State of Oregon Department of Environmental Quality

Attachment D: Response to Public Comments

The Department of Environmental Quality issued a public notice on Sep. 6, 2024, opening a 30-day public comment period on the proposed order modifying the total dissolved gas water quality standard on the mainstem Columbia River. A public hearing was held on Sep. 20, 2024 to receive oral comments. On Sep. 27, 2024 DEQ presented an informational item on the proposed total dissolved gas modification order at the Environmental Quality Commission meeting. On Oct. 3, 2024, DEQ extended the public comment period by seven calendar days. Written comments were due by 4 p.m. on Oct. 13, 2024. DEQ received eight (8) comment letters and no oral comments during the public comment period. Summaries of public comments and DEQ's responses are below.

Table 1. List of commenters on the proposed modification to the total dissolved gas water quality standard on the mainstem Columbia River.

Commenter	Affiliation	Date Received
1. Tucker Jones	Oregon Department of Fish and Wildlife	Oct. 4, 2024
2. Michel DeHart	Fish Passage Center	Oct. 10, 2024
3. Scott G. Armentrout	Bonneville Power Administration	Oct. 10, 2024
4. Aja K. DeCoteau	Columbia River Inter-Tribal Fish Commission	Oct. 11, 2024
5. Erin Kuttel	U.S. Fish and Wildlife Service	Oct. 11, 2024
6. Michael Deen	Public Power Council	Oct. 11, 2024
7. David Blodget III	The Confederated Tribes and Bands of the Yakama Nation	Oct. 11, 2024
8. Clark Mather	Northwest RiverPartners	Oct. 12, 2024

1. **Tucker Jones, Oregon Department of Fish and Wildlife**
   Written comments

Commenter supports DEQ's proposed efforts to modify the total dissolved gas water quality standard on the mainstem Columbia to allow the implementation of agreed-to operations outlined in Appendix B of the U.S. Government Commitments in support of the Columbia Basin Restoration Initiative of the Resilient Columbia Basin Agreement (Agreement).

Commenter recommends the start date of the proposed modification order be January 1, as the operations associated with Appendix B of the Agreement are ongoing.

Commenter recommends the order remove the automatic trigger for spill curtailment during Spring spill due to biological threshold exceedances under Section 6.b) and instead provide the DEQ Director the discretion to make the decision to curtail spill or not. ODFW cites the large margin of safety inherent in the gas bubble trauma biological thresholds (15 percent of sampled fish showing signs; 5 percent showing signs of severe gas bubble trauma) that were developed based on laboratory studies on salmon where mortality in exposed fish did not occur until 60 percent of fish showed signs of gas bubble trauma and 30 percent showed severe signs. Additionally, ODFW notes that federal and state Endangered Species Act recovery plans for listed Columbia Basin salmonids identify non-native piscine (fish) predation as contributing to population declines and limiting the recovery of these species.

Commenter requests clarification on how total dissolved gas levels will be calculated outside of the spring and summer spill seasons, recommending that the order define the calculation as the average of the highest 12-hours in a 24-hour period.

Department Response to Comments:

DEQ acknowledges the commenter's support for the proposed total dissolved gas modification order.

DEQ changed the start date of the order to begin on January 1, rather than April 1, to allow for any operations that might be requested to occur between January 1 and March 31, 2025 to be covered by the new modification.

DEQ acknowledges the large margin of safety inherent in the gas bubble trauma biological thresholds for salmonids. DEQ acknowledges ODFW's concerns over the potential for voluntary spill for Endangered Species Act listed salmonid populations to be curtailed due to exceedances of gas bubble trauma incidence thresholds from samples of non-native fish species.

DEQ updated the order to provide the DEQ Director discretion during spring spill to curtail spill based on its review of the results of non-salmonid gas bubble trauma data. DEQ considered the results of the U.S. Geological Survey's *Nonsalmonid Gas Bubble Trauma Investigations* that found weak or non-existent relationships between gas bubble trauma prevalence and severity in laboratory studies that exposed two nonsalmonid species commonly detected below the lower four Columbia River Dams (sculpin species and threespine stickleback[1]) to total dissolved gas levels between 120 and 130 percent. In addition, the authors state it is difficult to predict the long-term survival, health, and performance of nonsalmonids that showed signs of gas bubble trauma and that past research has largely been unsuccessful in consistently attributing ecological significant to fish displaying signs of gas bubble trauma[2]. In contrast, there is strong evidence voluntary spill improves the survivorship of migrating salmon by reducing powerhouse passage rates.

DEQ updated the final order to explicitly state TDG levels will be evaluated using the methodology in 8.a)i., the average of the highest twelve total dissolved gas measurements in a calendar day.

---

[1] *Gasterosteus aculeatus*

[2] Kenneth F. Tiffan, B. D. Liedtke, and S.L. Benson, "Nonsalmonid Gas Bubble Trauma Investigations," Final Report to the Bonneville Power Administration (Portland, Oregon: U.S. Geological Survey, January 2024), https://www.cbfish.org/Document.mvc/Viewer/P206973.

2. **Michele DeHart, Fish Passage Center**
   Written comments

Commenter supports the renewal of the order modifying the total dissolved gas water quality standard to benefit migrating salmonids.

Commenter recommends the draft order include a specific modification for the fall and winter spill operations. Commenter recommends the order should run through the 2029 calendar year.

Commenter notes its concern about applying the gas bubble trauma biological thresholds developed for salmonids on non-salmonid species. Commenter recommends providing the DEQ Director discretion in whether or not to curtail Spring spill under Section 6.b)i. rather requiring spill be curtailed if there is an exceedance of biological thresholds.

Noting the small sample sizes for non-salmonid gas bubble trauma monitoring over the last three summer seasons, commenter recommends the DEQ Director not make management decisions to reduce spill based on inadequate sample sizes of non-salmonid monitoring

Department Response to Comments:

DEQ acknowledges the commenter's support for the proposed total dissolved gas modification order.

DEQ will not update the Order.Subject to advanced notification, the Order allows for elevated total dissolved gas levels up to 120 percent saturation outside the defined spring and summer seaons (April 1 – Aug. 31). DEQ extended the end date to be December 31 to allow for fall-winter operations to be implemented if requested through calendar year 2029.

DEQ updated the order to provide the DEQ Director discretion during spring spill to curtail spill based on its review of the results of non-salmonid gas bubble trauma data. Refer to DEQ's response to ODFW's comments for additional information.

DEQ acknowledges Commenter's concern over basing management decisions on inadequate small sample sizes during the summer spill season.

3. **Scott G. Armentrout, Bonneville Power Administration**
   Written comments

Commenter supports the proposed modification to Oregon's total dissolved gas water quality standard in order to allow for the operations agreed to with regional sovereigns to proceed.

Commenter requests the Findings include a summary of observed GBT for juvenile salmonid exposure to 125 percent TDG and a comparison with exposure to 120 percent TDG. Commenter requests that the Order use GBT incidence rates to describe the level of risk rather than the established biological threshold exceedance levels. Commenter requests reference to recently-published peer-reviewed literature on total dissolved gas, specifically the U.S. Geological Survey's 2024 report, *Nonsalmonid Gas Bubble Trauma Investigations*, which included descriptions of two exceedances of gas bubble trauma biological thresholds on the Lower Snake River and a chapter on laboratory studies that examine the impacts of elevated total dissolved gas on two non-salmonid species, sculpin and threespine stickleback. Commenter notes species variability to elevated levels of total dissolved gas levels.

Commenter requested DEQ correct the year of the previous modification order.

Under Section 4 of the draft Order, commenter requests clarification regarding if biological monitoring is required in the fall-winter months when additional periods of application may be requested.

Commenter requests the order include explicit reference to the Fish Passage Center's biological monitoring protocol, which includes examination of gas bubbles around the eyes in addition to the non-paired fins. Commenter recommended the Commission be aware biological monitoring by the USGS has found gas bubble trauma in multiple non-salmonid species, including in non-protocol areas. To help avoid confusion, commenter requests the Order use only "resident" or "non-salmonid" where possible.

Department Response to Comments:

DEQ acknowledges the commenter's support for the proposed total dissolved gas modification order.

DEQ updated the Order with references to the U.S. Geological Survey's 2024 report, *Nonsalmonid Gas Bubble Trauma Investigations*. DEQ included additional statements related to gas bubble trauma incidence rates in juvenile salmonids and nonsalmonids over the last several spill seasons.

DEQ deleted the reference to the last total dissolved gas modification order.

DEQ updated the Order to specifically include "eyes" and acknowledges signs of gas bubble trauma may present outside of the Fish Passage Center's monitoring protocol zones (eyes and unpaired fins). DEQ further acknowledges that gas bubble trauma was found in multiple species of non-salmonid species over the last several years of monitoring below Bonneville and McNary Dams.

DEQ does not recommend a change in the gas bubble monitoring methodology to include areas outside of the eyes and unpaired fins.

DEQ will not make changes to the Order but will work with the commenter and others to clarify, as needed, its interpretations and use of the words "resident" and "nonsalmonid" related to biological monitoring that is required as a condition of allowing elevated total dissolved gas levels above 110 percent saturation. DEQ is unable to change the text of the Oregon Administrative Rules, which use the term "resident". The biological monitoring is intended to evaluate a range of encountered species. Some of these species, including pacific lamprey, for example, may not meet the strict definition of "resident" species because of they spend part of their life-cycle in the ocean before returning to freshwater environments. Therefore, DEQ uses the broader term "nonsalmonid" monitoring to refer to the monitoring of resident and migrating species other than juvenile salmonids.

4. **Aja K. DeCoteau, Columbia River Inter-Tribal Fish Commission**
   Written comments

Commenter supports the proposed order to modify the total dissolved gas water quality standard on the mainstem Columbia River to support migrating salmonids, including support for continued implementation of the 125 percent saturation limit in spring and 120 percent saturation limit in summer.

Commenter recommends the order expand the applicable date ranges within the calendar year the elevated limits apply to allow for agreed-to spill operations in the fall and March to proceed.

Commenter does not support an automatic reduction of spill based on non-salmonid biological thresholds during spring spill as detailed under Section 6.b) of the draft order – commenter supports providing the DEQ Director discretion in making a decision to curtail spill based on monitoring results.

Commenter notes there may be confusion about how the total dissolved gas levels will be evaluated outside of the spring and summer spill seasons and recommends explicitly stating the limits will be calculated as the average of highest 12 hours in a 24-hour period.

Department Response to Comments:

DEQ acknowledges the commenter's support for the proposed total dissolved gas modification order.

DEQ updated the order to provide the DEQ Director discretion during spring spill to curtail spill based on its review of the results of non-salmonid gas bubble trauma data. Refer to DEQ's response to ODFW's comments for additional information.

DEQ updated the final order to explicitly state TDG levels will be evaluated using the methodology in 8.a)i., the average of the highest twelve total dissolved gas measurements in a calendar day.

5. **Erin Kuttel, U.S. Fish and Wildlife Service**
   Written comments

Commenter notes the order is focused on salmon and steelhead smolts, and states that while it supports efforts by regional fish managers to improve the status of Endangered Species Act listed populations, it believes efforts should be balanced with consideration of potential harm to native resident fishes. Commenter references a May 2024 letter sent to DEQ containing concerns about potential unintended consequences of elevated total dissolved gas on sculpin and other native resident aquatic species due to voluntary spill operations for salmon and notes its belief that none of its concerns were included in the draft findings. Commenter feels the section on potential harm to resident fishes is weak and recommends including additional references to recently-published peer-reviewed literature.

Commenter notes [the specified operations in the Agreement] would have total dissolved gas limits of 125 percent during spring spill at "three of the four lower Columbia dams, and likely around 120% at the fourth (The Dalles)."

Commenter notes the findings do not reference to the exceedances of the gas bubble trauma biological thresholds due to "the high prevalence of [gas bubble trauma] observed in sculpin at Ice Harbor Dam combined with low species abundance at that location" and argue these recent exceedances reinforce the need for more research to understand the population level impacts to sculpin from elevated total dissolved gas levels during spring spill.

Commenter argues the order fails to clarify the total gas limit is for "spring and fall steelhead overshoot spill" and requests the order state the total dissolved gas limits during this period.

Department Response to Comments:

DEQ acknowledges the commenter's support for efforts by regional fish managers to improve the status of Endangered Species Act listed populations. Following the requirements of the Oregon Administrative Rules, the Environmental Quality Commission may modify the total dissolved gas criteria in the Columbia River for the purpose of allowing increased spill for salmonid migration. Therefore, the draft order is focused on the benefits to salmonid populations. The potential harm to resident aquatic communities is considered in the draft order through the continuation of biological monitoring for gas bubble trauma in resident aquatic communities and the utilization of biological thresholds to inform management decisions that seek to balance the risk of impairment from elevated total dissolved gas with the expected benefits of voluntary spill for migrating Endangered Species Act listed populations of Columbia River salmonids.

DEQ received and reviewed the May 2024 letter on the potential unintended consequences of elevated total dissolved gas on native resident aquatic species. DEQ anticipates working closely with the U.S. Army Corps of Engineers, its contractors, regional sovereigns, the State of Washington, and others in the region to address the concerns related to monitoring methods and gear bias in the biological monitoring plans that the Corps would be required to submit to DEQ for approval prior to spill.

The comment related to the specified operations in the agreement is outside the scope of the proposed modification order text. The modification of the total dissolved gas water quality standard does not prescribe operations at the dams. Rather, it provides maximum total dissolved gas levels that can be met, but not exceeded. As detailed in Section 1 of the draft modification order, the total dissolved gas limit of 125 percent saturation would apply to all four lower Columbia River dams (McNary, John Day, The Dalles, and Bonneville) during the spring spill season, defined as April 1 – June 15.

DEQ acknowledges the exceedances of biological gas bubble trauma thresholds established by the State of Washington for the Lower Snake River. DEQ focused the scope of its draft findings on gas bubble trauma to data generated within Oregon's portion of the Columbia River that are to be affected by the Commission action.

DEQ acknowledges the commenter's interest for research into population level impacts on non-salmonid aquatic species due to elevated total dissolved gas levels caused by voluntary spill operations on the Columbia River. DEQ agrees this data would be useful to inform management decisions and welcomes the opportunity to consider this data and the findings of peer-reviewed publications when they become available.

The draft order defines Spring spill as April 1 – June 15 and summer spill season as June 16 – Aug. 31. During those periods, the draft order would allow total dissolved gas up to 125 percent saturation during spring and 120 percent saturation during the summer spill season. Section 4 of the draft order provides the DEQ Director the ability to approve additional periods the modification order would apply up to 120 percent total dissolved gas, subject to at least one-week advanced notification and the requirements of Sections 8.a) to 8.c) of the draft order, during the fall and winter months (Sep. 1 – March 31).

6. **Michael Deen, Public Power Council**
   Written comments

Commenter states that it believes the order does not provide appropriate detail on the potential risk of gas bubble trauma to juvenile salmonids and resident fish species. Rather than rely solely on comparisons against established biological thresholds, the commenter requests the order summarize gas bubble trauma incidence rates, including information on gas bubble trauma incidence rates observed since 2020 when the managed TDG limits allowed up to 125 percent atmospheric pressure compared to incidence rates during previous orders that allowed managed TDG up to 120 percent saturation.

Commenter additionally requests inclusion of the best available science, including the 2024 USGS report, *Nonsalmonid Gas Bubble Trauma Investigations*.

Department Response to Comments:

For DEQ's response to the recommendation to include more detailed gas bubble trauma incidence rates and to the suggestion to include the best available science, refer to DEQ response to BPA comments.

7. **David Blodgett III, The Confederated Tribes and Bands of the Yakama Nation**
   Written comments

Commenter supports the proposed modification to the total dissolved gas water quality standard on the Columbia River to allow for agreed-to operations in the Resilient Columbia River Basin Agreement to proceed. Commenter supports the comments provided by the Columbia River Inter-Tribal Fish Commission, Oregon Department of Fish and Wildlife, and the Fish Passage Center.

Commenter supports expanding the dates for additional periods of the modification to apply up to 120 percent total dissolved gas (calculated as the average of the 12 highest hours in a 24-hour period) in the fall and winter months.

Commenter supports the removal of the automatic spill reduction based on the gas bubble trauma biological monitoring thresholds in non-salmonids.

Department Response to Comments:

DEQ acknowledges the commenter's support for the proposed total dissolved gas modification order and its support for the other public comment letters from the listed organizations.

DEQ acknowledges the commenter's support for provisions allowing additonal periods of the modification up to 120 percent saturation to apply to allow for voluntary fish passage operations in the fall and winter months.

DEQ updated the order to provide the DEQ Director discretion during spring spill to curtail spill based on its review of the results of non-salmonid gas bubble trauma data. Refer to DEQ's response to ODFW's comments for additional information.

8. **Clark Mater, Northwest RiverPartners**
   Written comments

Commenter states that it believes the order does not provide appropriate detail on the potential risk of gas bubble trauma to juvenile salmonids and resident fish species. The commenter

requests the order detail use gas bubble trauma incidence rates compared to previous modification orders rather than relying on exceedances of biological threshold exceedances.

Commenter recommends that DEQ include the best available science, specifically referencing the U.S. Geological Survey's 2024 report *Nonsalmonid Gas Bubble Trauma Investigations* that documents the two exceedances of the gas bubble trauma biological threshold on the Lower Snake River in Washington state.

Commenter recommends DEQ consider BPA comments.

Department Response to Comments:

For DEQ's response to the recommendation to include more detailed gas bubble trauma incidence rates and to the suggestion to include the best available science and reference to the thresholds of the biological threshold exceedance in Washington, refer to DEQ response to BPA comments.