DEPARTMENT OF ECOLOGY
State of Washington

OAKLAND BAY SEDIMENT INVESTIGATION

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

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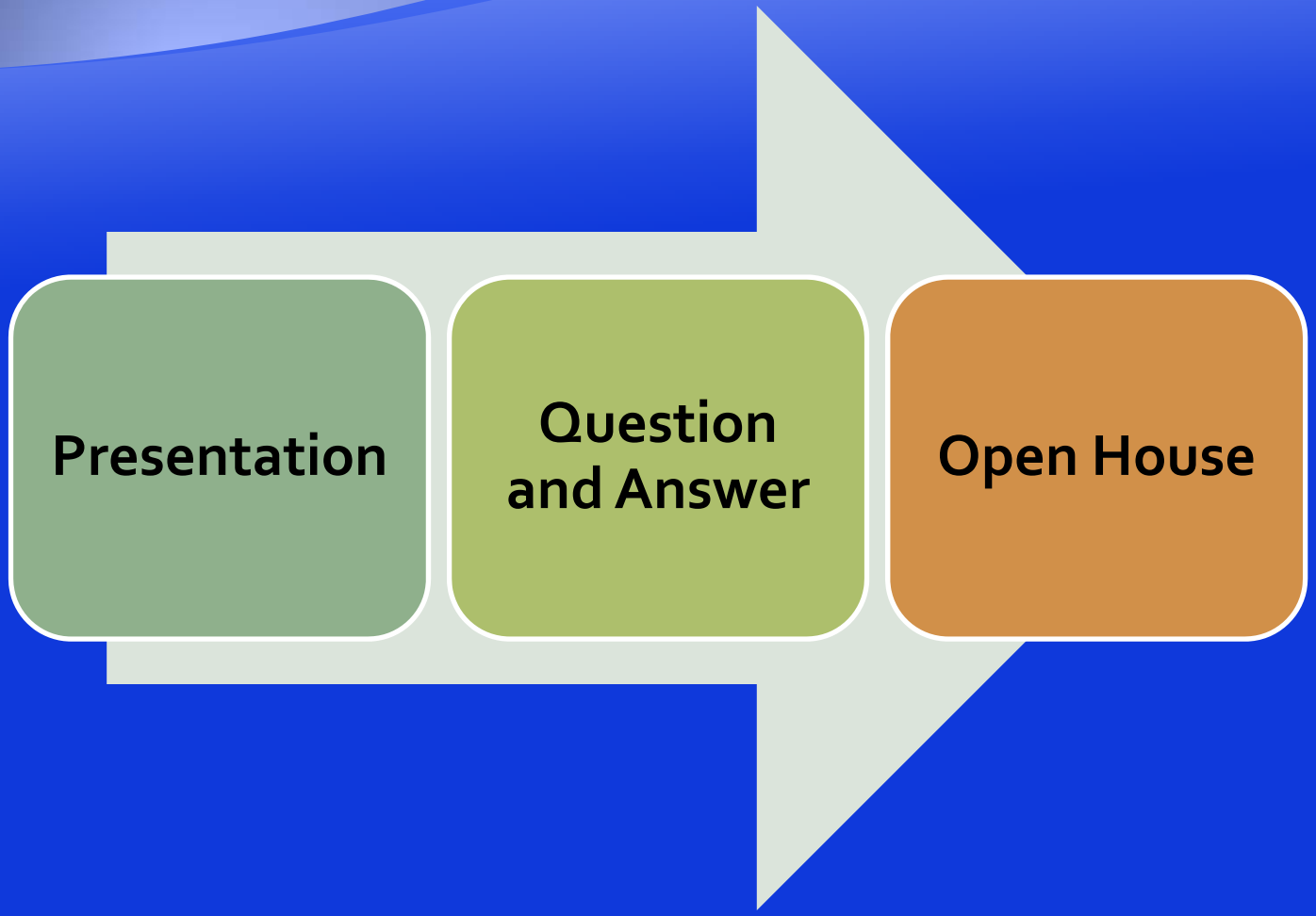
Meeting Overview



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Presentation Overview

- Background
- Results
- Department of Health
- Next Steps

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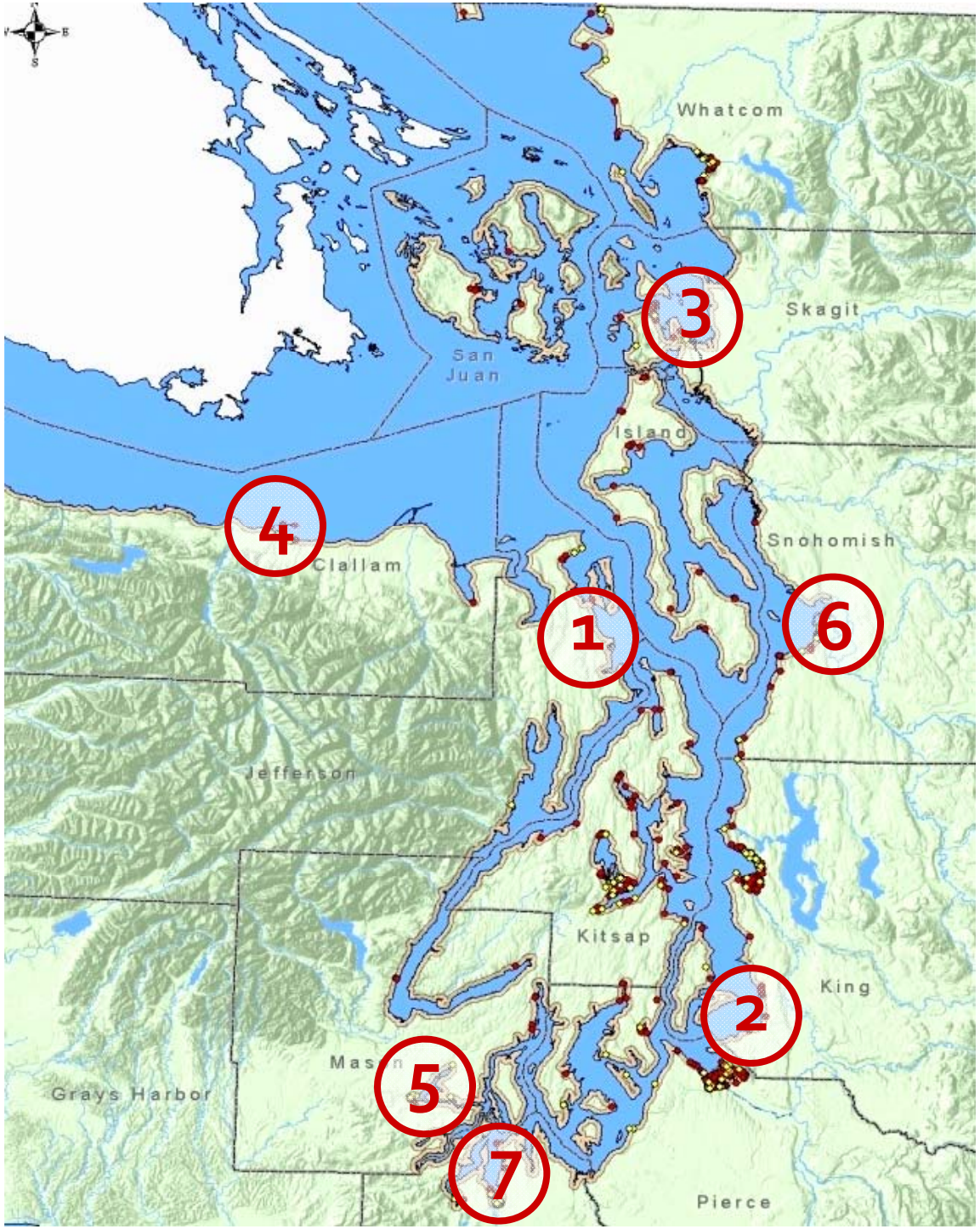
Puget Sound Initiative

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

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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

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Dioxin Results: Surface samples

Location	Range of dioxins (ppt) in surface samples
Oakland Bay	4.4 - 54
Shelton Harbor	1 - 175
Hammersley Inlet	1.8 - 13
Reference location (Carr Inlet)	0.25 - 0.7

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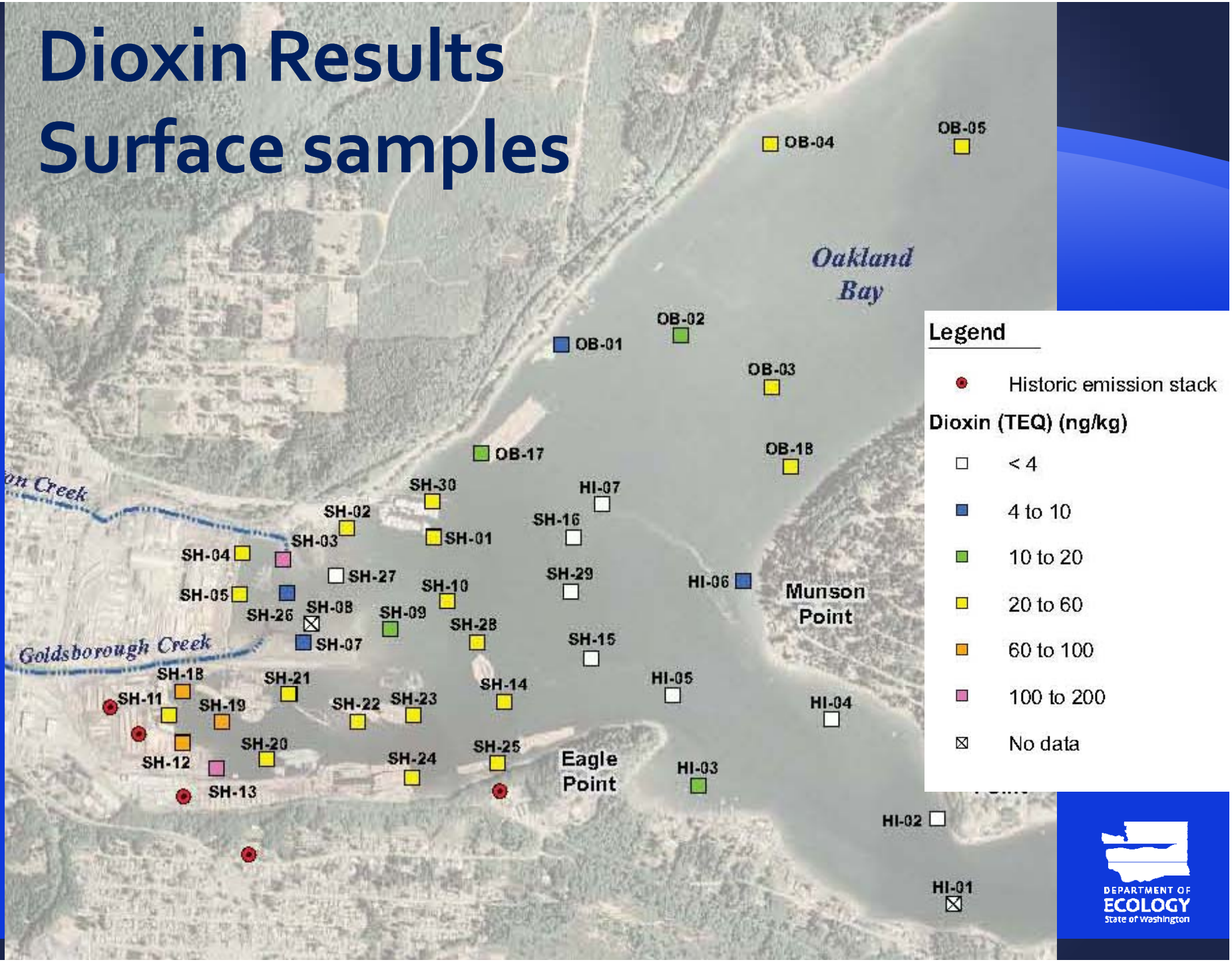
Dioxin Results
Surface samples



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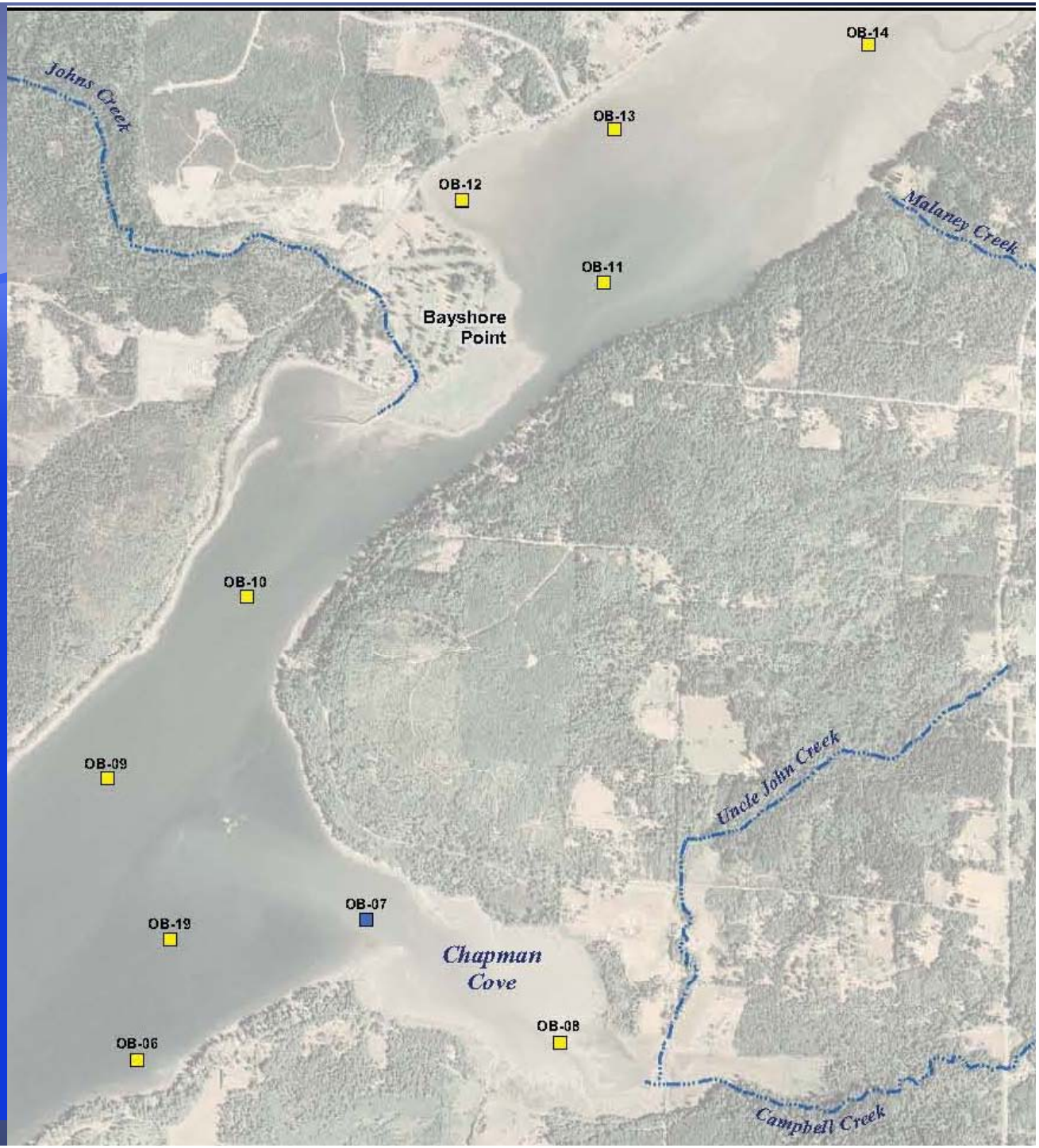
Dioxin Results Surface samples



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

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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

Biological Testing

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

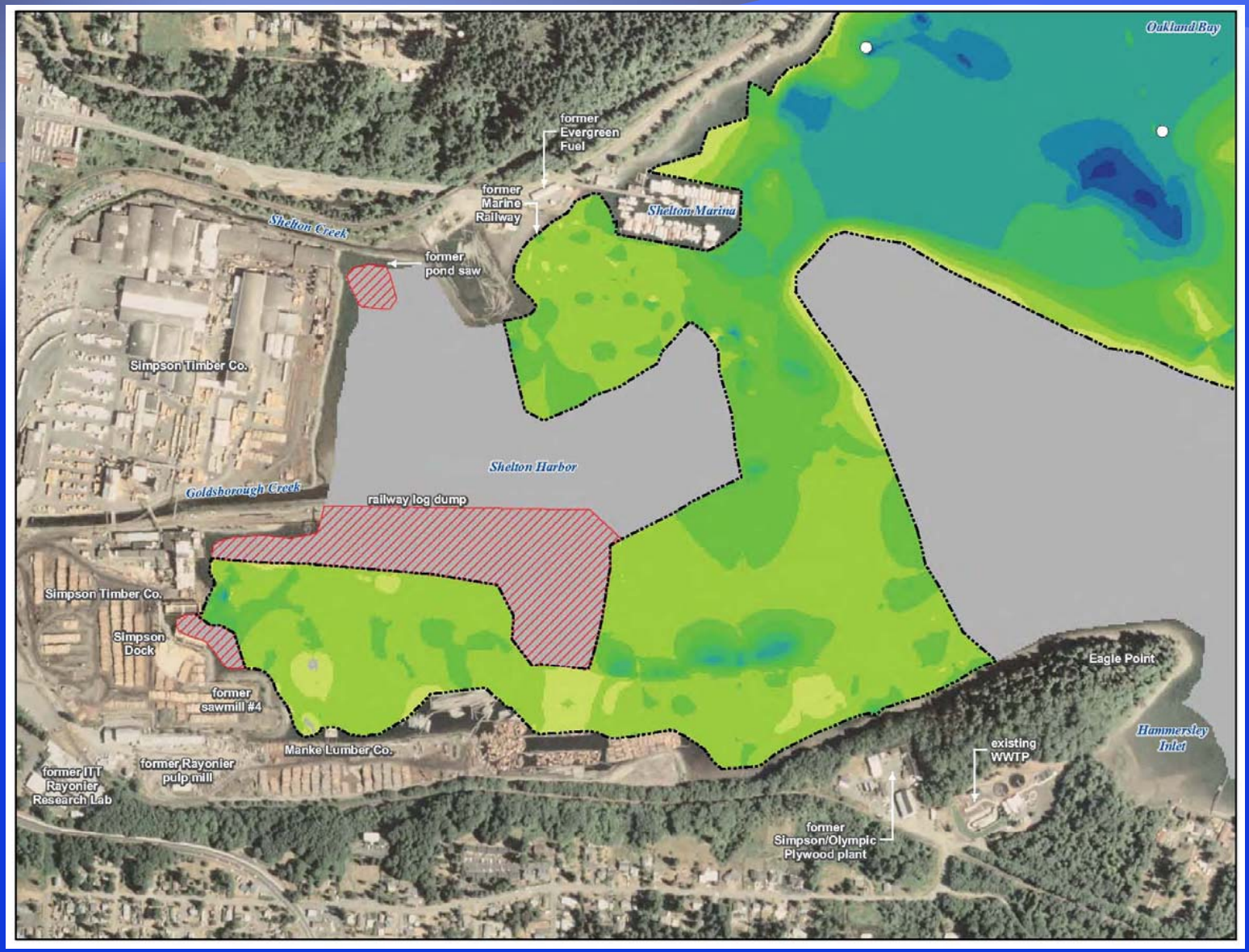
What we did

- 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

Woodwaste Distribution



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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

	Response	Type of Result
Non-Cancer Risk	Threshold	Yes or No
Theoretical Cancer Risk	No Threshold New guidance moving toward a more qualitative approach that acknowledges thresholds	Probability

Sediment

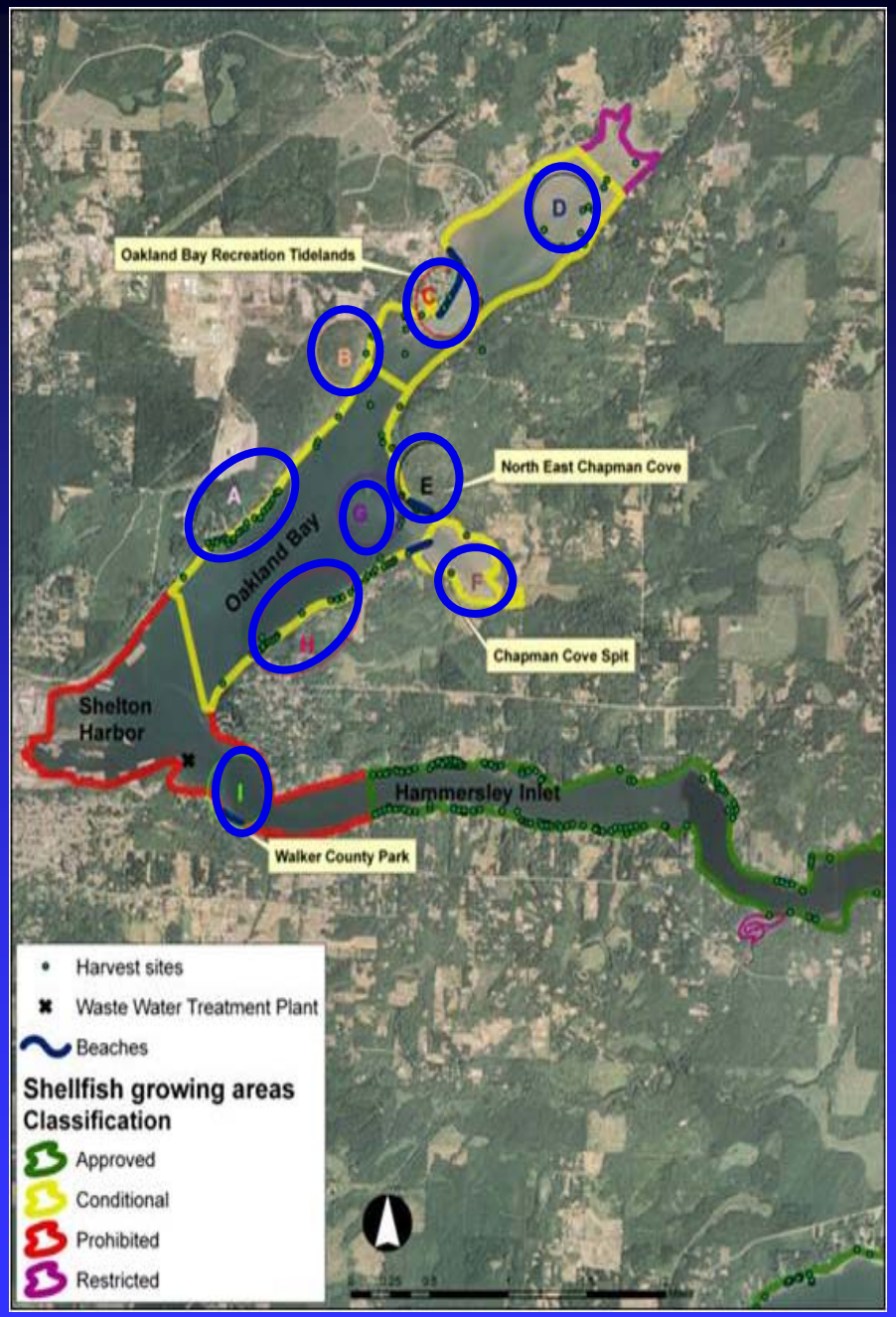
- Reviewed Ecology's sediment data
  - Contaminants of concern
    - Dioxin
    - Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)
- Department of Health evaluated
  - Contaminant concentrations
  - How people could be exposed (working or recreating)
  - How long people could be exposed

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)

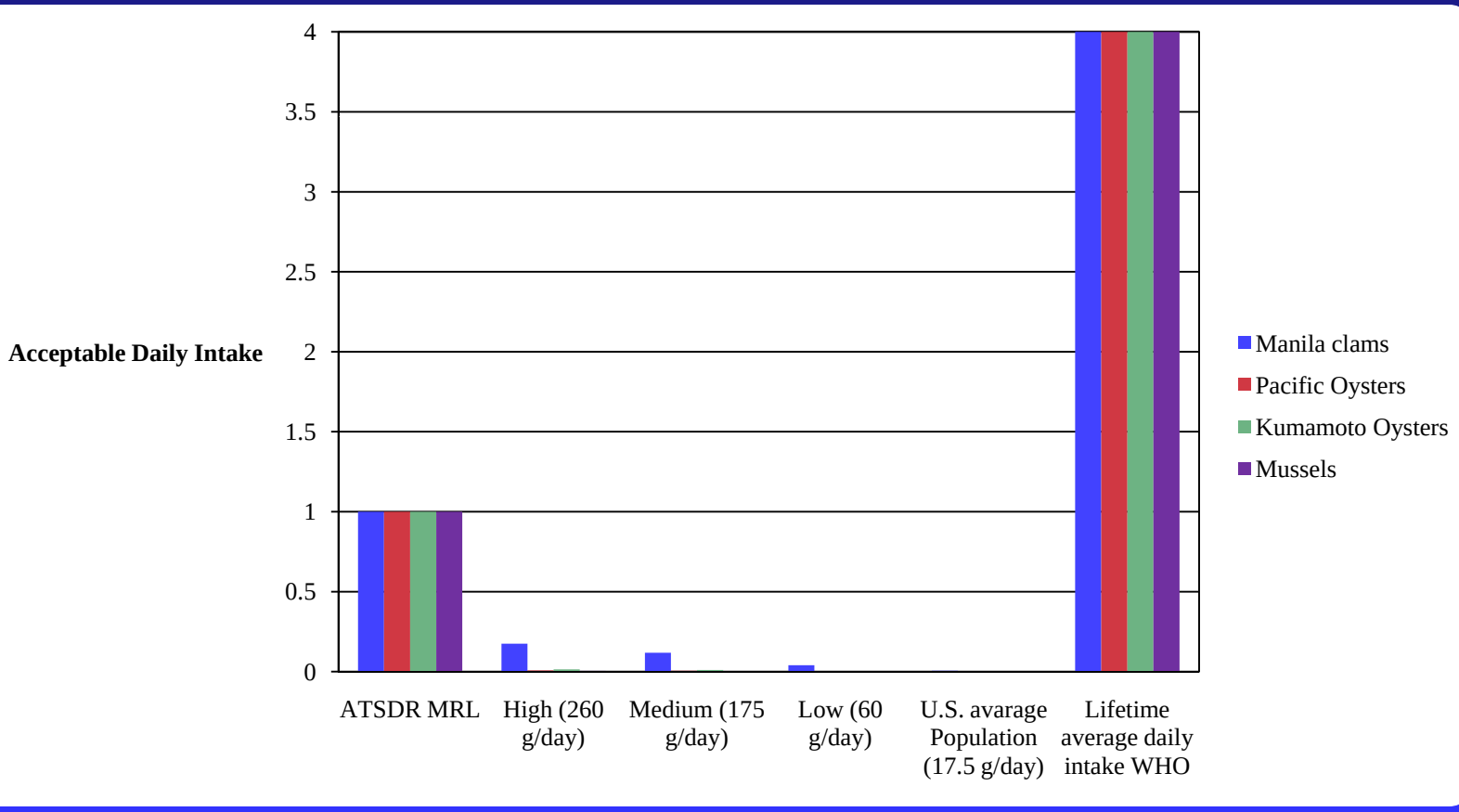
**Low, medium, and high are based on total seafood consumption*

Total dioxin concentrations

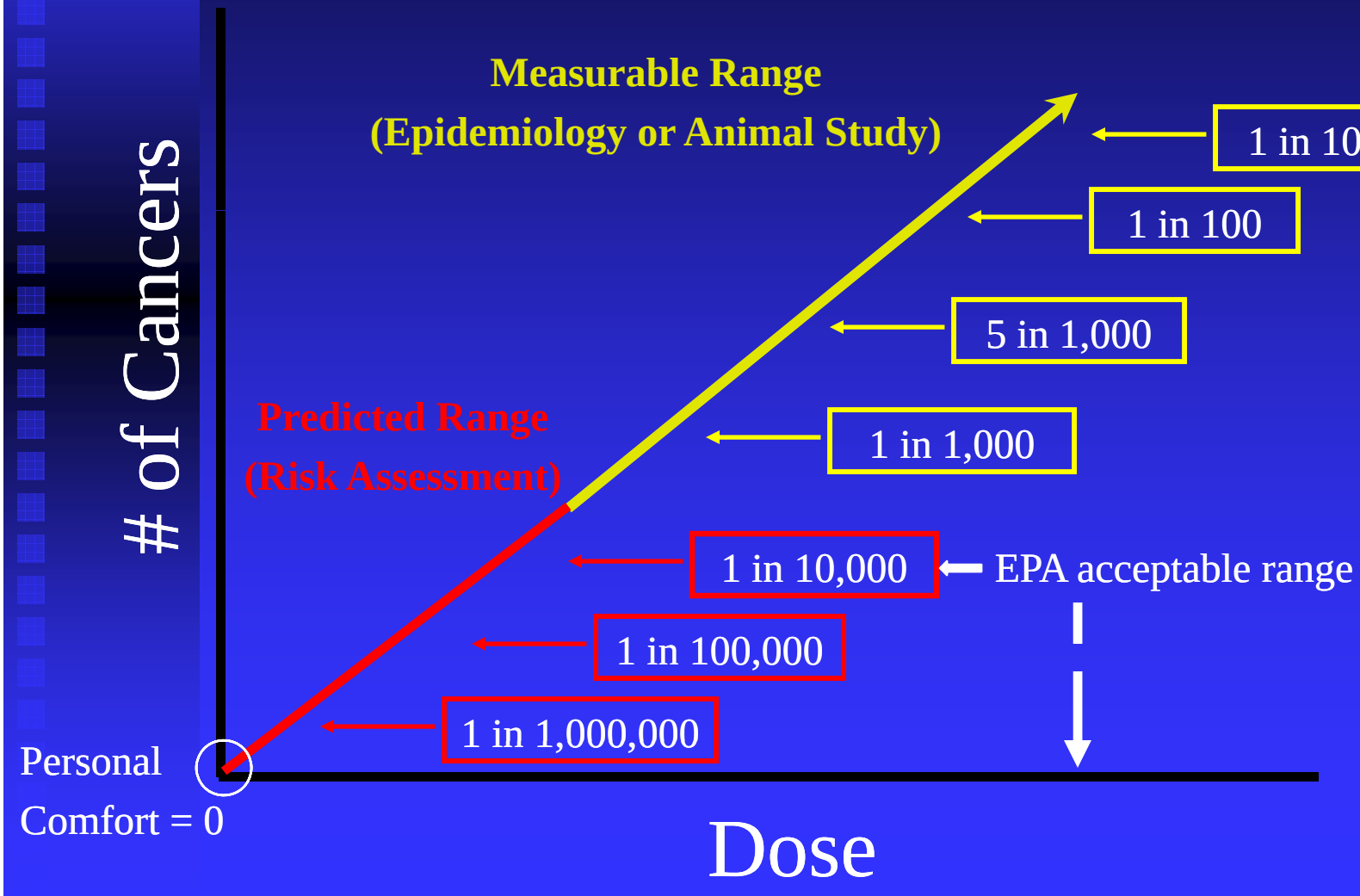
Species	Mean (ppt)	Range (ppt)
Manila clams	0.11	0.05 – 0.27
Pacific oysters	0.26	0.13 – 0.37
Kumamoto oysters	0.45	0.3 – 0.6
Mussels	0.17	NA

Non-Cancer Assessment

- Comparison of average daily intake of dioxin in shellfish

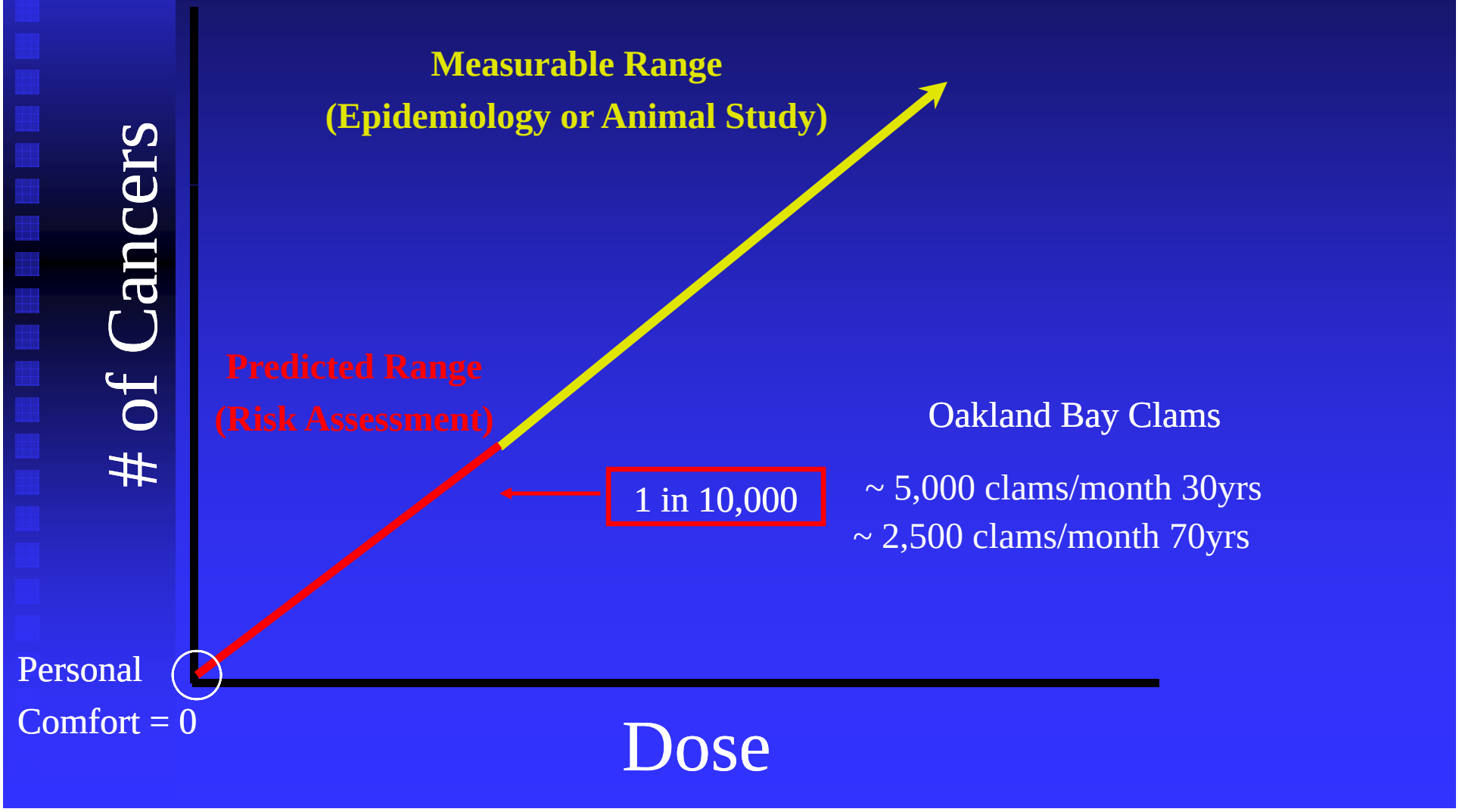


Cancer Assessment



Cancer Assessment

Based on average concentration of manila clams 0.11 ppt



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**

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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

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