



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NORTHWESTERN DIVISION
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Planning, Env Resources, Fish Policy & Support

Mr. Vincent McGowan
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Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Ms. Leah Feldon
Interim Director
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
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Dear Mr. McGowan and Ms. Feldon:

The U.S. Army Corps of Engineers (Corps) will implement 2023 spill operations for juvenile fish passage beginning April 3 at the four lower Snake River projects and April 10 at the four lower Columbia River projects in accordance with the annual Fish Operations Plan. Accompanying this letter is the 2023 Fish Operations Plan (2023 FOP) (Enclosure 1). The 2023 FOP outlines implementation of spring and summer juvenile fish passage spill and transport operations for juvenile salmonids at the Corps' eight fish passage projects on the lower Snake and lower Columbia rivers.

The Corps is providing this summary of biological monitoring to be implemented during the implementation of 2023 juvenile fish passage spill in accordance with each State's requirement that a biological monitoring plan be submitted prior to implementation of spring spill up to 125 percent total dissolved gas (TDG). Consistent with gas bubble trauma (GBT) monitoring that has been implemented in past years, the GBT Monitoring Program will sample juvenile salmonids each week at the dams identified in Table 1, beginning in April 2023. Sampling protocol will target a sample size of 100 total juvenile steelhead and/or Chinook salmon at each sampling site during the season. Tentatively, sampling will occur according to the preliminary draft sampling schedule outlined in Table 2. Data from juvenile salmonid GBT monitoring samples will be available at: <http://www.fpc.org/smolt/gasbubbletrauma.html>.

Table 1. Location, frequency, duration, and collection site at each project where juvenile salmonid GBT monitoring occurs under the GBT Monitoring Program (see: <https://www.fpc.org/documents/memos/05-20.pdf> for background information).

Region	Project	Frequency ¹	Duration	Fish Collection Site
Lower Snake	Lower Granite	Once per week	April-June	Separator
	Little Goose	Once per week	April-August	Separator
	Lower Monumental	Once per week	April-August	Separator
Lower Columbia	McNary	Twice per week	April-August	Separator
	Bonneville	Twice per week	April-August	Sample tank

¹ Location, frequency and approximate start and end dates will be updated at: <https://www.fpc.org/smolt/gasbubbletrauma.html>.

Table 2. Preliminary 2023 GBT Monitoring Program sampling schedule for juvenile salmonids (see: <https://www.fpc.org/documents/memos/12-20.pdf> for background information).

Project	Exam Day(s)	Approx. Begin Date
Lower Granite	Thursday	April 6
Little Goose ¹	Sunday or Monday (pre-transport) Sunday (post-transport)	April 2 or 3
Lower Monumental ¹	Wednesday or Thursday (pre-transport) Wednesday (post-transport)	April 5 or 6
McNary ²	Saturday and Monday or Friday and Sunday	April 3 or 7
Bonneville ³	Saturday and Tuesday	April 4

¹ Prior to transportation, sampling at Lower Monumental and Little Goose dams is every-other-day and, therefore, GBT sampling is dependent on sample days. As in 2022, sample days for these two sites are not yet known.

² Smolt Monitoring Program sampling at McNary Dam occurs every-other-day. Therefore, GBT sampling is dependent on sample days and fluctuates (Sat. & Mon. vs. Fri. & Sun.) on a weekly basis.

³ Regularly scheduled sampling at Bonneville Dam will occur on Saturday and Tuesday. However, some samples in mid-April and early May might be cancelled and/or rescheduled to accommodate passage of ESA-listed Spring Creek National Fish Hatchery fall Chinook tules.

In addition to the continued sampling of juvenile salmonids for GBT at dams identified in Table 2, non-salmonid¹ fish sampling will occur during 2023 spring spill operations up to 125 percent TDG in the tailrace of lower Snake and lower Columbia projects. The sampling plan employed in 2022 generally satisfied the spring minimum weekly sample size requirement of 50 native, non-salmonid fish (sample size target of 100 fish) and the species richness criteria at the four in-river locations sampled

¹ Unless indicated otherwise, the term “non-salmonid” inclusively refers to the Washington Department of Ecology Implementation Plan specification of native non-salmonids for evaluation against biological thresholds and Oregon Department of Environmental Quality’s clarification of non-salmonid as including native and non-native species for purposes of biological monitoring specified in Oregon Environmental Quality Commission’s *Order Approving a Modification to the Oregon’s Water Quality Standard for TDG in the Columbia River Mainstem*.

(minimum three species). Accompanying this letter is the USGS 2023 study plan for monitoring GBT at in-river locations (Enclosure 2).

Clarification guidance from Oregon Department of Environmental Quality (ODEQ) defines “non-salmonid” fish species as inclusive of native and non-native fish species for purposes of biological monitoring under Sections 6(b), 6(e) and 7(d) of the Oregon Environmental Quality Commission’s *Order Approving a Modification to the Oregon’s Water Quality Standard for TDG in the Columbia River Mainstem* (Order).^{2,3} In 2023, the monitoring of GBT in non-salmonids will include both native and non-native species at lower Columbia River in-river sites during spring spill operations and dam locations during summer operations. Consistent with previous years’ practice, the Corps will apply the more restrictive of ODEQ’s or Washington Department of Ecology’s (WDOE) GBT action criteria as informed by daily monitoring results.

Non-salmonid fish will be examined at the time of collection to determine the level of GBT incidence during spring spill up to 125 percent TDG as follows:

- a. Methods of GBT examination of collected non-salmonid fish will mimic those used for juvenile salmonids.
- b. Non-salmonid fish will be sampled for GBT **weekly** at four index sites chosen by the Corps, in collaboration with Bonneville Power Administration (Bonneville) and the U.S. Geological Survey. These sites may include locations downstream of dams where spill may occur up to 125 percent TDG spill, within distance of the next downstream TDG fixed monitoring site⁴, or within one mile downstream from the Corps project, whichever is greater.⁵

(1) **Lower Columbia River:** Two locations are proposed in this zone (tailrace of Bonneville Dam to the mouth of the Snake River); one area downstream of Bonneville Dam and the second area downstream of McNary Dam.

(2) **Lower Snake River:** Two locations are proposed in this zone (between mouth of the Snake River to the tailrace of Lower Granite Dam or lower Snake River

² Wigal, Jennifer. June 10, 2022. [Response letter from ODEQ to Bonneville Power Administration regarding summer non-salmonid GBT monitoring.]

³ Gruen, David. Jan. 18, 2023. “RE: Request for Clarification of Spring Non-Salmonid Monitoring Requirement.”

⁴ TDG fixed monitoring sites downstream of each dam defined by Corps Reservoir Control Center Water Quality Program (<https://www.nwd.usace.army.mil/CRWM/Water-Quality/>) in Appendix A: Total Dissolved Gas Fixed Monitoring Stations *from* annual TDG reports.

⁵ Similar to the sampling employed in 2022, additional flexibility may be required for the Bonneville Fish & Wildlife (F&W) Program sponsor (U.S. Geological Survey, Columbia River Research Laboratory) to determine the sampling sites based on shallow water habitat requirements specified in the WDOE Implementation Plan. If shallow water habitat is not accessible within the areas described, sampling will occur up to approximately five miles downstream, consistent with mid-Columbia River PUD sampling protocols.

zone); one area downstream of Lower Granite and one area downstream of Ice Harbor Dam.

c. The primary sampling methods proposed are seining (e.g., beach and two-stick) and backpack electrofishing in shallow water habitat with flexibility to include other secondary methods (e.g., minnow traps, floating fyke nets) during periods when environmental conditions challenge the field crew's ability to meet sample size and species richness criteria. All sampling methods are subject to review and input by the National Marine Fisheries Service (NMFS) and any take associated with this sampling must be incidental to the proposed action consulted upon in the 2020 NMFS Columbia River System Biological Opinion.

d. Adaptive management of proposed methods may be required and implemented to meet the WDOE Implementation Plan.

Weekly summary reports of juvenile salmonid and non-salmonid fish GBT sampling will be provided to the Corps to monitor GBT incidence rates. A summarized annual report will be completed and provided to ODEQ and WDOE by January 31, 2024.

If an exceedance of GBT incidence action criteria is detected either in juvenile salmonids or non-salmonids (with a minimum sample size of 50 juvenile salmon and 50 non-salmonids required weekly) during juvenile fish passage spring spill operations up to 125 percent TDG in 2023, the Corps will immediately contact WDOE and ODEQ. Upon notification and conferring with the states, the protocol below will be followed by the Corps to reduce spill to 120 percent TDG in the tailrace (Oregon and Washington) and 115 percent TDG in the forebay (Washington). The GBT action criteria state that spill must be reduced to the levels in the previous sentence when there are exceedances of:

- a. GBT in non-paired fins of 15 percent; or
- b. GBT in non-paired fins of five percent and gas bubbles occlude more than 25 percent of the surface area of the fin.

In accordance with the state water quality agencies' requirements, when or if one of the action criteria above is detected at a GBT monitoring location, spill, at all projects within the geographic zone where the action criterion exceedance was detected, will be reduced to 120 percent TDG in the tailrace/115 percent TDG in the next downstream forebay. Performance standard spill will be implemented as planned to reduce TDG loading in the affected geographic zone more expeditiously (see Table 3 in Enclosure 1).

The geographic zones, as described in the WDOE Implementation Plan, include the lower Snake River zone (Lower Granite, Little Goose, Lower Monumental, and Ice

Harbor dams) and the lower Columbia River zone (McNary, John Day, The Dalles, and Bonneville dams). In the event an action criterion exceedance is detected at McNary Dam, which is just below the confluence of the Snake and Columbia rivers, TDG levels in the middle Columbia River and lower Snake River would need to be evaluated to determine if the exceedance was the result of spill operations in the lower Snake River zone exclusively, or if conditions in the middle Columbia River were also contributing to the action criterion exceedance. Generally, if an exceedance was detected at McNary Dam for juvenile salmonids that have not encountered TDG below the dam, spill would be reduced at all projects in the lower Snake River zone. If an exceedance was detected downstream of McNary Dam for non-salmonids, then all projects in the lower Columbia River zones would be reduced. If an exceedance was detected at Bonneville Dam for either juvenile salmonids or non-salmonids, then spill at all projects in the lower Columbia River zone would be reduced, including Bonneville Dam.

The following criteria will be utilized to guide reinstatement of spring spill operations up to 125 percent TDG in the event an action criterion exceedance spill reduction is detected:

- a. If gas bubble trauma exceeds any of the action criteria, additional GBT monitoring must demonstrate the incidence of gas bubble trauma is below the applicable action criterion before spill up to 125 percent TDG can resume.
- b. Gas bubble trauma must be below the applicable action criterion over the next 7-day period before spill up to 125 percent TDG can be applied again.

Under high river flow conditions that result in lack of turbine capacity in the spring, which force projects to spill above 125 percent TDG levels, then the following points will be applied:

- a. GBT monitoring data shall be excluded from comparison to biological thresholds when higher than normal river flow results in excess spill above 125 percent TDG.
- b. This monitoring data exclusion shall apply for one full calendar day after every project (that spills up to 125 percent TDG for fish passage) within an assigned zone is not exceeding 125 percent TDG.

Washington's criteria adjustment rule and Oregon's Order requires a reduction of spill to 120 percent in the tailrace and Washington's rule also requires 115 percent in the forebay if GBT monitoring sample size and species richness criteria are not met. However, consistent with clarification guidance received from both Washington and Oregon in 2021, the Corps will not reduce spill in the event only the sample size and species richness requirements alone are not met, and instead will only reduce spill if GBT incidence exceeds the action criteria stated above for reducing spill.

We look forward to working with each state as we implement flexible spill operations that incorporate spill up to 125 percent TDG for juvenile fish passage in spring 2023. If any necessary components of the biological monitoring plan, including any procedural steps in how to address GBT action criteria exceedances, have been misinterpreted in this letter, we request clarification in writing as soon as possible to facilitate ease of implementation in 2023. If we do not receive any such clarifications, we will proceed with implementation of this plan with the understanding that this plan is approved by Washington and Oregon. Please contact Tim Dykstra, at (503) 808-3726, if you have any questions.

Sincerely,

Frances E. Coffey, SES
Director, Programs

Enclosures