

from the reservoir. EPA, however, believes that applying a 9°C/48°F criterion immediately below the reservoir would be protective because of the application of the criterion there at the earliest spawning dates. Typically, bull trout spawning begins at the upper end of the range of waters in which spawning occurs, and gradually moves downstream as temperatures naturally cool due to seasonal weather changes. Thus, applying a 9°C/48°F criterion immediately below the reservoir at the start of the spawning time period would mean that temperatures downstream are likely to cool naturally later in the spawning period.

Second, EPA also requests public comment on a narrative provision that would limit temperature increases during spawning times to no more than 0.3°C/0.5°F greater than the otherwise applicable criterion immediately downstream of the reservoir relative to the water temperature upstream of the reservoir. EPA believes this prohibition of any significant warming would be protective because in each case, EPA is proposing to designate bull trout spawning and rearing upstream of the reservoir, which will make the 12°C/54°F summer maximum criterion applicable there. As discussed above, seasonal temperature cycles would be expected to cool those upstream waters to the 9°C/48°F temperature that is protective of spawning in time for the fall time periods when spawning occurs. Limiting the temperature increase from these reservoirs to this insignificant increment would therefore be expected to protect the bull trout spawning below the reservoirs.

EPA believes it is important to consider the attainability of the bull trout rearing and spawning use and accompanying criterion EPA is proposing. As such, EPA will consider data and information submitted regarding the attainability of this use and criterion on the water bodies where it is proposed, including data regarding attainability of the additional criteria it is considering for the four water bodies mentioned above.

*ii. Temperature Criteria for Waters Designated for Salmon and Steelhead Core Juvenile Rearing.* EPA proposes a 16°C/61°F maximum 7DADM numeric criterion (which roughly translates to an equivalent constant temperature of 14.5°C/58°F) for waters designated for salmon and steelhead core juvenile rearing to: (1) Protect juvenile salmon and trout from lethal temperatures (23–26°C/73–79°F constant); (2) provide conditions during the period of summer maximum temperature at the upper end of the optimal temperature range when

food is limited for juvenile growth (10–16°C/50–61°F constant), thus providing optimal temperatures for other times of the year; (3) protect against temperature-induced elevated disease rates (14–17°C/57–63°F constant); and (4) provide temperatures that juvenile salmon and trout prefer, as demonstrated by studies indicating fish in high densities at these temperatures (10–17°C/50–63°F constant or less than 18°C/64°F 7DADM). See Table III–1.

When determining the overall optimal temperature range for salmon and steelhead juvenile rearing, EPA reviewed both laboratory and field data and considered both physiological and ecological aspects. Optimal growth under limited food rations in laboratory experiments, preference temperatures in laboratory experiments where fish select between a gradient of temperatures, and field studies on where rearing predominately occurs are three independent lines of evidence that form the basis for identifying the optimal temperature range for salmon and steelhead juvenile rearing in the natural environment. These three lines of evidence show very consistent results, with the optimal range between 10–16°C/50–61°F for salmon and steelhead juvenile rearing. See the Temperature Guidance.

EPA is proposing that this numeric criterion apply to the warmest times of the summer, the warmest years (except for the warmest year in ten), and throughout the water body or segment, including the lowest downstream extent of the waterbody or segment designated for that use. Because of the conservative nature of how this criterion is applied, EPA believes that it is appropriate to propose numeric criteria near the warmer end of the optimal temperature range for core juvenile salmon and trout rearing. EPA expects that a numeric criterion near the warmer end of the optimal range that is applied during the period of summer maximum temperatures is likely to result in temperatures near the middle of the optimal range for most of the spring through fall in the segments where most of the rearing use occurs. EPA has identified three reasons for this. First, if the criterion is met during the summer maximum period, then temperatures will be colder than that value during most of the rest of the year. Second, because the criterion would apply throughout the waterbody or segment, including the furthest point downstream where the use is designated, temperatures will generally be colder throughout the rest of the waterbody or segment. Finally, criterion must be met in the warmest years (except for the

warmest year in ten), so that in most years, the waters will be colder.

*iii. Temperature Criteria for Waters Designated for Salmon and Trout Juvenile Rearing and Migration.* EPA proposes an 18°C/64°F maximum 7DADM criterion (which roughly translates to an equivalent constant temperature of 16.5°C/62°F) for waters designated for salmon and trout juvenile rearing and migration to: (1) Protect against lethal conditions for both juveniles and adults (21–22°C/70–72°F constant); (2) prevent migration blockage conditions for migrating adults (21–22°C/70–72°F average); (3) provide optimal or near optimal juvenile growth conditions (under limited food conditions) during the summer maximum conditions and optimal conditions during the rest of the year (10–16°C/50–61°F constant); and (4) prevent adults and juveniles from high disease risk and minimize the exposure time to temperatures that can lead to elevated disease rates (14–17°C/57–63°F constant). See Table III–1.

Data and information in the record indicates that salmon and steelhead will use waters that are warmer than their optimal thermal range during the summer and that portions of rivers and streams in the Pacific Northwest naturally (*i.e.*, absent human impacts) were historically warmer than the optimal thermal range for salmonids during the period of summer maximum temperatures. Therefore, EPA proposes a 7DADM numeric temperature criterion that is slightly warmer than the optimal thermal range for salmon and steelhead to protect this use. EPA believes this criterion would provide sufficient protection from lethal conditions and sub-lethal effects that would significantly adversely affect these uses. As a result, if this value is met during the period of summer maximum temperatures, then during other times of the summer and the rest of the year, temperatures will likely be within the optimal temperature range. An additional level of protection is provided by requiring the criterion to be met during the warmest years (except for the warmest year in ten), thus ensuring that the water will be colder in most years.

*iv. Temperature Criteria for Waters Designated for Salmon and Steelhead Migration.* As discussed in section III.B.2.iv, the salmon and steelhead migration use applies to the lower Willamette River, a portion of the John Day River, and a portion of the Snake River. To protect salmon and steelhead migration, EPA proposes a 20°C/68°F maximum 7DADM numeric criterion in conjunction with a requirement to