouth upstream to confluence with unnamed tributary
- BTHD1 – Indian Creek from the confluence with Sheep Creek upstream to confluence with West Fork Indian Creek
- BTHD2 – John Day River from confluence with Canyon Creek upstream to confluence with Reynolds Creek
- BTHD3 – No habitat designations
- BTHD4 – John Day River from confluence with North Fork John Day River to confluence with Canyon Creek
- BTHD4 – Indian Creek from mouth to confluence with Sheep Creek

**Timing designations –**

- BTHD1 = All Year  
 BTHD2 = Mid-October through May  
 BTHD3 = Not Applicable  
 BTHD4 = Mid-October through May
- 

**Middle Fork  
John Day Sub-  
Basin****Habitat designations –**

- BTHD1 – Big Creek from confluence with Deadwood Creek to just below headwaters  
 BTHD1 – Deadwood Creek from confluence with Big Creek upstream approximately 2 miles  
 BTHD1 – Granite Boulder Creek from mouth upstream to approximately 1 mile below confluence with Blackeye Creek  
 BTHD1 – Clear Creek from approximately 6 miles upstream to confluence with first large unnamed tributary (approximately 4 miles)
- BTHD2 – Middle Fork John Day River from confluence with Big Creek upstream to confluence with Clear Creek  
 BTHD2 – Big Creek from mouth upstream to confluence with Deadwood Creek  
 BTHD2 – Clear Creek from mouth upstream approximately 6 miles
- BTHD3 – Indian Creek from confluence with Little Indian Creek upstream to headwaters  
 BTHD3 – Big Boulder Creek from mouth to headwaters  
 BTHD3 – Butte Creek from mouth to headwaters  
 BTHD3 – Vinegar Creek from mouth to headwaters  
 BTHD3 – Herring Creek from mouth upstream to headwaters (not on map)  
 BTHD3 – Blue Gulch from mouth upstream to headwaters  
 BTHD3 – Davis Creek from mouth upstream to headwaters  
 BTHD3 – Middle Fork John Day River from confluence with Clear Creek upstream to Phipps Creek
- BTHD4 – Middle Fork John Day River from mouth upstream to confluence with Big Creek  
 BTHD4 – Indian Creek from mouth to confluence with Little Indian Creek
- Timing designations –**  
 BTHD1 = All Year  
 BTHD2 = Mid-October through May  
 BTHD3 = All Year  
 BTHD4 = Mid-October through May
- 

**North Fork  
John Day Sub-  
Basin****Habitat designations –**

- BTHD1 – Desolation Creek from approximately river mile 20 upstream to

- confluence with South Fork Desolation Creek
- BTHD1 – South Fork Desolation Creek from mouth to headwaters
- BTHD1 – North Fork John Day River from confluence with Granite Creek upstream to headwaters
- BTHD1 – Boulder Creek from confluence with South Fork Boulder Creek upstream to confluence with unnamed tributary
- BTHD1 – Clear Creek from confluence with Lightning Creek upstream to confluence with West Fork Clear Creek
- BTHD1 – West Fork Clear Creek from mouth upstream to headwaters
- BTHD1 – Lightning Creek from mouth to confluence with Salmon Creek
- BTHD1 – Crane Creek from approximately RM 2 upstream to just below headwaters (RM 7)
- BTHD1 – South Trail Creek from mouth to headwaters
- BTHD1 – Onion Creek from confluence with unnamed tributary upstream to headwaters
- BTHD1 – Baldy Creek from mouth to headwaters
- BTHD1 – Unnamed Creek (tributary to Baldy Creek) from mouth to headwaters
- BTHD1 – Crawfish Creek from mouth to just below headwaters
- BTHD1 – Cunningham Creek from mouth upstream approximately 1 mile
- BTHD2 – North Fork John Day River from confluence with Middle Fork John Day River upstream to confluence with Granite Creek
- BTHD2 – Desolation Creek from confluence with Kelsay Creek upstream to approximately 20 miles
- BTHD2 – Granite Creek from mouth upstream to confluence with Indian Creek.
- BTHD2 – Trail Creek from mouth upstream to confluence with North Trail Creek
- BTHD2 – Clear Creek from mouth upstream to confluence with Lightning Creek
- BTHD3 – North Fork Desolation Creek from mouth upstream to headwaters
- BTHD3 – Winom Creek from mouth upstream to source
- BTHD3 – Granite Creek from confluence with Boulder Creek upstream to headwaters
- BTHD3 – Hideaway Creek from confluence with Line Creek upstream to confluence with unnamed tributary
- BTHD3 – Crane Creek from mouth upstream to approximately RM 2
- BTHD3 – Onion Creek from mouth upstream to confluence with unnamed tributary
- BTHD4 – Desolation Creek from mouth upstream to confluence with Kelsay Creek
- BTHD4 – Big Creek from mouth upstream to confluence with Winom Creek
- BTHD4 – Granite Creek from confluence with Indian Creek upstream to

- confluence with Boulder Creek  
 BTHD4 – Boulder Creek from mouth upstream to confluence with South Fork Boulder Creek  
 BTHD4 – Hideaway Creek from mouth upstream to confluence with Line Creek

**Timing designations –**

- BTHD1 = All Year  
 BTHD2 = October through June  
 BTHD3 = All Year  
 BTHD4 = October through June
- 

## Umatilla Basin

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**Umatilla Sub-Basin**

**Habitat designations –**

- BTHD1 – Mainstem Umatilla from the confluence with Ryan Creek upstream to the confluence with the North and South Umatilla Forks  
 BTHD1 – Ryan Creek from mouth upstream to the confluence with the first tributary  
 BTHD1 – North Fork Umatilla from the mouth upstream to the headwaters  
 BTHD1 – Coyote Creek from the mouth upstream to the confluence with East and West Coyote Forks  
 BTHD1 – Woodward Creek from the mouth upstream approximately one mile  
 BTHD1 – North Fork Meacham Creek and tributaries  
 BTHD1 – South Fork Umatilla from confluence with Thomas Creek upstream to approximately 1 mile above confluence with Shimmiehorn Creek, approximately RM 5.5
- BTHD2 – South Fork Umatilla from the mouth upstream to the confluence with Thomas Creek  
 BTHD2 – South Fork Umatilla from approximately RM 5.5 upstream to the headwaters  
 BTHD2 – Shimmiehorn Creek from the mouth upstream to the headwaters  
 BTHD2 – Umatilla River from confluence with McKay Creek (Pendleton) upstream to the confluence with Squaw Creek  
 BTHD2 – Meacham Creek from mouth upstream to confluence with North Fork Meacham Creek
- BTHD3 – Umatilla River from confluence with Squaw Creek upstream to confluence with Ryan Creek  
 BTHD3 – Meacham Creek and perennial tributaries from confluence with North Fork Meacham upstream

BTHD4 – Umatilla River from mouth upstream to confluence with McKay Creek (Pendleton)

**Timing designations –**

BTHD1 = All Year

BTHD2 = October through April

BTHD3 = All Year

BTHD4 = November through March

**Walla Walla  
Sub-Basin**

**Habitat designations –**

BTHD1 – North Fork Walla Walla from Forest Service boundary upstream to headwaters

BTHD1 – South Fork Walla Walla from Forest Service boundary upstream to headwaters

BTHD1 – Skiphorton Creek and tributaries from mouth upstream to headwaters

BTHD1 – Reser Creek and tributaries from mouth upstream to headwaters

BTHD1 – Husky Spring from mouth upstream to headwaters

BTHD1 – Unnamed tributary to South Fork Walla Walla (entering from the East in the middle of Section 20) from mouth upstream to headwaters

BTHD1 – Mill Creek and tributaries from confluence with Tigard Creek upstream to headwaters

BTHD2 – North Fork Walla Walla River from mouth upstream to Forest Service boundary

BTHD2 – South Fork Walla Walla River from mouth upstream to Forest Service boundary

BTHD2 – Walla Walla River from Oregon state boundary line to confluence of North and South Walla Walla Forks; Timing designation is October through June

BTHD2 – Mill Creek from Oregon state boundary line upstream to confluence with Tigard Creek

BTHD3 – No designations

BTHD4 – No designations

**Timing designations –**

BTHD1 = All Year

BTHD2 = November through June; Walla Walla River from Oregon state boundary upstream = October through June

BTHD3 = Not Applicable

BTHD4 = Not Applicable

## Grande Ronde Basin

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### Imnaha Sub-Basin

#### **Habitat designations –**

- BTHD1 – McCully Creek from Wallowa Valley Canal crossing upstream to headwaters
- BTHD1 – Redmont Creek from mouth to confluence with unnamed tributary
- BTHD1 – Wallowa Valley Canal from confluence with Cabin Creek up canal to Big Sheep Creek (at river mile 37)
- BTHD1 – Big Sheep Creek from confluence with Lick Creek upstream to headwaters
- BTHD1 – Lick Creek from mouth upstream to headwaters
- BTHD1 – Salt Creek from mouth upstream for approximately 1.5 miles
- BTHD1 – Imnaha River from confluence with Skookum Creek upstream to confluence with North Fork Imnaha River
- BTHD1 – North Fork Imnaha River from mouth upstream to just above confluence with unnamed tributary
- BTHD1 – Middle Fork Imnaha River from mouth upstream to Falls
- BTHD1 – South Fork Imnaha River from mouth upstream for approximately 6 miles
- BTHD1 – Cliff Creek from mouth to headwaters
- 
- BTHD2 – Snake River from State line boundary upstream to below Oxbow Dam
- BTHD2 – Imnaha River from mouth upstream to Skookum Creek
- BTHD2 – Big Sheep Creek from mouth upstream to confluence with Little Sheep Creek
- BTHD2 – Little Sheep Creek from mouth upstream to confluence with Cabin Creek
- BTHD2 – Big Sheep Creek from confluence with Carrol Creek upstream to confluence with Lick Creek
- 
- BTHD4 – McCully Creek from mouth upstream to Wallowa Valley Canal crossing
- BTHD4 – Big Sheep Creek from confluence with Little Sheep Creek upstream to confluence with Carrol Creek
- #### **Timing designations –**
- BTHD1 = All Year
- BTHD2 = October through June
- BTHD2 = All Year for Imnaha River from confluence w/Grouse Creek upstream to Skookum Creek
- BTHD3 = Not Applicable
- BTHD4 = October through June
-

**Wallowa Sub-Basin**

**Habitat designations –**

- BTHD1 – Little Minam River from Falls upstream to confluence with unnamed tributary
- BTHD1 – Boulder Creek from mouth upstream for approximately 1 mile
- BTHD1 – Dobbin Creek from mouth upstream to just below headwaters
- BTHD1 – North Minam River from mouth upstream to confluence with unnamed tributary
- BTHD1 – Elk Creek from confluence with East Fork Elk Creek upstream to confluence with Diamond Lake Creek
- BTHD1 – East Fork Elk Creek from mouth upstream for 0.5 mile
- BTHD1 – Deer Creek from US Forest Service boundary upstream to approximately 1 mile below confluence with unnamed tributary
- BTHD1 – Little Bear Creek from US Forest Service boundary upstream to approximately 1.5 miles below headwaters
- BTHD1 – Unnamed tributary from mouth upstream for approximately 0.5 mile
- BTHD1 – Bear Creek from Wilderness boundary upstream to confluence with unnamed (twin lakes) tributary
- BTHD1 – Goat Creek from mouth upstream to falls
- BTHD1 – Lostine River from confluence with Bitter Creek upstream to confluence with East Lostine River
- BTHD1 – Silver Creek from mouth upstream for approximately 0.5 miles to Wilderness boundary
- BTHD1 – Lake Creek from mouth upstream for approximately 1 mile
- BTHD1 – Hurricane Creek from confluence with Upper Alder Slope Ditch diversion upstream to Slick Rock Falls below Granite Creek
- BTHD2 – Wallowa River from mouth upstream to confluence with Lostine River
- BTHD2 – Minam River from approximately river mile 11 upstream to confluence with Elk Creek
- BTHD2 – Deer Creek from mouth upstream to US Forest Service boundary
- BTHD2 – Lostine River from mouth upstream to confluence with Bitter Creek
- BTHD2 – Hurricane Creek from Upper Alder Slope Ditch diversion downstream to mouth (*Note: downstream migration only*)
- BTHD2 – Upper Alder Slope Ditch diversion from the confluence with Scotch Creek upstream to the diversion point on Hurricane Creek
- BTHD2 – Bear Creek from confluence with Hays Canyon upstream to confluence with Doc Creek
- BTHD3 – Minam River from confluence with Elk Creek upstream to fish passage barrier
- BTHD3 – Elk Creek from mouth upstream to confluence with East Fork Elk Creek
- BTHD3 – Bear Creek from confluence with Doc Creek upstream to

Wilderness boundary

- BTHD3 – Wallowa River from head of Wallowa Lake upstream to confluence with East Fork Wallowa River  
 BTHD3 – West Fork Wallowa River from confluence with East Fork upstream 0.5 miles to falls  
 BTHD3 – East Fork Wallowa River from confluence with West Fork upstream 0.5 miles

- BTHD4 – Minam River from mouth upstream to approximately river mile 11  
 BTHD4 – Little Minam River from mouth upstream to Falls  
 BTHD4 – Little Bear Creek from mouth upstream to US Forest Service boundary  
 BTHD4 – Wallowa River from confluence with Lostine River upstream to head of Wallowa Lake

**Timing designations –**

- BTHD1 = All Year  
 BTHD2 = October through June  
 BTHD3 = All Year  
 BTHD4 = October through June

**Upper Grande  
 Ronde Sub-  
 Basin**

**Habitat designations –**

- BTHD1 – Lookinglass Creek from approximately 1 mile upstream from mouth to approximately river mile 13  
 BTHD1 – Summer Creek from mouth upstream to confluence with Swamp Creek  
 BTHD1 – Little Lookinglass Creek from mouth upstream to confluence with Buzzard Creek  
 BTHD1 – Motett Creek from mouth upstream for approximately 4 miles  
 BTHD1 – Indian Creek from approximately river mile 13 upstream for approximately 1 mile  
 BTHD1 – Indian Creek from confluence with Camp Creek upstream to approximately 1 mile below headwaters  
 BTHD1 – Camp Creek from mouth upstream to confluence with unnamed tributary  
 BTHD1 – East Fork Indian Creek from mouth upstream to confluence with Bell Creek  
 BTHD1 – North Fork Catherine Creek from confluence with Middle Fork Catherine Creek upstream to top of meadow  
 BTHD1 – Middle Fork Catherine Creek from mouth upstream to confluence with Squaw Creek  
 BTHD1 – South Fork Catherine Creek from confluence with Corral Creek upstream for approximately 7.5 miles  
 BTHD1 – Sand Pass Creek from mouth upstream for approximately 0.5 mile  
 BTHD1 – Collins Creek from mouth upstream to confluence with unnamed tributary

- BTHD1 – Limber Jim Creek from confluence with Marion Creek upstream to just below headwaters
- BTHD1 – Marion Creek from mouth upstream to headwaters
- BTHD1 – Clear Creek from confluence with unnamed tributary upstream for approximately 1.5 miles
- BTHD1 – Unnamed tributary (to Clear Creek) from confluence with unnamed tributary upstream for approximately 1 mile
- BTHD1 – Unnamed tributary (to Clear Creek) from mouth upstream for approximately 1 mile
- BTHD1 – Indiana Creek from mouth upstream to just below headwaters
- 
- BTHD2 – Grande Ronde River from confluence with Lookinglass Creek upstream to confluence with Fly Creek
- BTHD2 – State Ditch from mouth upditch to Grande Ronde River at approximately river mile 150
- BTHD2 – Catherine Creek from confluence with McAllister Slough upstream to confluence with North Fork Catherine Creek and South Fork Catherine Creek
- BTHD2 – North Fork Catherine Creek from mouth upstream to confluence with Buck Creek
- BTHD2 – South Fork Catherine Creek from mouth upstream to confluence with Camp Creek
- 
- BTHD3 – Lookinglass Creek from mouth upstream for approximately 1 mile
- BTHD3 – Indian Creek from confluence with North Fork Indian Creek upstream to approximately river mile 13
- BTHD3 – Indian Creek from approximately river mile 14 upstream to confluence with Camp Creek (approximately 2 miles)
- BTHD3 – North Fork Catherine Creek from confluence with Buck Creek upstream to confluence with Middle Fork Catherine Creek
- BTHD3 – South Fork Catherine Creek from confluence with Camp Creek upstream to confluence with Corral Creek
- BTHD3 – Lookout Creek from mouth upstream for approximately 3.0 miles
- BTHD3 – Limber Jim Creek from confluence with Deadwood Gulch upstream to confluence with Marion Creek
- BTHD3 – Clear Creek from mouth upstream to confluence with unnamed tributary
- BTHD3 – Unnamed tributary from mouth upstream for approximately 1 mile
- BTHD3 – Chicken Creek from confluence with unnamed tributary upstream to confluence with Indiana Creek
- 
- BTHD4 – Indian Creek from mouth upstream to confluence with North Fork Indian Creek
- BTHD4 – Grande Ronde River from confluence with Fly Creek upstream to confluence with Clear Creek
- BTHD4 – Fly Creek from mouth upstream to confluence with Little Fly

Creek

BTHD4 – Little Fly Creek from mouth upstream to confluence with Lookout Creek

BTHD4 – Chicken Creek from mouth upstream to confluence with unnamed tributary

BTHD4 – Limber Jim Creek from mouth upstream to confluence with Deadwood Gulch

**Timing designations –**

BTHD1 = All Year

BTHD2 = October through June

BTHD2 = All Year for Catherine Creek and Catherine Creek Forks above Union Dam

BTHD3 = All Year

BTHD4 = October through June

**Lower Grande  
Ronde Sub-  
Basin**

**Habitat designations –**

BTHD1 – Wenaha River from confluence with Fairview Creek upstream to confluence with North Fork Wenaha River and South Fork Wenaha River

BTHD1 – Butte Creek from mouth upstream to State boundary line

BTHD1 – Beaver Creek from mouth upstream to confluence with unnamed tributary

BTHD1 – North Fork Wenaha River from mouth upstream to State boundary line

BTHD1 – Milk Creek from mouth upstream to confluence with unnamed tributary

BTHD1 – South Fork Wenaha River from mouth upstream to confluence with unnamed tributary

BTHD2 – Grande Ronde River from mouth upstream to confluence with Lookingglass Creek

BTHD2 – Wenaha River from mouth upstream to confluence with Fairview Creek

BTHD4 – Crooked Creek from mouth upstream to State boundary line

**Timing designations –**

BTHD1 = All Year

BTHD2 = October through June

BTHD2 for Wenaha River = October through July

BTHD3 = Not Applicable

BTHD4 = October through July

## Powder Basin

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### Pine Creek Sub-Basin

#### Habitat designations –

- BTHD1 – Elk Creek from confluence with Aspen Creek upstream to headwaters
- BTHD1 – Aspen Creek from mouth upstream to headwaters
- BTHD1 – Cabin Creek from mouth upstream for approximately 1 mile
- BTHD1 – Big Elk Creek from mouth to approximately 1 mile below headwaters
- BTHD1 – East Pine Creek from road crossing upstream to headwaters
- BTHD1 – Unnamed tributary to East Pine Creek upstream for approximately 2 miles
- BTHD1 – Unnamed tributary to East Pine Creek upstream for approximately 1 mile
- BTHD1 – Clear Creek from US Forest Service boundary?? upstream to confluence with West Fork Clear Creek and East Fork Clear Creek
- BTHD1 – Meadow Creek from mouth upstream to headwaters
- BTHD1 – Trail Creek from mouth upstream to confluence with unnamed tributary
- BTHD1 – Pine Creek from confluence with East Fork Pine Creek upstream to confluence with West Fork Pine Creek and Mid Fork Pine Creek
- BTHD1 – Boulder Creek from mouth upstream to falls, approximately 0.5 miles
- BTHD1 – East Fork Pine Creek from mouth upstream for approximately 4 miles
- BTHD1 – Mid Pine Creek from mouth upstream for approximately 2 miles
- BTHD1 – West Pine Creek from mouth upstream for approximately 1 mile
  
- BTHD2 – Pine Creek from mouth upstream to confluence with North Fork Pine Creek
- BTHD2 – North Pine Creek from mouth upstream to confluence with Lake Fork Creek
  
- BTHD3 – Duck Creek from confluence with Dutchman Creek upstream to headwaters
- BTHD3 – Elk Creek from above Passage Falls upstream to confluence with Aspen Creek
- BTHD3 – Lake Fork Creek from confluence with Pole Creek upstream to headwaters
- BTHD3 – Fall Creek from mouth upstream to 90 degree west turn
- BTHD3 – Little Elk Creek from approximately 3 miles upstream of mouth to headwaters
- BTHD3 – Fish Creek from approximately 5 miles upstream of mouth to upstream for approximately 4 miles

- BTHD3 – East Pine Creek from confluence with Okanogan Creek upstream to road crossing  
 BTHD3 – Okanogan Creek from mouth upstream to headwaters  
 BTHD3 – Trinity Creek from mouth upstream to approximately 1 mile below headwaters  
 BTHD3 – Pine Creek from confluence with Cornucopia Creek upstream to confluence with East Fork Pine Creek  
 BTHD3 – Eagle Creek from confluence with West Eagle Creek upstream to confluence with Cashed Lake Creek  
 BTHD3 – East Fork Eagle Creek from mouth upstream to confluence with Hidden Lake Creek  
 BTHD3 – West Eagle Creek from mouth upstream to confluence with unnamed tributary

- BTHD4 – North Pine Creek from confluence with Lake Fork Creek upstream to confluence with Duck Creek  
 BTHD4 – Duck Creek from mouth upstream to confluence with Dutchman Creek  
 BTHD4 – Lake Fork Creek from mouth upstream to confluence with Pole Creek  
 BTHD4 – Elk Creek from mouth upstream to Passage Falls  
 BTHD4 – Little Elk Creek from mouth upstream for approximately 3 miles  
 BTHD4 – Pine Creek from confluence with North Pine Creek upstream to confluence with Cornucopia Creek  
 BTHD4 – Fish Creek from mouth upstream for approximately 5 miles  
 BTHD4 – East Pine Creek from mouth upstream to confluence with Okanogan Creek  
 BTHD4 – Clear Creek from mouth upstream to US Forest Service boundary  
 BTHD4 – Eagle Creek from mouth upstream to confluence with West Eagle Creek  
 BTHD4 – Powder River from mouth upstream to confluence with Eagle Creek

**Timing designations –**

- BTHD1 = All Year  
 BTHD2 = October - June  
 BTHD3 = All Year  
 BTHD4 = October - June

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**Upper Powder  
 Sub-Basin**

**Habitat designations –**

- BTHD1 – Wolf Creek from approximately river mile 17 upstream to approximately river mile 19  
 BTHD1 – North Fork Anthony Fork from mouth upstream to confluence with unnamed tributary  
 BTHD1 – Anthony Fork from confluence with North Fork Anthony Fork upstream to confluence with Webfoot Creek

- BTHD1 – Indian Creek from mouth upstream to confluence with unnamed tributary
- BTHD1 – North Powder River from confluence with North Fork upstream to confluence with Little Summit Lake Creek
- BTHD1 – Big Muddy Creek from confluence with unnamed tributary upstream approximately .5 mile to confluence with unnamed tributary
- BTHD1 – Lake Creek from approximately 2 miles upstream of mouth to confluence with unnamed tributary
- BTHD1 – Little Cracker Creek from mouth to headwaters
- BTHD1 – Silver Creek from mouth to headwaters
- 
- BTHD3 – Wolf Creek from confluence with Third Creek upstream to approximately river mile 17
- BTHD3 – North Powder River from confluence with Twin Mountain Creek upstream to confluence with North Fork
- BTHD3 – Rock Creek from Killamacue Creek upstream to confluence with North Fork Rock Creek
- BTHD3 – Lake Creek from mouth upstream for approximately 2 miles
- BTHD3 – Fruit Creek from mouth upstream to confluence with unnamed tributary
- 
- BTHD4 – Powder River from confluence with Wolf Creek upstream to headwaters
- BTHD4 – Wolf Creek from mouth upstream to confluence with Third Creek
- BTHD4 – North Powder River from mouth upstream to Twin Mountain Creek
- BTHD4 – Anthony Fork from mouth upstream to confluence with North Fork Anthony Fork
- BTHD4 – Big Muddy Creek from mouth upstream to confluence with unnamed tributary
- BTHD4 – Rock Creek from mouth upstream to confluence with Killamacue Creek
- BTHD4 – Salmon Creek from mouth upstream to confluence with Pine Creek
- BTHD4 – Pine Creek from mouth upstream to confluence with unnamed tributary
- BTHD4 – Deer Creek from mouth upstream to confluence with Lake Creek
- BTHD4 – Cracker Creek from mouth upstream to confluence with Little Cracker Creek
- Timing designations –**
- BTHD1 = All Year
- BTHD2 = Not Applicable
- BTHD3 = All Year
- BTHD4 = October through June
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## Malheur Basin

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### Upper Malheur Sub-Basin

#### **Habitat designations –**

- BTHD1 – Meadow Fork from mouth upstream to headwaters
- BTHD1 – Big Creek from Forest Service road 1648, approximately RM 7 upstream to headwaters
- BTHD1 – Snowshoe Creek from mouth upstream to headwaters
- BTHD1 – Lake Creek from Forest Service road 1648, approximately RM 6 upstream to headwaters
  
- BTHD2 – Malheur River from confluence with Wolf Creek upstream to confluence with Big Creek
- BTHD2 – Big Creek from mouth upstream to Forest Service road 1648, approximately RM 7)
- BTHD2 – Lake Creek from mouth upstream to Forest Service road 1648 approximately RM 6)
  
- BTHD3 – Summit Creek from Forest Service road 16, approximately RM 10) upstream to headwaters
- BTHD3 – Bosonberg Creek from mouth upstream to headwaters
- BTHD3 – McCoy Creek from mouth upstream to headwaters
  
- BTHD4 – Summit Creek from mouth upstream to Forest Service road, 16 approximately RM 10)
- BTHD4 – Malheur River from head of Namorf Dam upstream to confluence with Wolf Creek

#### **Timing designations –**

- BTHD1 = All Year
  - BTHD2 = December through May
  - BTHD2 for Malheur River segment = October through May
  - BTHD3 = All Year
  - BTHD4 = December through May
  - BTHD4 for Malheur River = October through May
- 

### North Fork Malheur Sub- Basin

#### **Habitat designations –**

- BTHD1 – North Fork Malheur River from confluence with Swamp Creek upstream to headwaters
- BTHD1 – Little Crane Creek from mouth upstream to Forest Service road 1660
- BTHD1 – Elk Creek from mouth upstream to confluence with North and South Forks
- BTHD1 – South Fork Elk Creek from mouth upstream to headwaters

BTHD1 – North Fork Elk Creek from mouth upstream to headwaters

BTHD1 – Sheep Creek from mouth upstream to headwaters

BTHD1 – Swamp Creek from mouth to headwaters

BTHD1 – Flat Creek from mouth to headwaters

BTHD1 – Horseshoe Creek from mouth to headwaters

BTHD2 – North Fork Malheur River from above Beulah Reservoir upstream to confluence with Little Malheur River; Timing designation = October through June

BTHD2 – North Fork Malheur River from confluence with Little Malheur River upstream to confluence with Crane Creek; Timing designation = All Year

BTHD2 – North Fork Malheur River from confluence with Crane Creek upstream to confluence with Sheep Creek

BTHD2 – Crane Creek from mouth upstream to confluence with Little Crane Creek

BTHD3 – Deadhorse Creek from mouth upstream to headwaters

BTHD4 – North Fork Malheur River from mouth upstream to Beulah Reservoir

**Timing designations –**

BTHD1 = All Year

BTHD2 = December through June; North Fork Malheur River between Crane Creek and Sheep Creek = All Year

BTHD3 = All Year

BTHD4 = October through May

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## **Conclusion**

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**More  
Information  
Needed**

The work group believes that while this project used the most up-to-date information available, there are several sub-basins in the Willamette Basin in need of more data. Habitat designations can not be determined until more data is collected.

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## Appendix A

### Publications:

- Baxter, C. V. 2002. Fish movement and assemblage dynamics in a Pacific Northwest riverscape. Ph.D. dissertation. Oregon State University, Corvallis, Oregon.
- Bellerud, B.L., S. Gunckel, A.R. Hemmingsen, D.V. Buchanan, and P.J. Howell. 1997. Bull trout life history, genetics, habitat needs and limiting factors in central and northeast Oregon, 1996 annual report. Project 199405400, Bonneville Power Administration, Portland, OR.
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- Buchanan, D. V., and S. V. Gregory. 1997. Development of water temperature standards to protect and restore habitat for bull trout and other cold water species in Oregon. Pages 119-126 *in* W. C. Mackay, M. K. Brewin, and M. Monita, editors. Friends of the Bull Trout Conference Proceedings. Trout Unlimited Canada, Calgary, Alberta, Canada.
- Buchanan, David V., M.L.Hanson, and .M. Hooton. 1997. Status of Oregon's Bull Trout. Oregon Department of Fish and Wildlife, Portland, OR.
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### Research Projects:

Hydrologic, geomorphic, and ecological connectivity in Columbia River Watersheds: Implications for endangered salmonids. (1996-2000) NSF-EPA Partnership for Environmental Research, Water and Watersheds Program. Collaborators: Hiram Li, Bruce McIntosh, Bob

Beschta, Boone Kauffman, Judy Li, Colden Baxter, Kris Wright, Christian Torgersen, and Kate Dwire.

Modeling, monitoring and restoring water quality and habitat in Pacific Northwestern Watersheds. (1994-2000) Environmental Protection Agency and the Intelligence Community's Environmental Program, Governmental Applications Task Force. Collaborators: Doug Norton, Jim Sedell, Bruce McIntosh, Russ Faux, Nathan Poage, Christian Torgersen, and others.

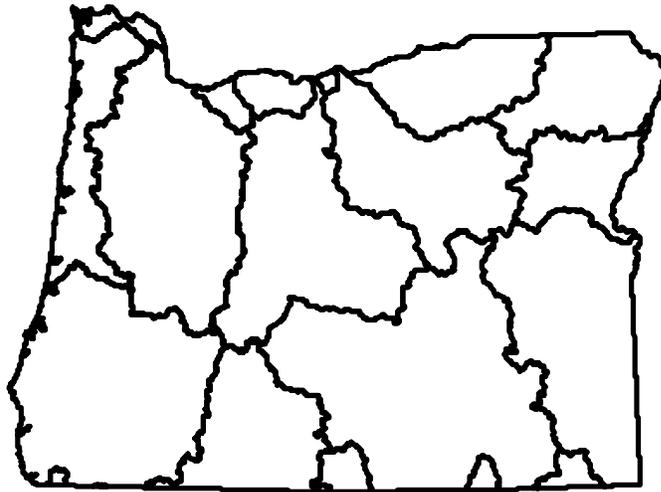
Aerial survey of the Upper McKenzie River: Thermal infrared and color videography. (1999) Collaborators: Bruce McIntosh, Christian Torgersen, and Russ Faux, Watershed Sciences, LLC.

Thermal refugia and habitat ecology of spring chinook salmon in the John Day Basin. (1993-95) Bonneville Power Administration. Collaborators: Bruce McIntosh, Dave Price, Christian Torgersen, and Hiram Li.

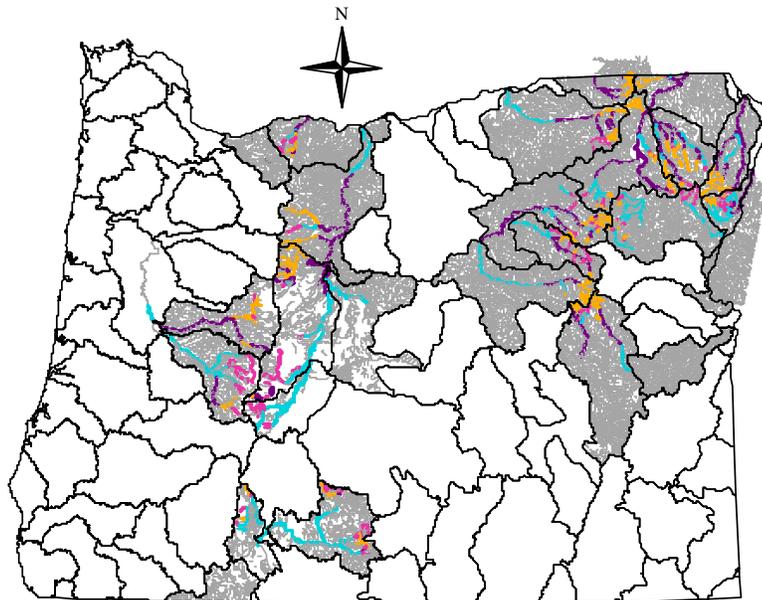
## Appendix B

**Maps:**

Bull trout habitat designation maps.

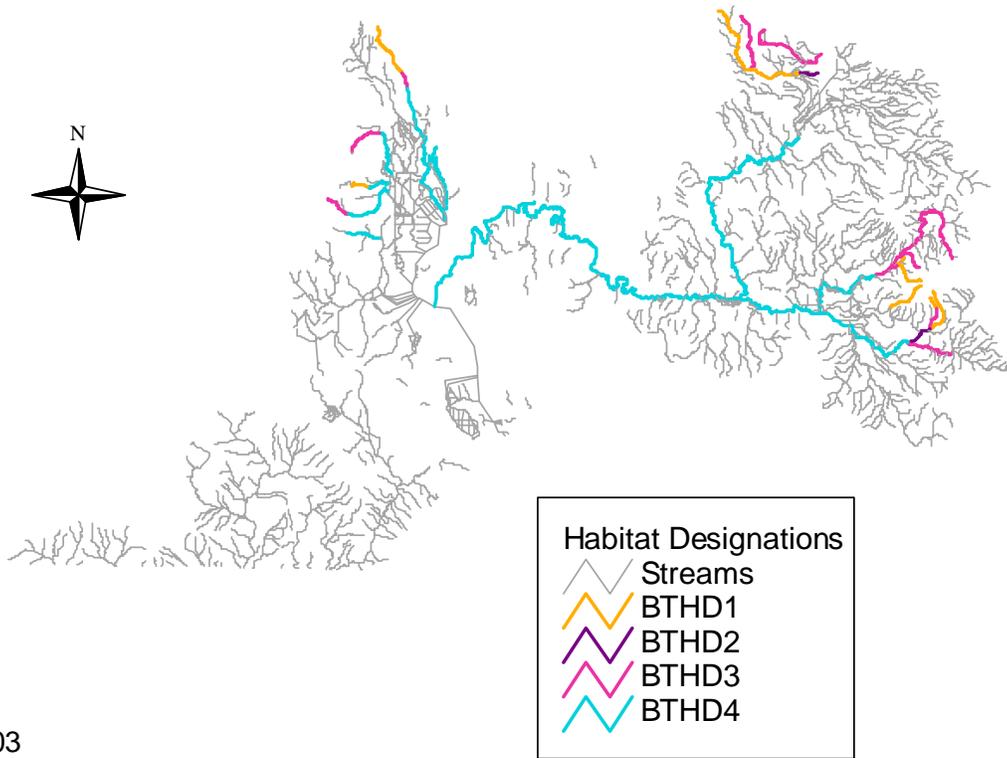


Map 1. Major Oregon River Basins.



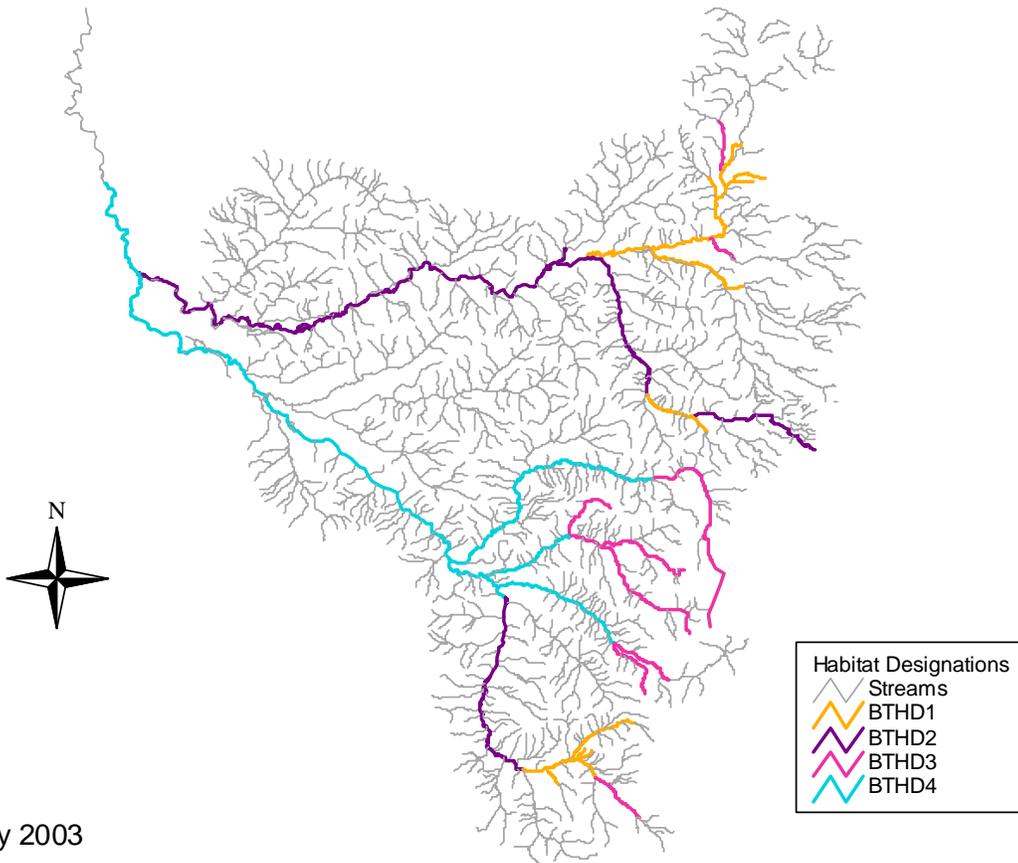
Map 2. Sub-basins with Bull trout habitat referenced in this paper.

# Klamath Sub-basin Bull Trout Habitat Designations

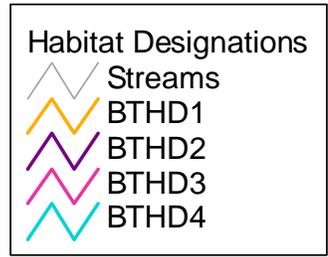
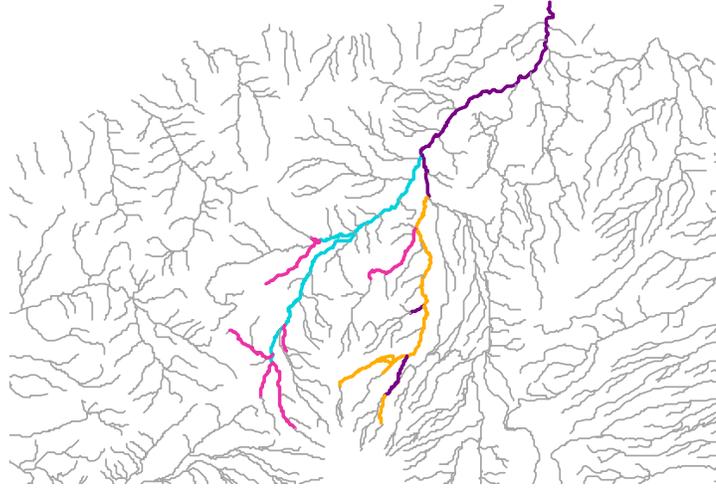


July 2003

# McKenzie, Upper, and Middle Fork Willamette Sub-basin Bull Trout Habitat Designations

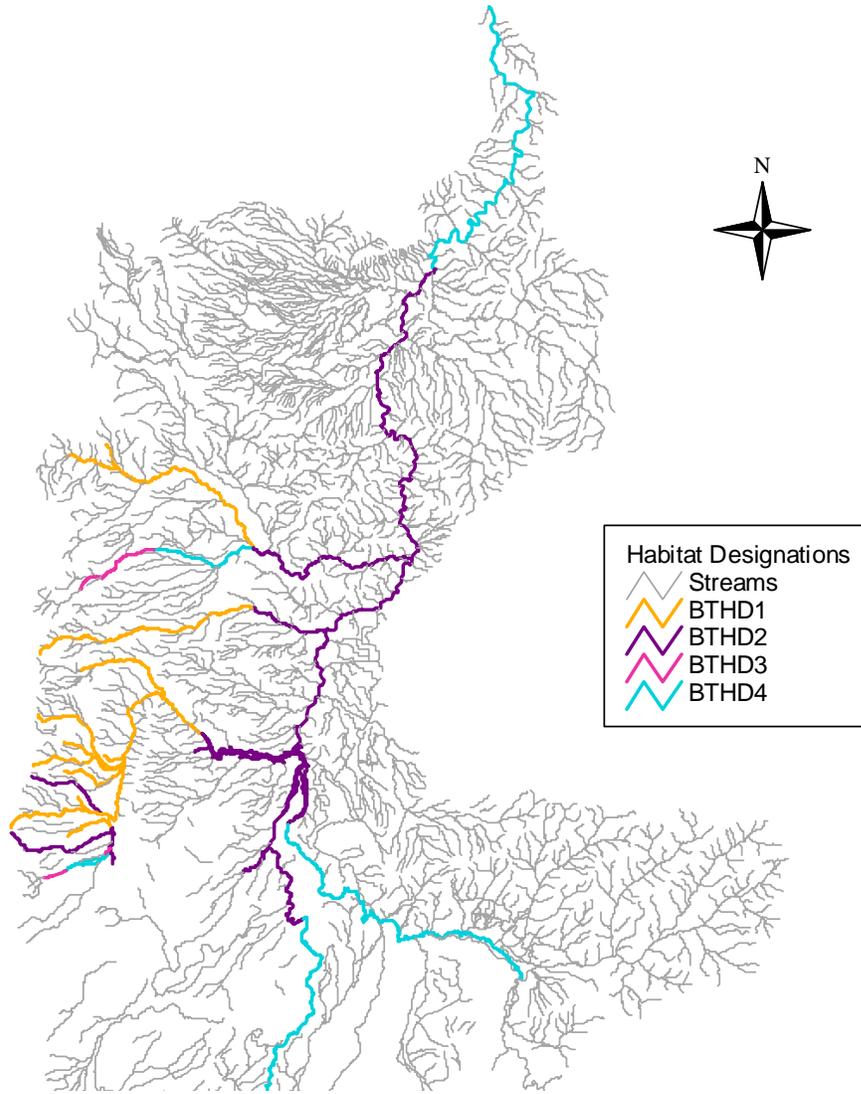


# Hood River Sub-basin Bull Trout Habitat Designations



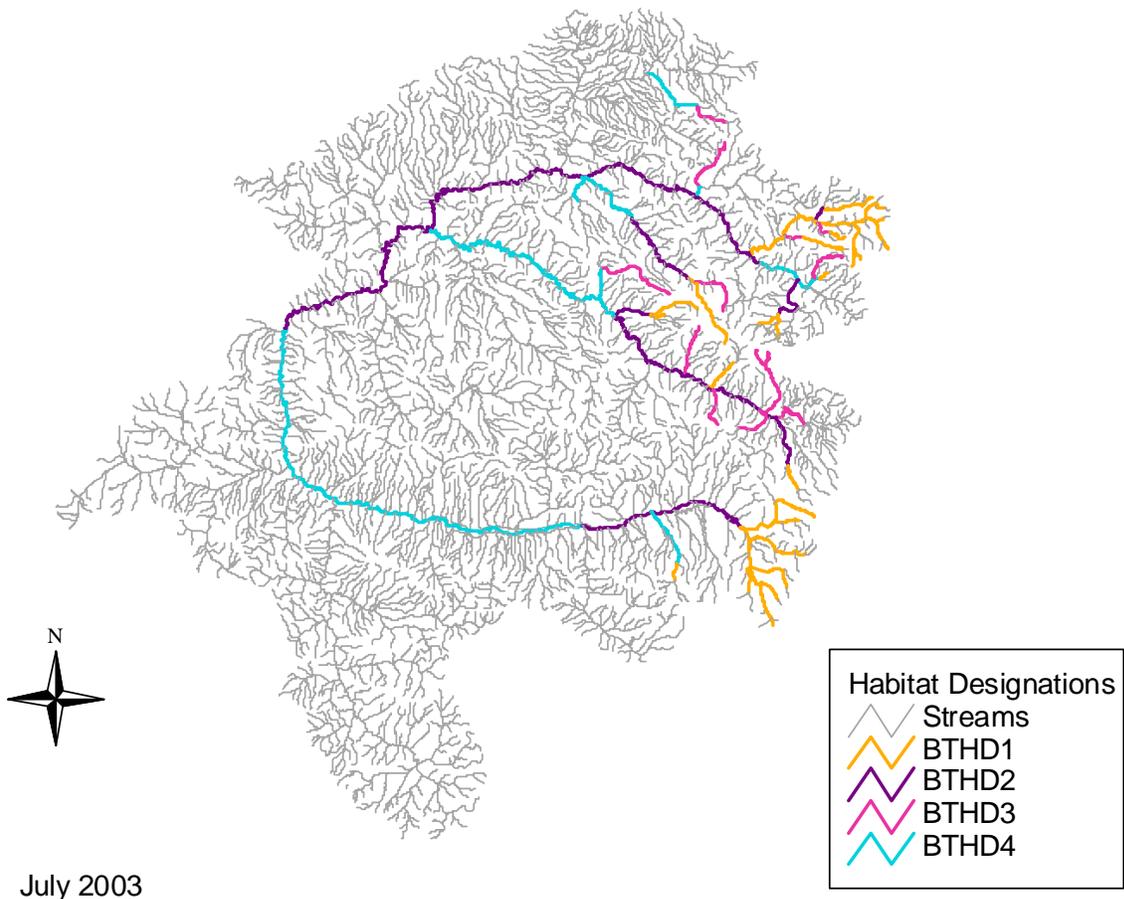
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# Upper and Lower Deschutes Sub-basin Bull Trout Habitat Designations

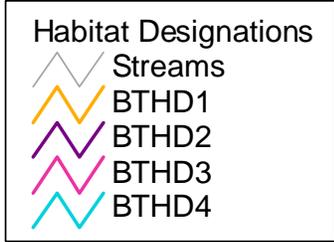
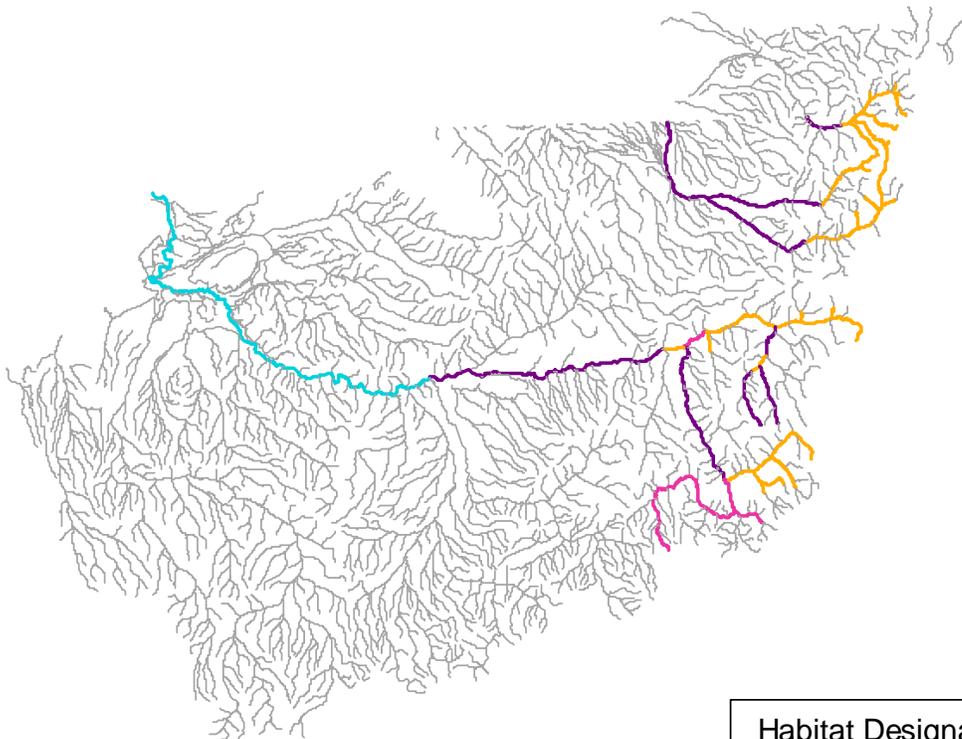


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# John Day Sub-basin Bull Trout Habitat Designations

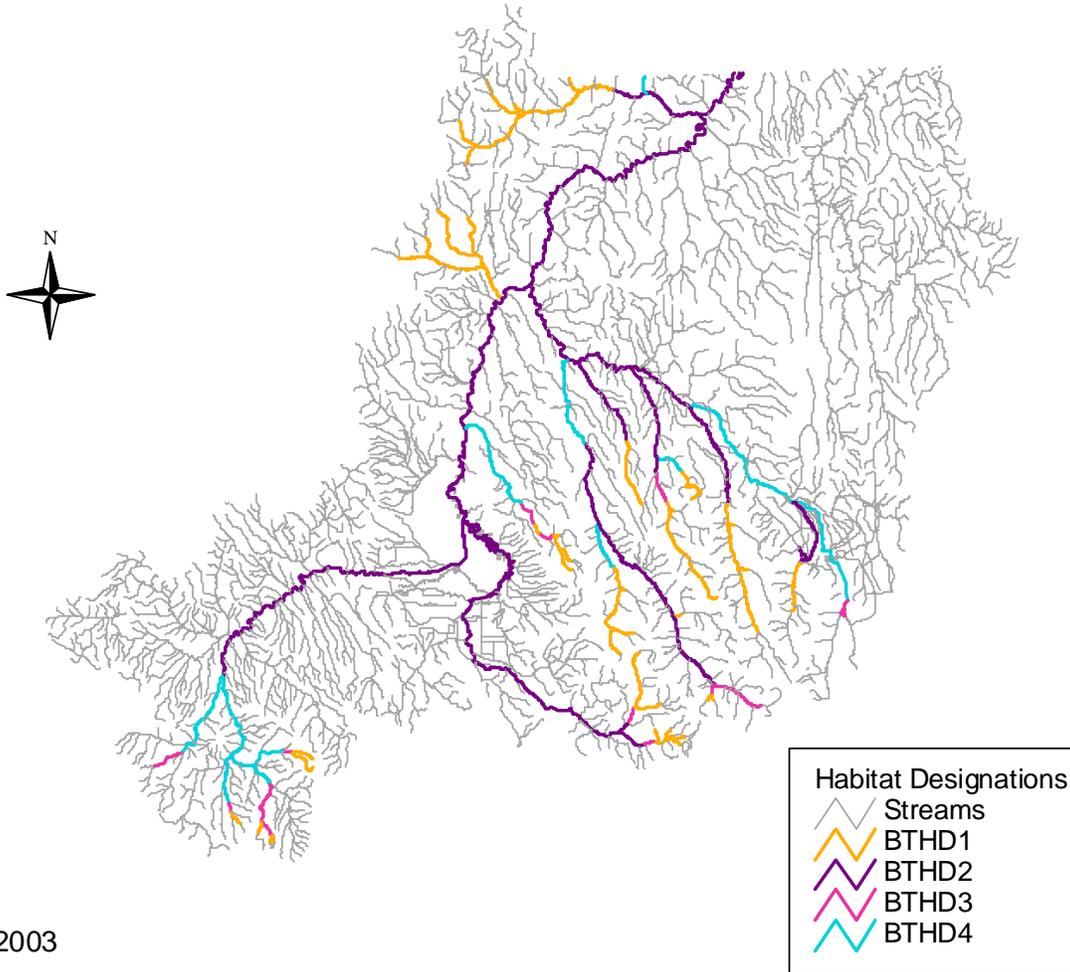


# Umatilla and Walla Walla Sub-basin Bull Trout Habitat Designations

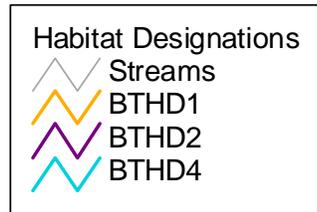
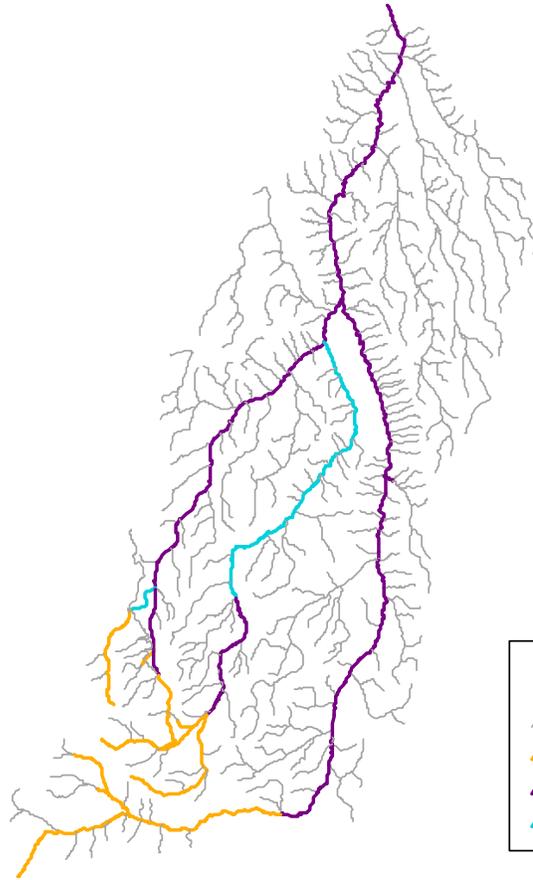


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# Wallowa, Upper, and Lower Grande Gronde Sub-basin Bull Trout Habitat Designations

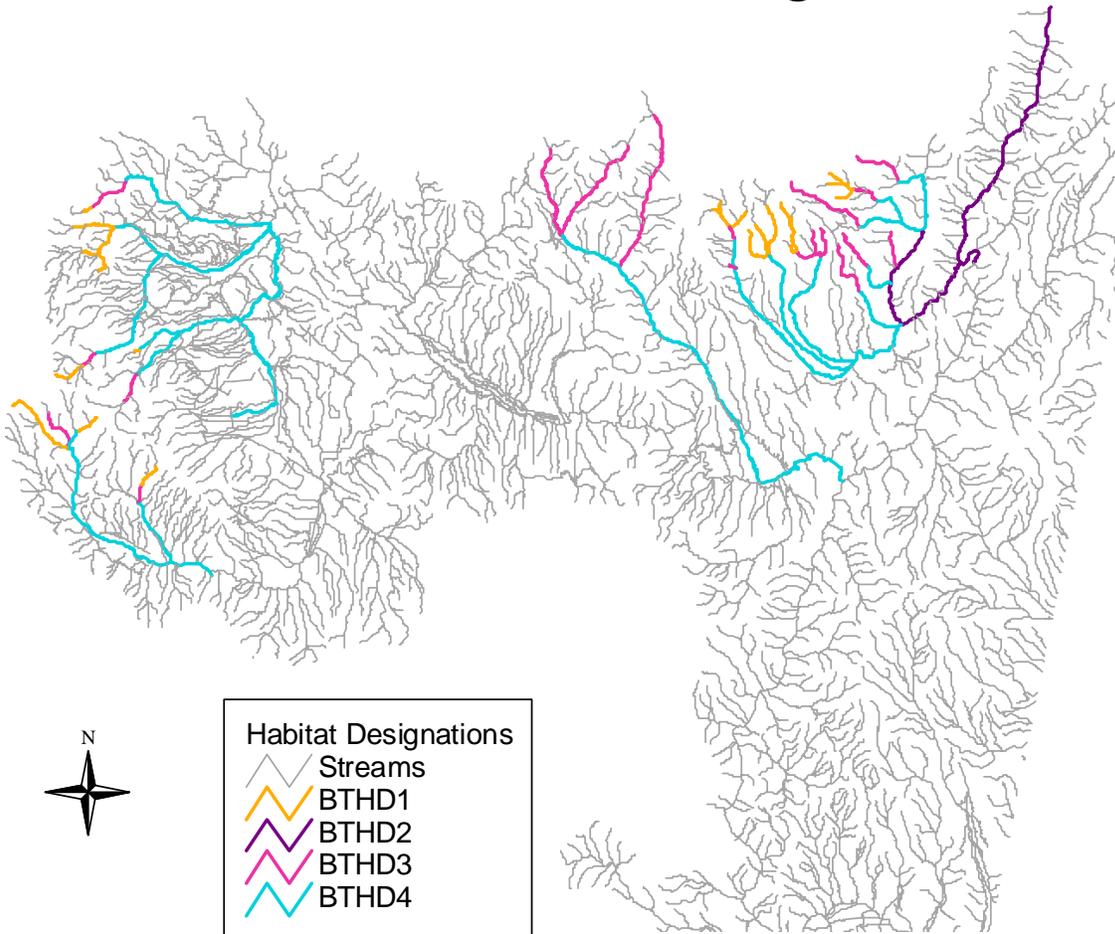


# Imnaha Sub-basin Bull Trout Habitat Designations



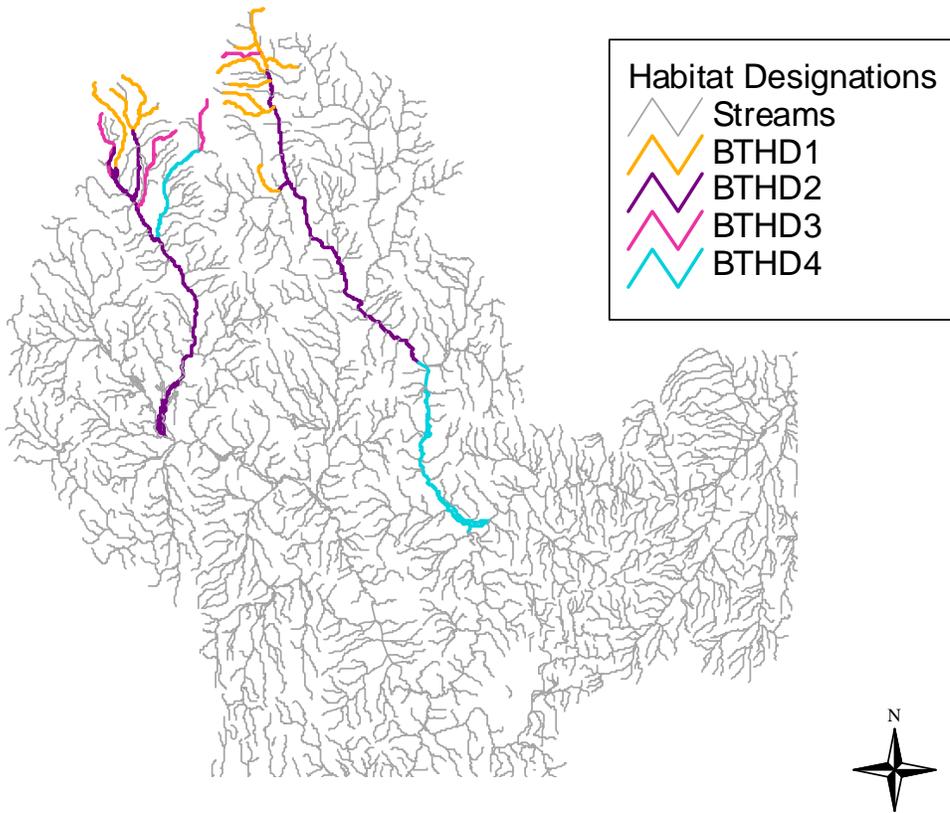
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# Powder and Pine Sub-basin Bull Trout Habitat Designations



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# Malheur Sub-basin Bull Trout Habitat Designations



July 2003

