

APPENDIX D. FIELD FORMS, FIELD NOTES, AND PROTOCOL MODIFICATION FORMS



CLAM COLLECTION FORM

Project Name: Add'l Clam Background Sampling Project no. 2DW-Benthic Invertebrate

Date: 8.19.05 Station: Dungeness NWR

Start/Stop time: _____ X: _____

Sampling Method: Shovel Y: _____

Weather: Foggy, cool, windy Sample Location ID: DU-C2-T, DU-C2-T

Crew: A. Rodriguez, T. Da, K. Hurley

Clam species	#	Shell length (cm)	Clam species	#	Shell length (cm)
Mya arenaria	C1	7.5	Mya arenaria	C2-T	6.1
		6.1			5.4
		6.3			5.5
		8.0			5.7
		8.7			5.6
		6.2			5.5
	T2	8.2		4.6	
		6.4		4.8	
		7.0		6.7	
		5.2		6.9	
		5.6		5.6	
		8.4		4.8	
T1	5.9	8.0			
	5.6	7.1			
	7.3	5.7			
	6.0	6.0			
	5.9	8.3			
	8.5	5.6			
T1	7.8	6.1			
	7.3	6.7			

Comments: DU-C123-T1: 12 Clam Samples from 3 areas (C1, C2, C3)
DU-C123-T2: 12 Clam samples from 3 areas (C1, C2, C3)



CLAM COLLECTION FORM

Project Name: Add'l Clam Background Sampling Project no. _____
LDW Benthic Invertebrate
 Date: 8.19.05 Station: Dungeness NWR
 Start/Stop time: _____ X: _____
 Sampling Method: Shovel Y: _____
 Weather: Foggy, cool, windy Sample Location ID: Du-C3-T, Du-C4-T
 Crew: A. Rodriguez, T. Do, K. Hurley

Clam species	#	Shell length (cm)	Clam species	#	Shell length (cm)
<u>Mya arenaria</u>	<u>C3-T</u>	<u>6.9</u>	<u>Mya arenaria</u>	<u>C3-T</u>	<u>6.5</u>
		<u>7.6</u>			<u>6.0</u>
	<u>T2</u>	<u>5.9</u>			<u>7.6</u>
	<u>T2</u>	<u>6.3</u>			<u>6.7</u>
	<u>T2</u>	<u>7.8</u>			<u>6.2</u>
	<u>T1</u>	<u>4.5</u>			<u>5.2</u>
	<u>T1</u>	<u>5.2</u>			<u>6.0</u>
	<u>T1</u>	<u>5.2</u>			<u>5.4</u>
	<u>T2</u>	<u>5.0</u>			<u>8.2</u>
		<u>4.8</u>			<u>6.3</u>
	<u>T2</u>	<u>4.9</u>			
		<u>6.1</u>			
		<u>6.8</u>			
		<u>5.0</u>			
	<u>T1</u>	<u>6.2</u>			
		<u>6.2</u>			
		<u>5.6</u>			
		<u>5.4</u>			
		<u>4.8</u>			
		<u>5.4</u>			

Comments: Du-C123-T1 12 Clam samples from 3 areas (C1, C2, C3)
Du-C123-T2 12 Clam samples from 3 areas (C1, C2, C3)



CLAM COLLECTION FORM

Project Name: _____ Project no. _____
 Date: 8/23/05 Station: Vashon Island
 Start/Stop time: _____ X: _____
 Sampling Method: Shovel Y: _____
 Weather: _____ Sample ID: VI-C1-T, VI-C2-T
 Crew: Thai Do, Joanna Flores, Kathleen Hurley, Angelita Rodriguez

Clam species	#	Shell length (cm)	Clam species	#	Shell length (cm)
<i>Mya arenaria</i>	C1-T	6.2	<i>Mya arenaria</i>	C2-T	7.2
		4.5			6.9
		7.2			5.9
		6.6			7.2
		6.2			8.1
		5.5			6.6
		5.7			6.4
		6.7			6.8
		6.3			6.9
		5.6			5.9
		4.9			5.4
		5.5			7.3
		6.5			6.3
		6.0			7.0
		5.4			6.0
		5.6			6.4
		6.0			7.5
		7.1			5.6
		5.4			6.8
		5.5			5.2

Comments:



CLAM COLLECTION FORM

Project Name: _____ Project no. _____
 Date: 8/23/05 Station: Vashon Island
 Start/Stop time: _____ X: _____
 Sampling Method: Shovel Y: _____
 Weather: _____ Sample ID: VI-C3-T, VI-C4-T
 Crew: Thai Do, Joanna Flores, Angelita Rodriguez, Kathleen Hurley

Clam species	#	Shell length (cm)	Clam species	#	Shell length (cm)
<i>Mya arenaria</i>	C3-T	5.1	<i>Mya arenaria</i>	C4-T	7.0
		5.9			7.1
		5.3			7.6
		6.1			7.5
		5.9			7.4
		6.5			7.0
		5.1			7.4
		6.6			5.8
		7.1			6.3
		5.8			6.9
		6.9			7.1
		7.6			6.3
		7.3			6.1
		7.9			6.5
		7.2			5.5
		6.1			5.4
		6.7			5.9
		6.7			5.0
		6.1			5.3
		5.3			5.3

Comments:



CLAM COLLECTION FORM

Project Name:

Project no.

Date:

8/23/05

Station:

Vashon Island

Start/Stop time:

X:

Sampling Method:

Shovel

Y:

Weather:

Partly cloudy, warm, light wind

Sample ID:

VI-C5-T, VI-C6-T

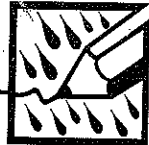
Crew:

Thai Do, Joanna Flores, Kathleen Hurley, Angelita Rodriguez

Clam species	#	Shell length (cm)	Clam species	#	Shell length (cm)
Mya arenaria	C5-T	7.8	Mya arenaria	C6-T	7.8
		7.6			8.8
		6.6			7.9
		7.1			7.4
		7.4			7.5
		6.7			7.1
		7.2			7.3
		7.2			7.0
		6.7			7.8
		6.2			7.4
		5.8			6.9
		6.3			7.1
		6.0			6.6
		6.1			6.5
		6.0			6.2
		6.2			5.3
		5.5			6.4
		6.1			5.7
		5.4			5.3
		5.2			

Comments:

"*Rite in the Rain*"
ALL-WEATHER WRITING PAPER



LEVEL

All-Weather Notebook
No. 311

<i>Clam Additional Background</i>
<i>Sampling</i>
<i>Aug 2 '05 - Aug 4 '05</i>
<i>Aug 19 '05 - Aug 23 '05</i>

4 5/8" x 7" - 48 Numbered Pages

2

8/26/05

A. Rodriguez

Project: Additional Clam
Background Sampling

Crew: A. Rodriguez, WW

T. Do, WW

A. Gomez, WW

Kevin Li, King County

0900 Arrive at Nisqually Reach
Nature Center

0910 Brief safety meeting

Weather: Sunny, clear, warm

0940 Begin sampling

Composite location 1, muddy sandy

47° 06' 04 N

122° 43' 38 W

Location near the Nature Center (west side)

Dominant species: Bent-nose clams

Little neck clams

Total Eastern soft-shell collected = 4

1040 Composite location 2; sandy

47° 06' 10 N

122° 43' 38 W

Dominant species: Bent-nose clams, a majority
of them were dead empty shells

No E. soft-shell collected

3

8/26/05

A. Rodriguez

1130

Composite location 3, sandy

47° 06' 07 N

122° 43' 38 W

E. soft-shell clams were not present

Dominant species: Bent-nose clams

1140

Kevin Li dug at the southeastern
side of Nature Center and observed less
shells and clam shells and found
no Mya present

1150

Contacted Tad to report the lack of
Mya present and only 4 collected
during a 3 hour sampling effort. It
was decided to not return to Nisqually
Reach area on Aug 3, 2005 but to
begin sampling at the alternative
background sampling locations

1200

Kevin Li suggested a site on the
eastern side of Vashon Island that
has an abundance of Mya and Tad was
informed of this potential sampling location

8/2/05

A. Rodriguez

12:30

Homogenized and processed sample:
NR-C1-S, ~ 200ml sediment
Wrapped and bagged tissue sample:
NR-C1-T, 4 clams

1300

Lunch break

1330

Drove back to Seattle

1420

Arrive back to office and secure
sediment and tissue samples in
refrigerator

Angelika
8.2.05

08.04.05

T. Do

07:30

Arrive at Dungeness boat ramp.

Mobilised gear and equipt.

07:37

Begin digging for clams

48° 09' 09" N

123° 08' 36" W

0830

Location is near freshwater influence,
specifically west of the Dungeness
River

Several seeps observed on shoreline
and substrate is mud & sand with
overlying algal Mats

0930

Complete digging with a total
of 3 soft-shell clams ~ 2cm
in width

0945

Arrive at Three Crabs Cafe area,
located east of the mouth of
Dungeness River - Private property

1000

Begin digging for clams
Substrate is a mix of sand
fine to medium, very little silt
and algal mats

48° 09' 06" N

123° 07' 17" W

1100

Stop digging for clams and

6

8/4/05

A. Rodriguez

observed the presence of
Butter clams (dominant),
Little necks, Bent-nose (Sparse).
E. soft-shell clams were not
observed or present

1120 Spoke to Tad about poor catch
and agreed to sample Pillar
Point Park at evening low tide

1145 Homogenize and process samples:
DU-C1-T and DU-C1-S
~150 ml of sediment and 3 small
clams

1215 Head back to Port Angeles

1630 Head to Pillar Point Park

1730 Arrive at Pillar Point Park
Low tide is +2.3 and much of
the shoreline is covered with
algal mats and gravel mud
substrate

1740 Discuss access to shoreline

7

8/4/05

A. Rodriguez

and substrate of beach at Merrill
& Ring - Joseph F. Murray

They own all tide lands west of
Pillar Point Park and need
study plan before grant access.
The substrate is similar to Pillar
Point Park.

1759 Drive back to Pillar Point Park
to begin digging for clams

48° 11' 58" N

124° 06' 13" W

Location east of Physt River mouth
observed an abundance of broken
Mya shells and empty dead shells

2000 Complete our search for Mya
and none collected

2104 Contact Tad and discuss poor results
and agree the field crew will return to
Seattle in the morning

~~Angela
8/4/05~~

10

8/23/05

A. Rodriguez

0800 Meet at office to load supplies

0900 Catch ferry from West Seattle
to Vashon Island

Crew: Thai Do

Kathleen Hurley

Joanna Florez

Angelita Rodriguez

0915 Contact Sherri Abbott to inform
of our ETA to her private
propertyWeather: Partly cloudy, warm,
light wind0930 Arrive at Abbott property
and check the exposure of the
beach & siphon holes.It is too early for sufficient beach
and clamming to begin. The crew
continues to assess the beach
exposure for optimum ^{time} to begin
clam sampling.

1130 Begin clam sampling

47° 27' 13N

122° 26' 37W

20 clams & sediment (14) collected

11

8/23/05

A. Rodriguez

1215 2nd location begin sampling

47° 27' 14N

122° 26' 37W

Collected 20 clams & sediment (14)

1235 3rd location ~ 15 ft from 2nd location

47° 27' 14N

122° 26' 37W

Collected 20 clams & sediment (14)

1250 4th location ~ 10 ft from 3rd location

47° 27' 14N

122° 26' 37W

Collected 20 clams & sediment (14)

1310 5th location ~ 20 ft from 4th location

47° 27' 14N

122° 26' 36W

Collected 20 clams & sediment (14)

1320 6th location ~ 20^{ft} from 5th location

47° 27' 14N

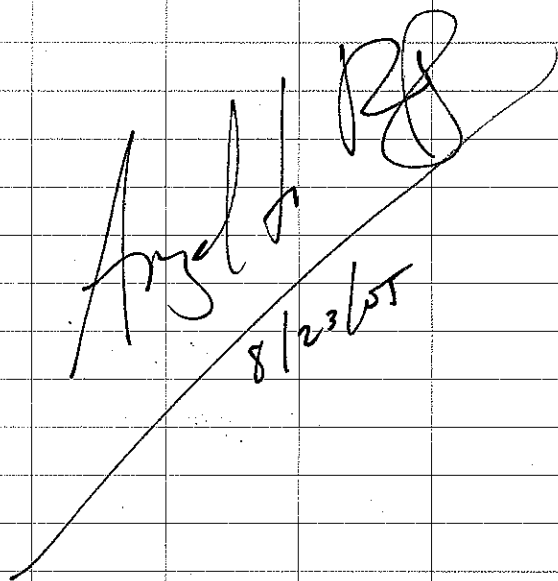
122° 26' 36W

Collected 20¹⁹ clams & sediment (14)

1350 Catch ferry back to Seattle

1530 Arrive at office, demob & process samples

8/23/05



 Angel *RS*

 8/23/05

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PROTOCOL MODIFICATION FORM

Project Name and Number: 04-08-06-21 / LDW RI: Benthic Invertebrate Survey

Material to be sampled: Sediment and tissue (*Mya arenaria*)

Measurement Parameter: Not applicable

Standard Procedure for Field Collection and Laboratory Analysis (cite reference):

Windward 2005. Lower Duwamish Waterway remedial investigation. Quality assurance project plan: Benthic invertebrate sampling of the Lower Duwamish Waterway. Addendum: Additional clam sampling in background area. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Windward 2004. Lower Duwamish Waterway remedial investigation. Quality assurance project plan: Benthic invertebrate sampling of the Lower Duwamish Waterway. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Reason for Change in Field Procedure or Analysis Variation:

A private property on the northeastern side of Vashon Island was selected as an additional clam sampling location because of the poor catch results for *Mya arenaria* from the Nisqually Reach area, the original proposed clam sampling location. Both the original Nisqually Reach area and the selected Vashon Island location are within the Asarco Tacoma smelter plume wind pattern and meet the study design requirements stated in the original Benthic Invertebrate QAPP (Windward 2004). The northeastern portion of Vashon Island has similar soil arsenic concentrations to the Lower Duwamish Waterway watershed with the exception of one sample collected approximately 5 miles south of the proposed clam sampling beach. This location had an arsenic concentration in soil over 100 mg/kg as displayed in the King County arsenic footprint figure included with the QAPP addendum (Windward 2005). An additional consideration for selecting sampling locations that was discussed in the QAPP addendum was the presence of known or suspected arsenic sources as compiled in the Washington State Department of Ecology Confirmed and Suspected Contaminated Site database. This database was consulted for the Vashon Island area. There were two sites listed with confirmed arsenic concentrations greater than 20 mg/kg that are located approximately 8 miles southwest of the selected Vashon location. Two additional sites were listed with suspected arsenic concentrations greater than 20 mg/kg but the locations on Vashon Island were unknown and listed as Tacoma Smelter Plume.

Variation from Field or Analytical Procedure:

The field schedule was modified to increase the sampling effort from 4 days to 6 days (at low tide) so that sufficient *Mya arenaria* could be collected for chemical analysis to meet the objectives and design of the QAPP addendum (Windward 2005).

Accordingly, the northeastern end of Vashon Island was sampled on August 23, 2005.

Special Equipment, Material or Personnel Required:

Same as stated in original QAPP and addendum (Windward 2004; 2005).