

EPA's Methodology in its Review of Ecology's "Non-Core" Use Designations and Application of 13°C to Protect Salmon Spawning/Egg Incubation

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Note: "Non-Core" refers to the "*salmon and trout spawning, noncore rearing, and migration*" designated use and "Core" refers to the "*salmon and trout spawning, core rearing, and migration*" designated use in Washington's 2003 water quality standards (WQS).

Ecology's "Non-Core" Use Designations

In its 2003 WQS revisions, Ecology designated the waters that were designated "Class AA" to the "*salmon and trout spawning, core rearing, and migration*" use (except some of the Class AA waters were designated Char use) and designated the waters that were designated "Class A" to the "*salmon and trout spawning, noncore rearing, and migration*" use.

EPA has concerns with this simple conversion of uses and believes that the new aquatic use designations should be based on fish distribution information. To address this concern, EPA is conducting a preliminary analysis of the waters that Ecology designated as "Non-Core" to determine if the actual uses in the river support this use designation and are fully protected by the criteria associated with this use designation.

Table XX lists all the waterbodies that are designated as "Non-Core" in the 2003 WQS. The columns in Table XX depict fish timing and distribution and other information that EPA believes is relevant to examine the appropriateness of the "Non-Core" use designations. The information in each column is described below followed by an overall interpretation of the information. Table XX and the GIS maps identify the "Non-Core" waterbodies which EPA's preliminary findings indicate should be "Core" use.

Discussion of Data in Table XX

DOE Non-Core Designation

This column in Table XX denotes the waterbodies designated as "Non-Core" in Washington's WQS. These include those identified in Table 602 of Washington's WQS. In addition, waterbodies that are designated as "Non-Core" due to application of WAC 173-201A-600 (and not specified in Table 602) are also included. This column also includes EPA's preliminary findings as to what portion of the "Non-Core" segment it recommends should be a "Core" use.

July-August Juvenile Salmon and Steelhead Rearing

This column in Table XX depicts *where* Washington Dept. of Fish and Wildlife (WDFW) fish distribution maps indicate juvenile rearing for each species occurs within the non-core segment. For some segments the river miles are denoted, for other segments, the species are just listed, which means juvenile rearing generally occurs throughout the segment. It is important to note that there is no timing data associated with this distribution information, so it is uncertain if it

occurs during July or August. For some segments, other data sources are available that document July/August juvenile use and density. These specific field studies are succinctly summarized and cited.

Summer Salmon/Steelhead Spawning-Emergence

This column in Table XX depicts *where* within the non-core segment the WDFW fish distribution maps show salmon spawning for stocks that *start spawning* in Mid September or earlier according to information contained in WDFW's Salmonid Stock Inventory (SaSI). Also depicted is where and when steelhead finish spawning in Early June or later (based on WDFW dist. maps and SaSI timing information). EPA preliminary conclusion is that it is appropriate to target stocks with the above timing to reflect species that spawn/incubate in the summer. For some segments, other data documenting salmon/steelhead spawning-emergence during this time period are succinctly summarized and cited (e.g., WDFW Spawner Database). For some segments, information from the WDFW Spawner Database depicts spawning that is documented prior to "mid-September," which means documented spawning on or prior to September 15.

July-August Adult/Sub-Adult Bull Trout Use

This column in Table XX denotes where the WDFW distribution maps indicate either bull trout juvenile rearing or presence/migration in the non-core segment. It is important to note that there are no timing data associated with the WDFW distribution maps. Further, the WDFW maps refer to juvenile rearing, which includes migratory juveniles. EPA refers to these migratory juveniles herein as sub-adults to avoid confusion with young juveniles in their natal streams that are protected through the Char use designation. This column also succinctly summarizes and cites specific studies documenting adult and sub-adult use in the July/August timeframe.

Existing Temperatures

This column in Table XX includes temperature data from monitoring stations in the non-core segment. The monitoring data are from continuous monitors (over the summer) unless otherwise noted. The maximum 7 day average of the daily maximum (7DADM) value is denoted for the year.

Habitat Conditions, Population Significance, Other Fish Uses, & Other Considerations

This column in Table XX succinctly summarizes and cites information describing the habitat conditions (i.e., the degree of current habitat degradation) and the relative importance and significance of the salmonid stocks for the recovery of ESA listed species. Also included in this column are other fish use information that may warrant consideration, such as field studies documenting July/August adult holding (in areas other than the WDFW spawning distribution for the species) and steelhead smolt emigration timing. Any other information that may warrant consideration is also included in this column (e.g., summer turbidity conditions that prevent documenting use).

Preliminary Data Interpretation

In the EPA Region 10 Temperature Guidance, EPA recommends that the above fish uses (i.e., moderate to high density juvenile salmon rearing, salmon spawning and incubation, and adult/sub-adult bull trout use, that occurs in the summer) be protected with a “core” designation and an associated 16C temperature criterion. In addition, the Temperature Guidance also recommends other factors be considered when designating a “core” use, such as waters that currently attain 16C 7DADM, have the potential to support moderate to high density of rearing juveniles, or are identified as important summer salmon rearing areas to help recover listed species (See page 27 of the EPA Temperature Guidance).

EPA has since referred to these factors (included the above fish uses) as “multiple lines of evidence” as a basis for core designation. EPA thinks it is appropriate to designate “core” use based on the overall strength of the evidence, which may include one or more the factors described in the Temperature Guidance. It is not necessary that all factors exist in a waterbody to serve as a basis for “core” use, nor is it the case that if one factor exists it automatically is a basis for “core” use. If one factor exists, however, and it is strong and compelling evidence (e.g., well documented use of one of the fish uses noted above), it might be sufficient as a sole basis for “core” use (i.e., it is an existing use that must be fully protected).

Based on review of the data thus far, EPA has come to the following preliminary conclusions:

- EPA does not view the presence of juvenile rearing based on the WDFW distribution maps as a strong basis to designate core because the timing of the use is not specified and the WDFW maps show juvenile rearing to occur in most of the State. However, EPA does view documented studies of moderate to high density July-August use as a strong basis for “core” designation.
- EPA views WDFW and SaSI information depicting summer salmon spawning and steelhead incubation areas to be a strong basis to support a “core” designation because this information is well documented and summer spawning/incubation areas will not likely be protected with the “non-core” 17.5C temperature criterion. However, EPA recognizes there may be some waters where the SaSI timing information may overgeneralize and indicate summer spawning/incubation, but summer spawning/incubation may actually only occur for a portion of the WDFW spawning distribution. For a few river segments, EPA has made a preliminary finding not to include the entire WDFW spawning distribution as “core” because there was a basis or other specific data (e.g., WDFW spawner database) that indicates summer spawning/incubation is unlikely for the river segment. In these few cases it was generally just the lower few miles and a small portion of the overall spawning distribution.
- EPA does not view the WDFW distribution maps for bull trout (nor the USFWS FMO proposed critical habitat designations) to be a strong basis for “core” designation because the timing of the use is not specified and the use in many cases is during the non-summer

period. However, EPA does view documented studies of July-August adult and sub-adult use as a strong basis for “core” designation, depending on the degree of use.

- EPA views temperature data that shows that current maximum 7DADM temperatures are 16C or lower as a strong basis for “core” use if salmon juvenile rearing also occurs. If the maximum 7DADM temperatures are near 16C (16-18C range) and human activities likely have elevated temperatures to some extent and juvenile rearing occurs, then EPA views this situation as an important basis for “core” use to be considered along with other factors.

In summary, waters that EPA is making a preliminary finding should be “Core” have the following use characteristics: adult Chinook, Pink, and/or Chum salmon holding and spawning in the summer; Steelhead eggs incubating into the summer; young Chinook, Steelhead, and/or Coho juveniles that hatch in the spring and rear and grow throughout the summer; and adult and sub-adult bull trout migrating/rearing in the mid-summer. In most waters that EPA is making a preliminary finding for “Core,” many of these uses occur.

Application of 13°C to Protect Salmon Spawning and Egg Incubation

In its 2003 WQS, Ecology adopted a narrative provision that applies 13C to waters when and where Ecology determines that the summer maximum criterion would not protect salmon/steelhead spawning or incubation. Because the “*salmon and trout spawning, noncore rearing, and migration*” and the “*salmon and trout spawning, core rearing, and migration*” designated uses includes spawning in the use definition, the associated criteria must fully protect spawning (and incubation). EPA believes that where the summer maximum criteria are not sufficient to protect spawning/incubation, Ecology must determine where and when 13C applies in order to fully protect the use designations.

Table XX and the GIS maps depict where and when EPA has made a preliminary finding that 13C should apply because the summer maximum criteria would not likely protect spawning/incubation. Below is a discussion of the basis of EPA’s preliminary findings.

In EPA’s preliminary view, salmon that start spawning in early September or earlier (as listed in SaSI) are unlikely to be protected by the summer maximum criteria (even assuming the maximum criteria is 16C) because rivers are unlikely to cool down to protective temperatures by the time the spawning period begins. Therefore, salmon stocks that start spawning in early September or earlier (listed in the 3rd column of the Table XX), EPA’s preliminary thinking is that 13C should apply to the WDFW spawning distribution of that species. Based on the factors listed below, EPA’s preliminary thinking is that the start date for application of the 13C criterion should be as follows: Aug 1 if SaSI timing indicates spawning starts in late July; August 15 if SaSI timing indicates spawning starts in early August (or mid August in some cases); September 1 if SaSI timing indicates spawning starts in late August (or mid August in some cases); and September 15 if SaSI timing indicates spawning starts in early September. EPA’s preliminary thinking for the end date for application of 13C would be May 15 for salmon species (which

typically hatch by then) or later if steelhead spawning/incubation also occurs in the waters (see below for discussion of application of 13C to protect steelhead incubation).

Factors EPA is considering with respect to application of 13C to protect salmon spawning:

- Field surveys of spawning are not necessarily intended to document the first spawners/redds, thus the actual year-to-year extent of the entire spawning period may not be fully documented in many rivers
- SaSI timing information seems to generally reflect the earliest redds/spawners documented
- Field surveys are done periodically, not daily, thus when a redd/dead fish is documented, actual spawning may have been days or week prior
- The start of spawning can vary from year to year depending on environmental variables, including river temperature
- For some rivers, turbid conditions often prevent redd/spawner surveys in the summer
- For some rivers with a large spatial spawning distribution, the earliest spawning typically occurs in the upper part (higher elevation) of the spawning distribution
- Human caused elevated temperatures are likely to have truncated the full timing distribution of early spawning stocks (i.e., historically, more fish spawned earlier, perhaps earlier than what is documented today) plus present day low returns in wild stocks are unlikely to exhibit the full timing distribution of the stock
- Historically, it is likely some portion of the population spawned when temperatures were slightly higher than 13C 7DADM
- EPA's Temperature Guidance recommends applying 13C at the average date that spawning starts

In EPA's tentative view, steelhead eggs that incubate into mid-June or July are unlikely to be protected by the summer maximum criteria (even assuming the maximum criterion is 16C) because the rise in river temperatures in the summer is unlikely to result in protective temperatures during the final stages of egg incubation. EPA's tentative view is to apply the 13C criterion to the WDFW steelhead spawning distribution from February 15 (when SaSI indicates steelhead typically start spawning in Washington) to June 15 (if SaSI indicates spawning stops in early June), or July 1 (if SaSI indicates spawning stops in mid or late June), or July 15 (if SaSI indicates spawning stops in July). *Note: EPA's review with respect the timing of 13C to protect steelhead incubation is very preliminary. EPA is continuing to evaluate data to see if the application of 13C past June 15 is warranted throughout the WDFW steelhead spawning distribution.*

The basis for EPA's tentative view for application of 13C to protect steelhead egg incubation is as follows:

- Steelhead eggs generally incubate for 5-7 weeks after spawning
- The timeframe when SaSI indicates spawning stops generally reflects that last spawning documented

- Most spawning for a stock is likely completed several weeks prior to the spawning stop date indicated in SaSI
- For some rivers with a large spatial spawning distribution, the latest spawning typically occurs in the upper part (higher elevation) of the spawning distribution - this seems to be most prevalent for summer steelhead in eastern Washington and less so for winter steelhead in western Washington
- Historically, it is likely some portion of the population had eggs in the final stages of incubation when temperatures were slightly higher than 13C 7DADM