RESPONSIVENESS SUMMARY

Oakland Bay Sediment Investigation
Draft Sampling and Analysis Plan

June 2 – August 11, 2008 Public Comment Period

Prepared by
Washington State Department of Ecology
Southwest Regional Office
Toxics Cleanup Program
300 Desmond Drive
Olympia, Washington 98504-7775

September 2008

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Oakland Bay Sediment Investigation Information

Location: Shelton, Mason County
Project Manager: Joyce Mercuri
Public Involvement Coordinator: Meg Bommarito

The Washington State Department of Ecology (Ecology) is planning to investigate sediment contamination in Oakland Bay and Shelton Harbor. Ecology will sample sediments in the bay for contaminants and wood waste using chemical analysis of sediments, wood waste coring and chemical analysis and toxicity testing.

In Shelton Harbor, Ecology will conduct a sampling and analysis effort based on previous investigations and existing data gaps to further characterize and prioritize areas for potential cleanup. In Oakland Bay, Ecology will conduct a sampling and analysis effort to assess presence of contaminants and wood waste. The investigation will:

- Evaluate potential for transport of contaminated sediments and wood waste out of Shelton Harbor.
- Determine horizontal and vertical extent of contamination.
- Examine trends in contaminant concentration.
- Investigate known and suspected sources of contamination.
- Conduct a geophysical survey to assess presence of wood waste
- Characterize distribution of wood waste types and amounts.
- Examine biological effects of contamination.
- Examine sediment for effects from tidal flushing, creek inputs, and potential near-shore use of hazardous substances.
- Estimate sedimentation rates.
- Use a screening-level "fingerprinting" evaluation of total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and dioxin/furan sediment, if present.
- Compare chemical and biological effects data to a reference location.

Background

Oakland Bay is one of seven bays identified as a priority for environmental cleanup by the Department of Ecology (Ecology) as part of the Toxics Cleanup Program's work on Governor Gregoire's Puget Sound Initiative. Ecology has identified Oakland Bay for focused sediment investigation related to source control, sediment cleanup and restoration. Ecology initiated this sediment investigation because previous environmental investigations throughout the bay, including the Shelton Harbor area, have documented contamination from historical and current industrial and commercial activities around the bay.

Previous sediment quality investigations indicated that contaminant concentrations exceeded the State of Washington Sediment Management Standards (SMS), Chapter 173-204 Washington Administrative Code (WAC). Ecology is directing a sediment characterization investigation and a geophysical survey of the bay that will include assessment of potential contamination across the entire bay and assessment of the marine sediment environment associated with potential sources of contaminants from land and water.

Next Steps

Sampling will begin the last week in September and continue for approximately 2 weeks. A Data Report is anticipated in Spring or Summer 2009. Ecology will keep interested parties, stakeholders and the local community involved and informed as this investigation moves forward.

Public Comment Period

A public comment period was held from June 2 – August 11, 2008. A public meeting was held on June 16, 2008. Approximately 60 members of the community and stakeholders participated in this meeting.

Site Location Map

Figure 2-1. Vicinity map of Oakland Bay in Mason County, Washington.

Oakland Bay Sediment Investigation Responsiveness Summary

Washington State Department of Ecology (Ecology) appreciates the support of all the commenters who took the time and effort to review documents, participate in meetings and provide written comments which have helped improve the planned Oakland Bay Sediment Investigation.

This Responsiveness Summary presents the comments received by Washington State Department of Ecology (Ecology) regarding the May 2008 Public Review Draft Sampling and Analysis Plan (SAP), Oakland Bay Sediment Characterization Study, Mason County, Washington. Written comments received based on the Oakland Bay Sediment Investigation Public Meeting held by Ecology on June 16, 2008 in Shelton, Washington as well as the August 6, 2008 Technical Meeting, and the July 29 and August 11, 2008 Stakeholders Meeting are also included.

Each comment is repeated in its entirety and followed by Ecology's response. Each comment also identifies the commenter and how the comment was received (for example; e-mail or hand-written text). In many cases, multiple comments were included within the commenter's text. Individual comments are briefly paraphrased to help understand the specific issue to which Ecology is responding.

There have been three major changes to the originally proposed sediment investigation that have broad implications with regard to the questions and comments that have been received. These changes were based on input from stakeholders and the community. First, the human health and aquatic risk assessments have been deferred. Second, collection of tissue samples has also been deferred. To the extent possible, Ecology has responded to questions and comments regarding risk, shellfish, and fish sample collection and analysis in this responsiveness summary, should these tasks be conducted later. Third, collection of samples was delayed until late September 2008 in order to allow more time for public comment and meetings with the community and stakeholders.

These and additional changes to the SAP were included in a Technical Memorandum dated August 18, 2008 (Appendix A). This was prepared following two stakeholder meetings and one technical meeting, and summarizes Ecology's decisions based on comments received. Revised sample locations, revised objectives, removal of the background sample designation, and bioassays in surface of wood waste samples were also included in the Technical Memorandum.

Ecology has revised the proposed locations for sampling stations in Oakland Bay based on input from the community and stakeholders. Several modifications were made to locations to provide appropriate coverage to help identify potential contaminant sources within the bay, the extent of sediment contamination (including the range and

distribution of wood waste quantities) within the Shelton Harbor, and to determine if contaminants have migrated into Oakland Bay or Hammersley Inlet. The final station locations are documented in the final Oakland Bay Sediment Investigation Sampling and Analysis Plan published on Ecology's Oakland Bay website at:

http://www.ecy.wa.gov/programs/tcp/sites/oaklandBay/oaklandBay_hp.htm.htm

Ecology has also clarified the objectives of the proposed study. Ecology is evaluating the sediment within Shelton Harbor as an area of known contamination, to further characterize and prioritize areas for cleanup. Previous studies have documented the presence of contaminants in Shelton Harbor sediment at concentrations that exceed the Washington State Sediment Management Standards (SMS) Sediment Quality Standards (SQS), and the presence of deposits of wood waste. The overall goal of the sampling and analysis program for Shelton Harbor is to better identify potential sources of contamination and document the nature and extent of contamination in the harbor.

Harbor sampling has been augmented with Oakland Bay and Hammersley Inlet sampling transects to determine if contaminants have migrated outside the Harbor. Ecology is studying Oakland Bay and part of Hammersley Inlet (excluding Shelton Harbor) to assess presence of contaminants and wood waste, given the extremely limited data available for that area.

Comment 1: Bob Woolrich, Department of Health

Manager of Growing Area Section
Office of Shellfish and Water Protection
Washington State Dept. of Health
P.O. Box 47824
Olympia, WA 98504-7824
(360) 236-3329
bob.woolrich@doh.wa.gov

Comment received as:
Email dated Tuesday, June 17, 2008 3:14 PM
Subject: RE: Department of Ecology Oakland Bay Public Meeting

Comment:
I found the presentations helpful last night. Nice job by all of you. I thought I should submit the comment I mentioned to you last night.
Where Ecology is planning to collect shellfish to determine the levels of chemicals they contain, DOH requests that you sample all species of clams and oysters available at each site. This could help us determine potential public health risks and help us compare the species propensity to pick up contaminants.

Ecology Response:
Ecology appreciates your positive comments regarding the helpfulness of the Oakland Bay Sediment Investigation Public Meeting.

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish analyses if data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species. Littleneck clams were planned for this study, Manila clams and Pacific oysters may be considered in the future.

Costs for the collection and analysis of the number of shellfish which would be required to allow for a statistically significant determination of interspecies contaminant accumulation differences would be extremely high and is beyond the scope of this study and the goals of the risk assessments.

Ecology had planned to address the uncertainty that would result from analyses of different species, with potentially different toxic uptakes, by collecting only a single shellfish species. Little neck clams, the species anticipated to be most commonly encountered in Oakland Bay, and thus the species that will provide a greater likelihood for collection of adequate sample mass to meet project-specific detection limits; was also assumed to represent the species with the highest consumption rate for risk evaluation.

Comment 2: Elmer Diaz, Department of Health

Site Assessment and Pesticide Section
Office of Environmental Health Assessments and Pesticides
Division of Environmental Health
Washington State Department of Health
PO Box 47846
Olympia, WA 98504-7846
phone: (360) 236-3357
fax: (360) 236-2251

Comment received as:
Email dated June 17, 2008 4:29 PM
Subject: RE: Department of Ecology Oakland Bay Public Meeting

Comment:
Nice work last night as well. I have a question regarding the chemicals of concern (COC). Are you planning to test for all these chemicals (i.e., dioxins & furans, PAHs, PCBs, & metals) in shellfish? I think the available shellfish should be analyzed for these chemicals in all sampling locations. Why fish sampling is not considered in this study? Have you identified any fish species in Oakland Bay?

I am also wondering where is that body of work for Oakland Bay available that this guy from Simpson's was talking about. He mentioned over 200 analytical sample results in the 1999 study. Do you have a copy of this study?

Ecology Response:
Ecology appreciates your positive comments regarding the Oakland Bay Sediment Investigation Public Meeting.

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and fish analyses if the data indicate that this would be appropriate.
Ecology had planned to analyze shellfish tissue samples collected at all planned tissue sampling stations in Oakland Bay. Tissue samples were to be analyzed for: semi-volatile organic compounds (which include PAHs), PCBs, dioxins and furans, metals, and lipids.

Ecology acknowledges the value of data that fish sampling and analysis could provide. Cost for the collection and analysis of the number of fish which would be required to allow for a statistically significant determination of contaminant accumulation in multiple species would be extremely high, and were beyond the scope of the current investigation. In the original study design, Ecology had planned to address the risk to fish by modeling uptake and bioaccumulation.

Because the focus of this study is sediment contamination and a decision has been made to defer tissue sampling, a detailed discussion of marine species has not been included in the Oakland Bay Sampling and Analysis Plan. A discussion of marine species would be included in future documents should tissue sampling be part of the program.

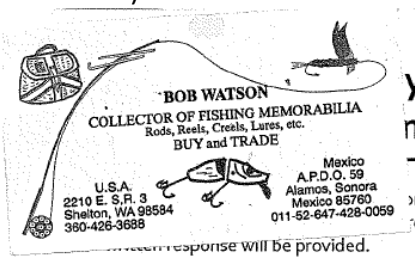
The report referred to by Simpson's representative is Ecology Publication No. 00-03-014 "Reconnaissance Survey of Inner Shelton Harbor Sediments" published May 2000. You may find the report at: http://www.ecy.wa.gov/biblio/0003014.html

Comment 3: Robert Watson

2210 E SR3
Shelton, WA 98584

Comment received as:
Hard copy on June 18, 2008

Comment:
(see below)



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RECEIVED
JUN 18 2008

on the Oakland Bay Sediment Investigation Sampling and
read by Cynthia Erickson, the Ecology site manager, and a
written response will be provided.

A response to your comments will be part of a responsiveness summary. The summary will be made public and mailed directly to those who comment.

You can submit your formal comment tonight or, if you need more time, complete it at home and mail it to Cynthia Erickson, Southwest Regional Office, Toxics Cleanup Program, PO Box 47775, Olympia, 98503. Please submit your comments by July 2, 2008.

NAME: ROBERT WATSON
ADDRESS: 2210 E SR3
CITY: SHELTON WA 98584

Thank you for your interest in the Oakland Bay Sediment Investigation!

COMMENTS
(Please use back side of this form if you need more room)

GOOD MEETING, I EXPRESSED MY CONCERN FOR THE OFFLOADING OF BARGES OF LOGS INTO THE BAY — THEY CAUSE ALOT OF DEBRIS TO DRIFT UP ON OUR SHORES. EVEN SHORT CHAINS OF LOGS.

Ecology Response:

Ecology appreciates your positive comments regarding the Oakland Bay Sediment Investigation Public Meeting.

Ecology agrees with the writer's concern about discharges of wood debris from log barges. This is an area that is not well regulated at the current time. Under State of Washington and United States laws and regulations it is against the law to discharge materials into marine waters. On aquatic lands that are owned by the Department of Natural Resources, there are conditions in leases and use permits to ensure that the underlying lands are not negatively affected. However, on private lands, there is not a specific permit or enforcement effort directed at log rafting or barge/chip loading operations. The Ecology Reconnaissance Survey of Inner Shelton Harbor Sediments report from May 2000 recommended that 'best management practices' to prevent chips and bark from entering the waters be applied at the Simpson Mill in Shelton.

If the results of the Oakland Bay Sediment Characterization study indicate that a cleanup of wood debris is needed, a part of the cleanup analysis will be targeted toward controlling sources of the bark, chips, or other wood debris to avoid recontamination of sediments.

Citizens can report water quality violations to the Department of Ecology complaint hotline at (360) 407-6300. As resources allow, Ecology staff will respond to complaints with a site visit, warning letter, or call to the discharger to redirect their activities to prevent water pollution.

In the Oakland Bay Sediment characterization study, Ecology is addressing the issue of wood debris using several approaches. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), geophysical (resistivity and acoustic tomography) mapping will be conducted across the Bay to help identify wood waste in the sediment. Figures 4-2 and 4-3 from the Oakland Bay Sediment Investigation Sampling and Analysis Plan, show several samples which are being collected to better identify the nature and extent of wood waste within the Bay.

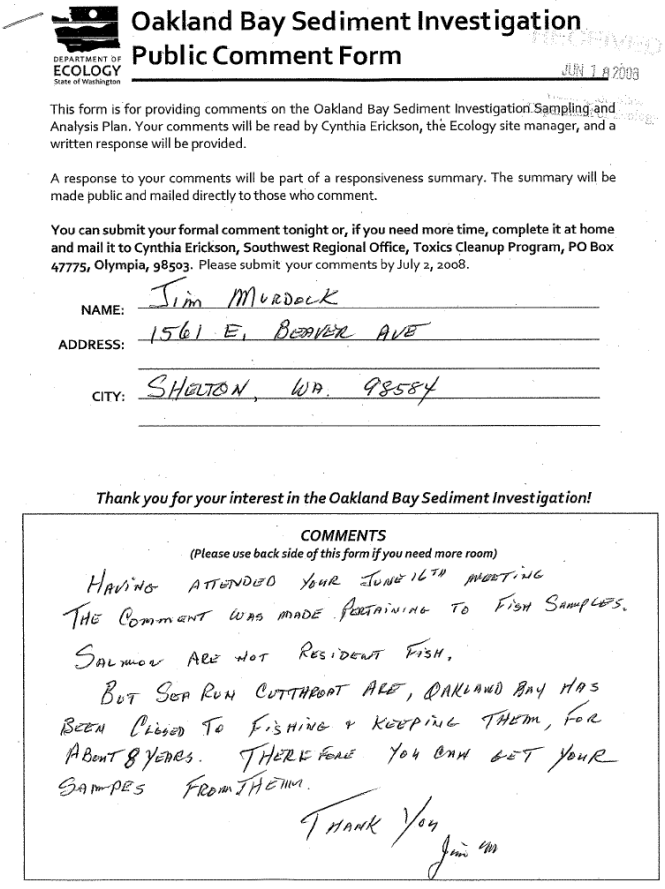
Ecology has revised the proposed locations for sampling stations in Shelton Harbor based on input from the community and stakeholders. Several modifications were made to locations to provide better coverage to help identify potential contaminant sources within the bay, the extent of sediment contamination (including wood waste) within the Shelton Harbor, and to determine if contaminants have migrated to Oakland Bay. In Shelton Harbor, sample locations for wood waste are distributed to evaluate a range of wood waste locations and depths of accumulation. In Oakland Bay, sample locations are associated with areas of known rafting and wood waste accumulations to assess whether it is present and if so, how much is present. If wood waste is found in any samples, the sediment core will be extended up to 12 feet into the sediments, and wood waste presence will be documented.

Comment 4: Jim Murdock

1561 E. Beaver Ave.
Shelton, WA 98584

Comment received as:
Hard copy June 18, 2008

Comment:



DEPARTMENT OF ECOLOGY State of Washington

Oakland Bay Sediment Investigation
Public Comment Form

JUN 18 2008

This form is for providing comments on the Oakland Bay Sediment Investigation Sampling and Analysis Plan. Your comments will be read by Cynthia Erickson, the Ecology site manager, and a written response will be provided.

A response to your comments will be part of a responsiveness summary. The summary will be made public and mailed directly to those who comment.

You can submit your formal comment tonight or, if you need more time, complete it at home and mail it to Cynthia Erickson, Southwest Regional Office, Toxics Cleanup Program, PO Box 47775, Olympia, 98503. Please submit your comments by July 2, 2008.

NAME: Jim Murdock
ADDRESS: 1561 E. Beaver Ave
CITY: Shelton, WA. 98584

Thank you for your interest in the Oakland Bay Sediment Investigation!

COMMENTS
(Please use back side of this form if you need more room)

Having attended your June 16th meeting
The comment was made pertaining to fish samples.
Salmon are not resident fish,
But Sea Run Cutthroat are, Oakland Bay has
been closed to fishing & keeping them, for
about 8 years. Therefore you can get your
samples from them.
Thank You
Jim M

(see below)

Ecology Response:
Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of tissue samples until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and fish analyses if the data indicate that this would be appropriate. At that time,

Ecology will consider sampling and analysis of more than a single species. In the original study design, Ecology had planned to address the risk to fish by mathematical modeling of uptake and bioaccumulation.

Ecology acknowledges the value of data that fish sampling and analysis could provide and notes that, if fish were tested, it would be best to sample resident fish. However, cost for the collection and analysis of the number of fish which would be required to allow for a statistically significant determination of contaminant accumulation in multiple species would be extremely high and this type of analysis was beyond the scope of the current investigation.

Comment 5: Andrew Beelik

Comment received as:
Email with attachment dated Tuesday, June 17, 2008 8:02 PM
Subject: Brant vs. Canada Goose

Comment:

Dear Cynthia,

I followed your presentation with interest last night at Shelton, it gave a good picture of your undertaking. I commented, questioning the suitability of Brants for the study, seeing that they do not occur in Oakland Bay/ Hammersley Inlet. I did not want to leave you merely with anecdotal information. Earlier this year I assisted a staffer at Capitol Land Trust, Laurence Reeves, with assembling a list of bird species found at Oakland Bay. He needed to include such in an application for funds to purchase a parcel of land for the Trust at the head of the Bay. We started with a list previously prepared for Eld Inlet. I deleted one species and added 15 more. I will attach the final list to this e-mail.

Brant fits into the category "Waterfowl": you note that it is absent, while Canada Goose is included. To learn more about this question, you might want to consult the field guide *Birds of the Puget Sound Region* by Morse, Aversa, and Opperman, pp. 55 and 57. Further, you might find Bob Morse, an active and knowledgeable member of Black Hills Audubon, our local chapter of National Audubon, helpful with this question. His phone in Olympia is: 943-8600.

Since you do not know me from Adam, I should add that I have led bird watching field trips for Black Hills Audubon along Hood Canal and also Oakland Bay since the early nineties, and have lived on the south shore of Hammersley Inlet just half a mile outside Shelton since 1956. I hope you will find this e-mail helpful.

Yours, Andrew Beelik.

Oakland Bay Twin Rivers Ranch possible bird species

Migratory or Coastal-dependent Landbirds (including neotropical migrants) Species include:	
Osprey	*Pandion haliaetus*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Red-tailed hawk	*Buteo jamaicensis*
Cooper's hawk	*Accipiter cooperi*
American kestrel	*Falco sparverius*
Peregrine falcon	*Falco peregrinus*
Northern pygmy owl	*Glaucidium gnoma*
Great horned owl	*Bubo virginianus*
Western screech owl	*Otus kennicottii*
Northern saw-whet owl	*Aegolius acadicus*
Band-tailed pigeon	*Columba fasciata*
Vaux's Swift	*Chaetura vauxi*
Belted kingfisher	*Ceryle alcyon*
Red-breasted sapsucker	*Sphyrapicus ruber*
Pileated woodpecker	*Dryocopus pileatus*
Northern flicker	*Colaptes auratus*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Olive-sided flycatcher	*Contopus borealis*
Willow Flycatcher	*Empidonax traillii*
Steller's jay	*Cyanocitta stelleri*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Purple martin	*Progne subis*
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Red-breasted nuthatch	*Sitta canadensis*
Black-capped chickadee	*Parus atricapillus*
Chestnut-backed chickadee	*Parus rufescens*
Brown creeper	*Certhia americana*
Bewick's wren	*Thryomanes bewickii*
Winter wren	*Troglodytes troglodytes*
Marsh wren	*Cistothorus palustris*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*

Swainson's thrush	*Catharus ustulatus*
American robin	*Turdus migratorius*
Varied thrush	*Ixoreus naevius*
Cedar waxwing	*Bombycilla cedrorum*
Orange-crowned warbler	*Vermivora celata*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Common yellowthroat	*Geothlypis trichas*
Spotted towhee	*Pipilo erythrophthalmus*
Golden-crowned sparrow	*Zonotrichia atricapella*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed junco	*Junco hyemalis*
Western tanager	*Piranga ludoviciana*
Red-winged blackbird	*Agelaius phoeniceus*
Bullock's oriole	*Icterus bullockii*
Purple finch	*Carpodacus purpureus*
Red crossbill	*Loxia curvirostra*
Pine siskin	*Carduelis pinus*

Migratory or Coastal-dependent Waterbirds Species include:	
Common loon	*Gavia immer*
Pied-billed grebe	*Podilymbus podiceps*
Horned grebe	*Podiceps auritus*
Western grebe	*Aechmophorus occidentalis*
Double-crested cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodias*
Green heron	*Butorides virescens*
Great egret	*Casmerodius albus*
Bonaparte's gull	*Larus philadelphia*
Mew gull	*Larus canus*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Western gull	*Larus occidentalis*
Glaucous-winged gull	*Larus glaucescens*
Caspian tern	*Sterna caspia*
Pigeon guillemot	*Cepphus columba*
Marbled murrelet	*Brachyramphus marmoratus*
Waterfowl Species include:	

Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Mallard	*Anas platyrhynchos*
Green-winged teal	*Anas crecca*
Northern shoveler	*Anas clypeata*
Northern pintail	*Anas acuta*
Canvasback	*Aythya valisneria*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Ruddy duck	*Oxyura jamaicensis*
Surf scoter	*Melanitta perspicillata*
Common goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Common merganser	*Mergus merganser*
Hooded merganser	*Lophodytes cucullatus*
Red-breasted merganser	*Mergus serrator*

Shorebirds Species include:	
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Spotted sandpiper	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Dunlin	*Calidris alpina*
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Common snipe	*Gallinago gallinago*

Additional Species for Oakland	**Bay <u>and</u> for Hartstene Island**
(Added by A. Beélik)	
Landbirds	
Turkey vulture	*Cathartes aura*
Bushtit	Psaltriparus minimus
Eurasian starling	*Sturnus vulgaris*
Northern shrike	*Lanius excubitor*
Black-headed grosbeak	*Pheucticus melanocephalus*
Brown-headed cowbird	*Molothrus ater*
House finch	*Carpodacus mexicanus*
American goldfinch	*Carduelis tristis*

Evening grosbeak	*Coccothraustes vespertinus*
House sparrow	*Passer domesticus*
Waterbirds	
Red-throated loon	*Gavia stellata*
Red-necked grebe	*Podiceps grisegena*
Pelagic cormorant	*Phalacrocorax pelagicus*
Waterfowl	
Eurasian wigeon	*Anas penelope*
Ring-necked duck	*Aythya collaris*
Shorebirds	
Killdeer	*Charadrius vociferus*
Additional Species for Hartstene	**Island <u>only</u>**
(Added by A. Beélik)	
Pacific loon	*Gavia pacifica*
Brandt's cormorant	*Phalacrocorax penicillatus*
Brant	*Branta bernicla*

<u>Ecology Response:</u>

Based on input from the community and stakeholders, Ecology has decided to defer the risk assessments until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the need for risk assessment if the data indicate that this would be appropriate. As noted below, if an ecological risk assessment is conducted, Ecology will use the Canada Goose rather than the Brant in the assessment.

Both Brant and Canada Goose are large herbivorous waterfowl and both fit the requirement for the exposure of such a functional group in the Ecological Risk Assessment. Even if anecdotal comments made at the Oakland Bay Sediment Investigation public meeting of June 16, 2008 regarding the absence of eel grass within Oakland Bay are correct, herbivorous waterfowl also consume algae and other water plants. The EPA and others have published exposure and effects data for Canada Goose. Therefore Ecology will replace the Brant with Canada Goose if an ecological risk assessment is eventually performed.

Comment 6: Andrew Beelik

Comment received as:
Email dated Friday day, August 08, 2008 3:39 PM
Subject: Oakland Bay Sediment Investigation and Brants

Comment:
Hello Cynthia,

Following your comprehensive presentation of the Sediment Study some weeks ago in Shelton I talked with you briefly about my observation of Brants, actually, of their absence from Oakland Bay and Hammersley Inlet. Our home is on the south shore of H.I., half mile outside Shelton city limits. We have been living there since 1956. We are avid birders, a telescope in the living room is aimed at Hammersley Inlet all the time. We drive St. Highway 3 along Oakland Bay frequently and we have birded there repeatedly. We have never seen a Brant in either body of water. I suggested to you Canada Goose as an alternative subject. They eat grass, numbers of them live in the area year-round, I see and hear flocks of them daily over our home and over the inlet, occasionally they graze on my neighbor's lawn.

The other day I received my current issue of /Washington Birds/, the Journal of the Washington Ornithological Society. Fortuitously, the first article in it deals with Brants in Hood Canal and Lower Puget Sound [B.L. Murphie, /et al., /Washington Birds, *10*:1-10(2008)].
You may well be aware of this paper, but, just in case. One spring staging area observation is recorded for Oakland Bay (Figure 3). For what it's worth, I wanted to share this with you. I'll be interested in the results of your study. Once published, please signal to me its availability.

Yours, Andrew Beélik.

Ecology Response:
Ecology appreciates the reference citation you have provided and your continued interest in the appropriate species for inclusion in an ecological risk assessment for Oakland Bay.

Based on input from the community and stakeholders, Ecology has decided to defer a risk assessment until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the need for risk assessment if the data indicate that this would be appropriate. As noted above, if an ecological risk assessment is conducted, Ecology will use the Canada Goose rather than the Brant in the assessment.

Comment 7: Debbie Riley, RS, Mason County Public Health

Environmental Health Manager
Mason County Public Health
PO Box 1666
Shelton, WA 98584
(360) 427-9670 ext 358
FAX (360) 427-8442
DLR@co.mason.wa.us

Comment received as:
Email dated Wednesday, June 18, 2008 4:39 PM

Comment:
Subject: Comments on Oakland Bay Plan

Cynthia,
I am sorry I did not introduce myself to you at the Oakland Bay public meeting on June 16th. I did speak to Rebecca, Lydia and Meg. I could not find information easily in the documents from the meeting or on the web site about where to send our comments to during the comment period, so I am sending them to you.

As the Environmental Health Manager for Mason County Public Health, I was concerned that this project was such a complete surprise to us. We have been working very closely with staff from the Department of Ecology on our own Oakland Bay Clean Water District and on Ecology's TMDL. The Sediment Study hit us out of the blue with no warning. The mailer that erroneously said "Budd Bay Sediment Study" was my first notification about this proposed work. It is helpful that we at the local level have some notice so that we can brief our elected officials before they see it in the newspaper or have a constituent phone them with questions.

My 2 main concerns at this time are: the use of Carr Inlet as a comparison to Oakland Bay. I see nothing similar between the two. Rebecca told me that there were several water bodies that Ecology had information for and the most "like" water body would be chosen for comparison with or to the study areas. The fact that a lot of information exists for Carr Inlet does not make it similar to Oakland Bay. The more we work in Oakland Bay, the more we find it is very unique and unlike other marine waters.

The second point from the presentation that caused a red flag for me was that in your portion you said no less than 2 times "shellfish tissue is not being collected in commercial shellfish beds". Why is that? Also along the same line on the Risk Assessment: Human Health slide commercial fisherman were left off. I see this as a very serious oversight. The commercial shellfish harvesters would be the group most at risk

for potential exposure. I don't see the best science being used when we talk about human health and do not collect tissue from commercial beds and do not include commercial fishermen in the populations at risk.

I would like to see the information that lead to Shelton Harbor and Oakland Bay being placed on the list of priority embayments. I can't help but support the statement from the audience asking that Ecology follow the recommendations of the sediment study report published in 2000 and put the money toward remediation rather than more study when those recommendations have not been implemented.

I will try to have formal comments in by July 2, but I am leaving for vacation tomorrow morning and will not be back in the office until Tuesday, July 1, 2008. Please consider my concerns as you collect comments about the work planned for the Oakland Bay Sediment Investigation.
Thank you,
Debbie

Ecology Responses:

1st comment – Inadequate notification
Ecology acknowledges concerns from stakeholders regarding the notification on the Public Review Draft SAP and upcoming sampling. We regret the mistake in the original mailer, and acknowledge that earlier communication with parties already very involved in water quality issues in Oakland Bay should have occurred.

In response to concerns from stakeholders in the Mason County area for better communication from Ecology and opportunity to be more closely involved in the project, Ecology extended the public comment period to August 11, and hosted two stakeholder meetings (July 29 and August 11, 2008). A technical discussion session was also held with a subset of stakeholders to discuss and gain input on specific details about the sampling design (August 6, 2008). Sampling was also delayed to the end of September to incorporate comments and concerns on scope of the study as well as sampling locations. In response to concerns raised from several stakeholders, the risk assessments and tissue sampling have been deferred, the objectives were revised to clarify different goals in Shelton Harbor and Oakland Bay/Hammersley Inlet, and sample locations were revised. Ecology also is working on better communication with the Squaxin Island Tribe and will participate in the Mason County Clean Water District Advisory Committee meetings to keep stakeholders apprised of the work conducted in Oakland Bay. Ecology will make every effort to keep stakeholders updated on progress made in the study as it moves forward.

2nd comment - Use of Carr Inlet for comparison to Oakland Bay
Ecology understands the unique character of Oakland Bay in comparison to other bays within Puget Sound. Carr Inlet is being used solely to provide a reference area for bioassay testing. Under the State Sediment Management Standards (Chapter 172-204

WAC), it is necessary to test a reference sediment when conducting bioassays. The bioassays conducted on the subject sediment are compared to the bioassays from the reference sediment to determine whether the subject sediment meets the sediment quality standards. The reference sediment chosen should have physical parameters such as total organic carbon and grain size similar to that of subject area, but with chemical concentrations known to be below the Sediment Quality Standards. Reference sediment samples are to represent sediments not affected by man-made activities.

Washington State Department of Ecology "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 172-204 WAC)" dated February 2008 references the Puget Sound Estuary Program (PSEP) protocols for bioassay testing. PSEP "Laboratory Sediment Bioassays – General QA/QC Guidelines – Revised July 1995" specify the need for Reference Test Samples and identifies several potential Puget Sound Reference Areas. The primary reference areas identified include: Sequim Bay, Samish Bay, Dabob Bay, and Carr Inlet. Of these options, Carr Inlet has been selected as the most reasonable reference area for Oakland Bay.

3rd comment – no sampling of commercial shellfish beds

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish analyses if the data indicate that this would be appropriate.

In the original study design, Ecology did not anticipate collecting shellfish samples from commercial areas. Much of the substrate within these commercial areas has been modified by the addition of imported bottom material and the construction of berms. The commercial shellfish industry is regulated by other agencies and testing of commercially farmed shellfish is more appropriately within their purview.

4th comment – Lack of commercial fisherman exposure scenario

Based on input from the community and stakeholders, Ecology has decided to defer a risk assessment until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of conducting a risk assessment if the data indicate that this would be appropriate.

In the initial study design, the commercial fisherman exposure scenario was included in the Oakland Bay Human Health Risk Assessment. The exposure route had inadvertently been left off the June 16, 2008 Oakland Bay Sediment Investigation Public Meeting presentation. If a risk assessment were to be conducted later, this path would be included. In the initial study design, Ecology had planned to evaluate the commercial fisherman scenario by using shellfish data from tissue samples collected within Oakland Bay.

5th comment – placement of Oakland Bay on list of priority embayments

Governor Gregoire's initiative is to restore the health of the Puget Sound by 2020. A leading source of pollution to the Sound is contaminated sites around its shorelines. In response to the Puget Sound Initiative and increased funding, Ecology accelerated its efforts to clean and restore contaminated sites within identified priority bays. These areas are the cornerstones of Ecology's approach to protect and restore Puget Sound. Ecology is taking a baywide approach, rather than site-specific, approach to cleaning up numerous sites within a geographic area under the Puget Sound Initiative. The result is larger areas of usable shoreline habitat for fish, wildlife and people.

The Puget Sound Initiative cleanup site selection process included a focus on embayments that involve State-Owned aquatic land with important natural resources and habitat, that are outside of the heavily urbanized embayments which may already have significant resources dedicated to cleanup. These are areas impacted by contaminated sediments as well as adjacent upland cleanup sites and/or upland sources. By conducting early cleanup and source control in these areas, it will result in the improvement of the overall health of the aquatic ecosystem by restoration and protection of valuable natural resources and critical habitat. Intervening now in impacted embayments that have received less attention will prevent them from becoming larger problems, and can avert costlier future cleanups. The selected projects are intended to integrate aquatic cleanup with adjacent upland source removal and source control.

Oakland Bay is one of these seven bays elected to conduct pilot cleanups under the Puget Sound Initiative. The areas have:

- Potential impacts to shellfish in outfall areas
- Degraded valuable natural resources
- Contamination from historical and current sources
- Wood waste impacts to marine life
- Impaired critical habitat which supports nursery grounds for marine life, salmon migration corridors, and eelgrass.

These areas were identified where cleanups and intervention will make a significant difference in restoring valuable natural resources, important habitat and protecting human health.

Ecology's "Reconnaissance Survey of Inner Shelton Harbor Sediments" report published May 2000 focused on inner Shelton Harbor and did not provide data adequate to address all Oakland Bay. The Oakland Bay Sediment Investigation is designed to build on and supplement the limited inner harbor study in order to ensure that activities and funding are focused on the most urgent and important problems facing Puget Sound.

Comment 8: Jules Michel

Comment received as:
Email with attachment dated Wednesday, June 18, 2008 7:46 PM

Comment:
Dear Ms. Erickson:

I hope that Monday's meeting went well and was helpful. I'm sorry I was not able to attend.

Attached please find comments regarding the Oakland Bay Sediment Study. I appreciate very much the opportunity to participate in what I believe will be a very valuable study. Hopefully my comments will help in some way to make a very well thought out and designed study better in some small way.

Thank you again for the opportunity in helping to assure that Oakland Bay becomes as healthy an ecosystem as possible.

Jules Michel

ATTACHMENT

To: Cynthia Erickson, Site Manager
Oakland Bay Sediments Investigation
ceri461@ecy.wa.gov

From: Jules Michel
jjnm@aol.com

Date: June 19, 2007

RE: Comments on Oakland Bay Sediments Characterization Study

Thank you for the opportunity to provide comments on the "Oakland Bay Sediment Characterization Study" (OBSCS) dated May 8, 2008. The current focus on Oakland Bay's water quality through minimizing the upland sources, coupled with past industrial impacts, warrant the additional focus on the sediments which this study provides. With the current shellfish operations in the bay expanding and sediment disturbances from a number of sources (boats, dock construction, shellfish harrowing/harvesting, etc.), it is critical to know what is contained in the lower levels of sediments.

The history of industrial impacts on Oakland Bay is well described in the document, as is the resultant impact on a once thriving shellfish industry in Oakland Bay. Important to mention is the spatial range of impact which Donald McKernan et. al. described in their April 1946 paper, extending to Eld and Totten Inlets ("An Investigation of the Decline of the native Oyster Industry ... With Special Reference to the Effects of Sulfite Pulp Mill Waste on the Olympia Oyster" published April, 1949, by the State of Washington Department of Fisheries). For a period of decades sulfate waste liquor was discharged into Shelton Harbor where concentrations reached levels described as causing "fish to roll over and die" when they came in contact with it.

I would add the email attached from a Seattle Shellfish employee describing the re-establishment of the shellfish industry in what I believe is the 1960's (see Attachment 1). He clearly describes woody sediments in which clams would not grow. Also described are what he felt were chemicals possibly existing in the lower sediments which were carried away when exposed. Important is that when sediment layers preventing cultivation of clams were removed a second generation of aquaculture began to take hold. Unknown was how deep those sediment layers were and what exactly they contained which prevented the growth of manila clams he noted.

Tidal flows studied in McKernan's paper, confirmed by more recent Department of Ecology studies (reference Ecology 2004b in OBSCS), show discharges in Shelton Harbor and Oakland Bay concentrate in the bay, eventually flowing out through Hammersley Inlet, entering into south Puget Sound. During the summer, low inflows of fresh water in the bay minimize flushing. In the winter, prevailing south westerly winds increase the tidal flow into Oakland Bay, again, increasing concentrations of inputs in Oakland Bay.

The end result of this low flushing and concentration in the bay is the probable settlement into the sediments of whatever metals, chemicals, and wood fibers were discharged into the water. Over the years of settlement, these sediments are layered over to an unknown depth. For this reason, the importance of the study's inclusion of as much sediment depth as possible is important, and is the primary focus of the comments included in the following pages.

Previous Investigations It is important to emphasize that previous sediment investigations were surficial. None measured sedimentation rates and depths. The significance of this is seen in "Historical Trends in the Accumulation of Chemicals in Puget Sound" (1997, Lefkowitz, Cullinan and Crecelius). Chemical concentrations peaked in sediments 28 cm to 60 cm in depth, a function of sedimentation rates and when the chemical looked at ceased being introduced into Puget Sound. Well described in OBSCS are industrial activities which ceased anywhere from 30 to 70 years ago, leaving unknown chemicals at an unknown depth, making the objectives of spatial distribution and sedimentation critical.

Study Objectives OBSCS' objectives address sedimentation rate and chemical concentrations from past activities.

Organization and Schedule The organization is clear and the schedule is both timely and reasonable.

Study Design Given the historical past and probable sedimentation rates, the following comments may help the study design meet the stated objectives.

1. Reference Samples: Perhaps a better reference sample may be found in Case Inlet. It is possible the sample in Carr Inlet may be influenced by its proximity to Tacoma and industrial discharges from that area.

2. Issues of Concern: It is felt that the hydrology of Oakland Bay warrants consideration of a wider spread of chemicals and metals beyond areas near industrial discharge points (e.g., contaminates from sulfite waste liquor most likely are spread throughout the bay, not just contained in Shelton Harbor).

3. Geophysical Survey: Core studies appear to be based on the surficial (0cm to 10cm) results. Given sedimentation rates, that most chemicals stopped being discharged decades ago, and that sediment disturbance can easily extend below 10cm (e.g., harvesting of clams may easily disturb sediments beyond 20 cm; bed preparation may also disturb sediments to a deeper level - see Attachment 2, email from Oakland Bay meeting notes) it is suggested initial chemical sampling be expanded well beyond the 10cm depth. Depending on sedimentation rates, one rule of thumb may be to simply test to the 1950 dateline, whatever that depth may be.

4. Subsurface Sediment Cores: Related to the above, it is unclear what decision criteria testing the deeper cores is being based on. Perhaps it is within the body of the report and I have missed it, but all I have been able to find is "based on surface sediment results." It may be good to define what limits are being looked at to base the further testing on, taking into consideration Point 3, above.

5. Additional Core Sample Location: It may be beneficial to locate one additional sample within the northern section, perhaps between OB-6 and OB-9, to capture a sediment sample not influenced by stream channel flushing in this part of the bay. Given the current possibility that fecal coliform may be reproducing in this area of the bay it would be especially helpful to have as complete an understanding of these sediments as possible.

6. Shellfish Farming Substrate Modifications: In areas where shellfish farms exist which coincide with surface and core sample locations, consideration of substrate modifications should be factored in to the analysis. Areas where gravel has been deposited may require deeper sampling to get a true indication of the underlying sediments.

7. Bioassays: Perhaps consideration may be given to larvae tested being from natural or predominant shellfish currently found in Oakland Bay, instead of mussels and sand dollars. Examples might include Manila clams (Tapes phillippinarum); Native littleneck clams (Protothaca staminea); Olympia oyster (Ostreola conchaphila); Pacific oyster (Crassostrea gigas); or, Geoduck (Panopea abrupta) as larvae more indicative of what may be impacted by sediment contamination found.

8. Tissue Samples: Bi-valve tissue samples are excellent indicators of pollutants drifting in the water column, less so those found in sediments. That said, if bi-valves are to be tested, it would be suggested that those of the maximum age possible be tested (e.g., Pacific oysters can live to 30 years; Manila clams to 14 years; Geoducks over 100, etc.) as opposed to those which may have just recently been planted.

9. Additional Sample in Totten Inlet: Consideration may be given to adding one additional test to the mouth of Totten Inlet to determine whether pollutants discharged in Shelton Harbor reached there and were deposited in sediments. It is felt that Totten Inlet's sediments closely resemble those found in Oakland Bay.
10. Additional Test: If possible, it may be of interest to test for past history of dissolved oxygen.

Quality Assurance/Control Bioassay Water Quality: Given the recent outbreak of Vibrio tubiashii testing for this bacteria may be an addition to those things tested, in order to assure bi-valve larvae are not being impacted by this bacteria.

Field Procedures Tissue Sample Collection: As mentioned in Point 7 above, bi-valves of the highest age possible should be sought, as opposed to those just recently planted.

Laboratory Analytical Procedures As mentioned in Point 6 above, perhaps consideration should be given to using bivalve larvae of the species native or currently being cultivated in the bay (see Point 6 for possible alternatives to mussels and sand dollars).

Data Analysis and Reporting No comments.

As stated in the beginning, I appreciate a great deal the opportunity to participate in this public process. The goal of determining the health of the sediments in Oakland Bay complete the entire picture of what may impact Oakland Bay's as a whole. Given the growing importance of the shellfish industry, the recreational industry, and other industrial uses on or near Oakland Bay, this study will help to assure it continues to move towards a healthy ecosystem. I hope my comments will be of help in achieving this worthwhile effort.

Attachments (2):

Attachment 1: Email received 11/13/07 describing past efforts to re-establish shellfish farming.

MR. Michel; My name is Steve Bloomfield. I work for Seattle Shellfish. One of my jobs is understanding and helping to diagnose water quality problems and potential solutions. I have worked within the shellfish industry for more years than I like to admit and have walked and worked on every mile of shoreline in Oakland Bay. My personal history in that bay started in the late 1960's. A time when indeed there were water quality problems due to industrial pollution. We, at that time, were starting the harvest of Manila clams there. The ground had a coating of wood fiber from the local fiberboard plant and the ground was unsuitable for Manila Clams to grow within. In areas of high current flow and ground agitation caused by the swift current we noticed that the clams did indeed live within the ground. Other areas where the effects of current were less dramatic the clams lived on the surface. We as a group of for profit individuals realized that if we were going to be successful on our entire area of operation were going to have to remove what lay within the soil and the coat of wood fiber. We started with the fiber and in some cases hand raked and loaded this fiber onto scow decks and took it to upland dump. This allowed the water current to sweep the ground easier. The next thing we did was to start tilling the substrait even though much of it did not have commercial quantities of clams in it. This process took in excess of four years but eventually the ground was cleaned of contaminants that restricted the growth of the clams. Admittedly we were not very scientific in our efforts but success sometimes equates to understanding. I believe that by resuspending the pollutants into the water column we exposed them to light and some natural process consumed and deteriorated them. Other more long term problematic substances such as mercury or lead if present were taken into deeper water and redeposited into areas we do not farm. I believe Doe and health have done sediment samples in Oakland Bay not finding levels of concern with any heavy metals or industrial waste. I also believe Battelle did some work with sediments there quite some time ago. I think Dr. Ralph Elston may remember this but I have not talked with him. I do not believe in any way there today exists a industrial pollution problem left from any of the sources that caused such problems prior to the 1970's. But I would love to sit down and talk one on one with you about this issue. My cell phone number is 360-490-5917 or in the evening you can talk to me at home by calling 360-426-9847. Let's discuss your and my thoughts on this controversial subject. I can at that time explain fully Seattle Shellfish operations in that bay and in Puget Sound. Please give me this opportunity.
Thank You
Steve Bloomfield

Attachment 2: Notes from Oakland Bay sub-committee meeting, 6/11/08, discussing sediment disturbance from shellfish aquaculture activities.

Steve Bloomfield, Seattle Shellfish: Is coordinating the harrowing about to happen with John Konovsky so that water sampling can be done before, during, and after. Noted a lot of changes in sediments in the bay over the last six months due to dragging and graveling.

Ecology Responses:

1st comment - general comments provided in the opening paragraphs

Ecology appreciates and notes the comments provided regarding: impacts of sulfite waste liquor discharges; positive impacts to shellfish aquaculture following removal of woody wastes; tidal, freshwater inflow, and wind impacts on the movement of contaminants within the bay; and the buildup of contaminants in the sediment over time.

Ecology appreciates the input provided by Mr. Steve Bloomfield in the attachments and has taken note of his comments.

2nd comment – previous investigations

Ecology agrees that previous investigations were surficial; depth of contamination is not known in this area. Ecology is addressing the issue of sedimentation and contamination/wood waste depths within sediment using several approaches. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), geophysical (resistivity and acoustic tomography) mapping will be conducted across the Bay to help identify wood wastes in the sediment. The SAP, as illustrated in Figures 4-2 and 4-3, also identifies several sediment cores which are being collected to better identify the depths of contamination and wood wastes within Bay sediment. Three cores are also being collected specifically to measure the sedimentation rate at different locations in the Bay.

3rd comment – study objectives

Comment noted.

4th comment – organization and schedule

Comment noted.

5th comment – study design (specific comments addressed individually as follows)

(1) – Reference Samples

Ecology understands the unique character of Oakland Bay in comparison to other bays within Puget Sound. Carr Inlet is being used solely to provide a reference area for bioassay testing. Under the State Sediment Management Standards (Chapter 172-204 WAC), it is necessary to test a reference sediment when conducting bioassays. The bioassays conducted on the subject sediment are compared to the bioassays from the reference sediment to determine whether the subject sediment meets the sediment quality standards. The reference sediment chosen should have physical parameters such as total organic carbon and grain size similar to that of subject area, but with

chemical concentrations known to be below the Sediment Quality Standards. Reference sediment samples are to represent sediments not affected by man-made activities.

Washington State Department of Ecology "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 172-204 WAC)" dated February 2008 references the Puget Sound Estuary Program (PSEP) protocols for bioassay testing. PSEP "Laboratory Sediment Bioassays – General QA/QC Guidelines – Revised July 1995" specify the need for Reference Test Samples and identifies several potential Puget Sound Reference Areas. The primary reference areas identified include: Sequim Bay, Samish Bay, Dabob Bay, and Carr Inlet. Of these options, Carr Inlet has been selected as the most reasonable reference area for Oakland Bay.

(2) – Issues of Concern
Ecology agrees that contaminants should be evaluated at areas outside Shelton Harbor. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), sediment sampling stations have been identified throughout Oakland Bay, Shelton Harbor and the western portion of Hammersley Inlet. The SAP, as illustrated in Figures 4-2 and 4-3, identifies sediment sampling station locations chosen to help identify the extent of contamination within Bay sediment. Sampling locations were modified based on community and stakeholder input to reflect curved transects out from Shelton Harbor to Oakland Bay and across Hammersley Inlet to provide information on contaminant (and potentially wood waste) migration. Sample locations were designed to look at a gradient from the Harbor and characterize areas across the Bay with little or no information, and to examine tidal flushing into upper Oakland Bay and out Hammersley Inlet during winter. High tidal-refluxing and high river flows late fall to late spring is characteristic of Oakland Bay, and low fresh water flushing in summer and early fall causing retention of contaminants as Mr. Michel accurately depicts.

(3) – Geophysical Survey
Ecology is addressing the issue of sedimentation and contamination/wood waste depths within sediment using several approaches. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), geophysical (resistivity and acoustic tomography) mapping will be conducted across the Bay to help identify wood wastes in the sediment. The SAP, as illustrated in Figures 4-2 and 4-3, also identifies several sediment cores which are being collected to better identify the depths of contamination and wood wastes within Bay sediment. Several subsurface sediment samples are scheduled for analyses concurrently with the surface sediment samples. Additional analyses may be conducted on archived sediment core samples collected over several depth intervals, based on surface and subsurface sediment analytical results. Three cores are also being collected specifically to measure the sedimentation rate at different locations in the Bay. Also, see response to Subsurface Sediment Cores, below.

(4) – Subsurface Sediment Cores

The Oakland Bay Sampling and Analysis Plan (SAP), identifies several subsurface sediment samples scheduled for analyses concurrently with the surface sediment samples. This includes all wood waste 1-2' intervals and the 1-2' interval for all samples in Shelton Harbor. The 1-2' depth was chosen as initial characterization and based on depositional and current transport patterns reviewed in Oakland Bay. Additional analyses may be conducted on the deeper archived sediment core samples based on this initial data.

Based on surface and subsurface sediment analytical results, additional analyses may be conducted on archived sediment core samples collected over several depth intervals. Washington Sediment Management Standards Chapter 173-204 WAC (SMS) Marine Sediment Quality Standards (SQS) provide criteria used to identify surface sediments that have no adverse acute or chronic effects on biological resources and no significant risk to humans and will be used to help guide additional analyses for the deeper intervals. Specifically, surface sediment with SQS exceedances of contaminants or bioassay toxicity, or elevated (compared to reference area) levels of other chemicals that do not have an SQS value may trigger subsurface analysis.

(5) – Additional Core Sample Location
The recommendation for an additional sample location is noted. As noted in our response to (1) above, Ecology has revised the proposed locations for sampling stations in Oakland Bay based on input from the community and stakeholders. Sampling stations have been combined and moved out from mouths to encompass stream flushing and depositional areas away from these areas.

Please note that fecal coliform analyses are not part of this investigation. Ecology's Water Quality Program is focusing efforts on bacterial contamination in Oakland Bay. For more information about these efforts visit Ecology's Web page at http://www.ecy.wa.gov/programs/wq/tmdl/oakland_bay/index.html

(6) – Shellfish Farming Substrate Modifications
Ecology and our contractors were made aware that commercial shellfish beds have been manipulated through harrowing and addition of gravel from offsite sources. Much of the substrate within these commercial areas has been modified by the addition of imported bottom material and the construction of berms. Ecology still desires to sample these areas, particularly in northern Oakland Bay, to determine baywide extent of contamination. It is understood that sedimentation and manipulation of sediment has occurred in this area, and care will be taken to provide accurate logs of the sediment cores in these areas to assist with interpretation of the study results.

(7) – Bioassays
Washington State Department of Ecology Sediment Management Standards Chapter 173-204 WAC (SMS) and "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 172-204 WAC)" (SSAPA) dated

February 2008 references the Puget Sound Estuary Program (PSEP) protocols for bioassay testing. The SMS, SSAPA and the PSEP "Laboratory Sediment Bioassays – General QA/QC Guidelines – Revised July 1995" identify the species that may be used in these assays. Selection of appropriate species for larval assays depends on the time of year for spawning and reference documents for abnormality determinations. For *Crassostrea gigas*, a summer spawner, the September sampling will preclude use of this species because inducing spawning may lead to higher mortalities. Ecology will adhere to the regulatory requirements so these bioassays may be used for evaluation of sediment toxicity under the SMS.

(8) – Tissue Samples
Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish analyses if data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species. Littleneck clams were planned for this study, Manila clams and Pacific oysters may also be considered if tissue sampling is done at a later time.

Ecology agrees that bivalves should be excellent indicators of pollutants and also agrees that "older" specimens would be more indicative of contamination over time than younger individuals. In the initial study plan, Ecology had planned to collect the most mature shellfish samples that could be found, to the extent practicable, and will do so if sampling is planned in the future.

(9) – Additional Sampling Totten Inlet
Ecology does not believe that a single sample at the mouth of Totten Inlet would provide adequate data to identify contaminants from Shelton Harbor as the source of contaminants that might be found in Totten Inlet. This would also be beyond the scope of this study. The planned sediment investigation includes not only Shelton Harbor but Oakland Bay and a portion of Hammersley Inlet. Data from these areas will be used to help estimate the extent of contamination, if any, emanating from Shelton Harbor.

(10) – Additional Test
Tests are possible that may indicate the "history" of oxygen in sediment. However such tests are beyond the scope of this study..

<u>6th comment – quality assurance/quality control for bioassay water quality</u>
Vibrio is a naturally occurring bacteria in sea water that affects bivalve development. The SSAPA and PSEP protocols noted above provide several alternative species of test organisms. Since Vibrio affects mussel and oyster larvae, the test may be conducted using sand dollars or sea urchins. Vibrio impacts are more likely associated with seawater than with sediment are not expected to be significant based on sediment bioassay. However, Ecology will be in communication with Oakland Bay shellfish growers and address this issue if it appears likely to impact the bioassays. Bioassay

protocols (controls) are in place which will allow potential bacteria impacts to be seen and captured.

7th comment – field procedures for tissue sample collection
Please refer to the responses to comments (6) and (8) above.

8th comment – Laboratory analytical procedures
Please refer to the response to comment (7) above.

9th comment – Data analysis and reporting
Comment noted.

Comment 9: Patti Miller-Crowley

Comment received as:
Email dated Thu 6/26/2008 9:05 AM
Subject: personal comments on Oakland Bay Sediment Investigation
The attached comments are mine as a citizen and are not on behalf of the Port.

Comment:

June 25, 2008

Cynthia Erickson, Site Manager
WA Dept. of Ecology
SWRO Toxics Cleanup Program
PO Box 47775
Olympia, WA 98504-7775

RE: Comments on Oakland Bay Sediment Investigation

Dear Ms. Erickson:

During the June 16 public meeting the upcoming study was characterized as an "initial investigation to get a better idea of the health of Oakland Bay." This study is not the initial investigation. The DOE handout itself states that "previous investigations have documented several contaminants above state cleanup level standards." Proposed sampling frequently does not appear to correlate to the previous sites which should serve as the baseline to determine trending over time. Quantifiable, measurable progress is needed to kick-start public support for the long-term commitment needed to clean up Puget Sound. Further, toxic sediments build up over time and often were

generated by uses that were formerly accepted practices (i.e. toxic bottom paints) and/or by companies that may no longer exist. Mason County's first water-powered sawmill was built in 1853 and by the late 1890's we had the four largest logging companies in the state. While I am all for accountability, public funds may be needed to help deal with these historic problems.

It is disappointing that little to date has been done to address the known "hot spots". Also, wood waste, an identified contaminated sediment source, continues to be generated via log rafting on a large scale which has the potential to continue to grow given the increasing cost of land transport.

Other issues that are somewhat confusing from the investigation presentation include:

- By isolating "sediments" and not addressing "water quality", it appears that there is a potential to re-contaminate sediments if the water quality issues are not addressed concurrently and vice versa. Other studies (i.e., Oakland Bay Action Plan, Draft South Puget Sound Water Quality Study-Phase II- Dissolved Oxygen) need to be integrated for a holistic rather than piece-meal approach. This may also provide opportunities to leverage funding.
- How does the study plan to separate contamination from historical –vs- current activities (i.e. historical wood waste from current log rafting)?
- The description of wood waste sampling and concentrations was confusing and misleading as it changed several times throughout the presentation.
- Why does tissue data analysis not include any fish species?
- The person who identified Brant absence during the meeting is very knowledgeable about local bird populations so if he suggests that this species is not appropriate to be at risk for exposure, I would believe him.

Lest this appear too critical, I am happy that there appears to be follow-up to the past sediment study, even if it is another study. Given the Governor's timeline, perhaps concurrent clean up of known hot spots might be appropriate. Finally, there may be opportunities to integrate areas that would benefit by dredging to also achieve the goal of sediment abatement. An example would be the unimproved Pine Street boat ramp that is between a former fuel depot site (MTCA cleanup) and marine rail. This is another reason to take a holistic approach to this issue.

Sincerely,

Patti Miller-Crowley
Citizen

Ecology Responses:

1st Comment – Initial investigation

To date, there has not been a comprehensive investigation of Oakland Bay sediments. Previous studies identified in the Oakland Bay Sediment Investigation Sampling and

Analysis Plan (SAP) were limited in scope - for example, the National Dioxin Study; location - for example the Evergreen Fuel Site Remedial Investigation; or did not address chemical contamination - for example, the 2004/2005 TMDL studies. The most comprehensive study to date, Ecology's "Reconnaissance Survey of Inner Shelton Harbor Sediments" published May 2000, focused on Shelton Harbor and did not address the suite of potential contaminants of concern included in this study or the potential for the release of these contaminants outside the harbor. Only surface samples at 10 locations in Shelton Harbor were collected in the 2000 study for chemical screening analysis and 37 subtidal stations to evaluate and quantify wood waste. Nineteen violations of Sediment Quality Standards (SQS) were noted at 7 of the 10 locations, and 6 of 10 had Cleanup Screening Level exceedances. Chemical sediment monitoring in the event of disturbance (i.e. dredging) and transport of out of the Harbor was recommended in the 2000 study, as were biological effects testing (bioassays) for wood waste areas and areas of sediments with SMS exceedances. More accurate mapping of wood debris was then recommended, using a higher density of sampling. The information in the 2000 Reconnaissance study is not enough to make decisions about cleanup target areas or priorities.

2nd Comment – Sampling does not correlate with previous sites to determine trends over time

This study to a certain extent represents a baseline evaluation of Oakland Bay sediment, to determine the presence of contamination and wood waste. Data collected during this investigation will be compared to the limited data available within Oakland Bay. The goal of the study within Shelton Harbor differs from that of the bay. The harbor study is designed to help identify sources of contamination, begin to delineate potential "hot spots" within the harbor, and to clarify the nature and extent of contamination within the harbor to further characterize and prioritize areas for cleanup. Ecology agrees that re-sampling previously sampled areas could provide information regarding temporal changes, and some locations have been placed near those locations to supplement data collected. However, given the known variability of contaminant concentrations over short distances, and the inherent difficulty in returned to the exact same location previously sampled, the objectives noted above were of higher priority and value in terms of providing data for decision making. It is not as important to understand the difference in contaminants between 2000 and today as it is to identify areas which are currently contaminated. Temporal trends will be evaluated by comparing the levels of contaminants within sediment cores taken at multiple depths below the sediment surface.

3rd Comment – Quantifiable progress and public support and funding

Oakland Bay is one of seven bays identified as a priority for environmental restoration by the Washington State Department of Ecology as part of the Puget Sound Initiative. Ecology's "Reconnaissance Survey of Inner Shelton Harbor Sediments" report published May 2000 focused on inner Shelton Harbor and did not provide data adequate to address all Oakland Bay. The Oakland Bay Sediment Investigation is designed to build on and supplement the limited inner harbor study in order to ensure that activities and

funding are focused on the most urgent and important problems facing the Bay and Puget Sound.

In response to the Puget Sound Initiative and increased funding, Ecology has accelerated its efforts to clean and restore contaminated sites within identified priority bays. These areas are the cornerstones of Ecology's approach to protect and restore Puget Sound. Ecology is taking a baywide approach, rather than site-specific, approach to cleaning up numerous sites within a geographic area.

While the data from the 2000 Reconnaissance Study did indicate the pollutants were present in Oakland Bay, Ecology did not begin to identify liable parties and require them to conduct investigations to begin cleanup – due to other priorities for cleanup staff and financial resources, and the potentially very large scale of such a project. Now that public funding has been made available for addressing larger 'bay-wide' problem areas, Ecology is providing public funding for investigating the bay, instead of requiring liable parties to do so. It is also possible that public funds may be provided to local governments in the future, under the State Toxics Control Account, if local governments are identified as potentially liable parties for cleanup.

4th Comment – "hot spots"

A review of past studies has documented certain areas with elevated concentrations of toxics and wood waste. Until receiving additional funds under the Puget Sound Initiative, Ecology did not have resources to use state funds to investigate or clean up these hot spots. To address hot spots would have required Ecology to identify liable parties under the Model Toxics Control Act (RCW 70.105D), and require the liable parties to investigate and remediate the areas. Although Ecology has been aware of the potential for contamination in Shelton Harbor, it was not until the Puget Sound Initiative and its associated funding that this area became a higher priority for immediate action.

5th Comment – wood waste

Ecology agrees with the writer's concern about discharges of wood debris from log barges. This is an area that is not well regulated at the current time. Under State of Washington and United States laws and regulations it is against the law to discharge materials into marine waters. On aquatic lands that are owned by the Department of Natural Resources, there are conditions in leases and use permits to ensure that the underlying lands are not negatively affected. However, on private lands, there is not a specific permit or enforcement effort directed at log rafting or barge/chip loading operations. The Ecology Reconnaissance Survey of Inner Shelton Harbor Sediments report from May 2000 recommended that 'best management practices' to prevent chips and bark from entering the waters be applied at the Simpson Mill in Shelton.

If the results of the Oakland Bay Sediment Characterization study indicate that a cleanup of wood debris is needed, a part of the cleanup analysis will be targeted toward

controlling sources of the bark, chips, or other wood debris to avoid recontamination of sediments.

Citizens can report water quality violations to the Department of Ecology complaint hotline at (360) 407-6300. As resources allow, Ecology staff will respond to complaints with a site visit, warning letter, or call to the discharger to redirect their activities to prevent water pollution.

In this study, Ecology is addressing the issue of wood debris using several approaches. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), geophysical (resistivity and acoustic tomography) mapping will be conducted across the Bay to help identify wood waste in the sediment. The SAP, as illustrated in Figures 4-2 and 4-3, also identifies several samples which are being collected to better identify the nature and extent of wood waste within the Bay.

6th Comment – Other issues (multiple comments addressed individually as follows)
Bullet 1 – not addressing "water quality" & integration with other activities
The role of the Toxics Cleanup Program is to clean up toxic sites. A leading source of pollution to the Sound is contaminated sites around its shorelines. Ecology's Toxics Cleanup Program has identified contaminated sites within one-half mile of the Sound. In response to the Puget Sound Initiative and increased funding, Ecology has accelerated its efforts to clean and restore contaminated sites within identified priority bays. The focus of the Oakland Bay Sediment Characterization Study, as a PSI site, is to assess presence of contamination and wood waste to focus on areas for cleanup. Ecology is working with other programs and stakeholders to identify and address other issues contributing to contamination such as source control and water quality. Studies for dissolved oxygen and fecal coliform bacteria, while extremely important for the overall health of the bay, are not closely tied to the work of evaluating contamination of sediments from chemicals and wood waste. Ecology has committed to working with the Squaxin Island Tribe and participating in the Mason County Clean Water District Advisory Committee meetings as well for a holistic approach to Oakland Bay health, cleanup and restoration. Ecology staff also coordinate internally to be sure each program is aware of the work the other is doing and possible overlaps or opportunities for enhancement.

Ecology will use the information from the sediment study to determine if there may be ongoing sources of pollutants to the sediments – either direct discharges of materials such as wood debris and bark or impacts from chemically contaminated water discharges. The potential for recontamination of sediments would be taken into account during the planning stages for any cleanup that would be performed.

On a larger scale, the Puget Sound Partnership http://www.psp.wa.gov/ has taken the lead in mobilizing communities, agencies and organizations to work together to create a comprehensive Action Agenda to restore Puget Sound. Ecology is working cooperatively

with the Partnership to integrate studies conducted by multiple entities and develop a cost effective strategy for restoration of the ecological health of Puget Sound.

Bullet 2 – contamination from historical versus current activities

The Oakland Bay Sediment Investigation focuses on sediment contamination. Sediment provides a record of long-term impacts to the marine environment. The sampling within Shelton Harbor is designed to help identify sources of contamination to the sediment. Core samples are being collected which can be utilized to identify temporal trends in contaminant input to the harbor by comparing the levels of contaminants and wood waste within sediment cores taken at multiple depths below the sediment surface.

During design of the study, wood waste locations and potential sources of the wood waste contamination were looked at when determining sample locations. As noted in the SAP, field personnel will visually describe the physical nature of the sediment and may be able to differentiate the visual appearance of the wood waste over the depth of the sediment core. Known current and historic log rafting, wood handling, and chip loading areas have been identified. Type of wood present (i.e. bark, saw dust, wood chips) may differentiate these areas.

Bullet 3 – confusing descriptions regarding wood waste

Ecology regrets any confusion during its Oakland Bay Sediment Investigation Public Meeting of June 16, 2008. Without more specific comments, Ecology believes its best response is to refer the commenter to the Oakland Bay Sampling and Analysis Plan. Ecology is confident this document will provide clarity regarding both historical and proposed wood waste sampling and concentrations.

Bullet 4 – lack of fish tissue samples

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of tissue samples until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and fish analyses if the data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species.

Ecology acknowledges that fish sampling and analysis could provide valuable data. Costs for the collection and analysis of the number of fish which would be required to allow for a statistically significant determination of contaminant accumulation in multiple species would be extremely high and were beyond the scope of the current investigation. In the original study design, Ecology had planned to address the risk to fish by modeling uptake and bioaccumulation.

Bullet 5 – use of Brant in ecological risk assessment

Based on input from the community and stakeholders, Ecology has decided to defer a risk assessment until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the need for risk assessment if the data indicate that

this would be appropriate. As noted below, if an ecological risk assessment is conducted, Ecology will use the Canada Goose rather than the Brant in the assessment.

Both Brant and Canada Goose are large herbivorous waterfowl and both fit the requirement for representative species within this group in the Ecological Risk Assessment. Even if anecdotal comments made at the Oakland Bay Sediment Investigation public meeting of June 16, 2008 regarding the absence of eel grass within Oakland Bay are correct, herbivorous waterfowl also consume algae and other water plants. The EPA and others have published exposure and effects data for Canada Goose. Therefore Ecology will replace the Brant with Canada Goose for the ecological risk assessment, if one is performed.

7th comment – integration of sediment-related projects
Comment acknowledged. The focus of the Oakland Bay Sediment Characterization Study, as a PSI site, is to assess presence of contamination and wood waste to focus on areas for cleanup. Ecology will be, and is, working with other programs and stakeholders to identify and address other issues contributing to contamination such as source control and water quality. Ecology has committed to working with the Squaxin Island Tribe and participating in the Mason County Clean Water District Advisory Committee meetings as well for a holistic approach to Oakland Bay health, cleanup and restoration. If there are other drivers for work in the sediments, such as need for maintenance dredging, Ecology will work with those entities that need to perform the work to coordinate and take advantage of united efforts related to sediments.

Comment 10: Patricia B. Case, Green Diamond Resource Company

Public/Regulatory Affairs Manager
Green Diamond Resource Company
Northwest Timberlands Division
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Comment received as:
Email dated Tuesday, 7/15/2008 10:10 AM
Subject: 0708 Oak inv comments.doc

Comment:
Re: Comments on Oakland Bay Sediment Investigation

Thank you for the opportunity to comment on the Oakland Bay Sediment Investigation to be undertaken by the Department of Ecology. We particularly appreciate the extension of the comment period to August 11.

Green Diamond Resource Company owns approximately 25,000 acres of timberland in the Oakland Bay-Hammersley Inlet Watershed. In addition, we are a major supplier to our sister company, Simpson Timber Company, as well as to Olympic Panel Products, both of which have operations on Shelton Harbor. For these reasons, along with the fact that our roots in Shelton and Mason County date to 1890, we are interested in the careful stewardship of both land and water in this, our original operating community.

We have been involved in a stakeholder group which has been successful over the past 18 months in developing several aspects of a clean water plan for Oakland Bay. Such success would indicate that our community could become a model for a new approach to study and clean-up efforts, more closely aligned with the efforts of the Puget Sound Initiative. Of course, we all want a clean Puget Sound for ourselves and our successors. Instead of a MTCA-style investigation focused on remediation efforts, we support a proactive effort which will involve community stakeholders working cooperatively to focus on restoration and ultimately produce a cleaner Puget Sound. We believe that, given the nature of our community and the willingness to work together that has already been demonstrated, Oakland Bay could become a model for such a positive effort, one that could be duplicated in other communities to reach restoration goals in a collaborative manner.

We all want to restore Puget Sound. We ask that the Department of Ecology take a step back from its sediment investigation and work with the stakeholder's group in Mason County to achieve our mutual goal.

Ecology Response:

Ecology acknowledges concern from stakeholders regarding the notification on the Public Review Draft SAP and upcoming sampling. Ecology also acknowledges the unique collaborative efforts already underway toward assessment of Oakland Bay by a number of stakeholders, and acknowledges that earlier communication with parties already very involved in water quality issues in Oakland Bay should have occurred.

While Ecology has a public input process and welcomes feedback, we do not have the resources to create a watershed-type council for each bay for ongoing detailed involvement by stakeholders. However, Ecology is working on better interaction with the Squaxin Island Tribe and will participate in the Mason County Clean Water District Advisory Committee meetings to keep stakeholders apprised of the work conducted in Oakland Bay. Ecology will make every effort to keep stakeholders updated on progress made in the study as it moves forward.

The proposed sediment investigation is one element within a more comprehensive understanding and work toward restoration of Oakland Bay and surrounding watershed

by Ecology as well as local governments and business. The sediment study will provide information about hazardous chemicals and wood waste that is necessary to evaluate cleanup needs. Ecology believes cleanup is one component of community-wide efforts toward overall bay restoration. As was discussed at the July 29 Stakeholder meeting, Ecology is supportive of local government efforts to create unique partnerships that bring together many aspects of cleanup and restoration as well as economic development. Examples of this are present in Bellingham Bay, Port Angeles, and Budd Inlet. Also as was discussed at the July 29 and August 11 stakeholder meetings, there is some flexibility under the Model Toxics Control Act to incorporate habitat restoration into cleanup decisions, and to integrate cleanup decisions with local priorities for restoration as well as economic development.

Once the Sediment Investigation Report is received, Ecology will work with stakeholders toward effective and integrated cleanup, within the bounds of regulations and its role as a regulatory entity.

Comment 11: Jason Ragan, Taylor Shellfish

SE 130 Lynch Rd, Shelton, WA

Comment received as:
Hard copy on June 16, 2008

Comment:
(see reproduction of written comment, next page)

DEPARTMENT OF ECOLOGY
State of Washington

Oakland Bay Sediment Investigation
Public Comment Form

This form is for providing comments on the Oakland Bay Sediment Investigation Sampling and Analysis Plan. Your comments will be read by Cynthia Erickson, the Ecology site manager, and a written response will be provided.

A response to your comments will be part of a responsiveness summary. The summary will be made public and mailed directly to those who comment.

You can submit your formal comment tonight or, if you need more time, complete it at home and mail it to Cynthia Erickson, Southwest Regional Office, Toxics Cleanup Program, PO Box 47775, Olympia, 98503. Please submit your comments by July 2, 2008.

NAME: Jason Ragan

ADDRESS: Taylor Shellfish
SE. 130 Lynch Rd, Shelton WA

CITY:

Thank you for your interest in the Oakland Bay Sediment Investigation!

COMMENTS
(Please use back side of this form if you need more room)

The week chosen for sample collection is good for shell fish samples + low tide work, not good for high tide work.

Ecology Response:

Based on input from the community and stakeholders, Ecology has delayed the field investigation. Ecology has evaluated the appropriateness of the tides in choosing an acceptable time frame for field work and has identified the week of September 29 to begin sampling. Good high tides are found in this period.

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish

analyses if data indicate that this would be appropriate. Since shellfish tissue will not be collected, it is not necessary to conduct field work during low tides. In fact, higher tides will provide better access for the sampling boat to reach all sample locations.

Comment 12: Lincoln Loehr

Comment received as:
Email dated Tuesday, July 29, 2008 9:00 AM
Subject: comment re Oakland Bay sampling plan

Comment:
I note that the plan does not provide information on the timing of when samples will occur. For sediments that is OK. However, I suggest that two sampling periods for the shellfish tissue are needed. One would be in the rainy season in December (to match the timing of when NOAA's national mussel watch samples have always been taken) and the other would be in July or August. The purpose is to have samples from both wet and dry seasons, which in turn would provide information about differences most likely attributed to runoff.

The National mussel watch has shown Puget Sound mussels to have higher PAHs than the rest of the country. I often thought that didn't make any sense. A couple of years ago I found out that all of the National mussel watch samples have been taken in December. Then the PAH distribution made more sense to me. On the west coast, our rainy season is in the winter, so December sampling would have measured contaminants that mussels had been able to concentrate after a month or two of the rainy season. For the Gulf Coast, the summer is the rainy season, so mussels sampled in December would have had an extended dry period to depurate thereby reducing their PAH burden. The east coast tends to distribute the rain more evenly throughout the year, so December sampling would not be measuring any start of rainy season elevated concentrations.

I had posed that idea to Dr. Alan Mearns of NOAA who was on the Snohomish County Marine Resource Committee. There were a number of mussel watch stations in Snohomish County. The MRC did an extra round of sampling in July of last year and the results came in substantially lower for PAHs than the December sample.

Sampling the two seasons will provide more useful information than single season sampling.

Ecology Response:
Ecology appreciates the importance of seasonality in sampling shellfish and your valuable input. Based on input from the community and stakeholders, Ecology has

decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish sampling and analyses if the data indicate that this would be appropriate. At that time, Ecology will consider multiple rounds of sampling based on seasonal variations.

Comment 13: Lionel Klikoff, Washington State Department of Natural Resources

Environmental Specialist
Sediment Quality Unit
Aquatic Resources Division
1111Washington Street SE
MS 47027
Olympia, Washington 98504-7027

Comment received as:
Letter dated June 24, 2008
Subject: Sampling and Analysis Plan: Oakland Bay

Comment:
(See below)

The Department of Natural Resources (DNR) thanks you for the opportunity to comment on the draft *Oakland Bay Sediment Characterization Study, Mason County, Washington*, May 8, 2008.

The Department of Natural Resources as the steward of the aquatic lands owned by the State of Washington has the obligation to protect state owned aquatic lands. State-owned aquatic lands are managed by DNR for future and current citizens of the state to sustain ecosystems and economic viability and to ensure long-term access to aquatic lands and the benefits derived from them. DNR is directed by the legislature to balance land management activities with other public benefits including environmental protection, fostering water dependent uses, utilizing natural resources, encouraging public use, and generating revenue.

1. The Department of Natural Resources welcomes the Oakland Bay study as part of the Puget Sound Initiative to study and restore sediment quality within Puget Sound.
2. The study should gather sufficient data to provide for the development of a conceptual model of sediment movement in the bay in addition to sedimentation rates.
3. Sufficient tissue data should be gathered to provide a firmer basis for determination of ecological risk assessments. Levels of contaminants should be determined in macroalgae and Zostera within the study area. If possible levels should be determined in herbivores largely restricted to the bay. Bottom dwelling fish such as lingcod and non- migratory waterfowl may be appropriate.
4. It would be useful to characterize visually wood waste as it is removed including color, odor, nature of wood waste, state of decomposition, presence of biota, subsamples for sulfide, etc. I strongly urge consideration for subsamples for sulfides.
5. A local group built on the Action Committee created by Mason County Public Health Department would be a useful vehicle for Ecology to coordinate and disseminate information regarding the Oakland Bay study.

Thank you for the opportunity to comment on the sediment characterization study for Oakland Bay. We look forward to reviewing the sampling results.

Ecology Responses:

1st comment

Comment noted.

2nd comment – conceptual model of sediment movement

Ecology acknowledges the value of a model describing sediment movement in the bay.

Ecology is addressing the issue of sedimentation and waste depths within sediment using several approaches. Shallow acoustic tomography (imaging) of the seabed will be performed across each of the primary geomorphic units throughout greater Oakland Bay, including the Goldsborough Creek delta, Shelton Creek delta, Deer Creek delta, Campbell Creek delta (Chapman Cove) and the main basins of Oakland Bay, Shelton Harbor, and Hammersley Inlet. Acoustic imaging will used to estimate the changes in the composition of the uppermost layers of the seabed. The onset of development in the area (i.e., deforestation and other changes to the local hydrology) had a strong impact on sedimentation and thus produced changes in the composition of the seabed. It is expected that these changes will record the amount of sediment deposited since the onset of development 150 years ago. In conjunction with core-dating and known geologic markers determined from the background analysis (e.g., the timing of the stabilization of the modern sea level), it is possible that a sediment budget may be formulated for the various depositional areas. This information will provide a detailed picture of the geomorphic processes active in greater Oakland Bay.

3rd comment – tissue data for ecological risk assessments

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish, fish, macroalgae, Zostera (eel grass), and waterfowl sample collection and analyses if data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species.

Ecology acknowledges the value that a comparison of interspecies contaminants uptake could provide. Costs for the collection and analysis of the number of shellfish and other species which would be required to allow for a statistically significant determination of interspecies contaminant accumulation differences would be extremely high and were beyond the scope of the current investigation.

Ecology had planned to address the uncertainty that would result from analyses of different species, with potentially different toxic uptakes, by collecting only a single shellfish species. Little neck clams, the species anticipated to be most commonly encountered in Oakland Bay, and thus the species that will provide a greater likelihood for collection of adequate sample mass to meet project-specific detection limits, was also assumed to represent the species with the highest consumption rate for risk evaluation.

In the original study design, Ecology had planned to address human health and ecological risks by modeling uptake and bioaccumulation in fish.

4th comment – visually characterize wood waste

A visual description of each sample will be provided, as discussed in Section 6.4 of the final Sampling and Analysis Plan. Tables 4-3, 4-5, and 4-7 in the Oakland Bay Sediment Investigation Sampling and Analysis Plan identify all the sediment samples that will be submitted for analyses, including sulfides in wood waste.

5th comment – Ecology coordination with Clean Water District

Ecology will participate in the Mason County Clean Water District Advisory Committee meetings to keep stakeholders apprised of the work conducted in Oakland Bay. Ecology will make every effort to keep stakeholders updated on progress made in the study as it moves forward.

Comment 14: Heather Trim, People For Puget Sound

Urban Bays and Toxics Program Manager
911 Western Ave, Suite 580
Seattle, WA 98104
General tel: 206.382.7007 X215
Direct tel: 206.382.7005, immediately hit 215
Fax: 206.382.7006
email: htrim@pugetsound.org
url: pugetsound.org

Comment received as:
Email dated Wed 7/2/2008 8:29 PM
Subject: People For Puget Sound Comment Letter Oakland Bay

Comment:
RE: Oakland Bay Sediment Characterization Study: Sampling and Analysis Plan (Public Review Draft)

We are writing to comment on *Oakland Bay Sediment Characterization Study, Mason County, Washington*, dated May 8, 2008.

People For Puget Sound is a nonprofit, citizens' organization whose mission is to protect and restore Puget Sound and the Northwest Straits.

The harbor is contaminated with wood debris/creosote, dioxins and furans, polychlorinated biphenyls (PCBs) and other chemicals. We applaud Ecology for taking a proactive approach at Oakland Bay. The area has poor circulation due to its geographic configuration and action may be needed to prevent fish kills due to oxygen problems. We are also concerned about toxic contamination in area wildlife and the health of the biotic community in general.

Our comments follow:

1. **Sampling analysis.** Our experience has been that almost every sediment cleanup site in Puget Sound has had inadequate sampling that required more sampling to fill in later. We believe that a grid approach is more effective in the long run rather than focusing on areas known or suspected to be contaminated. We suggest that the sampling site selection be reviewed to ensure that this round of sampling will be definitive and additional sampling for the basic characterization won't be needed.

2. **Background.** We found the description of sampling to determine background confusing. We would like to ensure that samples are collected far enough out from the heart of the bay to get to "clean."

3. **Biotic community.** We believe that analysis of biotic community should be conducted as well as bioassays. This would yield better data about benthic long-term health.

4. **Fish tissue.** We request that fish tissue data be included in the study. The human health and ecological risk assessments should be based on current and local data.

5. **Dioxin sampling**. We are concerned that adequate dioxin sampling be included in the study so that its distribution is fully characterized at depth.

6. **Source Detection.** Samples up creeks and drains should be collected as part of this study rather than waiting till a later phase. This would be most cost efficient for the total study.

7. **Climate change.** We believe that all work done in Puget Sound should consider potential future impacts due to Climate Change. Investigations at this site, therefore, should consider that some upland areas might be under water or inlet physical dynamics may change.

8. **Stakeholders.** We are concerned that a fuller and more in-depth stakeholder process be developed for each of the seven Ecology Priority Bay Sediment Investigations. A large amount of public funding is being spent to conduct these investigations and the potential cleanups. We believe that Ecology should take a lead role in shaping how the various stakeholder processes be conducted (aside from the formal public hearings related to each phase). A watershed council model could work well - in which all of the stakeholders meet on a regular basis to discuss the various aspects of each investigation. We see ourselves as a stakeholder for this site because we have members in the Shelton area and because our mission is to restore the health of all of Puget Sound and the NW Straits.

Ecology Responses:

1st comment – Sampling analysis

Ecology is evaluating Shelton Harbor as an area of known sediment contamination and Oakland Bay (excluding Shelton Harbor) as an initial investigation given the extremely limited sediment data available for that area. Previous studies have documented the presence of contaminants in Shelton Harbor sediment at concentrations that exceeded the Washington State Sediment Management Standards (SMS) Sediment Quality Standards (SQS), but little is known about the sediments of the outer bay.

The overall goal of the sampling and analysis program for Shelton Harbor is to better identify potential sources of contamination and document the nature and extent of contamination in the harbor. Harbor sampling is augmented with Oakland Bay and Hammersley Inlet sampling to determine if contaminants have migrated outside the Harbor and the nature and extent of any migration. The overall goal of the Oakland Bay (outside of the harbor) investigation is to assess the presence of contamination and wood waste.

Washington State Department of Ecology "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 172-204 WAC)" dated February 2008 has been a key in the development of the sampling and analysis program for the Oakland Bay Sediment Investigation.

The last significant sampling event in Shelton Harbor was conducted in May 1999, over nine years ago. The study was "a screening level survey of sediment quality in inner Shelton Harbor" whose primary objectives were to "evaluate contaminant levels (metals and organics) near potential sources" and "estimate the distribution of wood waste in subtidal sediment". Ecology Publication No. 00-03-014 "Reconnaissance Survey of Inner Shelton Harbor Sediments" was published May 2000. You may find the report at: http://www.ecy.wa.gov/biblio/0003014.html

The reconnaissance survey made six recommendations. Three were related to management practices and monitoring prior to any activities that could disturb sediments. Two recommendations were for biological testing and the third was for "more accurate mapping of wood debris" if the biological testing indicated adverse effects.

Ecology has relied upon the Ecology guidance document noted above as well as solicited input from the community regarding sample locations. Locations were re-evaluated and revised and the study objectives were clarified based on input from the community and stakeholders. Several modifications were made to sample locations to provide appropriate coverage to assess presence of contamination/wood waste in Oakland Bay, help identify potential contaminant sources within the bay, the extent of sediment contamination (including wood waste) within the Shelton Harbor, and to determine if contaminants had migrated to Oakland Bay. Ecology believes that sufficient data will be generated to provide an acceptable investigation of sediment contamination in Shelton Harbor to further characterize and prioritize areas for cleanup, and assess presence of sediment contamination in Oakland Bay as described in Section 4.2.1 of Ecology's guidance document. Ecology's proposed sampling includes several contaminants (pesticides, dioxins, and furans) not included in the screening survey.

Ecology notes that should contamination be found that requires cleanup, it is highly likely that any named potentially responsible parties will be required to conduct further

investigations to better define sources and the extent of contamination as part of the formal cleanup process.

The reconnaissance survey recommended biological testing which is included in the planned study. Ecology is conducting concurrent chemistry and bioassay testing on sediment and wood waste samples from both Shelton Harbor and Oakland Bay. This will provide data from a single sampling event rather than requiring two events as is usually done. In addition to cost savings from a single field event, this approach will provide data more expeditiously for decision making. By conducting bioassays concurrently with chemical analyses, toxicity that could result from contaminants not included within the SMS or from combinations of chemicals will be assessed.

Ecology is addressing the issue of wood waste distribution and depths within sediment using several approaches. As stated in the Oakland Bay Sampling and Analysis Plan (SAP), geophysical (resistivity and acoustic tomography) mapping will be conducted across the Bay to help identify wood wastes in the sediment. The SAP, as illustrated in Figures 4-2 and 4-3, also identifies several sediment cores which are being collected to better identify the depths of wastes within Bay sediment. Three cores are also being collected specifically to measure the sedimentation rate at different locations in the Bay.

2nd comment – Background

The Oakland Bay Public Review Draft Sampling and Analysis Plan identified a potential background sample in northern Oakland Bay. This station was initially chosen to provide an "area background" not influenced by a specific contaminant source, but to represent sediment subject to the influence of the nearby highway and other human activities unrelated to releases from a specific facility.

The sample originally designated as "background" was located close to a stormwater outfall from Highway 3 and was close to a Washington Department of Transportation maintenance yard, therefore was unlikely to represent a true "natural" background level. Since very little information is known about upper Oakland Bay, Ecology agrees that it does not make sense at this time to designate a specific sample as "background". The samples to be collected in Carr Inlet for the bioassay reference are from a designated *reference* sediment area, where sediments are known to meet the state Sediment Quality Standards. The chemical and bioassay results from this study will be compared to the Carr Inlet sediment quality to evaluate whether levels are elevated above Puget Sound "background". Also, results from the Oakland Bay samples will be evaluated to determine whether the values represent a "background" for the area.

3rd comment – Biotic community

Ecology agrees that an expanded assessment of the biota within Oakland Bay could yield additional data regarding potential sediment impacts on benthos. However, cost and time for the collection and analysis of a biotic community analysis were beyond the

scope of the current investigation based on the limited contaminant and wood waste data in Oakland Bay. Collecting contaminant and wood waste data is a higher priority at this time.

4th comment – Fish tissue

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of tissue samples and the risk assessments until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and fish analyses if the data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species.

Ecology acknowledges that fish sampling and analysis could provide valuable data. Costs for the collection and analysis of the number of fish which would be required to allow for a statistically significant determination of contaminant accumulation in multiple species would be extremely high and were beyond the scope of the current investigation. Ecology had planned to address human health and ecological risks by modeling uptake and bioaccumulation in fish.

5th comment – Dioxin sampling

Ecology believes it has identified a sufficient number of samples for dioxin analyses based on previous presence of dioxins in the bay. All surface samples will be analyzed for dioxins initially. Should the data indicate additional analyses at depth are appropriate, archived sample would be submitted for analysis.

6th comment – Source detection

This is a study of the marine sediments within Oakland Bay. Many of the sampling station locations were selected to determine if creek and/or outfalls could be sources of contamination. The sampling and analysis of sediments from creeks and drains would more appropriately be a component of any future watershed study. Results of this sediment investigation can be used to help identify the need for such an investigation and to help focus the study on areas of concern. Based on statements made at the June 16, 2008 Oakland Bay sediment investigation public meeting by the Director of Public Works for the City of Shelton, the City adopted a stormwater plan in approximately 2002 that includes cleaning its drains on an annual basis as well as sampling drains on a regular basis. The City of Shelton may be able to provide additional data regarding potential sources. The Squaxin Island Tribe also noted during meetings with Ecology that it has data on water quality in several streams that empty into Oakland Bay.

7th comment – Climate change

Ecology acknowledges the long term value of considering potential future impacts due to Climate Change. However, the scope of this study is to evaluate existing conditions within the sediment. The study requested would, as noted above, would be more appropriate as a component of future, broader based studies.

Ecology's concerns regarding climate change as especially impacts on sea levels are presented on the following Ecology web site
http://www.ecy.wa.gov/climatechange/risingsealevel.htm

Ecology's coastal and infrastructure information is located within the Climate Change Interim Report at the following web site: http://www.ecy.wa.gov/pubs/0801008c.pdf. The Climate Change Interim Report is available on the following web site: http://www.ecy.wa.gov/climatechange/interimreport.htm.

8th comment – Stakeholders

Ecology acknowledges concern from stakeholders regarding the notification on the Public Review Draft SAP and upcoming sampling. Ecology also acknowledges the unique collaborative efforts already underway toward assessment of Oakland Bay by a number of stakeholders, and acknowledges that earlier communication with parties already very involved in water quality issues in Oakland Bay should have occurred. However, while Ecology has a public input process and welcomes feedback, we do not have the resources to create a watershed-type council for each bay for ongoing detailed involvement by stakeholders.

In response to requests from stakeholder in the Mason County area for better communication from Ecology and opportunity to be more closely involved in the project, Ecology extended the public comment period to August 11, and hosted two stakeholder meetings (July 29 and August 11, 2008). A technical discussion session was also held with a subset of stakeholder to discuss specific details about the sampling design (August 6, 2008). Sampling was also delayed to the end of September to incorporate comments and concerns on scope of the study as well as sampling locations. The risk assessments and tissue sampling has been deferred, and the objectives revised to clarify different goals in Shelton Harbor and Oakland Bay/Hammersley Inlet area as a result of these discussions.

Ecology also is working on better interaction with the Squaxin Island Tribe and will participate in the Mason County Clean Water District Advisory Committee meetings to keep stakeholders apprised of the work conducted in Oakland Bay. Ecology will make every effort to keep stakeholders updated on progress made in the study as it moves forward.

Once the Sediment Investigation Report is received, Ecology will work with stakeholders toward effective cleanup, within the bounds of regulations and its role as a regulatory entity.

Due to the different stakeholders and cleanup needs at the PSI embayments, public involvement will be unique for each embayment. Stakeholder and tribal inquiries and involvement will be solicited at key project junctures and during the cleanup process. In general, the 7 Puget Sound baywide sediment studies are a small and separate part of our cleanup work in these embayments. They are conducted to help Ecology understand

the general sediment quality of the area and help set cleanup priorities. Because of the specific, limited scope of the sediment studies and the need to mobilize efficiently, Ecology is not inviting large scale public participation for each study. Ecology invites all interested citizens to become involved during the cleanup process. Public Participation Plans have been prepared for each cleanup in the PSI embayments. These plans explain how you can learn about and review plans for cleaning up contaminated sites, and include your comments in the decision-making process.

Comment 15: Board of Mason County Commissioners

Tim Sheldon – Chair
Lynda Ring Erickson – Commissioner
Ross Gallagher – Commissioner
Mason County Building 1
411 North Fifth Street
Shelton, WA 98584-3400

Comment received as:
Letter dated July 17, 2008
Subject: Re: Comments on Oakland Bay Sediment Investigation

Comment:
Please see next page for entire comment.

RECEIVED
JUL 2 4 2008
Washington State
Department of Ecology

MASON COUNTY
BOARD
OF
COMMISSIONERS

1st District
LYNDA RING ERICKSON

2nd District
TIM SHELDON

3rd District
ROSS GALLAGHER

Mason County Building 1
411 North Fifth Street
Shelton, WA 98584-3400
(360) 427-9670 ext. 419
(360) 275-4467 ext. 419
(360) 482-5269 ext. 419
Fax (360) 427-8437

July 17, 2008

Department of Ecology
Cynthia Erickson
PO Box 47600
Lacey, WA 98504

Re: Comments on Oakland Bay Sediment Investigation

Dear Ms. Erickson:

Thank you for the opportunity to comment on the Oakland Bay Sediment Investigation to be undertaken by the Department of Ecology. We particularly appreciate the extension of the comment period to August 11, giving concerned citizens throughout Shelton and Mason County an opportunity to better acquaint themselves with the project.

We understand that this investigation is proposed under the state's Model Toxics Control Act. As you undoubtedly have heard, a stakeholder group in our close-knit community has been successful over the past 18 months in developing several aspects of a clean water plan for Oakland Bay. We have been integrally involved in these efforts and support the creation of a new paradigm more closely paralleling the objectives of the Puget Sound Initiative. Instead of a MTCA-style investigation focused on remediation efforts, we support a proactive approach which will involve community stakeholders, focus on restoration and ultimately produce a cleaner Puget Sound. We believe that, given the nature of our community and the willingness to work together that has already been demonstrated, Oakland Bay could become a model for such a positive effort, one that could be duplicated in other communities to reach restoration goals in a collaborative manner.

We all want to restore Puget Sound. We ask that the Department of Ecology take a step back from its sediment investigation and work with the stakeholder's group in Mason County to achieve our mutual goal.

Sincerely,

BOARD OF MASON COUNTY COMMISSIONERS

Tim Sheldon	Lynda Ring Erickson	Ross Gallagher
Chair	Commissioner	Commissioner

<u>Ecology</u> Response:

Please refer to Ecology's response) to Comment #10, Patricia B. Case, and #14,Heather Trim (response #8). Ecology is working toward more integrated stakeholder involvement as outlined previously and looks forward to positive progress forward in working together toward the health, any needed cleanup, and associated restoration of Oakland Bay.

Comment 16: Bob Woolrich, Washington State Department of Health

Manager of Growing Area Section
Office of Shellfish and Water Protection
P.O. Box 47824
Olympia, WA 98504-7824
(360) 236-3329
bob.woolrich@doh.wa.gov

Comment received as:
Email dated Friday, July 11, 2008 4:35 PM
Subject: RE: Oakland Bay Sediment Study - Rescheduled Meeting

Comment:

I appreciate all your efforts to address the concerns that stakeholders may have. I have only one two concerns about the sampling plan besides the one we gave you in our written comments.

My two comments are that:
- DOH would find any chemical analyses of shellfish tissue to be helpful regardless of where the samples are collected. If more than one species can be collected at any one site that would be even more helpful.

- I disagree with the Squaxins assertion that the study should focus only (or almost entirely) on Shelton Harbor. It would be helpful to have data from other parts of Oakland Bay. As I said in the meeting at Ecology this week, there are many people that just don't understand the idea of gradients. For example, several times we have shown that fecal coliform data in Dungeness Bay is worst near the mouth of the river and improves steadily as you move away from the mouth. One response is absolutely predictable - Blame it on Victoria's wastewater treatment system (or lack thereof). Hmmm. I've tried to use the analogy of a hot stove - the closer you are, the hotter you get. I get blank stares.

Finally, I'm not going to be available for these meetings, but am certainly willing to help respond to concerns that others raise that are pertinent to shellfish sanitation.

Ecology Responses:
Ecology appreciates your comment regarding our efforts to address stakeholder concerns.

1st comment – Chemical analyses of shellfish

Ecology believes that an assessment of shellfish tissue within Oakland Bay may be appropriate following assessment of contamination within the bay through sediment chemistry and bioassays. Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and other biota sample collection and analyses if data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species, and will consider what locations would be most appropriate for gathering samples.

Ecology acknowledges the value that a comparison of interspecies contaminants uptake could provide. Costs for the collection and analysis of the number of shellfish and other species which would be required to allow for a statistically significant determination of interspecies contaminant accumulation differences would be extremely high and were beyond the scope of the current investigation.

2nd comment – Focus on Shelton Harbor

Ecology does not agree with the recommendation from some stakeholders that the study should focus primarily/only on Shelton Harbor. One of the goals of this work is to assess presence of sediment contamination and wood waste across Oakland Bay.

Several modifications were made to station locations shown in the Public Review Draft Sampling and Analysis Plan to provide appropriate coverage to help identify potential contaminant sources within the bay, the extent of sediment contamination (including wood waste) within the Shelton Harbor, and to determine if contaminants had migrated to Oakland Bay. Ecology believes that sufficient data will be generated to provide an acceptable investigation of sediment contamination in Shelton Harbor to further characterize and prioritize areas for cleanup, and assess presence of sediment contamination in Oakland Bay.

Comment 17: Elmer Diaz, Washington State Department of Health

Site Assessment and Pesticide Section
Office of Environmental Health Assessments and Pesticides
Division of Environmental Health
PO Box 47846
Olympia, WA 98504-7846
phone: (360) 236-3357
fax: (360) 236-2251

Comment received as:
Email dated July 15, 2008 9:13 AM
Subject: RE: Oakland Bay Sediment Study - Rescheduled Meeting

Comment:

Please note that this comment related to July 11, 2008 comments provided by Bob Woolrich. Mr. Woolrich's comment and Ecology's response is above.

I support Bob's decision. At this process I don't know how much we can contribute. As he mentions we already provided some few comments. In order to conduct a health risk assessment in Oakland Bay, the Site Assessment Office would like to have good shellfish data - i.e., recreational or commercial shellfish data and/or any shellfish data that is being harvested in the area.

In summary we would like to have: 1) Five composites per location, and 2) at least five individuals per composite in all projected sampling locations

I also wont' be able to attend to these meetings, but we're here to support your great work and available to review data to assess potential human health risks for Oakland Bay

Ecology Responses:
1st comment – risk assessment/shellfish data
Based on input from the community and stakeholders, Ecology has decided to defer a risk assessment until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of conducting a risk assessment if the data indicate that this would be appropriate.

Ecology believes that an assessment of shellfish tissue within Oakland Bay may be appropriate following assessment of contamination within the bay through sediment chemistry and bioassays. Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and other biota sample collection and analyses if data indicate that this would be appropriate. At that time, Ecology will consider sampling and analysis of more than a single species, and will consider what locations would be most appropriate for gathering samples.

2nd comment – Composites
Should Ecology determine that shellfish sampling would be appropriate, Ecology will consider the recommended sample compositing protocol recommend by WDOH. A composite of 10 to 20 individuals per location were considered previously for sample sufficiencies.

Comment 18: Elmer Diaz, Washington State Department of Health

Site Assessment and Pesticide Section
Office of Environmental Health Assessments and Pesticides
Division of Environmental Health
PO Box 47846
Olympia, WA 98504-7846
phone: (360) 236-3357
fax: (360) 236-2251

Comment received as:
Email dated July 16, 2008 4:13 PM
Subject: RE: Oakland Bay Sediment Study - Rescheduled Meeting

Comment:
Here is our rationale for composite sampling. Previous work at DOH on composite sampling showed that 3 to 5 composites of 3 to 5 fish is a good starting point provided that we start out with knowing a little about what is to be sampled. More specifically, results from previous testing from a site or a comparable site with the same species where one could calculate a mean and standard deviation and that if the standard deviation was within 25% of the mean, then the 3 to 5 general rule appears to provide adequate sampling numbers. This would apply for fish.

For shellfish, given that they are generally smaller and that a person is likely to consume many at a given meal as compared to perhaps eating one fish, it would be reasonable to construct a sampling scheme where the number of individuals making up one composite would equal the number individuals typically consumed at one meal. Therefore the 3 to 5 composites could be composed of say 5 to 20 individuals per composite times 3 to 5 composites per site, again depending on what typically is consumed during a meal which may vary by species. Given that we don't know a great deal about the mean and variance of the data for the site, I would suggest that we error on getting more individuals - minimum of 5 and a minimum of 5 composites per site per species. It is also preferable to increase the number of composites over the number of individuals within a composite if possible. Again there are no hard and fast rules, particularly when dealing with sampling when no previous data is available. Composite sampling is a compromise. A greater number of individuals can be sampled to calculate a mean but we lose the ability to characterize variability around the mean.

We would like to have good data, but I understand cost considerations. Thanks

Ecology Response:
Ecology understands the rationale for composite shellfish sampling which WDOH has provided. Should Ecology determine that shellfish sampling would be appropriate;

Ecology will consider the recommended sample compositing protocol recommend by WDOH.

Comment 19: Elmer Diaz, Washington State Department of Health

Site Assessment and Pesticide Section
Office of Environmental Health Assessments and Pesticides
Division of Environmental Health
PO Box 47846
Olympia, WA 98504-7846
phone: (360) 236-3357
fax: (360) 236-2251

Comment received as:
Email dated July 24, 2008 12:44 PM
Subject: RE: Ecology considerations for Oakland Bay – feedback requested

Comment:
DOH - Site assessment recommends even in the early stages of this investigation that at least a few shellfish samples be collected in the "hot spots" and throughout the Harbor. This will give us an idea about levels of contaminants and the need for further investigation. We definitely support the idea of conducting further sampling if there is a need for it. In fact, we anticipate harbor-only sampling results will drive a DOH recommendation that additional sampling is needed outside the harbor - so we do encourage outside the harbor sample collection now.

We are willing to help evaluate any available data and look at the human health risk assessment aspect if there is a need for it.

I'm sending you a good study conducted in Spain, where it shows that sediment metals correlates well with bivalve metals (clams were allowed to flush out undigested matter after collection).

Ecology Response:
Ecology appreciates receiving the journal paper on the correlation between sediment and bivalve metals.

Based on input from the community and stakeholders, Ecology has decided to defer collection and analysis of shellfish, and the risk assessments until results of the sediment and bioassay testing have been reviewed and evaluated. Ecology will revisit the question of shellfish and other biota sample collection and analyses, and conducting a risk assessment, if data indicate that this would be appropriate. At this time, no shellfish tissue will be collected.

Comment 20: Duane Fagergren, Puget Sound Partnership

Regional Liaison
Hood Canal and South Sound
360-725-5438(o); 360-239-3366(c)
duane.fagergren@psp.wa.gov

Comment received as:
Email dated Wednesday, July 30, 2008 9:44 AM
Subject: Fwd: Sarah's gift received

Comment:
In case you need this. Good to see you all yesterday. Lunch became breakfast, if you know what I mean.

Duane

Begin forwarded message:

From: "Dutch, Margaret (ECY)" <mdut461@ECY.WA.GOV>
Date: July 30, 2008 9:08:55 AM PDT
To: "Duane Fagergren" <duane.fagergren@psp.wa.gov>
Subject: RE: Sarah's gift received

Hi Duane,

We sampled sediment quality (chem, tox, infauna) in Shelton Harbor and Oakland Bay in 1999. The data and report are on our web site (http://www.ecy.wa.gov/programs/eap/psamp/PSAMPNOAA/PSAMPNOAA.htm, http://www.ecy.wa.gov/biblio/0203033.html, http://www.ecy.wa.gov/biblio/0303049.html). We are scheduled to resample South Sound in 2011.

Let me know if you need any further info on this.

Maggie

Ecology Response:
Ecology appreciates that you took the time to identify and forward the references noted above. Ecology had reviewed these PSAMP documents and reported the chemical data in both its Summary of Information and Data Gaps Report and Sampling and Analysis Plan. Ecology did not include the toxicity and infauna studies from these references in its Data Gaps report, due to slight differences in toxicity tests from SMS. The data provided has been reviewed and evaluated in terms of the proposed sediment

investigation of Oakland Bay. These studies are referenced in the final Sampling and Analysis Plan.

Comment 21: John Konovsky, Squaxin Island Tribe

Environmental Program Manager
2952 SE Old Olympic Hwy
Shelton, WA 98584
TEL (360) 432-3804
CEL (360) 951-7379
EMAIL jkonovsky@squaxin.nsn.us

Comment received as:
Email dated August 4, 2008 12:33 PM
Subject: Sampling proposal
Attachments: SIT Proposal for OB-SH Sediment Sampling.pdf

Comment:
FYI, here is a very crude rendition of a map that tries to indicate my recommendations for sediment sampling sites. I couldn't manipulate the PDF for some reason (I kept getting "corrupted" messages), so I used stickies which sort of show through on these maps. Hopefully you will get the idea. My objective is to implement a recommendation on page 27 of the 2000 report to evaluate the potential for transport of contaminated sediment from the harbor to adjacent areas. John K.

Figure 4-2. Sediment and tissue sample locations (to be collected) in Oakland Bay and Hammersley Inlet in Mason County, Washington.

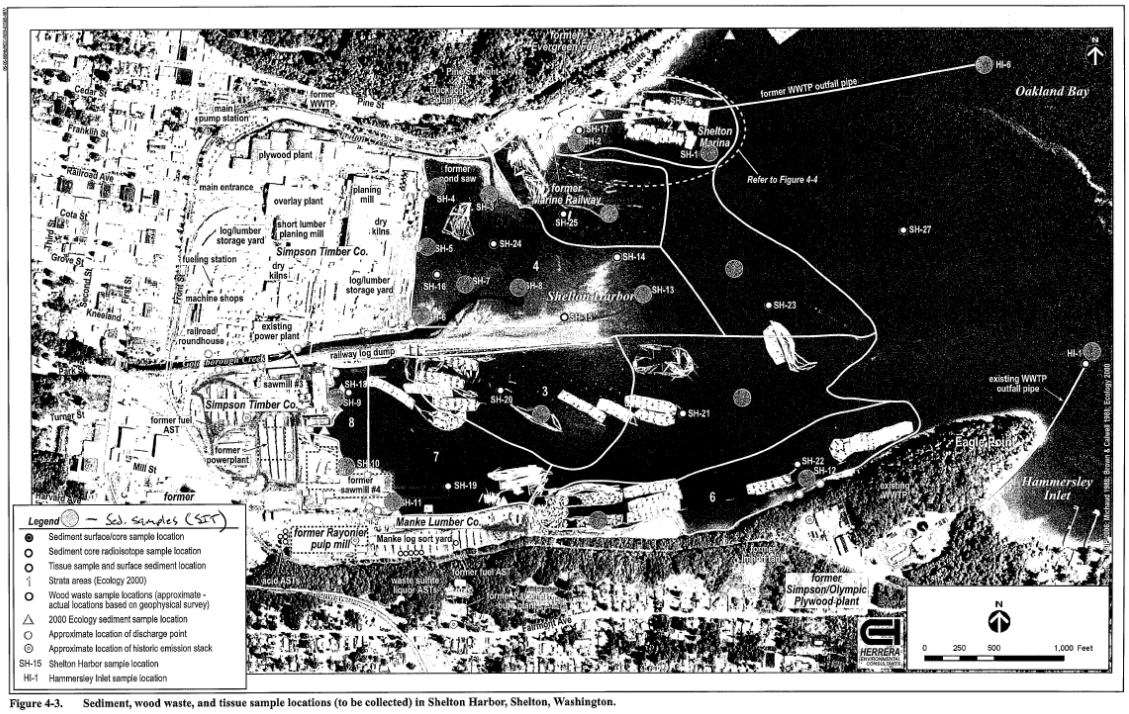


Figure 4-3. Sediment, wood waste, and tissue sample locations (to be collected) in Shelton Harbor, Shelton, Washington.

Ecology Response:

Ecology reviewed the recommended sampling sites shown on the maps submitted by the Squaxin Island Tribe. Sampling locations were discussed in the Technical Meeting on August 6, 2008. Revisions to the sampling locations are described in the Technical

Memorandum in Appendix A. These locations were reviewed in the second Stakeholder Meeting on August 11, 2008

Briefly, additional sampling locations in Shelton Harbor were added to build upon existing data, help evaluate whether contaminated sediments are migrating from Shelton Harbor, and begin to delineate areas that may need to be cleaned up. Attendees at the Technical Meeting were in general agreement about sampling locations in Shelton Harbor.

Sample locations in outer Shelton Harbor, Oakland Bay, and Hammersley Inlet were added and locations were shifted to create more distinct 'transects' (i.e., series of samples in a line across the openings to Oakland Bay and Hammersley Inlet) to evaluate whether contaminants may be moving outward from Shelton Harbor in response to the Squaxin Island Tribe and other stakeholder concerns. Some sample locations were also shifted based on input from the stakeholder group regarding logistics of sampling, circulation patterns, and historical uses.

Sample locations also are designed to look at a gradient from the Harbor and characterize areas across the Bay with little or no information, and to examine tidal flushing into upper Oakland Bay and out Hammersley Inlet. Although the objectives for sampling the northern Bay was believed by some stakeholders of lesser priority than Shelton Harbor, Ecology believes sampling in this area necessary for a complete picture of the bay. Ecology and our contractors were made aware that commercial shellfish beds have been manipulated through harrowing and addition of gravel from offsite sources in the northern bay. Care will be taken to provide accurate logs of the sediment cores in these areas to assist with interpreting study results.

Please also see the response to Comment #14, Heather Trim's "1st comment – Sampling analysis".

The final station locations are documented in the final Sampling and Analysis Plan. Ecology believes that sufficient data will be generated to provide an acceptable investigation of sediment contamination in Shelton Harbor to further characterize and prioritize areas for cleanup, and assess presence of sediment contamination in Oakland Bay.

Comment 22: Lalena Amiotte

Comment received as:
Email dated June 02, 2008 12:53 PM
Subject: Oakland Bay sediments

Comment:

Hello: I received an email probably because I am on a list serve for Oakland Bay. I worked for a clam farm operation this past year in Oakland Bay but just recently have moved on into the state DNR in Olympia. When I read what you are doing I thought to contact you and let you know that I have a file on my home computer and if you are interested can forward it on. Our company, Clam Fresh, did a dive survey on 2/28/08 that extended from just south of Munson Point to the DNR lease site #8135. The survey lists species noted, substrate, depths and woody debris. It may be of interest for your work. Let me know if you want me to forward it and I will do it tonight after I get home from work. Good luck with your project, it sounds really cool.

The following is the dive survey received by Ecology via email on June 4, 2008.
A dive survey map, received by Ecology via email on June 9, 2008 follows the text.

Dive Survey Summary for Clam Fresh, LLC

Date: 2/28/08
Name of Vessel: No Name, Skokomish Dive Boat
Names of crew & divers: Ed Green- Lead Diver (360) 877-5218; Bryan James-Diver; Donald Monahan-Tender (360) 229-0357; Brendan Mahaffey-Clam Fresh Owner (206)819-3474; RedWolf Krise-Clam Fresh staff; Lalena Amiotte-Clam Fresh Operations Manager (360)229-0367.
Tides: Low 5:14 7.0; High 10:10 12.6; Low 18:08pm 1.2

Begin at southern boundary of Clam Fresh LLC property line. Property line is 200 feet south of the DOH prohibited harvest line. Property line is marked with survey stakes and red flagging. The prohibited line is marked with survey stakes with red flagging as well as black cable lines coming out of the bulkhead (just below a large clump of white pampas grass on a residential property).

Dive time start: 10:40
Diver: Ed Green
Start Location: Southern property boundary/Munson Point

Diver dropped and walked the area parallel to the shoreline heading north toward Munson Point. This area is within the prohibited harvest area (200 feet).

Species/Something of note	Depth in feet
Sea anemone	30
Sea cucumber	35
Oyster shells	35
Horse clams (numerous)	30-35
Cockles	30-35
Butter clams	XXX
Dungeness crab	27

Substrate is sand, gravel and pea gravel	~16
Tunicate	20
Starfish	27
Rock crab	29

Diver begins surveying area in conditionally approved harvest area.
Underwater cable lines visible to the diver.

Species/Something of note	Depth in feet
Sea anemone	33
Red starfish	XXX
Geoduck	33
Barnacle	35
300-400 hermit crab ball (mating)	XXX
Rock crab	XXX
Species/Something of note	Depth in feet
Starfish	XXX
Juvenile Dungeness crab	XXX
Substrate is rock and gravel (fist size)	XXX
Sea anemone	27
Littleneck clam	29
Large chain	XXX
Hundreds of hermit crabs mating in ball	XXX
Cockle shell	XXX
Horse clam	31
Substrate is all sand, no gravel	XXX
Dead cockles	23
Rock crab	23
Horse clams	XXX
Rock crab	27
Horse clam bed	XXX
Sea anemone	XXX
Dungeness crab (several)	18
Horse clam	29
Geoduck	18

Diver is approximately 50 feet north of decertification line. Diver is continuing parallel to the shoreline, moving north towards Munson Point.

Species/Something of note	Depth in feet
Horse clam	18
Sand substrate	XXX
Horse clam bed	17
Starfish	16
Horse clam	16

Mud substrate	16
Soft mud substrate	15
Horse clam	XXX
Sea feather	19
Horse clam	19
Horse clam bed	21
Horse clam	18
Littleneck clam	18
Spider crabs	13
No sign of eel grass	inter-tidal reaches of Munson Point
Large log	Munson Point proper
3-4 foot deep mud substrate	23
Horse clam	XXX

Diver passes Munson Point proper and moving around the bend in the North-East direction, parallel to the shoreline.

Species/Something of note	Depth in feet
Horse clams	XXX
Starfish	XXX
3-4 foot mud substrate	19
Horse clam	19
Horse clam	18
Woody debris	18
Horse clam	17
Horse clam	18
Sand and gravel substrate	18
Sea cucumber	18
Gravel substrate	18
Woody debris	XXX
Horse clams	XXX
Woody debris	XXX
Large logs (~20-25 feet long)	16
Cockle shells	16
Woody debris	17
8-10” mud substrate	17
Sea cucumber	XXX
Woody debris	XXX
Sea cucumber	XXX
Woody debris	XXX
Dungeness crab	XXX
Gravel substrate	16
Large logs	15
10 or more logs	15 to 30
Marine piling (submerged)	XXX
Sea cucumber	XXX

Large logs	15
Numerous woody debris	15
No sign of life	19
Woody debris	XXX
Woody debris	23
Woody debris	20
Mud substrate	20-25
Dungeness crab	25
30” round log 25-30 feet long	25
Large log	24

Diver did not see any eelgrass through the extent of his dive.

Diver up time: 12:21. Drop anchor 200 feet from shoreline. Boat is 500 feet from northern Clam Fresh property line. This area is not residentially developed but did have a lot of run off and landslides through the winter of 2007-2008.

2nd diver down. Dive start time at 12:34. Diver is Bryan James. Diver is walking substrate heading toward the northern property line, parallel to the shoreline.

Species/Something of note	Depth in feet
Thick mud substrate	19
Starfish	19
Sea cucumber	19
Sea cucumber	25
Thick mud substrate	27
Sea cucumber	27
Sea feather	26
Thick mud, silt substrate	26
Woody debris	26
Tunicate (Purple didedium)	17
Sea cucumber	25
Thick mud substrate	20
Dungeness crab	20
Sea cucumber	20
Sea cucumber	25
Oyster shell	25
Thick mud substrate	25
Dungeness crab	XXX
Thick mud substrate	24
Starfish	XXX
Rock crab	XXX
Thick mud substrate	24
Tunicate (Purple didedium)	XXX
Woody debris and logs	XXX

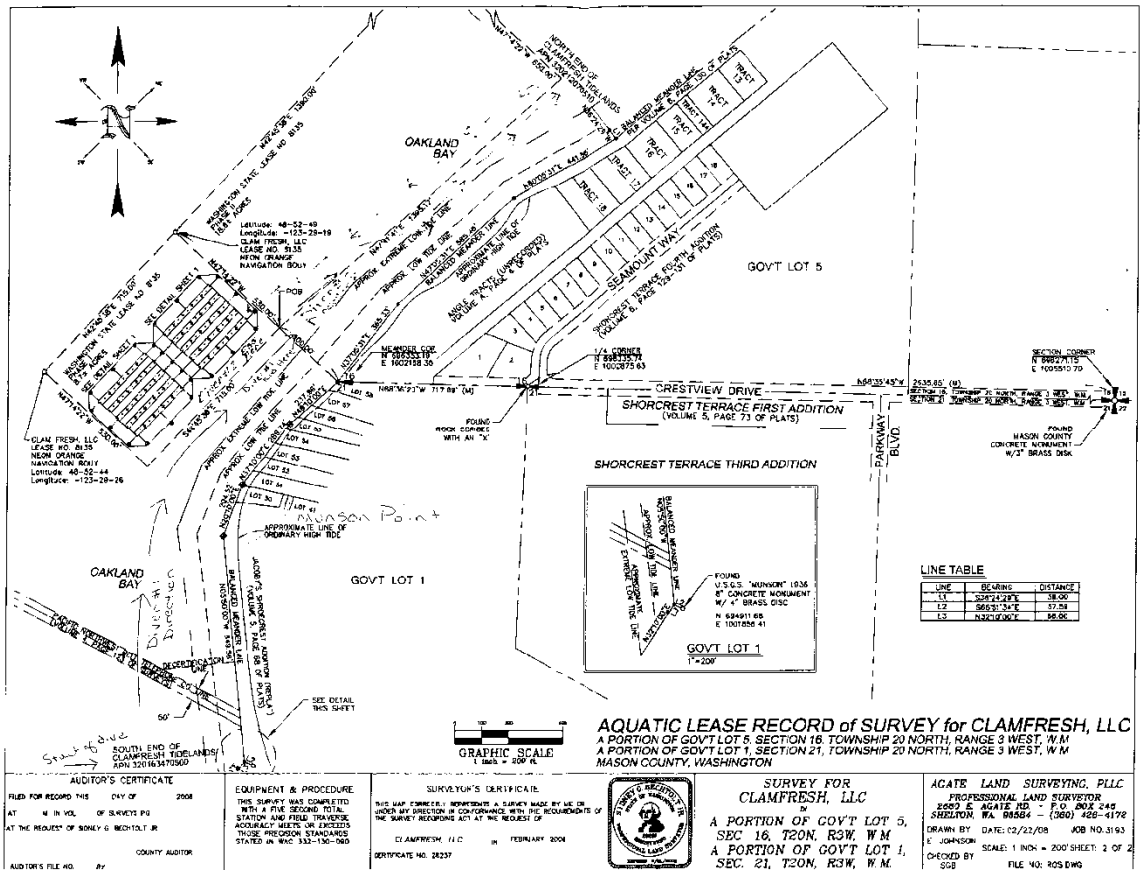
Cockle shell	XXX
Silty mud substrate with bark chunks	22
Woody debris	XXX
Mud substrate	XXX
Cockles	XXX
Tunicate (Purple didedium)	XXX
Thick mud substrate	18
Thick mud substrate	29
Horse clams	XXX
Thick mud substrate	20
Large log	25
Thick mud substrate	21
Sea cucumber	21

Diver came to edge of property line and will be heading towards DNR lease site #8135. Diver is directionally moving west parallel to the shoreline. Time start toward DNR lease site is 13:48 at 18 feet.

Species/Something of note	Depth in feet
Starfish	XXX
Logs	XXX
Woody debris	XXX
Sea whips	18
Thick mud substrate (diver having difficulty moving through mud)	18
Spider crab	18
Large logs just off eastern mooring buoy on DNR site	XXX
Littleneck clams (inside DNR site)	XXX
Thick mud substrate	XXX
Sea cucumbers	XXX
Sea cucumber	21
Substrate is not muddy on western side of DNR lease site	XXX

Diver up time at 14:14. Diver did not see any eelgrass during the dive.

Dive data compiled by Lalena Amiotte, Clam Fresh Operations Manager.



Ecology Response:

Ecology appreciates the information provided in the Clam Fresh survey. The data will be used to help refine the Sampling and Analysis Plan and in future reports.

Comment 23: Clay Patmont, Anchor Environmental, LLC

1423 Third Ave., Suite 300
Seattle, WA 98101-226
phone: (206) 903-3324
cell: (206) 300-1543
cpatmont@anchorenv.com

Comment received as:

Email dated August 12, 2008 12:15 AM
Subject: Oakland Bay Sediment Characterization Study

Comment:

As we discussed last week, provided below are comments on the draft Oakland Bay sediment characterization study sampling and analysis plan (SAP) prepared by Herrera Environmental Consultants (HEC) in May 2008.

1. **Upper Oakland Bay Sample Locations**. As discussed during the August 6 stakeholder meeting in Shelton, many of the proposed sediment sampling locations targeted in upper Oakland Bay (particularly northeast of the "narrows") are located in areas of the bay that are regularly subjected to erosion and/or habitat manipulation. Thus, sediment sampled from these areas is unlikely to be representative of longer-term average inputs to the bay, and will likely not provide data useful to address the sampling objectives stated in the draft SAP. We recommend that Ecology eliminate these sampling locations and better focus their efforts by sampling in net depositional areas southwest of the "narrows", as generally recommended in comments provided by John Konovsky on behalf of the Squaxin Tribe. In addition, historic PSAMP data collected in depositional areas southwest of the "narrows" does not suggest any releases of hazardous substances to upper Oakland Bay. As the intent of PSAMP was to use these data to make informed judgments as to where to focus future efforts, the existing data simply do not support collection of more samples in upper Oakland Bay.
2. **Phased Wood Waste Analysis**. As has become standard in sediment wood waste evaluations, we recommend that Ecology initially archive sediments targeted for wood waste bioassay analyses until the results of conventional and/or chemical analyses are available, and submit for bioassay analyses only those sediment samples with concentrations of wood waste indicator parameters (e.g., TVS, TOC and porewater sulfide & ammonia) that are within the range of sediment wood waste cleanup levels developed for other similar sites. That is, submitting samples for bioassay analyses that have relatively high or low wood waste levels will likely not provide data useful to address the sampling objectives stated in the draft SAP.
3. **Porewater Analysis**. Each wood waste sample should be submitted for analysis of porewater ammonia and sulfide concentrations, as these parameters are typically the most closely correlated with bioassay results at other similar wood debris sites (e.g., Port Gamble Bay). Analyses of bulk ammonia and sulfide provide relatively little value and should be replaced with the porewater analyses.
4. **Target Bioassay Organisms.** Consistent with other similar SAPs prepared and implemented by Ecology at other similar sites (e.g., Port Angeles SAP), Mytilus galloprovincialis should be identified in the SAP as the preferred larval species.

Please let me know if you have any questions

Ecology Responses:

Comment 1 – Upper Oakland Bay Sample Locations

See Ecology's Response to John Konovsky (COMMENT 21). Based on our review of previous investigations, no investigations have been conducted northeast of the "narrows"; and as you have pointed out, the historic PSAMP sampling areas were southwest of the "narrows". Ecology does not believe data from outside the area northeast of the "narrows" can be assumed to be fully representative of this area within Oakland Bay. Potential sources to this area were identified in the Sampling and Analysis Plan. Ecology believes it prudent to conduct some sampling within the area of concern. Sampling has been reduced to four locations.

Washington State Department of Ecology "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 172-204 WAC)" dated February 2008 has been a key in the development of the sampling and analysis program for the Oakland Bay Sediment Investigation. The proposed locations for sampling stations in Oakland Bay were re-evaluated based on input from the community and stakeholders. Several modifications were made to locations to provide appropriate coverage to assess presence of contamination and wood waste for a complete picture. Ecology believes that sufficient data will be generated to provide an acceptable initial investigation of sediment contamination in Oakland Bay as described in Section 4.2.1 of Ecology's guidance document.

Comment 2 - Phased Wood Waste Analysis

Ecology notes that bioassays are not dependent on chemistry results under the Sediment Management Standards and Sediment Sampling and Analysis Plan Appendix guidance noted above. That is, bioassays can be run concurrently with or ahead of chemistry if warranted. Ecology believes that it is appropriate to conduct the bioassays identified in the Sampling and Analysis Plan. A range of woodwaste distribution and concentrations will be collected to ensure that bioassays are conducted on a samples with varying amounts of wood waste.

Comment 3 - Porewater Analysis

Ecology evaluated costs and value of testing porewater of woodwaste samples for sulfides and ammonia. Ecology has evaluated a number of potential analytical suites for chemical testing and, due to budgetary constraints, has been forced to limit the analyses to those identified in the Sampling and Analysis Plan.

Ecology also researched whether porewater analyses were being conducted at other PSI sites and the usefulness of the data generated. Ecology is currently not analyzing ammonia and sulfides in porewater at other PSI sites. Such testing needs to be conducted under a nitrogen atmosphere, and even limited mixing and aeration of sediment samples during test setup and exposure often lead to substantial losses of total sulfides from porewater which are difficult to quantify. Furthermore, sediment

containing high total sulfides does not always result in observable toxicity, but may contribute to toxicity (Post Point, Bellingham Bay, Ecology publication http://www.ecy.wa.gov/pubs/0803016.pdf).

Comment 4 - Target Bioassay Organisms

As required by the methodology, the appropriate larval species will be based, in part, on the availability and life stage of the organisms during the sampling period.

Oakland Bay Sediment Investigation Draft Sampling and Analysis Plan

RESPONSIVENESS SUMMARY

APPENDIX A

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

August 18, 2008

To: Oakland Bay Stakeholder Group (Distribution List Attached)

From: Joyce Mercuri, Oakland Bay Project Coordinator

Subject: **CHANGES TO SAMPLING AND ANALYSIS PLAN: OAKLAND BAY SEDIMENT CHARACTERIZATION STUDY**

The Department of Ecology (Ecology) issued a Draft Sampling and Analysis Plan for the Oakland Bay Sediment Characterization Study for public comment in early June, 2008. In response to requests from stakeholders in the Mason County area for better communication from Ecology and opportunity to be more closely involved in the project, Ecology extended the public comment period to August 11, and hosted two stakeholder meetings (July 29 and August 11, 2008). A technical discussion session was also held with a subset of stakeholders to discuss specific details about the sampling design (August 6, 2008).

In response to verbal and written comments received, Ecology decided to make several changes that will be reflected in the final SAP. The changes were presented verbally to the stakeholders at the August 11 meeting. Ecology also made a commitment to stakeholders to provide a written description of the SAP changes to them, prior to issuing the final SAP.

In addition to the changes that we discussed at the stakeholder meetings, there will be language added to the SAP to ensure there is opportunity for the Squaxin Island Tribe to observe samples for artifacts or evidence of cultural resources. Ecology and the Squaxin Island Tribe are currently working out the best approach for this to occur.

As was discussed at the July 29 and August 11 stakeholder meetings, I am providing this memorandum to stakeholders to confirm the changes that Ecology intends to make, and give you an opportunity to review them to be sure they are accurately reflected. A full responsiveness summary explaining how each written comment has been addressed will be available with the final SAP.

Please reply by August 22 if you find these materials do not reflect what we have been discussing at the stakeholder meetings or technical discussion meeting.

1. Revised Objectives
The study objectives were revised and refined to reflect the idea that the objective for studying sediments in Shelton Harbor is to further characterize and prioritize areas for potential cleanup; compared to a different objective for Oakland Bay/Hammersley Inlet to assess the presence of chemicals and woodwaste. The revised study objectives are enclosed with this memorandum.

2. Removed Risk Assessments
At this time, Ecology has removed the Human Health and Ecological Risk Assessments from the study plan. Upon reviewing results of the work conducted under this SAP, Ecology will determine whether a Human Health and/or Ecological Risk Assessment would provide useful information for future efforts in Shelton Harbor/Oakland Bay.

3. Removed Collection and Analysis of Shellfish Tissue
The original study design included collection and analysis of shellfish tissue. The data from the shellfish tissue was intended to be used for the risk assessments. Since the risk assessments are not being conducted, no shellfish tissue samples are needed at this time. The sediment samples that were planned to be collected at the same locations as the tissue samples have also been eliminated. Some new sample locations have been added to 'replace' those locations (see #10 for more detail about new locations).

4. Removed Designation of Background Sample
The sample originally designated as "background" was located close to a stormwater outfall from Highway 3 and was close to a Washington Department of Transportation maintenance yard, therefore was unlikely to represent a true 'natural' background level. Since very little information is known about upper Oakland Bay, it does not make sense at this time to designate a specific sample as 'background'. The sample to be collected in Carr Inlet for the bioassay reference is from a designated 'reference' sediment area, where sediments are known to meet the state Sediment Quality Standards. The chemical and bioassay results from this study will be compared to the Carr Inlet sediment quality to evaluate whether the levels are elevated above Puget Sound "background". Also, results from the Oakland Bay samples will be evaluated to determine whether the values represent a 'background' value for the area.

6. Show Location of Reference Sediment Station in Carr Inlet
Figure 4-5 will be revised to show the specific area of Carr Inlet where reference sediment samples are obtained. For a description of the Puget Sound reference sample locations, refer to http://www.ecy.wa.gov/biblio/0609096.html.

7. Add Shellfish Closure/Approval Lines to Oakland Bay Figure 4-4
There was a request at the technical discussion meeting to show the shellfish classification lines on the Oakland Bay sampling map. The lines showing the areas that are conditionally approved, restricted and prohibited will be added to the map.

8. Added Bioassays for Surface Woodwaste Samples

The draft SAP included bioassays from sediments from beneath the accumulations of woodwaste at six of the 13 woodwaste locations. Ecology determined it will be more useful at this stage of the work in Oakland Bay to obtain bioassays of the surface woodwaste at all woodwaste sample locations, to better define areas that may need to be cleaned up.

9. Revise Bioassay Language from Section 2.1

The second paragraph of Section 2.1 (Previous Investigations) provides an overview of the Sediment Management Standards (SMS). This paragraph will be revised to clarify that conducting of bioassays is not dependent upon failing the Sediment Quality Standards (SQS), as is currently stated. Bioassays may be used to confirm toxicity of sediments whether the chemical results pass or fail the SQS, and bioassay testing may be conducted in cases where there is not a specific chemical standard in the SMS.

10. Revisions to Sample Locations (Maps Enclosed)

Shelton Harbor:

- Added three woodwaste sample locations (one each in areas 3, 6, and 7)
- Added four sediment sample locations (one each in areas 1, 9, and east of area 1);
- Moved sample SH-9 to the south
- Eliminated sample former SH-12

The additional locations will build upon existing data from the Reconnaissance Survey of Inner Shelton Harbor Sediments (Ecology, May, 2000), help evaluate whether contaminated sediments are migrating from Shelton Harbor, and begin to delineate areas that may need to be cleaned up. SH-9 was shifted to the south to provide better coverage of the nearshore area and capture possible inputs from historic activities. SH-12 was eliminated because it was very close to SH-22.

Oakland Bay/Hammersley Inlet:

- One sample was added near the mouth of Oakland Bay (next to OB-1), and samples in this area were shifted to a semi-circular pattern to provide a better transect across the mouth of the bay
- The number of samples in the upper bay was reduced from six samples to four samples (combined samples OB-7 and OB-8 into one location to represent extreme upper end of bay, and removed sediment sample that was planned to be co-located with the tissue sample).
- Sample location OB-9 in the upper bay was shifted to the southwest to a deep area which will better represent depositional sediments of the upper bay.
- Two samples were added near OB-2 to provide a transect across that part of the bay and to replace samples that were originally planned to be co-located with tissue samples.
- Sample OB-5 was eliminated because of the extreme disturbances and prior excavations in this area.

- Sample OB-22 was shifted slightly to the north to capture a reported area where logs were rafted in the past.
- Sample OB-3 was shifted slightly to the west to better capture circulation through this area.

In addition to the specific changes to sample locations, Ecology and our contractors were made aware that commercial shellfish beds have been manipulated through harrowing and addition of gravel from offsite sources. Care will be taken to provide accurate logs of the sediment cores in these areas to assist with interpreting study results.

Enclosures:
Oakland Bay Sediment Study Objectives
Distribution List
Shelton Harbor Sediment Sample Map
Oakland Bay Sediment Sample Map

OAKLAND BAY SEDIMENT CHARACTERIZATION STUDY
Section 2.2: REVISED STUDY OBJECTIVES

1. In Shelton Harbor, conduct a sampling and analysis effort based on previous investigations and existing data gaps to further characterize and prioritize areas for potential cleanup. This will be conducted through 1) determination of contaminant concentration trends across the Harbor, 2) sampling near known and suspected sources of contaminants, 3) evaluation of the distribution of wood waste through cores and chemical analysis, and 4) determination of the biological effects through toxicity testing in surface sample locations.

2. In Oakland Bay, conduct a sampling and analysis effort to assess presence of contaminants and wood waste. Chemical analysis of sediments, wood waste characterization through coring and chemical analysis, and toxicity testing to evaluate biological effects will be performed

3. Evaluate potential for transport of contaminated sediments and wood waste out of Shelton Harbor into Oakland Bay and Hammersly Inlet

4. Conduct a geophysical survey to determine the distribution of wood waste across Shelton Harbor and Oakland Bay for mapping and determining volume estimates.

5. Characterize horizontal and vertical extent of contamination in sediment across Shelton Harbor for effects from known and suspected sources, and characterize potential transport into Oakland Bay. Characterize Oakland Bay sediment for effects from tidal flushing, creek inputs, and potential near-shore use of hazardous substances.

6. Characterize wood waste using chemical and toxicity testing. In Shelton Harbor, sample locations are associated with a range of wood waste and quantities. In Oakland Bay, sample locations are associated with areas of known rafting and wood waste accumulations.

7. Estimate sedimentation rates in Oakland Bay and Shelton Harbor using radioisotope dating.

8. Conduct bioassays to determine extent of acute and chronic toxicity of sediment at all surface locations in Shelton Harbor and Oakland Bay

9. Conduct a screening-level "fingerprinting" evaluation of TPH, PAH, and dioxin/furan sediment data to provide a preliminary indication of the usefulness of the analytical data to differentiate between sources of contaminants.

10. Provide chemical and toxicity testing comparisons through analysis of sediments from reference location

Mercuri, Joyce (ECY)

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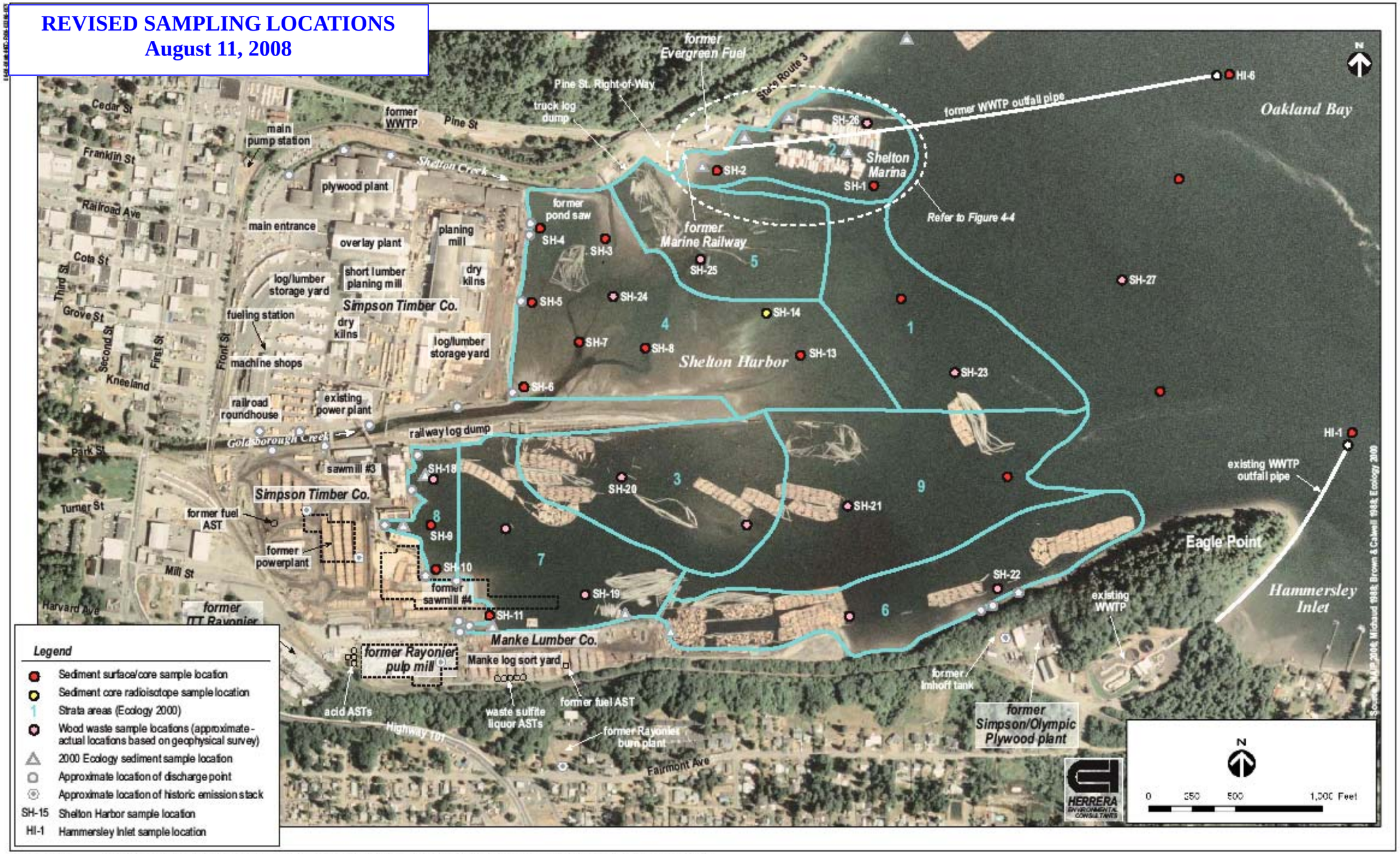

Figure 4-3. Sediment and wood waste sample locations (to be collected) in Shelton Harbor, Shelton, Washington.

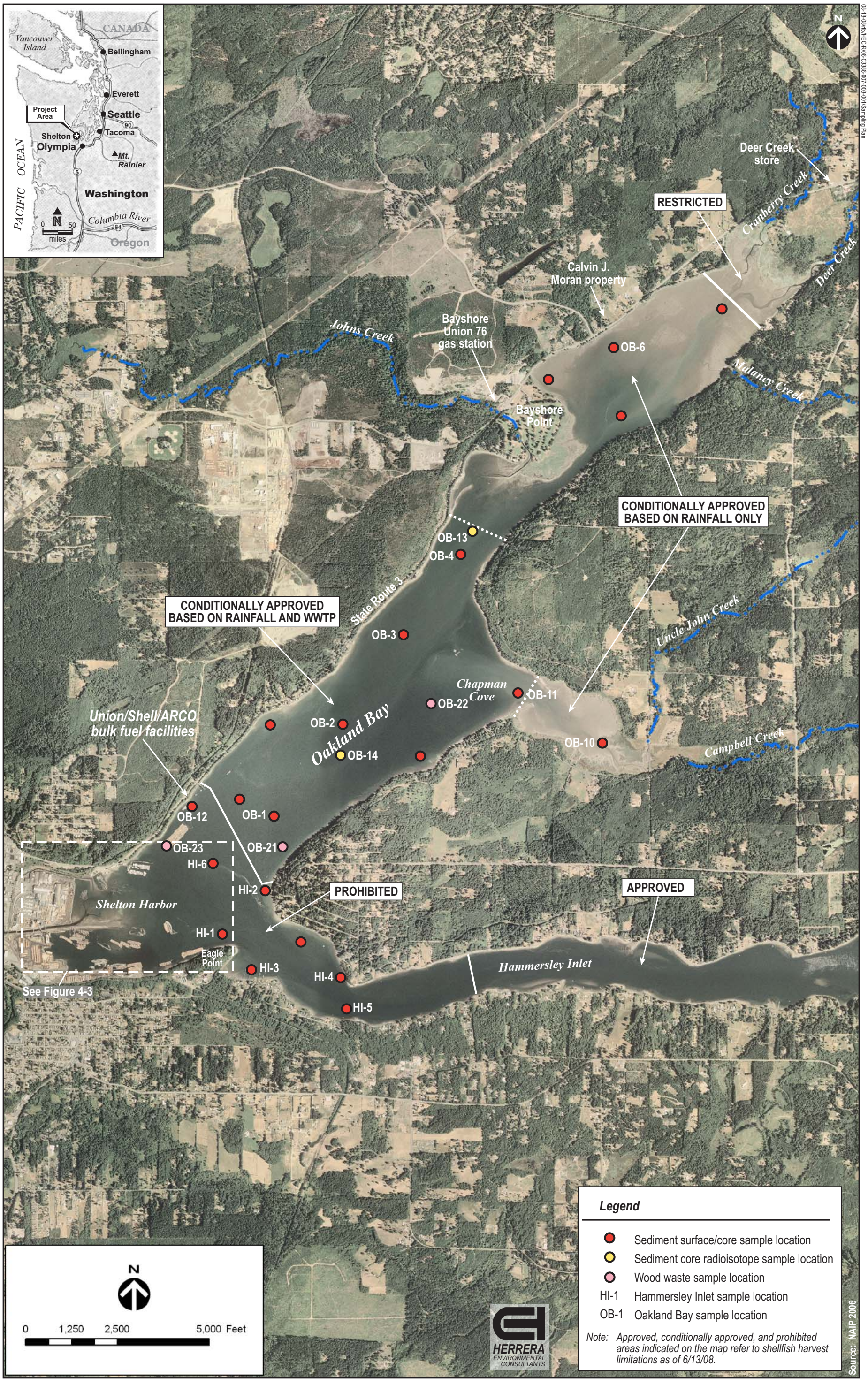

Figure 4-2. Sediment and wood waste sample locations (to be collected) in Oakland Bay and Hammersley Inlet in Mason County, Washington.