Portland General Electric
121 SW Salmon Street • Portland, OR 97204

March 18, 2025
ELECTRONICALLY FILED

Ms. Sara Mattecheck
Sandy, Clackamas, and Molalla Basin Coordinator
Oregon Department of Environmental Quality
Northwest Region Water Quality
700 NE Multnomah St.
Portland, OR 97232

Re: Project No. 2195 – Clackamas River Hydroelectric Project
Mercury TMDL Implementation Plan, 2024 Annual Report

Dear Ms. Mattecheck:

The Oregon Department of Environmental Quality (ODEQ) has set Total Maximum Daily Loads (TMDLs) for the Willamette Basin, which includes the Clackamas River. On December 30, 2019, the Environmental Protection Agency (EPA) established the Willamette Basin Mercury TMDL, which replaced ODEQ's 2006 Willamette Basin Mercury TMDL. EPA's 2019 TMDL, as revised on February 4, 2021, is currently in effect, accompanied by ODEQ's 2019 Water Quality Management Plan (WQMP).

The WQMP assigned Portland General Electric (PGE) as a Designated Management Agency (DMA) responsible for evaluating and implementing mercury reduction strategies associated with lands draining into their Clackamas River Hydroelectric Project reservoirs and impacts from reservoir operations, with particular consideration for factors affecting methylation rates. As a DMA, PGE is required under Oregon Administrative Rule (OAR) 340-42-0080 to submit a TMDL Implementation Plan (IP) to ODEQ. The ODEQ approved PGE's IP on November 3, 2023. The IP requires PGE to submit to ODEQ an annual report of its progress in implementing the IP.

Accordingly, enclosed for filing with ODEQ is the *Mercury Total Maximum Daily Load Implementation Plan – 2024 Annual Report* for PGE's Clackamas River Hydroelectric Project. This letter has been filed electronically.

Sincerely,

Brianna Weatherly

Hydropower FERC License Manager
Portland General Electric

Enclosure

Clackamas River Hydroelectric Project

FERC No. 2195

Mercury Total Maximum Daily Load Implementation Plan

2024 Annual Report

Prepared by:

Margaret David

March 2025

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Table of Contents

List of Figures

List of Tables

Introduction

The Oregon Department of Environmental Quality (ODEQ) has set Total Maximum Daily Loads (TMDLs) for the Willamette Basin, which includes the Clackamas River. On December 30, 2019, the Environmental Protection Agency (EPA) established the Willamette Basin Mercury TMDL, which replaced ODEQ's 2006 Willamette Basin Mercury TMDL. EPA's 2019 TMDL, as revised on February 4, 2021, is currently in effect, accompanied by ODEQ's 2019 Water Quality Management Plan (WQMP).

The WQMP assigned Portland General Electric (PGE) as a Designated Management Agency (DMA) responsible for evaluating and implementing mercury reduction strategies associated with lands draining into their reservoirs and impacts from reservoir operations, with particular consideration for factors affecting methylation rates. As a DMA, PGE is required under Oregon Administrative Rule (OAR) 340-42-0080 to submit a TMDL Implementation Plan (IP) to ODEQ. The ODEQ approved PGE's IP on November 3, 2023. The IP requires PGE to submit to ODEQ an annual report of its progress in implementing the IP. This is PGE's 2024 annual report on progress implementing the IP.

Approach

The IP describes monitoring and analysis that PGE will perform to understand baseline conditions within the Clackamas River Hydroelectric Project (Project) and inform the process for identifying potential mercury reduction strategies and assessing progress towards TMDL goals. PGE will meet these objectives using a phased approach (Table 1):

Phase 1: Data Collection & Sampling
Phase 2: Analysis & Evaluation
Phase 3: Refine Implementation

Adaptive management is a process that acknowledges and incorporates improved technologies and practices over time to refine implementation. PGE will incorporate these principles in later years by evaluating performance and adjusting management practices and monitoring plans to suit.

Table 1. Phased approach to TMDL implementation.

Phase	Objective	Timeline	Deliverables
Pre-phase:	Implementation Plan Development	2019-2023	Mercury TMDL Implementation Plan (Oct 2023)
Phase 1: Data Collection & Sampling	Collect water quality data from strategic locations within the subbasin	2024	Annual Report (April 1) • Calendar year 2023 activities
		2025	Annual Report (April 1) • Calendar year 2024 monitoring results
		2026	Annual Report (April 1) • Calendar year 2025 monitoring results
Phase 2: Analysis & Evaluation	• Analyze monitoring results in conjunction with relevant data from other sources • Identify locations where methylation is occurring • Identify best management practices (BMPs) that could be employed to reduce methylation • Identify data gaps and adjust future monitoring to suit	2027	Annual Report (April 1) • Calendar year 2026 monitoring results Evaluation Report (Dec 31) • Data summary (2024 – 2026 monitoring results) ○ Compiled monitoring data ○ Other relevant data • Data analysis • Basin-wide mercury translator • Recommendations ○ BMPs ○ Future monitoring plan
Phase 3: Refine Implementation	• Implement plan and timeline for recommended BMPs • Implement additional water quality monitoring if data were gaps identified	2028+	Annual Report (April 1) • Implementation status • Calendar year monitoring results

2024 Monitoring

In 2024, water quality samples were taken as part of Phase 1 of the IP. Samples and vertical water-column chemistry profiles were taken in late summer from the Project's two major reservoirs - Timothy Lake and North Fork Reservoir (Table 2, Table 3). Samples were collected following the procedures detailed in PGE's Mercury TMDL Standard Operating Procedure (SOP).

Water samples were analyzed for the following analytes: total mercury (THg), dissolved methylmercury (MeHg), sulfate, total dissolved organic carbon (DOC), and total suspended solids (TSS) (Table 2). An additional analyte (i.e. sulfide), not listed in PGE's IP, was sampled to provide supplemental data as part of Phase 1 of the IP. THg and MeHg were collected following the trace metal sampling protocols in US EPA Method 1669. The other analytes were collected following standard methods outline in PGE's SOP. Samples were analyzed by a certified laboratory (i.e. ALS-Kelso, WA). Table 2 lists the laboratory methods used for chemical analysis, the method detection limits, and the laboratory reporting limits.

To characterize thermal stratification and chemical gradients in both reservoirs, temperature, dissolved oxygen (DO), pH, and conductivity were measured in vertical water-column profiles using a Hydrolab HL4 Series Sonde. Measurements were taken at 1-m intervals in the Timothy Lake forebay and at 2-m intervals in the North Fork Dam forebay.

Table 2. The method, detection, and reporting limits for the monitored analytes.

Analytical Parameter/Field Measurement	Project Target	Minimum Detection Limit	Minimum Reporting Limit	Method
Total Mercury	0.14 ng/L	0.06 ng/L	0.50 ng/L	US EPA Method 1631
Methylmercury, dissolved	No project target for water column	0.03 ng/L	0.10 ng/L	US EPA Method 1630
Sulfate	No project target	0.50 mg/L	1.00 mg/L	IC 300.0/9056A
Sulfide	No project target	0.02 mg/L	0.05 mg/L	SM 4500-S2-D
Total Dissolved Organic Carbon	No project target	1.00 mg/L	1.00 mg/L	SM5310C (Diss)
Total Suspended Solids	No project target	0.50 mg/L	0.50 mg/L	SM 2540 D-LL

Table 3. Summary of the Phase 1 water quality monitoring proposed for the Mercury TMDL.

Sampling Location	Frequency	Parameters
Timothy Lake – Outlet	1 sample in late summer/early fall Taken in years 2024, 2025, 2026	• THg • MeHg, dissolved • Sulfate • Sulfide • DOC • TSS
Timothy Lake – Forebay	1 sample in late summer/early fall Taken in years 2024, 2025, 2026	• Temp/DO/pH/conductivity – profiles, 1-m interval
North Fork Reservoir – Outlet	1 sample in late summer/early fall Taken in years 2024, 2025, 2026	• THg • MeHg, dissolved • Sulfate • Sulfide • DOC • TSS
North Fork Reservoir – Forebay	1 sample in late summer/early fall Taken in years 2024, 2025, 2026	• Temp/DO/pH/conductivity – profiles, 2-m interval

Note: THg = Total Mercury, MeHg = Methylmercury, DOC = Dissolved Organic Carbon, TSS = Total Suspended Solids

Timothy Lake

On August 6, 2024, at 15:15 water samples were taken from the tailrace of the Timothy Lake Powerhouse. A duplicate sample for each parameter was taken from the same location. Results are shown in Table 4.

Vertical profiles for water temperature (˚C), DO (mg/L), pH, and conductivity (uS/cm) were collected in one-meter increments from the powerhouse intake tower on July 8, July 31, and August 6, 2024 (Figure 1). The temperature profiles for Timothy Lake show that the lake was stratified by July 8 and remained stratified through sampling on August 6 (Figure 1). Across all three sampling dates, there was a metalimnetic spike in DO (mg/L) between 5-15 m, indicating high rates of photosynthetic activity in the metalimnion. pH exhibited a similar profile with a spike in pH values in the metalimnion followed by decreasing pH values in the hypolimnion. This further indicates high photosynthetic activity in the metalimnion. The conductivity profiles for Timothy Lake increased through the summer, which typically reflects the combination of evaporative concentration of ions and increasing conductivity of inflowing streams.

Table 4. Results from water quality samples taken from the tailrace of the Timothy Lake Powerhouse on August 6, 2024. NC = Not Collected; ND = Not Detected

Analytical Parameter/Field Measurement	Sample Result	Duplicate Result	Field Blank	Minimum Detection Limit
Total Mercury	0.44 ng/L	0.40 ng/L	NC	0.06 ng/L
Methylmercury	ND	ND	NC	0.03 ng/L
Sulfate	0.25 mg/L	0.24 mg/L	NC	0.50 mg/L
Sulfide	ND	ND	NC	0.02 mg/L
Dissolved Organic Carbon	1.00 mg/L	1.00 mg/L	NC	1.00 mg/L
Total Suspended Solids	ND	ND	NC	0.50 mg/L

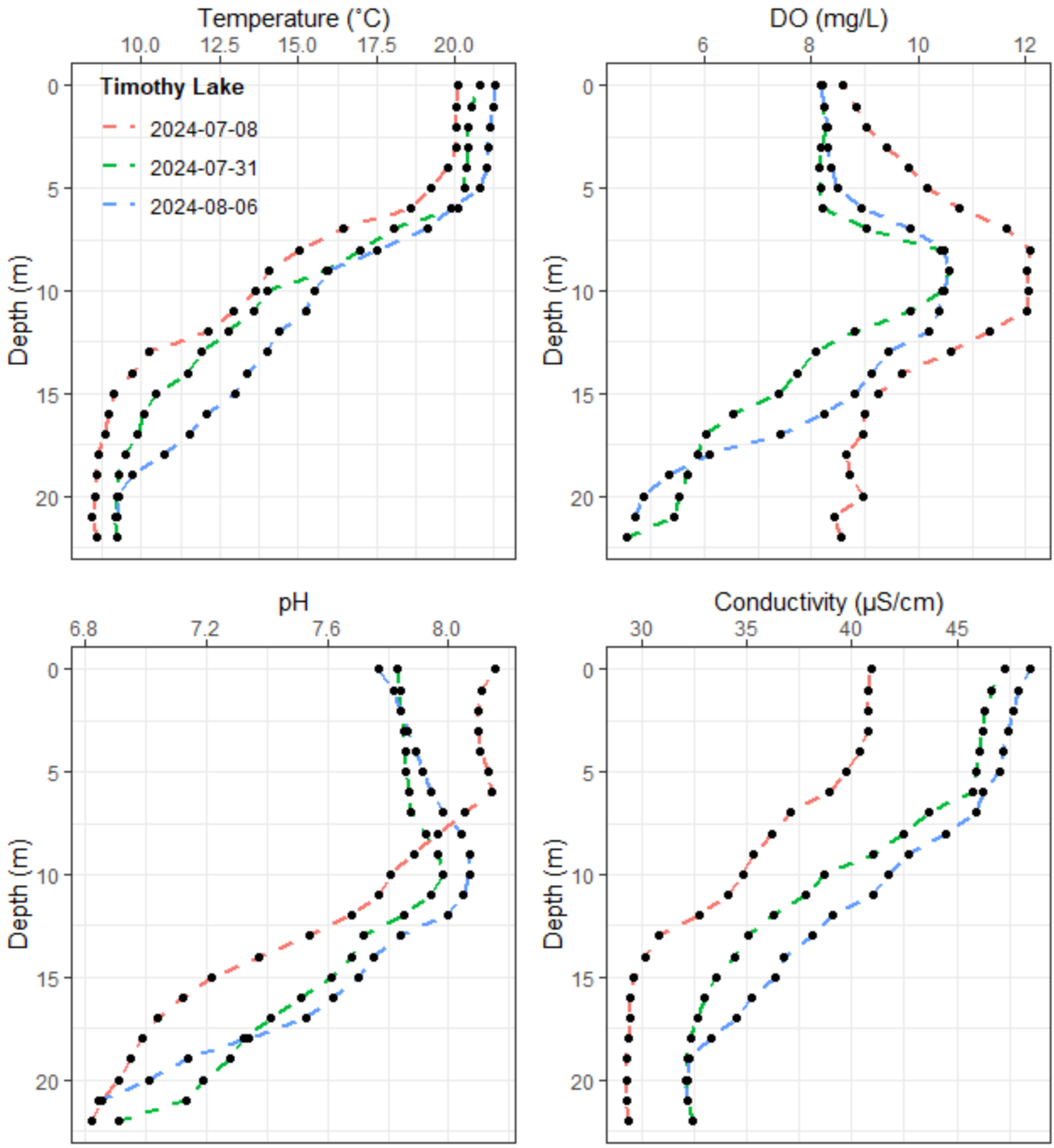

Figure 1. Vertical water-column chemistry profiles for water temperature (˚C), DO (mg/L), pH, and conductivity (uS/cm) were collected in one-meter increments from the Timothy Lake Powerhouse intake tower on July 8, July 31, and August 6, 2024.

North Fork Reservoir

On August 5, 2024, at 15:15 water quality samples were taken from a penstock release valve of the North Fork Powerhouse. A field blank for total mercury and methylmercury occurred in the same location. Results are shown in Table 5. An additional sampling event occurred on September 16, 2024, at 15:00 where samples for total mercury and methylmercury were taken from the North Fork Dam tailrace by boat. A duplicate sample and field blank were taken from the same location. Results are shown in Table 6.

Vertical water-column chemistry profiles for water temperature (˚C), DO (mg/L), pH, and conductivity (uS/cm) were collected in two-meter increments in front of the powerhouse intakes on August 5 and September 16 (Figure 2). Temperature profiles from the two sampling events show slight warming, between 2-3°C, in the upper several meters but no formal stratification was evident. DO profiles show minimal difference from top to bottom, except for the values from September 16, which showed some oxygen demand at a depth of 8 m. Values for pH remained relatively unchanged with depth on September 16. While pH values measured on August 5 increased slightly until a depth of 10 m, it remained relatively unchanged in proceedings depths. Conductivity profiles were unchanged from top to bottom on both sample dates. The minor deviations within a given conductivity profile are within the error of the instrument.

Table 5. Results from water quality samples taken from a penstock release valve of the North Fork Powerhouse on August 5, 2024. NC = Not Collected; ND = Not Detected

Analytical Parameter/Field Measurement	Sample Result	Duplicate Result	Field Blank Result	Minimum Detection Limit
Total Mercury	4.92 ng/L	NC	0.23 ng/L	0.06 ng/L
Methylmercury	ND	NC	ND	0.03 ng/L
Sulfate	1.05 mg/L	NC	NC	0.50 mg/L
Sulfide	ND	NC	NC	0.02 mg/L
Dissolved Organic Carbon	0.60 mg/L	NC	NC	1.00 mg/L
Total Suspended Solids	ND	NC	NC	0.50 mg/L

Table 6. Results from water quality samples taken from North Fork Dam tailrace by boat on September 16, 2024. NC = Not Collected; ND = Not Detected

Analytical Parameter/Field Measurement	Sample Result	Duplicate Result	Field Blank Result	Minimum Detection Limit
Total Mercury	2.49 ng/L	2.83 ng/L	0.29 ng/L	0.06 ng/L
Methylmercury	ND	ND	NC	0.03 ng/L

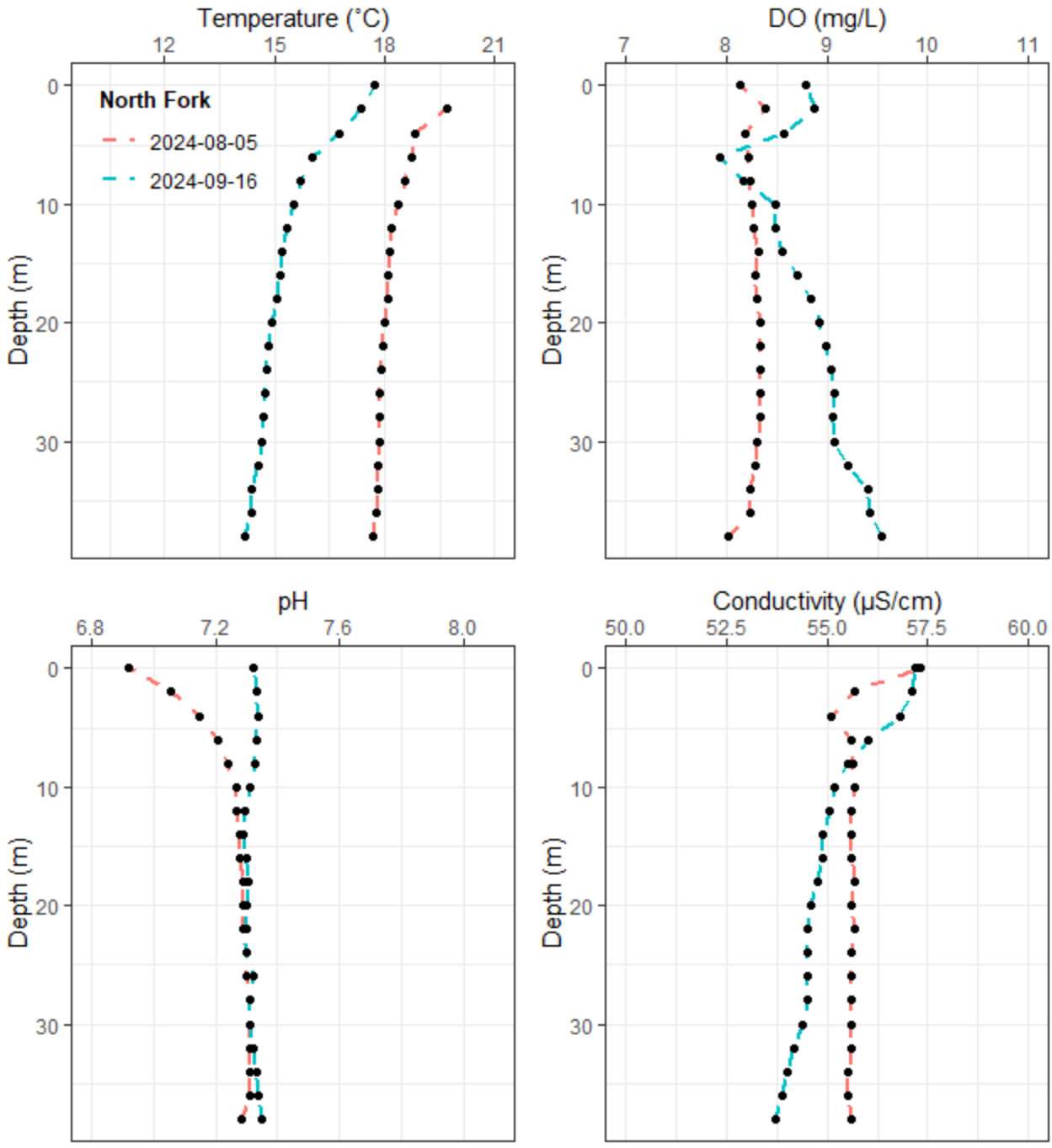

Figure 2. Vertical water-column chemistry profiles for water temperature (˚C), DO (mg/L), pH, and conductivity (uS/cm) were collected in two-meter increments in front of the powerhouse intakes on August 5 and September 16, 2024.

Quality Assurance Results

All sampling events in 2024 were conducted in accordance with PGE's QAPP. Where applicable, data results were checked for data quality indicators in accordance with PGE's QAPP. Data quality indicators for analytical QAQC samples taken by ALS (Kelso, WA), were completed in accordance with their SOP and were reported to PGE. The Hydrolab HL4 Series sondes for DO, pH, and conductivity were calibrated on July 29 and August 7. The depth sonde was calibrated prior to each use. The sondes were calibrated in accordance with manufacturer recommendations. All quality assurance results are available upon request.