Public Meeting, December 15, 2010
Toxics Cleanup Program / Southwest Regional Office
Meeting Goals

- **Provide** you with information about the Sediment Investigation Report
- **Answer** your questions and hear your concerns
- **Collect** written public comments
Presentation Overview

1. Background
2. Results
3. Department of Health
4. Next Steps
Puget Sound Initiative

1. Port Gamble
2. Dumas Bay
3. Padilla / Fidalgo Bay
4. *Port Angeles
5. *Oakland Bay
6. Port Gardner / Port of Everett
7. *Budd Inlet

*Managed by the Southwest Regional Office
Background

Goal of the investigation

What did we do?
- Sediment sampling and analysis
- Biological testing
- Geophysical survey
- Dioxin source analysis
Timeline

2008
- Sediment sampling

2009
- Preliminary results
- Department of Health shellfish and sediment evaluations

2010
- Final report completed
Sediment Sampling

Collected:
- 50 surface sample locations
- 48 core sample locations

Tested for:
- Metals, organic chemicals, pesticides, dioxins, sulfides, and ammonia
- Petroleum and tributyltin (only a few locations)
- Wood waste chemicals (selected locations)
  - Total volatile solids
  - Resin acids and guaiacols
Sediment Sampling Results

- No samples with chemicals above state standards
- Elevated levels of some wood-related chemicals
- Dioxins in all sediment samples
## Dioxin Results: Surface samples

<table>
<thead>
<tr>
<th>Location</th>
<th>Range of dioxins (ppt) in surface samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland Bay</td>
<td>4.4 - 54</td>
</tr>
<tr>
<td>Shelton Harbor</td>
<td>1 - 175</td>
</tr>
<tr>
<td>Hammersley Inlet</td>
<td>1.8 - 13</td>
</tr>
<tr>
<td>Reference location (Carr Inlet)</td>
<td>0.25 - 0.7</td>
</tr>
</tbody>
</table>
Dioxin Results
Surface samples

Legend
- Historic emission stack
- Dioxin (TEQ) (ng/kg)
  - < 4
  - 4 to 10
  - 10 to 20
  - 20 to 60
  - 60 to 100
  - 100 to 200
  - No data
  - No data
Dioxin Results Surface samples

Legend
- Historic emission stack

Dioxin (TEQ) (ng/kg)
- < 4
- 4 to 10
- 10 to 20
- 20 to 60
- 60 to 100
- 100 to 200
- No data
Dioxin Results: Subsurface samples

- Tested 12 locations for deeper sediments (1-2 feet and 2-3 feet)
- Higher concentrations with depth
  - Shelton Harbor: 2.68 ppt – 902 ppt
  - Oakland Bay: 52.4 – 180 ppt
Dioxin Source Analysis

What we did
- Compared dioxin profile in Oakland Bay to that of known sources to determine possible dioxin source type
  - Nearby Goose Lake
  - Puget Sound area-wide
  - Some EPA known source profiles

What we found
- Similar to Puget Sound and Goose Lake dioxin profiles
- Also similar to PCP and burning of pulp mill wastes
- No source can be identified without more sampling
What we did

Exposed marine life to sediments

Measured health effects

What we found

50% of samples showed some level of toxicity

No specific cause was identified
Geophysical Survey

What we did:
- Examined physical environment using sonar and other techniques
- Evaluated location and amount of woodwaste

What we found:
- Very little sediment movement
- Several areas of high amounts
- Small amounts mixed with sediments throughout Bay
WASHINGTON STATE DEPARTMENT OF HEALTH

• Sediment Evaluation
• Shellfish Evaluation
Washington State Department of Health

Len O’Garro – Health Assessor
Office of Environmental Health, Safety, and Toxicology

December 15, 2010

“Public Health – Always working for a safer and healthier Washington.”
Health Consultations

- Department of Health conducted two health consultations for Oakland Bay.
  - Sediments
    - Touching, breathing, or accidentally eating sediments from Oakland Bay is not likely to harm people’s health
  - Shellfish
    - Eating shellfish from Oakland Bay is not likely to harm people’s health - even for people who eat a lot of these products
Health Assessment

- The health consultations looked at contaminants in Oakland Bay
  - Critical to evaluate contaminant levels in sediments and shellfish
  - Determine if contaminant levels are a health threat to people
# Assessment Methods

<table>
<thead>
<tr>
<th></th>
<th>Response</th>
<th>Type of Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Cancer Risk</strong></td>
<td>Threshold</td>
<td>Yes or No</td>
</tr>
<tr>
<td><strong>Theoretical Cancer Risk</strong></td>
<td>No Threshold</td>
<td>Probability</td>
</tr>
<tr>
<td></td>
<td>New guidance moving toward a more qualitative approach that acknowledges thresholds</td>
<td></td>
</tr>
</tbody>
</table>
Sediment

- Reviewed Ecology’s sediment data
  - Contaminants of concern
    - Dioxin
    - Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)

- Department of Health evaluated
  - Contaminant concentrations
  - How people could be exposed (working or recreating)
  - How long people could be exposed
Question

- What amount of dioxin accumulates in shellfish and how might it affect people?
  - Shellfish sampling conducted
Shellfish Sampling

- Four types of shellfish were collected from eight different regions
  - Manila clams,
  - Pacific oysters,
  - Kumamoto oysters
  - Mussels
Shellfish Consumption Scenarios

Four consumption scenarios were used:

- **Average U.S. population = 17.5 g/day**
  - (89 clams/month)
- **Low subsistence = 60 g/day**
  - (152 clams/month)
- **Medium subsistence = 175 g/day**
  - (443 clams/month)
- **High subsistence = 260 g/day**
  - (659 clams/month)

*Low, medium, and high are based on total seafood consumption*
## Total dioxin concentrations

<table>
<thead>
<tr>
<th>Species</th>
<th>Mean (ppt)</th>
<th>Range (ppt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manila clams</td>
<td>0.11</td>
<td>0.05 – 0.27</td>
</tr>
<tr>
<td>Pacific oysters</td>
<td>0.26</td>
<td>0.13 – 0.37</td>
</tr>
<tr>
<td>Kumamoto oysters</td>
<td>0.45</td>
<td>0.3 – 0.6</td>
</tr>
<tr>
<td>Mussels</td>
<td>0.17</td>
<td>NA</td>
</tr>
</tbody>
</table>
Non-Cancer Assessment

- Comparison of average daily intake of dioxin in shellfish

![Graph showing comparison of average daily intake of dioxin in shellfish]
Cancer Assessment

Measurable Range
(Epidemiology or Animal Study)

Predicted Range
(Risk Assessment)

- 1 in 10
- 1 in 100
- 5 in 1,000
- 1 in 1,000
- 1 in 10,000
- 1 in 100,000
- 1 in 1,000,000
- 1 in 1,000,000

EPA acceptable range

Personal Comfort = 0
Cancer Assessment

Based on average concentration of manila clams 0.11 ppt

Measurable Range
(Epidemiology or Animal Study)

Predicted Range
(Risk Assessment)

Personal Comfort = 0

Dose

Oakland Bay Clams

~ 5,000 clams/month 30yrs
~ 2,500 clams/month 70yrs

1 in 10,000
Conclusions

- **Sediments**
  - Touching, breathing, or accidentally eating sediments from Oakland Bay is not likely to harm people’s health.

- **Shellfish**
  - Eating shellfish from the Oakland Bay is not likely to harm people’s health - even for people who eat a lot of these products.
What Happens Next?

- Review comments and continue to evaluate data
- Create a Responsiveness summary
- Begin discussions about next steps
  - Squaxin Tribe
  - Interested community members and local businesses
  - Environmental groups and state and local agencies
- Possible integration of potential cleanup actions and habitat restoration and other activities
Information about possible historic or current sources of pollution

Concerns about the impact of Ecology's work on your business or activities

We want to hear from you!

Ideas about cleanup priorities

Possible ways that cleanup work can be linked to habitat restoration or other projects