



# CITY OF PORTLAND ENVIRONMENTAL SERVICES



1120 SW Fifth Ave, Suite 613, Portland, Oregon 97204 ■ Mingus Mapps, Commissioner ■ Dawn Uchiyama, Director

## Technical Memorandum

May 30, 2024

**To:** Sarah Miller, Oregon Department of Environmental Quality (DEQ) Northwest Region  
Cleanup Program  
Heidi Nelson, PE, DEQ Northwest Region Cleanup Program

**From:** Andrew Davidson, PE, City of Portland/Bureau of Environmental Services (BES)/  
Columbia Slough Sediment Program  
Rod Struck, City of Portland BES Columbia Slough Sediment Program  
Nanci Klinger, City of Portland Attorney's Office

**Cc:** Gary Vrooman, State of Oregon Department of Justice

**Interim DEQ Approval:** October 30, 2023

**Workplan Amendment Date:** May 30, 2024

**Subject:** **Columbia Slough 2025 Long-term Fish Tissue Sampling and Analysis Plan  
Amendment**

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This Sampling and Analyses Plan (SAP) Amendment was prepared by the City of Portland (City) in conformance with the Consent Judgment Statement of Work. This Interim SAP Amendment was approved by the Oregon Department of Environmental Quality (DEQ) on October 30, 2023, and becomes final upon entry of the Consent Judgment. The Interim Plan noted that if the Scope of Work for this task was modified pursuant to the Consent Judgment's public comment or judicial process, then the City would submit an amendment to this Workplan to DEQ for approval within 45 days of the entry of the Consent Judgment to incorporate the relevant changes. The Consent Judgment was entered on May 8<sup>th</sup>, 2024, and these changes to the Interim SAP Amendment are provided in this final document.

This SAP Amendment establishes the scope of work for a one-time Slough-wide fish tissue sampling event to be completed by the City in 2025. This work will be conducted in general conformance with the DEQ approved 2015 *Sampling and Analysis Plan for the Collection and Processing of Fish Tissue Samples in Columbia Slough* (BES, 2015<sup>1</sup>).

### Fish Tissue Sampling Objectives

The objectives of the 2025 fish tissue sampling event are to:

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<sup>1</sup> Sampling and Analysis Plan for the Collection and Processing of Fish Tissue Samples in Columbia Slough. Prepared by City of Portland Bureau of Environmental Services. Prepared for Oregon Department of Environmental Quality. April 2015.

- 1) Inform the Oregon Health Authority (OHA) Columbia Slough fish advisory.
- 2) Identify contaminants of potential concern (COPCs) in 2025 fish tissue, based on a comparison of contaminant concentrations detected in fish tissue that exceed DEQ’s acceptable tissue levels (ATLs) for human health. Results will be summarized by major Slough reach.
- 3) Verify if fish tissue COPCs remain consistent over time by major Slough reach by comparing 2025 fish tissue results to historical fish tissue data.

**Schedule**

The target dates for fish sample collection are between January 2025 and December 2025 but will be conducted in accordance with any schedule limitations included in the National Marine Fisheries Service (NMFS) Section 10 permit for the Lower Slough and/or the Oregon Department of Fish & Wildlife (ODFW) Scientific Taking Permit (pending). Sampling likely will not occur during the summer when stream temperatures are too high for electroshocking.

**Target Fish Species and Analytes**

BES will collect carp (note: large scale sucker will be collected if sufficient carp are not available in identified sampling locations) from the eight major reaches within the Columbia Slough watershed. Fish collected from each reach will be processed for analysis of whole body and filet composites. Fish with the following target characteristics will be collected to represent the size of fish caught in previous years’ sampling events and the size caught by local anglers for human consumption:

- 250 to 600 millimeters (mm) in length
- 0.5 to 6 kilograms (kg)
- 2 to 19 years of age

The species of each fish will be documented, and the length and weight of each fish collected will be measured in the field and fish scales collected to determine the age of each fish.

Fish tissue (whole body and filet) composite samples will be analyzed from each major Slough reach to provide a range of concentrations for evaluating human consumption. Table 1 provides the analytes, methods and analytical laboratories that will be used.

**Table 1. Proposed Analytes, Methods, and Laboratories**

| Analyte                                    | Method                                | Analytical Laboratory   |
|--|---------------------------------------|-------------------------|
| Polychlorinated biphenyl (PCB) congeners   | EPA Method 1668C                      | ALS <sup>a</sup>        |
| PCB Aroclors                               | EPA Method 8082                       | ALS                     |
| Per- and polyfluoroalkyl substances (PFAS) | EPA Method 1633 <sup>b</sup>          | ALS                     |
| Organochlorine pesticides                  | EPA 8081 Modified <sup>c</sup>        | ALS                     |
|  | EPA 1699 High Resolution <sup>d</sup> | ALS                     |
| Total metals (arsenic, lead, mercury)      | EPA 6020                              | ALS                     |
| Total solids                               | SM2540B (Freeze dry)                  | ALS                     |
| Lipids                                     | Gravimetric                           | ALS                     |
| Fish age                                   | Microscope fish scale analysis        | Cason & Associates, LLC |

Notes:

- <sup>a</sup> WPCL's subcontract laboratory, ALS, in Kelso, Washington.
- <sup>b</sup> Method may change before sampling is conducted. EPA /DEQ recommended methods will be used. DEQ will be notified if method is changed.
- <sup>c</sup> EPA 8081 Modified will be used for all whole body and filet composite samples
- <sup>d</sup> High resolution method EPA 1699 will be used for three whole body and three filet composite samples

## **Numbers And Locations of Fish Tissue Samples**

The 2025 fish tissue sampling event will include collection of up to 118 fish from 59 locations distributed throughout each major Slough reach including: Lower Slough, North Slough, Middle Slough, Upper Slough, Big Four Corners East Slough, Peninsula Drainage Canal, Buffalo Slough, and Whitaker Slough. Table 2 (prepared and adapted from BES, 2015<sup>2</sup>) lists the number of proposed fish to be collected, composited and analyzed for each Slough segment within a major reach. Major reaches are comprised of between one and three segments This will result in 6 to 16 fish collected and composited per Slough segment (3 to 8 fish for whole body or filet composite sample). Proposed 2025 fish sample locations are shown on Figures 1 and 2 (prepared and adapted from BES/GSI, 2018<sup>3</sup>). The 2015 sampling locations were used to inform the 2025 sampling locations for consistency across these sampling events. However, final locations are subject to achieving a similar distribution of fish across the 8 Slough reaches. That is, a 2025 sampling objective is to target and obtain the same number of fish per Slough reach as in 2015.

Two fish will be collected from each of the 59 locations (118 fish total) as shown in Table 2 and in Figure 1 in accordance with this Amendment and applicable permits. If no fish are present at a location then supplemental fish may be collected from other locations within the segment to meet fish targets for each segment. Laboratory replicates of both whole body and filet composites will be analyzed from one segment each of the Lower Slough [RM 6-8.6], Middle Slough [RM 0-3.25] and Whitaker Slough [RM 0-4.8]. Collected fish will be used to prepare whole body fish composite samples and filet fish composite samples for each Slough segment, as follows:

- Whole body fish composites: One whole body fish from each location (59 fish) will be homogenized by the analytical laboratory. Slough segment whole body composite samples will be prepared using equal weight aliquots from each homogenized fish sample location collected within that Slough segment. Slough segment composites will be analyzed and used to evaluate whole body concentrations in 11 Slough segments and 3 laboratory replicate samples.
- Fish filet composites: One fish from each location will be fileted and the filets homogenized (59 homogenized filet samples, no remainders will be analyzed). Slough segment filet composite samples will be prepared using equal weight aliquots from each homogenized fish sample location collected within that Slough segment. Slough segment composites will be analyzed and used to evaluate filet concentrations in 11 Slough segments and 3 laboratory replicate samples.

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<sup>2</sup> Sampling and Analysis Plan for the Collection and Processing of Fish Tissue Samples in Columbia Slough. Prepared by City of Portland Bureau of Environmental Services. Prepared for Oregon Department of Environmental Quality. January 2015.

<sup>3</sup> Columbia Slough Fish Tissue Report - 2015 Sampling. Prepared by City of Portland Bureau of Environmental Services and GSI Water Solutions, Inc. Prepared for Oregon Department of Environmental Quality. September 2017 (Revised June 2018).

**Table 2. Proposed Number of Fish Tissue Samples by Slough Segment**

| Year                              | Fish Sample Locations | Lower (0 - 3 RM) | Lower (3 - 6 RM) | Lower (6- 8.8 RM) | North (0 - 0.9 RM) | Middle (0 - 3.25 RM) | Middle (3.25 -6.9 RM) | Peninsula (0 - 0.9 RM) | Buffalo (0 - 0.9 RM) | Whitaker (0 - 4.8 RM) | Upper (0 - 3.3 RM) | Upper (6 - 8.6 RM) | Total Fish to be Collected |
|-----------------------------------|-----------------------|------------------|------------------|-------------------|--------------------|----------------------|-----------------------|------------------------|----------------------|-----------------------|--------------------|--------------------|----------------------------|
| 2025                              | Whole body            | 5                | 7                | 5                 | 4                  | 7                    | 8                     | 3                      | 4                    | 5                     | 7                  | 4                  | 59                         |
|                                   | Filet                 | 5                | 7                | 5                 | 4                  | 7                    | 8                     | 3                      | 4                    | 5                     | 7                  | 4                  | 59                         |
| Sample Analyses                   | Whole body            | 1                | 1                | 1                 | 1                  | 1                    | 1                     | 1                      | 1                    | 1                     | 1                  | 1                  | 11                         |
|                                   | Filet                 | 1                | 1                | 1                 | 1                  | 1                    | 1                     | 1                      | 1                    | 1                     | 1                  | 1                  | 11                         |
| Lab Replicate                     | Whole body            |                  |                  | 1                 |                    | 1                    |                       |                        |                      | 1                     |                    |                    | 3                          |
|                                   | Filet                 |                  |                  | 1                 |                    | 1                    |                       |                        |                      | 1                     |                    |                    | 3                          |
| Total # of Fish Collected Samples |                       | 10               | 14               | 10                | 8                  | 14                   | 16                    | 6                      | 8                    | 10                    | 14                 | 8                  | 118                        |
| Total # of Analyzed samples       |                       | 2                | 2                | 4                 | 2                  | 4                    | 2                     | 2                      | 2                    | 4                     | 2                  | 2                  | 28                         |

Note: Upper Slough (6-8.6 RM) is also identified as Big Four Corners Slough.

This sampling approach will yield 22 total composite samples, 2 samples for each of the 11 segments (one whole body and one filet for each segment) and six laboratory replicate samples (three whole body and three filet). Fish collection may not be successful at all locations. Alternative fish species have been identified in the event that carp cannot be collected. Sample locations may be moved if sampling locations are not successful after two attempts.

For comparison, in 2005, 48 whole body samples were collected over 8 reaches, and in 2015, 49 whole body plus 10 filet/remainder samples were collected over 8 reaches (i.e., for a total of 59 samples).

### Collection And Processing of Fish Tissue Samples

Boat electroshocking will be the primary method employed in the Slough; however, the method may be dictated by water conditions and accessibility at the time of collection. Stunned fish will be immediately captured, removed from the electric field using dip nets, and placed in an aerated live-well. Non-target fish will be released upon stable recovery in a location that minimizes likelihood of recapture.

Target fish will be collected, killed by clubbing, measured to the nearest millimeter, and weighed to the nearest kilogram. Fish will be examined in the field by BES field teams for general health and any physical abnormalities or growths. Collected fish will then be wrapped in aluminum foil, labelled, bagged, and placed on ice. Before freezing, approximately 10 scales will be collected from each fish for fish scale aging. At the end of each field day, fish will be frozen in the BES Field Operations freezer and subsequently submitted to the analytical laboratory under chain-of-custody procedures. Homogenization, freeze drying, and subsampling will be conducted by the subcontracted analytical laboratory, ALS.

### Reporting

The City will prepare a project report summarizing findings of the fish analytical data and comparisons with historical data and submit to DEQ and OHA. The report will be similar to the 2015 Fish Tissue Sampling Report (BES/GSI, 2018) and include a presentation of relevant field and analytical data in textual, tabular, and/or graphic form as appropriate. Data comparisons will include evaluation of fish tissue concentrations from major Slough reaches where historic fish tissue data are available to calculate mean Slough reach concentrations to assess potential trends for selected COPCs.

The City will also provide an updated electronic database to DEQ, as described in the *Columbia Slough Outfall Investigation and Basin Closure Work Plan* (BES, 2024<sup>4</sup>), that includes the 2025 analytical fish tissue data in accordance with the Consent Judgment.

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<sup>4</sup> Columbia Slough Outfall Investigation and Basin Closure Work Plan. Prepared by the City of Portland, by and through its Bureau of Environmental Services. Prepared in conformance with the Consent Judgment. Submitted to DEQ for Interim Approval in October 2023. Finalized in June 2024.

## Figures

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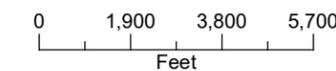
**FIGURE 1**

**2025 Fish Sampling Locations**  
Columbia Slough 2025  
Long-term Fish Tissue Sampling  
and Analysis Plan Amendment



**LEGEND**

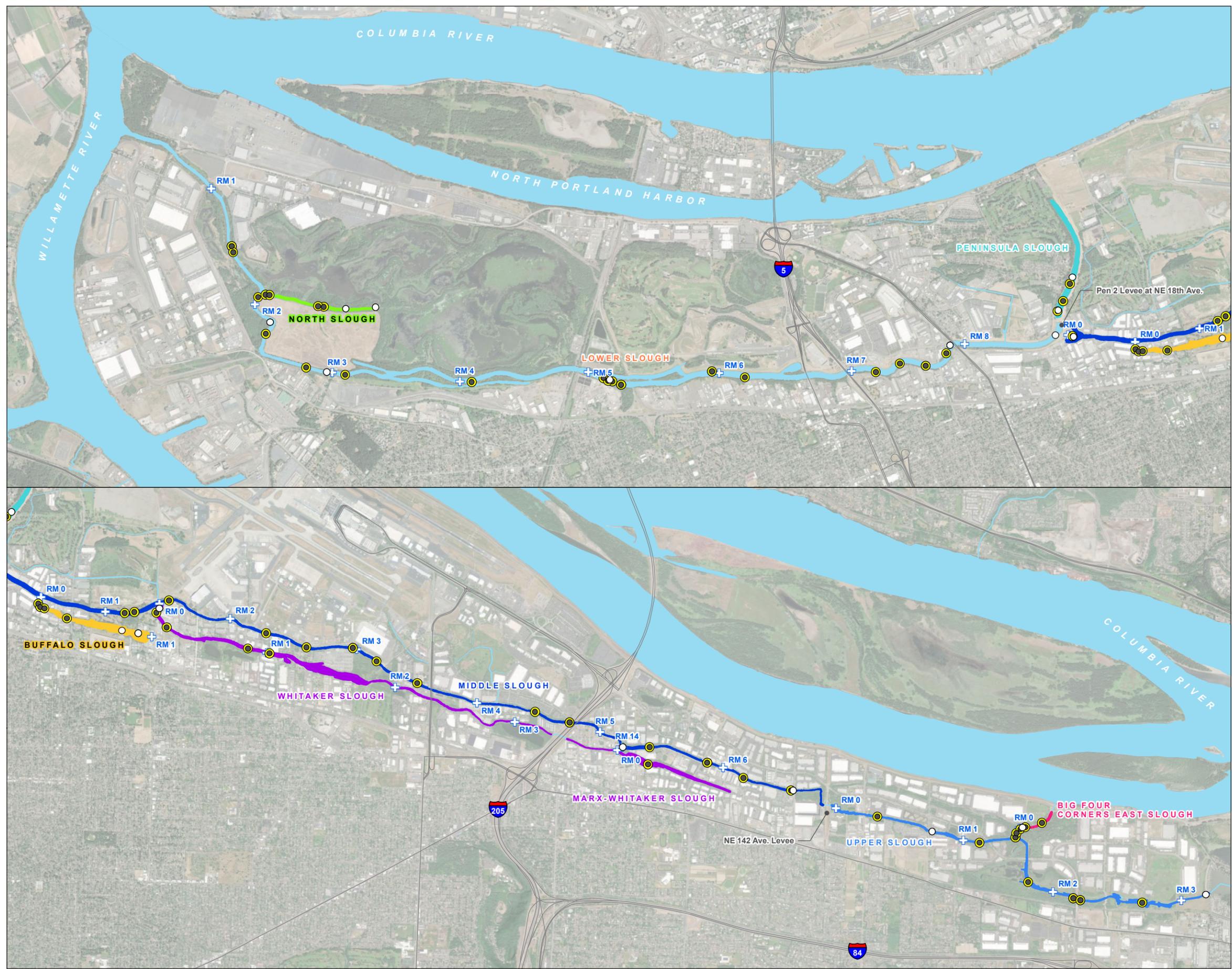
- 2025 Fish Tissue Sample Location
- Big Four Corners East Slough
- Buffalo Slough
- Lower Slough - A
- Lower Slough - B
- Lower Slough - C
- Middle Slough
- North Slough
- Peninsula Drainage Canal
- Upper Slough
- Whitaker Slough
- River Mile (RM)



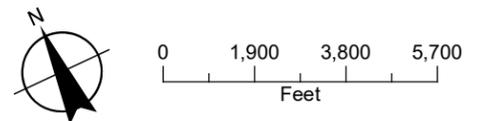
Date: May 16, 2024  
Data Sources:



**FIGURE 2**  
**2005, 2015, and 2025**  
**Fish Sampling Locations**  
 Columbia Slough 2025  
 Long-term Fish Tissue Sampling  
 and Analysis Plan Amendment



- LEGEND**
- 2005 Fish Tissue Sample Location
  - 2015 Fish Tissue Sample Location
  - 2025 Fish Tissue Sample Location
  - Big Four Corners East Slough
  - Buffalo Slough
  - Lower Slough
  - Middle Slough
  - North Slough
  - Peninsula Drainage Canal
  - Upper Slough
  - Whitaker Slough
  - + River Mile (RM)



Date: May 31, 2024  
 Data Sources:

