APPENDIX J CONSIDERATIONS FOR PERMIT WRITERS ON WASTELOAD ALLOCATIONS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
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TECHNICAL MEMORANDUM

Subject: Evaluation of Point Source Discharges in the Columbia and Snake River Temperature TMDL and Considerations for Permit Writers on Wasteload Allocations

To: File

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Introduction

This memo describes the evaluation of point source discharges from EPA's Total Maximum Daily Load (TMDL) for temperature in the mainstem Columbia and Snake rivers and provides considerations for permit writers to translate wasteload allocations to permit limits. Permit writers may need to consider other factors not discussed in this memo such as state water quality standards, site-specific information, or new information that was not available during TMDL development.

This document is not intended to and does not impose binding requirements on any entity, governmental or non-governmental. The document, however, explains EPA consideration of the derivation of the wasteload allocations. As such, the document may be useful to permit writers to illuminate EPA's development of the TMDL, when translating wasteload allocations to permit conditions.

EPA's TMDL for temperature in the mainstem Columbia and Snake rivers assesses the impacts of point source discharges required to obtain National Pollutant Discharge Elimination System (NPDES) permits and establishes wasteload allocations for current and future discharges. The TMDL allocates a temperature increase of 0.1°C to NPDES point sources, or one third of the 0.3°C allocation for all sources. The TMDL includes facility-wide heat load wasteload allocations for individual municipal and industrial point sources that directly discharge to the mainstem Columbia and Snake rivers. When developing effluent limits in individual NPDES permits for these facilities, as well as facilities authorized to discharge under general permits, the permitting authority must ensure that water quality-based

limits are consistent with the assumptions and requirements of the available wasteload allocation for the discharge in the TMDL per 40 CFR 122.44(d)(1)(vii)(B).

In developing the TMDL, EPA determined that temperature increases in municipal, industrial, and construction stormwater discharges are negligible, particularly in the summer when storm events rarely occur, and do not contribute to temperature impairment. The analysis is described in the TMDL and in an EPA memo written on 4/6/2020 entitled "Stormwater Discharges." Therefore, the TMDL does not assign temperature WLAs for NPDES permits for stormwater discharges or for discharges from municipal separate storm sewer systems. Consistency with the assumptions and requirements in the TMDL would not require limits to reduce heat or other forms of temperature limits for discharges from these stormwater and storm sewer point sources, unless facility-specific information shows otherwise. If facility-specific information demonstrates more than minimal contributions of elevated heat, the reserve allocation would apply.

EPA assessed the impact of the heat discharged by facilities by running the RBM10 model (Tetra Tech 2019, EPA 2021) with and without point source discharges. Municipal and industrial facilities designated as major facilities in the NPDES program are included as individual inputs in the model at the respective river mile of their discharges. Because of the large number of minor NPDES facilities, EPA aggregated these sources into a single gross input of heat at the midpoint of the TMDL reach into which they discharge. EPA's designation of "major" or "minor" for municipal treatment works permits is based on flow, whereas EPA's nationally-applicable designation of major and minor industrial facilities is based on a variety of factors unrelated to heat loading. For this reason, some "minor" industrial permittees may discharge higher heat loads than "major" industrial facilities.

There are no major NPDES facilities (municipal or industrial) on the lower Snake River within the TMDL study area, i.e., the impaired segments that the TMDL was developed to address. Two major facilities, however, are located just upstream of the TMDL study area: Clearwater Paper and the City of Lewiston, Idaho. One minor facility, the City of Asotin, Washington, is also located upstream. For estimating point source impacts, EPA included these facilities in the model scenario's loading assumptions (Appendix D). These facilities are not assigned wasteload allocations, however, because they are outside of the TMDL study area.

Characterizing Point Source Heat Loads

The facilities incorporated into the modeling analysis are listed in the TMDL and RBM10 model scenario report (Appendix D). Initial model runs indicated that the NPDES point sources currently have a smaller cumulative impact than the 0.1°C allocation, so the final scenario was run with the heat loads based on the design flow and maximum discharge temperature for each source. This approach ensures that non-attainment of the WLA (attributable to a particular NPDES point source) would only arise if a facility has a substantial increase in its heat load over current discharges. In some cases, EPA used alternate metrics when design flow and maximum temperature were not available in permitting and compliance databases.

EPA obtained flow and temperature information to characterize point sources from Washington Department of Ecology, Oregon Department of Environmental Quality, EPA NPDES permitting programs, Integrated Compliance Information System (ICIS) database, and permit applications. EPA asked the State permitting agencies for design flows and maximum reported temperatures for facilities with State-

issued individual NPDES permits and authorization under NPDES general permits. Where information was not available, State agencies provided EPA with estimates using best professional judgment. When EPA invited comment on the established May 18, 2020 TMDL, it also received public comments from individual facilities identifying information that EPA should consider when developing WLAs. EPA, Washington, and Oregon evaluated the information and revised WLAs where temperature and/or flow information were inaccurate based on confirmed current discharges and design flows. EPA did not revise WLAs where facilities requested higher WLAs based on projected future growth. For facilities with multiple outfalls, the input into the TMDL model used a flow-weighted average temperature of the outfalls and the total flow from all outfalls.

Permits and permit applications include flow information, but some facilities do not monitor or report discharge temperatures. For facilities lacking effluent temperature data, EPA used temperatures representative of the industry sector to estimate heat loads. The sectors used were hydroelectric dams, municipal wastewater treatment plants, hatcheries, and the remaining industrial facilities. These sectors were used because effluent temperature vary substantially across these particular sectors, with hatcheries and dams discharging colder temperatures than municipalities and industrial sources. Within each sector, the average maximum temperature from those facilities with monitoring data was calculated and applied to all sources in that sector for which there were no data. Some facilities provided additional information during the public comment period that predicted August effluent temperatures more accurately. EPA used this information in revised WLAs.

Modeling Assumptions and Results

EPA's recognition of system variability and inherent model uncertainty (discussed in the TMDL) influences how it developed the TMDL and, in turn, how model scenarios were run and outputs were processed to provide information for the TMDL. EPA's goal was to capture central tendencies in the multi-year simulations (e.g. long-term mean conditions) while also capturing seasonal variation and critical conditions. In addition, conservative assumptions were used to ensure that the effects of the data inputs on modeled temperatures were not underestimated, and to account for uncertainties in the data.

Modeling Assumptions

The RBM10 model used to develop the TMDL simulated the daily average temperature of the Columbia and lower Snake rivers for six years (2011-2016) and aggregated results for June to October by month. Two scenarios were run, with point sources and without point sources, to evaluate the impact on river temperatures. The model is one-dimensional, and each point source discharge is fully mixed into the segment on which it is located, so this assessment evaluated the impact on the fully mixed river.

In the model, the point sources are assumed to discharge at a constant flow and temperature for the entire simulation. The endpoint for the impact assessment is the 90^{th} percentile temperature difference for each month. To ensure that critical temperature locations were appropriately identified, model outputs were processed at all dam tailrace sites, major tributary confluences, and at River Mile 42 on the Columbia River, which is located at or downstream of numerous major point source discharges.

As noted earlier, these discharges represent the maximum possible heat load from the point sources based on the design flows and maximum measured temperatures of each included discharge. The assumption that all point sources discharged at their maximum heat load, simultaneously and

continuously, results in a substantial margin of safety in the estimate of the current point source impact. On a given day, sources actually discharging at higher-than-average flow volumes are likely balanced by sources discharging lower than average flows.

Results

The initial model scenario for the existing NPDES facilities estimated a maximum temperature impact of approximately 0.08°C at the critical location (RM 42) from June to October. EPA estimated a reserve loading that increased the modeled impact to 0.1°C. To calculate the reserve loading, EPA inserted a heat load in the model at the midpoint of each TMDL reach and the heat loads from all existing NPDES facilities. EPA then ran the model iteratively, increasing the reserve heat load until the maximum impact equaled 0.1°C. The resulting reserve load for each reach is $4.8x10^9$ kcal/day. This loading is equivalent to a 49 MGD discharge at 26°C and is similar to the heat load discharged by the largest individual point sources in the study area. One exception is in October when the Priest Rapids target site is also a critical location (see Section 6.5.4 Reserve Allocation and Appendix D of the TMDL). To meet the allowable 0.1°C impact at the Priest Rapids target site, the reserve allocation is $2.0x10^9$ kcal/day for reaches in the Columbia River upstream of the site.

Translating TMDL WLAs into Permit Limits

The TMDL includes: (1) point sources that are assigned individual WLAs because they discharge directly to the mainstem Columbia and Snake Rivers (Tables 6-12 through 6-14 of the TMDL), and (2) point sources that have not been assigned WLAs because they are considered to be negligible or there is currently not enough information available to assess whether the discharge contributes to the impairment (Table 6-15 of the TMDL).

In developing water quality-based effluent limits for NPDES permits for facilities listed in Tables 6-12 through 6-14 of the TMDL, the permitting authority must ensure that the limits are consistent with the assumptions and requirements for individual wasteload allocations in the TMDL per 40 CFR 122.44(d)(1)(vii)(B). The assumptions of the assessment are appropriate for consideration in determining how to translate the TMDL wasteload allocations into permit limits. As previously explained, the wasteload allocations are expressed as facility-wide heat load limits that apply from June 1 to October 31. Therefore, expression of the permit limit as a facility-wide heat load limit also would be consistent with that aspect of the individual waste load allocations. In addition to the facility-wide heat load limit, a limitation expressed as a temperature also would be consistent with the TMDL inputs used in developing the TMDL.

The input of heat loads is analogous to a source discharging at its monthly average permit limit. Collectively, if all the sources discharge this load on average, the goal of the TMDL for point sources will be achieved. Where there are local effects near outfalls, state and tribal NPDES regulations and water quality standards provide mechanisms for permitting authorities to address such effects consistent with the CWA.

Other circumstances that could apply are:

- For facilities covered under a general permit, WLAs were assigned where facilities were believed to have a temperature discharge and where information was available. Note that some hatcheries discharge below temperature water quality standards and therefore may not need a temperature limit. Sectors that are not expected to include temperature in their discharges include facilities

covered under the following general permits: Confined Animal Feeding Operations (CAFOs), in-stream placer mining, pesticide discharge, fruit packer, seafood processing, net pen aquaculture, fish hatchery permits, 500J boiler boildown, 1700A washwater, 400J log ponds, and 1500A petroleum hydrocarbon cleanup permits. Therefore, these facilities do not require a heat load or temperature limit, unless there are site-specific circumstances that indicate a heat discharge. For other facilities not receiving a WLA covered by a general permit, EPA recommends the permit writer evaluate each facility's operations and make a case-by-case determination whether additional temperature monitoring is needed and whether a temperature or heat load limit is needed. If a permit limit is needed, the permit writer may access the reserve allocation or engage in trading (See below).

- For facilities that require a higher WLA, the permit writer may access the reserve allocation or allow the point source to engage in trading. These trades could be tracked in a central system that parties can access to ensure that the resulting shift in heat loads as a result of trades are consistent with TMDL assumptions.

- For facilities with multiple outfalls, the permit writer may include an equation in the permit to calculate the facility-wide heat load, the sum of heat loads for each outfall. Doing so would not be inconsistent with the assumptions in the TMDL. The permit writer may also choose to develop outfall-specific heat load limits so long as the sum of those heat loads does not exceed the facility-wide heat load WLA in the TMDL.

- For facilities that are discharging at temperatures below the water quality standard, EPA recommends that the permit writer verify that the data in the TMDL tables accurately reflect discharge temperatures. If no or limited effluent temperature data are available, the permit writer may consider requiring temperature monitoring. If the discharge temperature is accurate and below the applicable water quality standard, a heat load or temperature limit may not need to be applied except seasonally, consistent with the individual WLA that applies in October, i.e., when and where the 13°C spawning criterion applies.

- For facilities that have not been assigned individual wasteload allocations, (Table 6-15 of the TMDL), the permit writer, in ensuring consistency with the assumptions and requirements of an available WLA, may determine whether the TMDL did not assign a wasteload allocation because the facility is expected to discharge no heat or because there is insufficient information. Where the facility is not expected to discharge heat, the permit writer may include an explanation in the reasonable potential analysis section of the fact sheet as to why the facility would not be expected to discharge heat (e.g., treatment process does not involve heat). For a facility where maximum measured temperature is unknown, the permit writer may consider requiring temperature monitoring. If temperature data or other information exist that indicates there are heat discharges above the criterion, the permit writer may consider accessing the reserve allocation to provide a new wasteload allocation for the facility, or whether a point source-to-point source trade for a WLA is available.

Reserve Allocation

If a facility needs to discharge above its individual heat load wasteload allocation in the TMDL, the permit writer must ensure consistency with the assumptions and requirements in an available WLA and may consider the reserve allocation. The reserve load for each reach is $4.8x10^9$ kcal/day. A facility may require a higher heat load discharge if it expands, if its effluent temperature increases, or if there is new information that shows that the facility's heat load discharge is greater than what was used in the TMDL model. Reliance on the reserve allocation would be consistent with the assumptions in an available WLA because the reserve allocation affords the opportunity to increase an individual WLA.

Upon implementation of the TMDL, EPA recommends that permitting authorities give priority to facilities that have explored other options to reduce their heat load, but are still unable to meet their permit limits for accessing a reach's reserve allocation. Over the long-term, if there is a substantial change in the number and location of the point sources, the model may need to be revisited to reanalyze the reserve allocation.

Trading

Trading between point sources offers another option for facilities who require a greater heat load discharge than the TMDL provides and for facilities able to discharge below their allocated heat load and thereby establish a temperature credit. EPA recommends that EPA, Ecology, and Oregon DEQ convene an interagency group to ensure that there is agreement on tracking and documentation for how temperature credits are established, traded, and used. The group could also ensure that there are no instances of the same credit being used by two different point sources at the same time, and that there are no near-field or far-field impacts from the increased heat load at a particular location that result in the TMDL wasteload allocations not being met. This group could also consider how to ensure the trades are consistent with any applicable state trading rules, guidances or policies for point sources in their states.

TMDL WLA Revision

EPA anticipates that new WLAs or changes to WLAs from new or modified sources will generally involve minor heat loads that have minimal individual impacts on the mainstem river temperatures. These changes can be managed without the need for additional modeling and/or TMDL revisions using the reserve allocation. If situations arise involving large new sources or depletion of the reserve allocation in a reach, the recommended interagency group potentially convened to manage NPDES sources and reserve allocations could explore additional modeling work using the TMDL model (RBM10) to analyze individual sources and/or the distribution of reserve allocations across the basin. This effort will require close coordination between the proposed interagency group, EPA TMDL program, and water quality modelers. Based on the new information from the model, a formal modification of the TMDL may be appropriate.

References

Appendix C: Tetra Tech 2019. Update of the RBM10 Temperature Model of the Columbia and Snake Rivers. Prepared by Tetra Tech for EPA Region 10. September 2019.

Appendix D: EPA 2021. Assessment of Impacts to Columbia and Snake River Temperatures using the RBM10 Model. Scenario Report. EPA Region 10. March 2021.