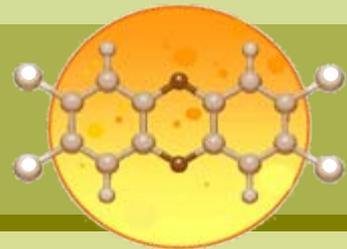


Rayonier Mill Off-Property Soil Dioxin Study

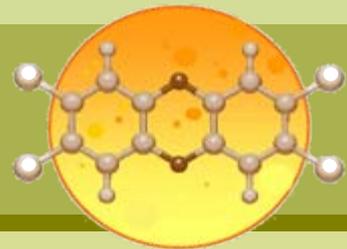
Rebecca Lawson, P.E., LHG - July 9, 2008





Ecology Staff

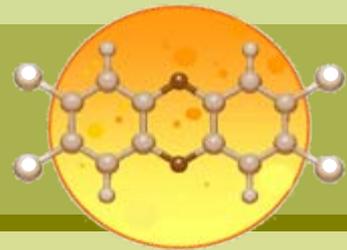
- **Marian Abbett, P.E.** – Rayonier Project Manager
- **Connie Groven** – Rayonier Mill Off-Property Soil Dioxin Study Manager
- Public Involvement Coordinators - **Meg Bommarito & Hannah Aoyagi**



Health Staff

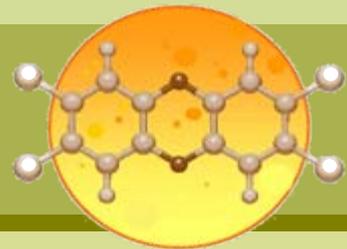
- **Barbara Trejo** - WA Department of Health
Health Assessor

- **Andy Brastad** - Clallam County Health and
Human Services Department



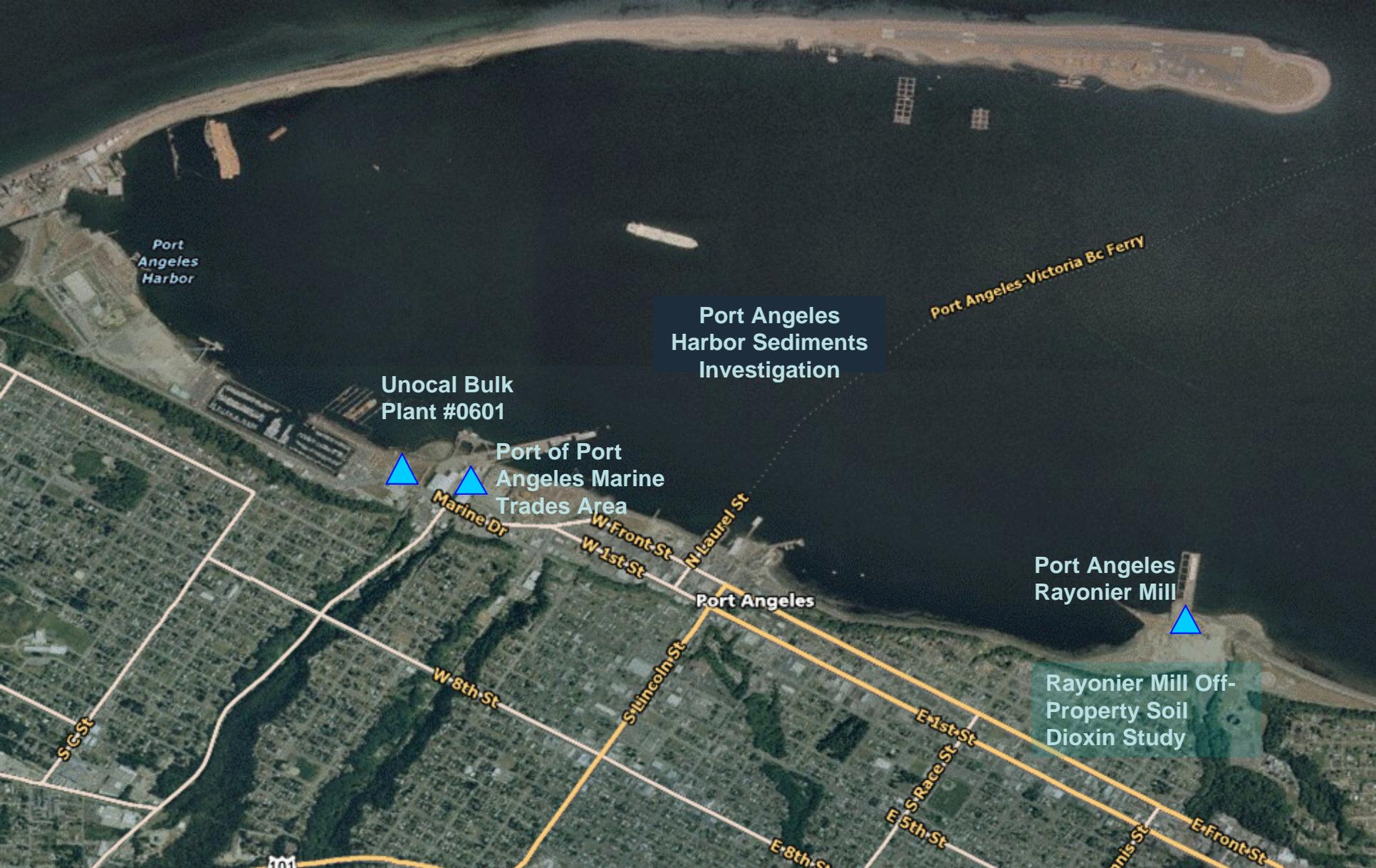
Outline

- Ecology's work in Port Angeles
- Port Angeles Rayonier Mill & dioxins
- Rayonier Mill Off-Property Soil Dioxin Study



Puget Sound Initiative

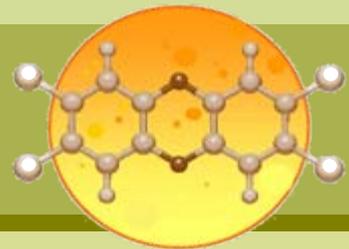
- Puget Sound Initiative (PSI) = Governor Gregoire's initiative to restore the health of Puget Sound by 2020
- Toxics Cleanup Program response: accelerate cleanups with ½ mile of Puget Sound
- Port Angeles Harbor is one of seven *priority embayments*



Ecology work in Port Angeles

Port Angeles Rayonier Mill

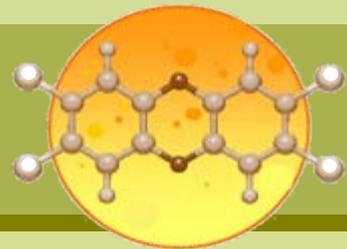




Rayonier Mill History

- Pulp mill operated from 1930 to 1997
- Mill activities contaminated sediment, soil, and groundwater
- Formal cleanup under the Model Toxics Control Act begins in 2000





Cleanup Process

2000

2008

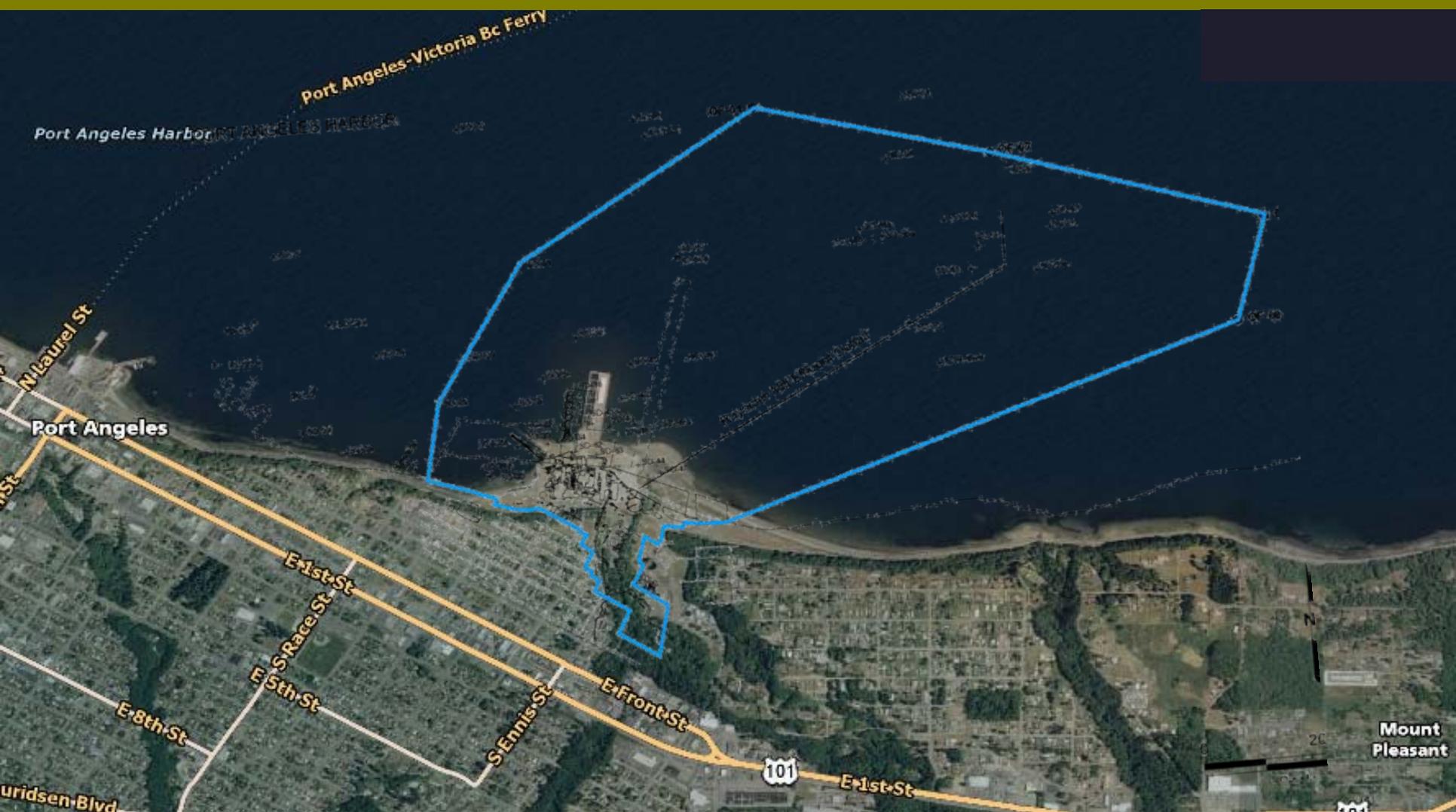
Rayonier Mill - Upland
Solid Waste Program management

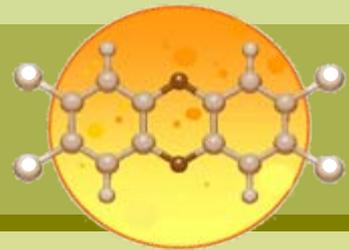
Rayonier Mill - Marine
Solid Waste Program management

Rayonier Mill
Study Area

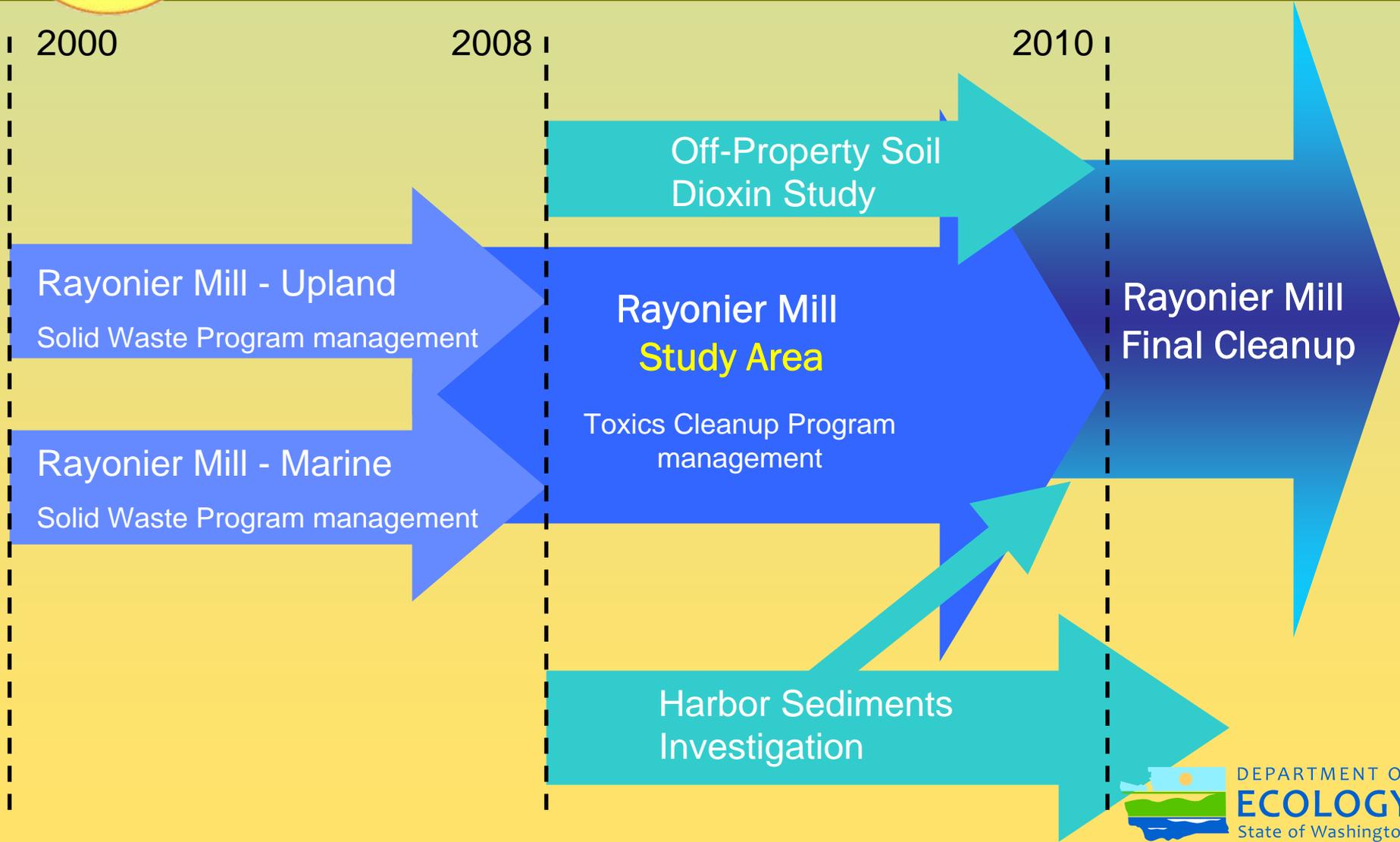
Toxics Cleanup Program
management

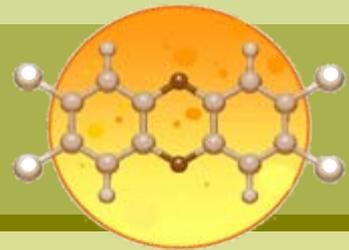
Port Angeles Rayonier Mill Proposed Study Area



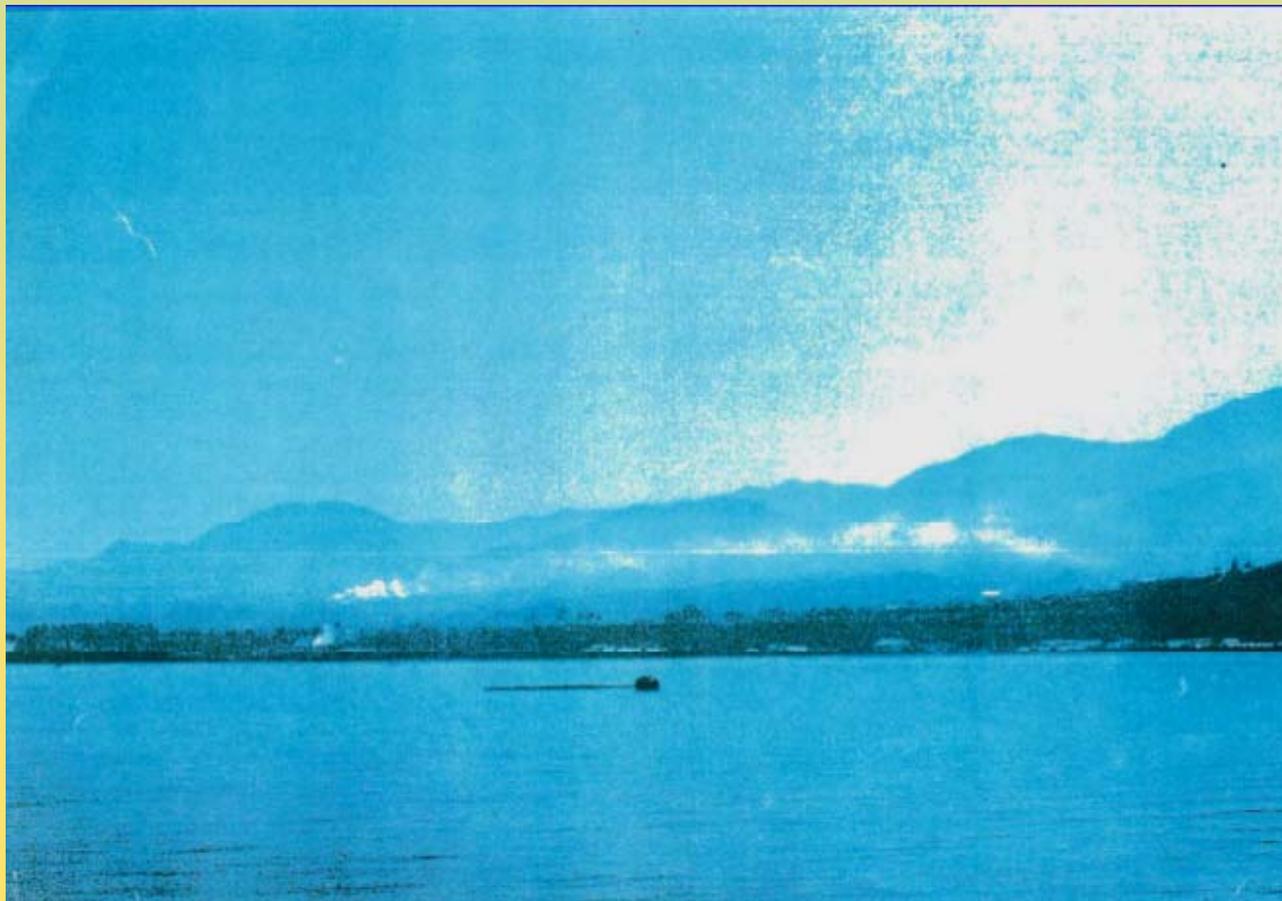


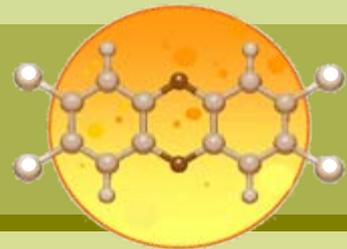
Cleanup Process





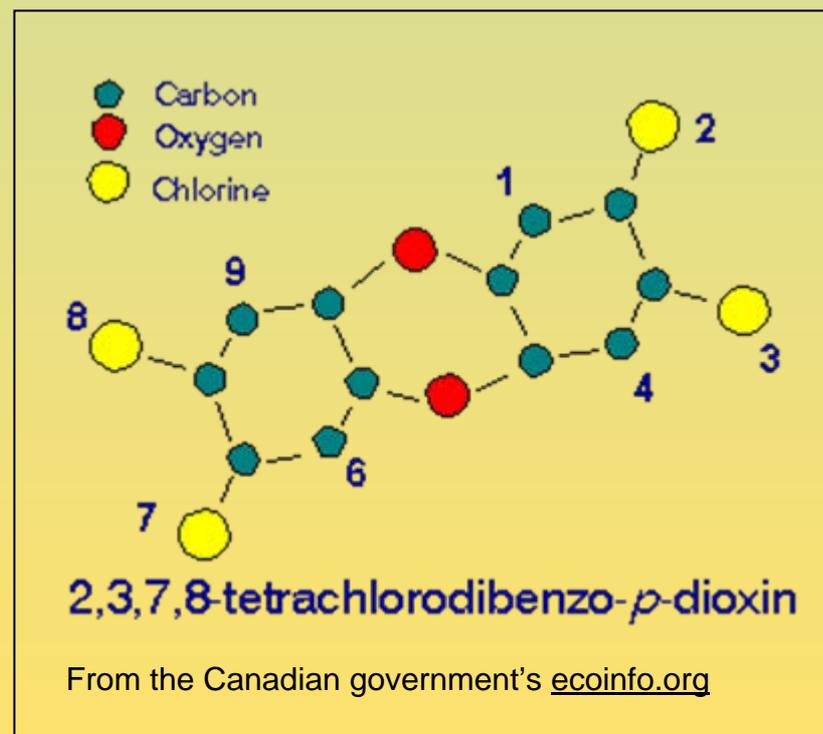
Rayonier Mill

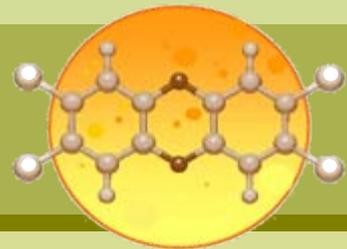




What are dioxins?

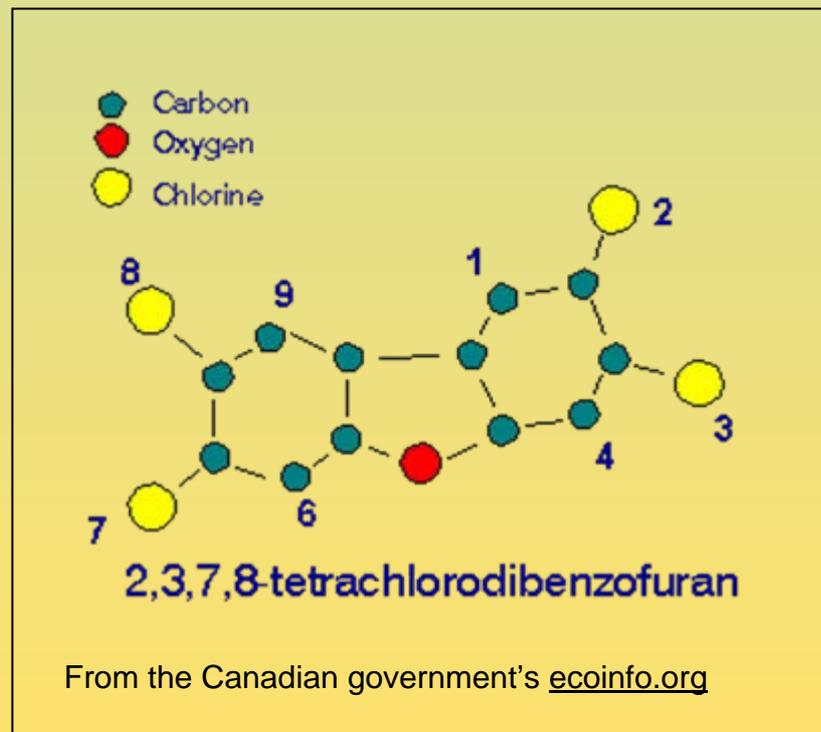
- Family of chemicals with similar structures and biological effects
- Persist in environment and accumulate → present worldwide
- Most people are exposed to low, background levels
- Exposures linked to cancer, non-cancer health effects

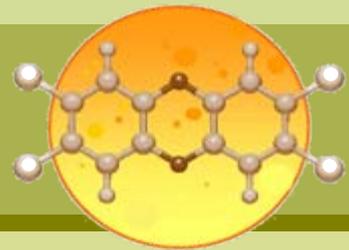




What are furans?

- Related to dioxins
- Similar chemical structure and effects
- Sources same as dioxins

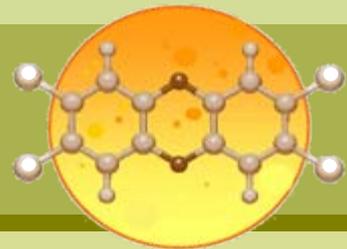




Dioxin Sources

- Industrial processes
 - Pulp chlorine bleaching
 - Chemical manufacturing
- Combustion (burning)
 - Forest fires
 - Waste incineration
 - Burn barrels, fireplaces and wood stoves





Rayonier Dioxin Sources

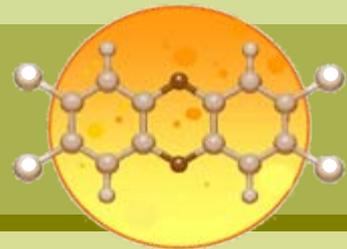
- Primary source = hog fuel burner
 - Saltwater-soaked wood
 - Stack testing showed presence of dioxins and furans in ash

Other Potential Dioxin Sources in Port Angeles



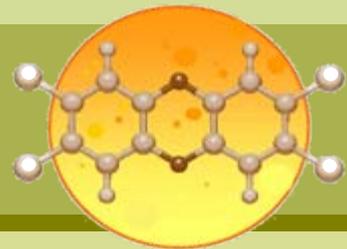
Off-Property Soil Dioxin Study





Study Purpose

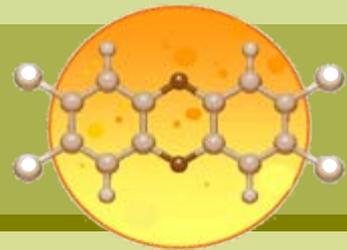
- Determine the magnitude of dioxin and furan contamination in soils potentially impacted by airborne emissions from the former Rayonier Mill.
- Determine the former Rayonier Mill's contribution to measured dioxin contamination, compared to other possible sources.



Study Limitations

This study will not

- Delineate the total extent of contamination.
- Completely characterize individual properties.
- Support interpolation from one property to another.
- Define background levels.



Study Design

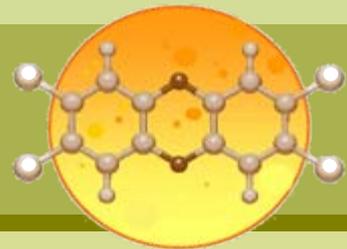
- Study area selection
- Sample zones
- Sample allocation
- Property selection
- Soil sampling
- Lab analysis



AIR EMISSIONS DEPOSITION TO SOILS

Rayonier Mill Off-Property Soil Dioxin Study



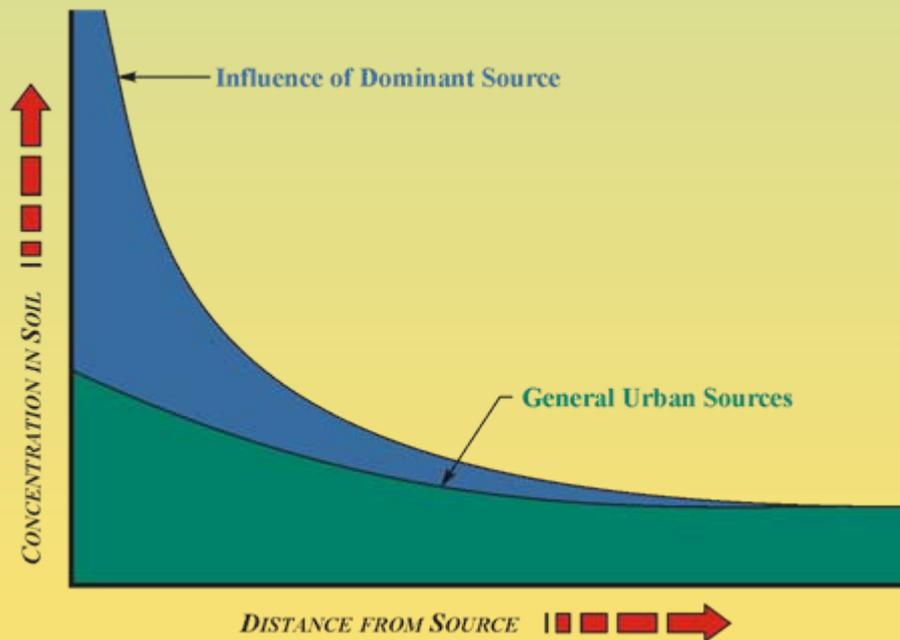


Study Area Selection

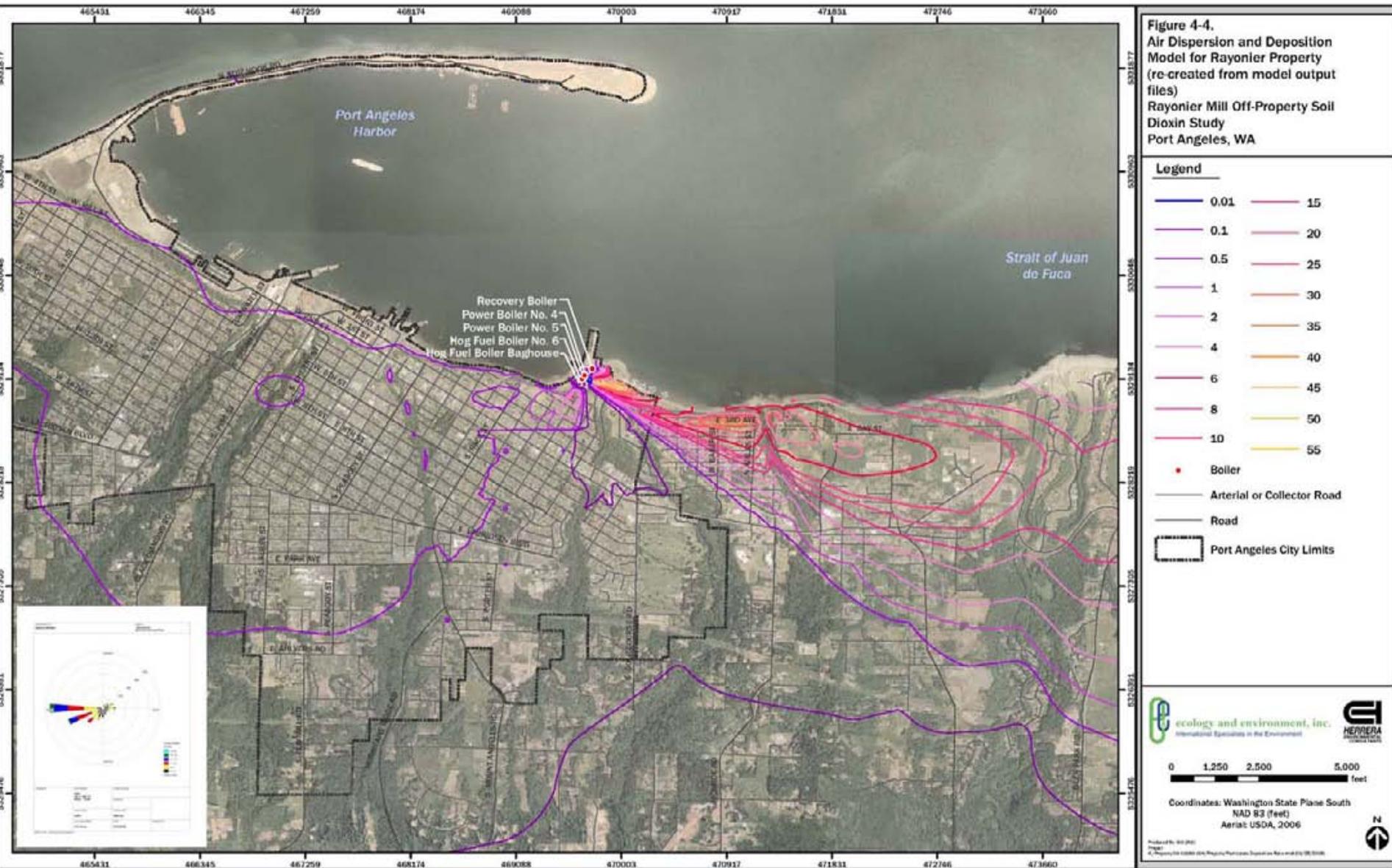
Where we predict dioxins should be:

- Denser nearer to the source(s).
- Found in the upper layer of soil.
- Higher in undisturbed soils, such as forests.

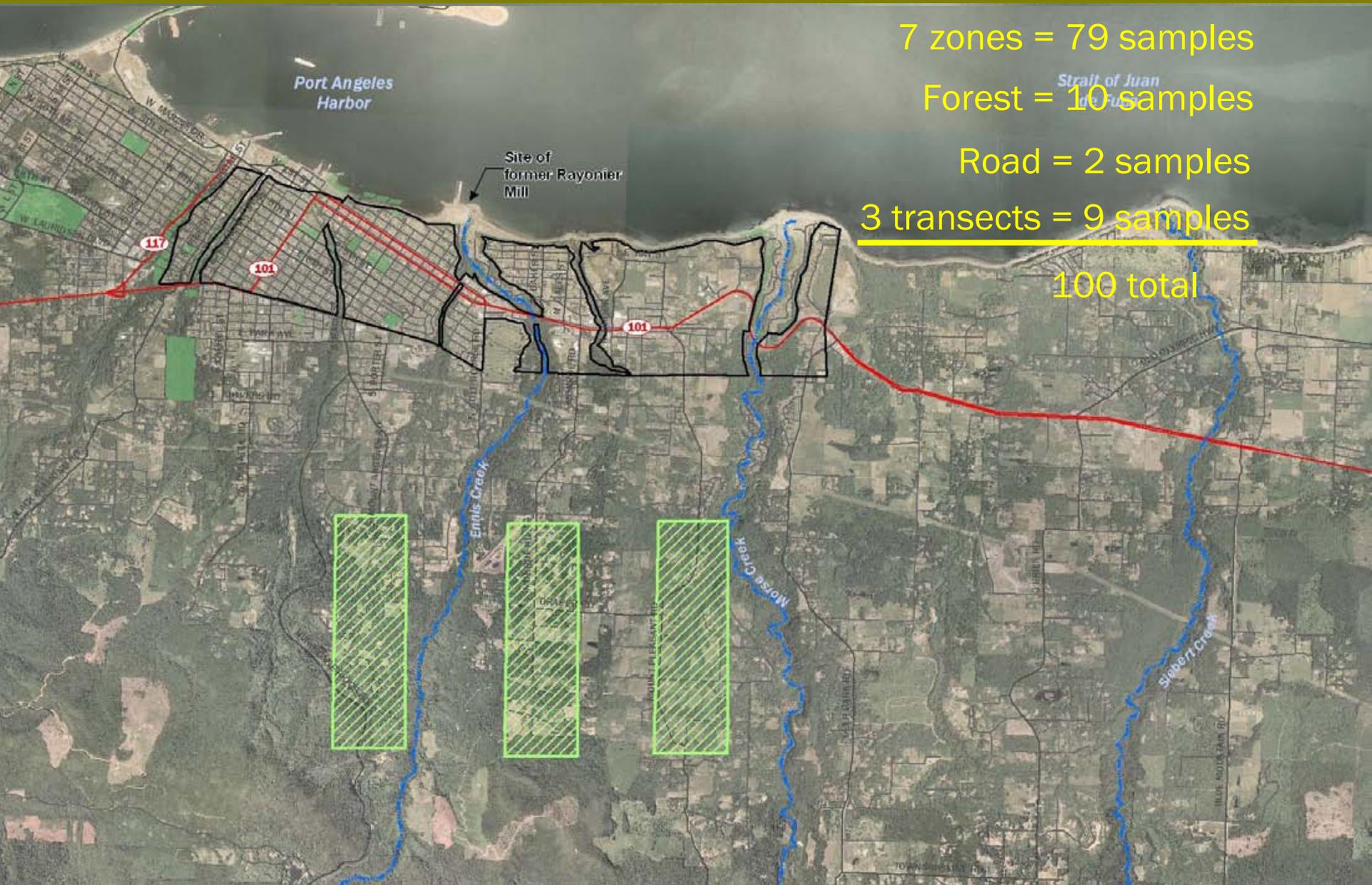
Uses past studies and existing information...



Air Modeling, 2006



Sampling Overview



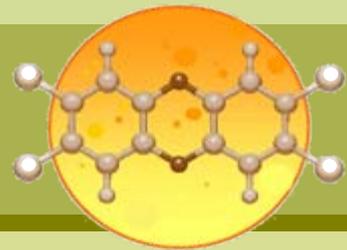
7 zones = 79 samples

Forest = 10 samples

Road = 2 samples

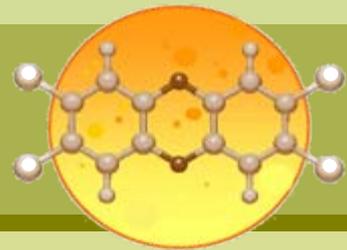
3 transects = 9 samples

100 total



Property Selection Process

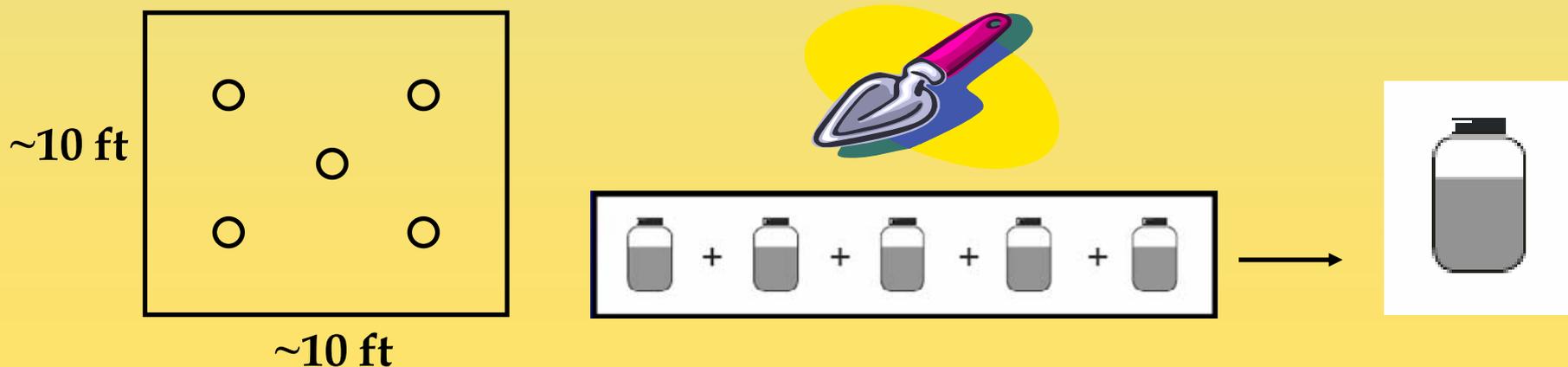
1. Preferred properties selected
2. Exclusion criteria applied
3. Letters sent to potential participants
4. Interviews
5. Single property selected per grid cell

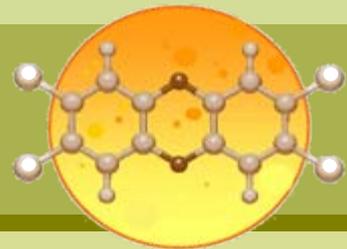


Soil Sampling

After a property is selected, the sampling team will visit to:

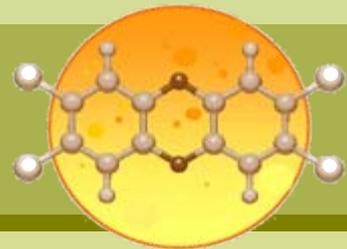
- Take five samples from 4 inch deep holes
- Mix the five samples into one “composite”





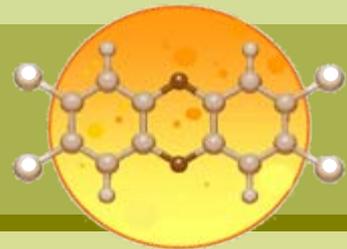
Analysis

- Laboratory analysis
- Looks for types and concentrations of dioxins and furans
- Validation by a separate lab



Evaluation

- Preliminary data evaluation
 - General summary of statistics
 - Mapping
- Notify participants of their results
- Share preliminary findings with the community
- Detailed evaluation to try to identify specific sources of dioxins
- Final report (spring 2009)



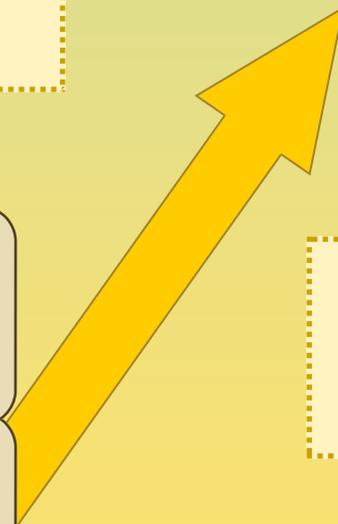
Next Steps

Draft Soil Sampling Plan (SSP)
Public Comment Period
June 30—July 30, 2008



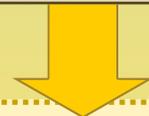
Ecology responds to public comments and finalizes the Soil Sampling Plan

Property access and soil sampling (Summer 2008)



Lab analysis (Fall—Winter)

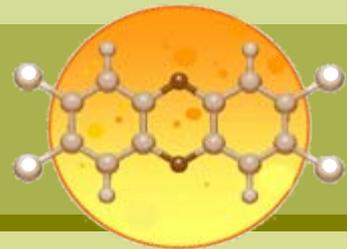
Participants and community notified (Early 2009)



Soil Dioxin Report Available to the Public
Spring 2009



For any areas of concern, identify sources and conduct further studies



Public Involvement

- How to get involved:
 - Submit written comments by July 30
 - Join Ecology's mailing list for Port Angeles
 - Sign up to be considered for soil sampling
- Public Participation Plan available



Any questions?

