

FIELD SAMPLING PLAN
Priest Point Park Sediment Sampling
Project

Prepared by
Thurston County Health Department

For

Washington Department of Ecology
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Field Sampling Plan

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1.0 INTRODUCTION

The work described in this Field Sampling Plan (FSP) is being performed by the Thurston County Health Department (TCHD) on behalf of the Washington State Department of Ecology (Ecology). The work is to provide adequate sampling data to allow the Washington State Department of Health (DOH) to determine the potential health hazards from dioxin contamination to people interacting with sediments within Priest Point Park.

This document will outline the sediment sampling protocol within the intertidal areas at Priest Point Park.

2.0 PROJECT DESCRIPTION

2.1 Overview

A recent sediment characterization study of the Olympia Harbor Navigation Channel and Port of Olympia berthing area has found elevated concentrations of dioxins. The data has raised concerns regarding the overall extent of contamination in Budd Inlet and the potential for risk to human health and the environment. To help evaluate the potential hazards for people coming into contact with sediments, TCHD will collect and analyze sediment samples from the publicly accessible beach at Priest Point Park (currently the only public beach in the southern portion of Budd Inlet).

2.2 Sample Locations

The study zone will include the northern and southern intertidal area at Priest Point Park. It is anticipated that 30 locations will be selected and sampled. All samples will be collected from the upper 10 centimeters of surface sediment.

2.3 Sample Location Selection Process

TCHD used a Geographic Information System (GIS, based on ESRI Arcview® 8.1) program to overlay a sampling grid for the entire study zone. The grid consists of five meter by five meter squares projected over the intertidal beach area with a continuous alphanumeric numbering sequence (Appendix A). The samples at Priest Point Park will be divided between the north and south park locations (with Ellis Creek dividing the two areas). The northern side of the park beach area is steeper than the southern portion of the park, so the beach area is much smaller at low tides. Because of the larger beach size and easier accessibility to the southern area of Priest Point Park, more samples will be collected there than from the northern side.

2.4 Choosing Sampling Locations

The study zone was split into two areas; northern Priest Point Park, southern Priest Point Park. Thirty samples will be divided by the size of the different areas (ten in the northern area and twenty for the southern area).

Random sampling was selected because the entire sample area is within the intertidal zone where water mixes and deposits the sediments in an unknown pattern. Sampling points along the grid will be selected utilizing a computer-based random number generator. The grid will be overlain across the intertidal zone that is available when there is at least a minus two (-2) tide within Budd Inlet. A -2 tide will allow the grid to be as large as possible at the time of sample location selection and collection. In October 2010, there is predicted to be two days when the tides range from -2.3 to -2.4.

2.5 Sampling Strategy

Once the sample locations within the grid have been selected, one discrete sample will be collected from the upper ten centimeters of surface sediments. This process will continue until all of the locations have been sampled. If a sample location is assigned a duplicate sample, then the sediment will be collected into a stainless steel bowl and stirred until the sediment is homogenous. Once the sediment is thoroughly mixed, two sample jars will be filled with the sediment to create a duplicate set of samples.

2.6 Exclusion Criteria

Since the sampling grid will be created on a computer and uploaded onto a GPS device, there will be sampling grids that may be selected that cannot be sampled. The criteria that would exclude a randomly selected grid from sampling would be:

- The location is vegetated and not part of the intertidal area.
- The location is underwater at a -2 tide mark.
- The grid location selected has evidence of recent burning activities (charred wood or waste).

3.0 TASK DESCRIPTIONS - SEDIMENT SAMPLING

3.1 Sample Numbering Scheme

The sample number scheme consists of the following:

- Grid sample location (ex. G14)
- Type of sample: 01=regular, 02=duplicate

An example of a sample number is: G14-01. This would be a sample collected in grid G14 and is a regular (non-duplicate) sample.

3.2 Sampling Protocol

All sampling activities will be conducted according to the Field Sampling Health and Safety Plan (Appendix B).

1. Sampling will be performed using a team of two samplers
2. Note site location in field books and current site conditions
3. Record sampling data; see list in section 3.4
4. Sample collection
 - a. All points within a grid will be collected using the same stainless steel spoon and the same nitrile or latex gloves.
 - b. A leveled spoonful will be collected from each point and added to one stainless steel bowl.
 - c. Duplicate samples will be stirred in a stainless steel bowl utilizing the same spoon until the mixture is homogenous.
 - d. For each sample, transfer sediment into two sterile glass jars provided by the laboratory, (four if a duplicate is collected), using the stainless steel spoon. The jars, which do not contain preservatives, will have a

label with the date and time, sampler name or initials, and sample number.

- e. Place a custody seal across the sample jar lid and down the side of the jar (so, if it is opened the seal will be visibly broken).
- f. Decontaminate sampling scoops, spoons and bowls using Alconox[®] detergent and rinsing twice with deionized water between each sample collected with the equipment.
- g. Make sure all information is collected and recorded in field log, sample label and chain of custody.
- h. Place samples in a cooler with ice or ice packs to maintain samples at or below 4°C. These samples will be delivered to the laboratory, placed in a refrigerator and maintained at 4°C (+/- 2° C) until analyzed.

3.3 Field Log Information

Field staff is responsible for recording pertinent information regarding site description and conditions during the sampling process. The following information will be recorded in the field notebook for each sample location:

- Sampling team members
- Date and time of sampling event
- Sample numbers (which incorporates the location)
- Geographic Positioning System (GPS) latitude and longitude coordinates for the sample location. Readings will be logged in degrees, minutes, and seconds where the value for minutes and seconds are in decimals.
- Elevation, derived from the GPS
- Sample location description
- Sediment description according to the Unified Soil Classification System
- Any unusual circumstances

3.4 Equipment

The majority of the field equipment will be purchased before sampling begins, with a few items that will need to be replenished periodically.

- Stainless steel bowls and spoons
- Nitrile or latex gloves
- Aluminum foil
- Field notebooks, pencils, and indelible pens
- Measuring tape
- Trimble Pathfinder[®] GPS unit
- Sample labels (provided by lab)

- 4 oz. Sampling jars (provided by lab)
- Custody seals (provided by lab)
- Alconox® detergent and deionized water
- Scrub brushes
- Spray bottle
- 5-gallon buckets for decontamination
- Cooler and ice

3.5 Field Preparation

Field equipment and sampling supplies will be in the custody of TCHD prior to and during field use. Sample labels and a Chain of Custody will be prepared daily out in the field.

3.6 Decontamination and Waste Handling

To prevent the cross-contamination of samples, sampling devices will be cleaned using Alconox® detergent, deionized water, and scrub brushes. The sampling scoops will be washed and rinsed twice using a spray bottle of deionized water. Equipment will be decontaminated prior to first use and between each sample. The wastewater generated from washing and rinsing digging tools will be discarded off-site in the sanitary sewer.

3.7 Sample Shipping & Chain of Custody

Samples will be placed in a cooler with ice or “blue ice” packs and kept in the field until transferred to the laboratory or a refrigeration unit at TCHD and maintained at or below 4° C. Samples will be transported to the laboratory by staff daily or shipped via Federal Express®. The Chain-of-Custody form will be included in each sample shipment (Appendix C).

3.8 Quality Control Samples for Field Collection

Field precision will be assessed through the analysis of duplicate field samples collected from a particular sampling point. A minimum of two duplicate samples will be collected. One will be collected in the Priest Point Park northern area, and another in the Priest Point Park southern area.

To create a duplicate sample, sediment will be spooned into a stainless steel bowl and will be homogenized until a consistent color and texture is achieved. The sample will then be spooned into separate jars and analyzed as two individual samples. The

location of field duplicate samples will not be pre-selected because they are a test of field variability and sample collection competence. If possible, the locations will be chosen to represent different textures of sediments.

To ensure that the decontamination technique is adequate and not transferring potential contamination from one sample to another, two equipment rinse samples will be collected. After sampling ten locations at the northern Priest Point Park area, one set of decontaminated sampling equipment (spoon and bowl) will have deionized water poured over them and collected in a pre-cleaned laboratory supplied sample bottle. Another rinse sample will be collected after sampling half of the southern Priest Point Park area. These rinse samples will be labeled, chilled, shipped, and analyzed for dioxins / furans.

4.0 LABORATORY ANALYSES

4.1 Analytical Methods Used For Sediment Samples

All dioxin and furan analyses will be performed using Method 1613 (tetra- through octa-chlorinated dioxins and furans by isotope dilution HRGC/HRMS).

Table 1. Analyte List, Analytical Methods, and Target Detection Limits*

Parameter	Units	Analytical Method	Sediment Quality Standards Criteria	Minimum Laboratory Detection Limit
Dioxins				
2,3,7,8-TCDD	ng/kg dry wt	1613	---	0.2 to 0.5
1,2,3,7,8-PeCDD	ng/kg dry wt	1613	---	1 to 5
1,2,3,4,7,8-HxCDD	ng/kg dry wt	1613	---	1 to 5
1,2,3,6,7,8-HxCDD	ng/kg dry wt	1613	---	1 to 5
1,2,3,7,8,9-HxCDD	ng/kg dry wt	1613	---	1 to 5
1,2,3,4,6,7,8-HpCDD	ng/kg dry wt	1613	---	1 to 5
OCDD	ng/kg dry wt	1613	---	10
Furans				
2,3,7,8-TCDF	ng/kg dry wt	1613	---	0.2 to 0.5
1,2,3,7,8-PeCDF	ng/kg dry wt	1613	---	1 to 5
2,3,4,7,8,-PeCDF	ng/kg dry wt	1613	---	1 to 5
1,2,3,4,7,8-HxCDF	ng/kg dry wt	1613	---	1 to 5
1,2,3,6,7,8-HxCDF	ng/kg dry wt	1613	---	1 to 5
1,2,3,7,8,9-HxCDF	ng/kg dry wt	1613	---	1 to 5

2,3,4,6,7,8-HxCDF	ng/kg dry wt	1613	---	1 to 5
1,2,3,4,6,7,8-HpCDF	ng/kg dry wt	1613	---	1 to 5
1,2,3,4,7,8,9-HpCDF	ng/kg dry wt	1613	---	1 to 5
OCDF	ng/kg dry wt	1613	---	10

* Table 1 contents are reproduced from Washington State Department of Ecology's *Sediment Sampling and Analysis Plan Appendix*. February 2008.

4.2 Quality Assurance and Quality Control for Chemical Analyses

The QA/QC procedures for chemical analyses and the data quality objectives are to be consistent with those in Table 2 and as published in USEPA Method 1613B (Appendix D).

Table 2. Minimum Laboratory QA/QC

Analysis Type	Duplicate ¹	Laboratory Control Sample	Surrogate Spikes ²	Ongoing Precision and Recovery ³
Dioxins / Furans ⁴	X	2 (for project)	X	X

¹ Duplicate analysis should be performed once per batch or at a 5% frequency – whichever is more.

² Surrogate spikes are required for every sample, including matrix spiked samples, blanks, and reference material.

³ Ongoing precision and recovery test should be ran for each batch of samples.

⁴ Calibration test required at least once every 12 hours.

A written report will be prepared by the analytical laboratory documenting all the activities associated with the sample analyses. The following data should be included in the data report:

- Results of the laboratory analyses and the QA/QC results (in hard copy and electronic format).
- The protocols used for the analyses.
- Copies of the Chain of Custody forms.
- Any deviations from the sample analysis plan.

5.0 Data Management

Following the completion of all sample collection and receipt of sample analyses, a data report will be written by TCHD. The report will include at a minimum; a summary of sampling, any deviations from the sampling plan, a table showing sample numbers and GPS positioning, a table of all sampling data, and a set of maps showing the area-wide sample grid as well as individual grid sample points. Sample

data, maps, and technical data from field logs (GPS coordinates, sample numbers, etc.), data report, and laboratory analyses will be retained by TCHD and copies will be provided to Ecology and DOH.

6.0 REFERENCES

Anchor Environmental, L.L.C. January 2009. Water Quality Monitoring and Sediment Sampling Plan – Port of Olympia West Bay Berths 2 and 3. Prepared for the Washington State Department of Ecology, Lacey, WA.

Washington State Department of Ecology. February 2008. Sediment Sampling and Analysis Plan Appendix. Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC). Ecology Publication No. 03-09-043.

SAIC. March 2007a. Budd Inlet Summary of Existing Information and Identification of Data Gaps for Sediments, Budd Inlet, WA. Data Report. Prepared for the Washington State Department of Ecology, Lacey, WA

SAIC. March 2007b. Sediment Characterization Study, Budd Inlet, Olympia, WA. Sampling and Analysis Plan. Prepared for the Washington State Department of Ecology, Lacey, WA.

SAIC. March 12, 2008. Sediment Characterization Study, Budd Inlet, Olympia, WA. Final Data Report. Prepared for the Washington State Department of Ecology, Lacey, WA.

APPENDIX A

SAMPLE GRID LOCATIONS

APPENDIX B

FIELD SAMPLING HEALTH AND SAFETY PLAN

APPENDIX C

CHAIN OF CUSTODY FORM

APPENDIX D

USEPA METHOD 1613B



4. Yellow Cells - Randomly Selected Cells for Sampling.
15 cells for North Zone

1. Red Line - Patrick's Field Expedition

2. Green Cells - Filtered Sampling Grid from Field Expedition

3. Yellow Cells - Randomly Selected Cells for Sampling.
25 cells for South Zone

Priest Point Park Study in Thurston County Health and Safety Plan

1. General

Site name: Priest Point Park Intertidal Beach Sampling
Safety officer: Patrick Soderberg (Thurston County Health Dept)
Proposed date of field activities: October 2010

2. Sampling Objective

- a: Collect samples of soil from 0- 10 cm.
- b: Collect GPS readings at each sample location for incorporation into site map.

3. Key Personnel/Duties Identified:

Patrick Soderberg -	Project manager /safety officer / data collector
Gerald Tousley -	Sampler
Brad Zulewski -	Alternate sampler
Mark Koster -	Alternate sampler
Nicky Upson	Alternate sampler

4. Site/Waste Characteristics

Site description: Sampling activities are part of a dioxin contamination study along the beach of Priest Point Park.

Waste types: Dioxin contaminated sediments.

Chemical concentration: Unknown, but expected to be less than 1 ppb.

5. Hazard Summary

Chemical Dioxins – potential routes of entry are dermal / ingestion.

Physical Physical hazardous associated with heavy lifting and being outdoors, heat or cold stress, slips / trips / falls, uncontrolled animals and people.

6. Site Safety Work plan

Site entry procedures: Area is open for use by the public.

7. Personnel Protection

Sampling: Sample team will use modified Level D protection. PPE will consist of nitrile gloves and waterproof boots.

Air Monitoring:
Contaminants of concern: Dioxins.

Monitoring equipment: Not required (no volatile compounds).
Decontamination:

Procedures: After sample collection and equipment decontamination, personnel will remove nitrile sampling gloves and boots and visible dirt on any body part will be washed off with soap and water. Nitrile gloves will be thrown away and boots will be rinsed off.

8. Hospital

Name and Location: For all non-emergencies accidents that result in personnel needing medical attention will be brought to Group Health Medical Center at 700 Lilly Road NE, Olympia (see attached map).

9. Emergency Contact Information:

Local/Site Resources	Name	Phone	Notified	
			Yes	No
Fire District or Department	Various fire districts	911		X
Police	Thurston County Sheriff Lacey Police Department Yelm Police Department	911		X
Ambulance		911		X
Hospital	Group Health	360-923-7000		X
Poison Control Center	800-732-6985			X
Site Phone #1	Patrick Soderberg	360-561-4385	X	
Site Phone #2	Gerald Tousley	360-481-0257	X	
Site Phone #3	Brad Zulewski	360-789-2192	X	

Site Safety Plan Consent Agreement

I have received the Site Safety Plan for the Priest Point Park Intertidal Beach Sampling project, dated September 17, 2010. I understand its purpose and consent to adhere to its procedures and guidelines.

Employee Name (Print)	Employee Signature	Date

(Please Print Clearly)

Company Name:	
Branch/Location:	
Project Contact:	
Phone:	
Project Number:	
Project Name:	
Project State:	
Sampled By (Print):	
Sampled By (Sign):	
PO #:	
Regulatory Program:	



UPPER MIDWEST REGION
 MN: 612-607-1700 WI: 920-469-2436

COC No.

CHAIN OF CUSTODY

***Preservation Codes**
 A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol
 H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

FILTERED?
 (YES/NO)
**PRESERVATION
 (CODE)***

Y / N																	
Pick Letter																	
Analyses Requested																	

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable) <input type="checkbox"/> EPA Level III <input type="checkbox"/> EPA Level IV	MS/MSD <input type="checkbox"/> On your sample (billable) <input type="checkbox"/> NOT needed on your sample	Matrix Codes A = Air W = Water B = Biota DW = Drinking Water C = Charcoal GW = Ground Water O = Oil SW = Surface Water S = Soil WW = Waste Water Sl = Sludge WP = Wipe
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PACE LAB #	CLIENT FIELD ID	COLLECTION		MATRIX
		DATE	TIME	

CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #

Rush Turnaround Time Requested - Prelims (Rush TAT subject to approval/surcharge) Date Needed:	Relinquished By:	Date/Time:	Received By:	Date/Time:	PACE Project No.
Transmit Prelim Rush Results by (complete what you want):	Relinquished By:	Date/Time:	Received By:	Date/Time:	Receipt Temp = °C
Email #1:	Relinquished By:	Date/Time:	Received By:	Date/Time:	Sample Receipt pH OK / Adjusted
Email #2:	Relinquished By:	Date/Time:	Received By:	Date/Time:	Cooler Custody Seal Present / Not Present Intact / Not Intact
Telephone:	Relinquished By:	Date/Time:	Received By:	Date/Time:	
Fax:	Relinquished By:	Date/Time:	Received By:	Date/Time:	
Samples on HOLD are subject to special pricing and release of liability	Relinquished By:	Date/Time:	Received By:	Date/Time:	