



# Project ENVVEST Community Update

- Technical Progress and Accomplishments
- Schedule
- Community Update CD

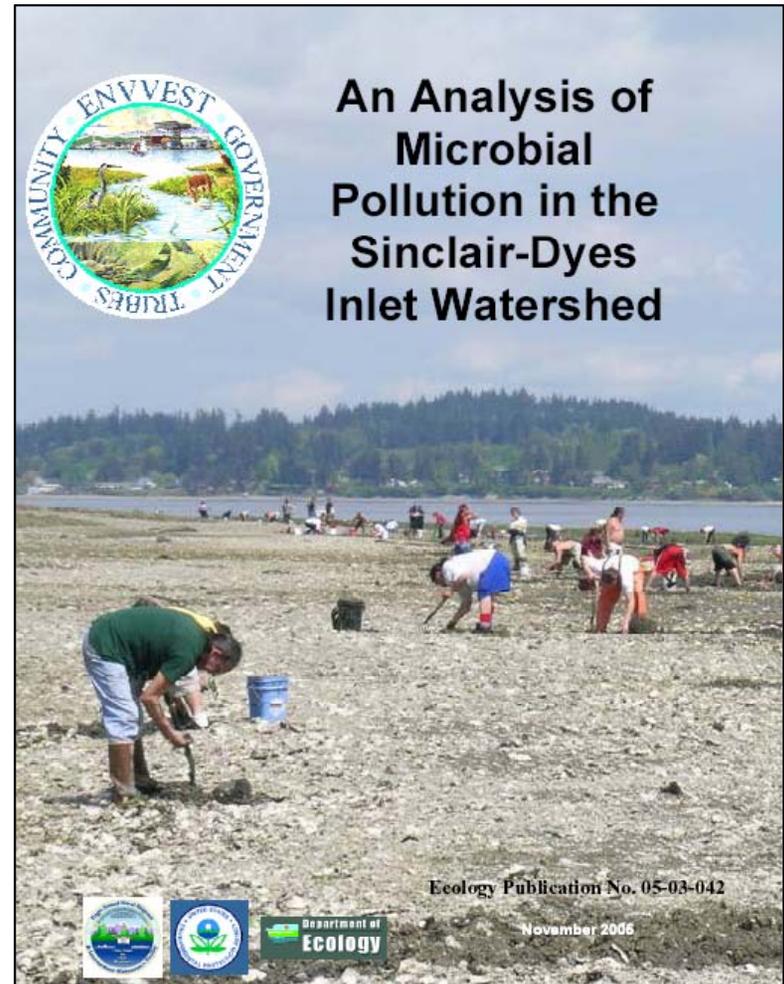
**Dr. Robert K. Johnston**  
**ENVVEST Technical Coordinator**  
**Community Advisory Committee Meeting**  
**June 15, 2006**  
**Norm Dicks Government Center**  
**Bremerton, WA**

# **Technical Progress and Accomplishments**

- Total Maximum Daily Load (TMDL)  
Study of Microbial Pollution
- Integrated Modeling of Inlets
- Storm Event Sampling
- Ambient Water Quality Monitoring
- Watershed Monitoring
- Biota Sampling
- Current Meter Study

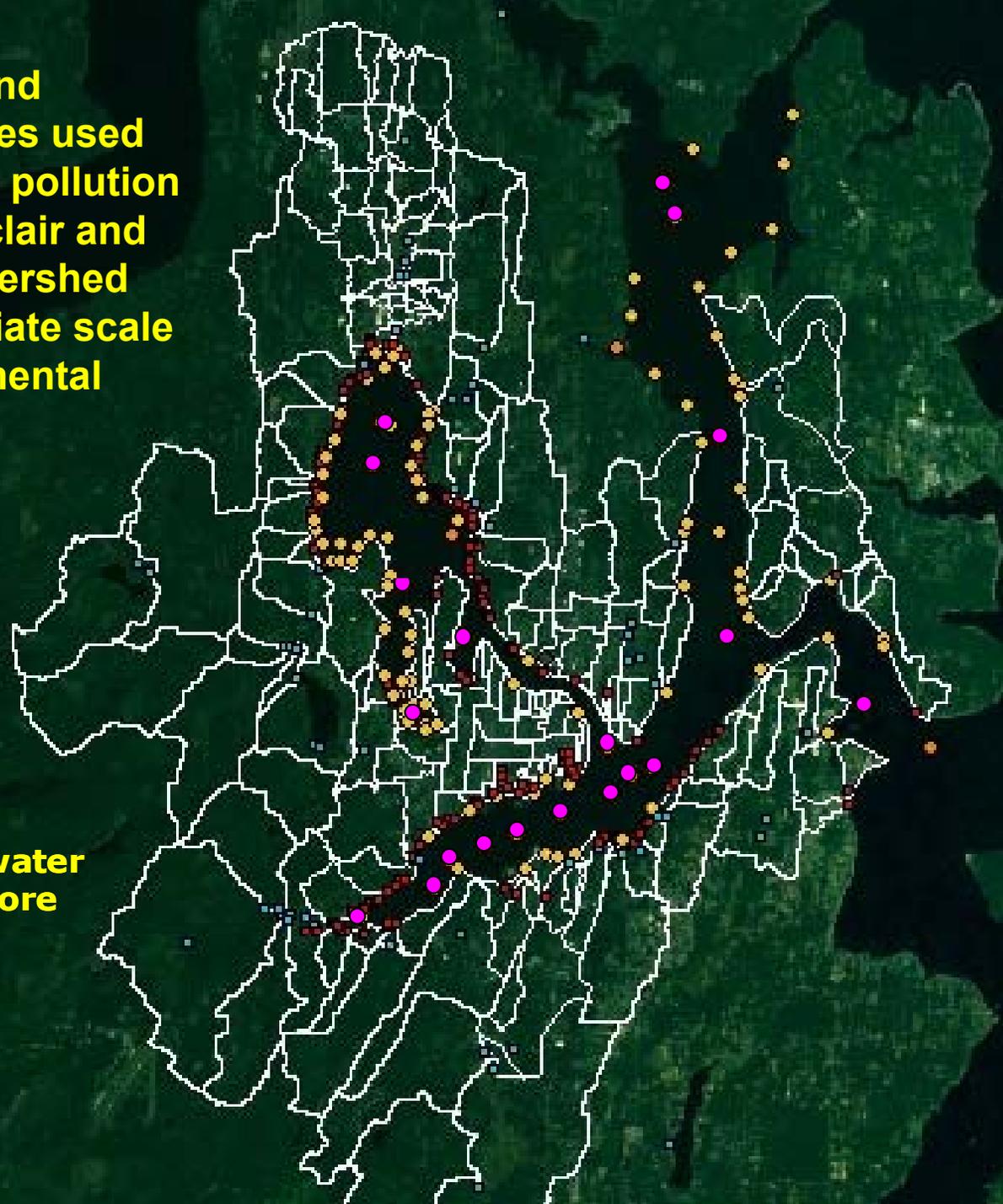
# Total Maximum Daily Load (TMDL) Study of Microbial Pollution

- Technical Study Completed
- Combined Effort of Stakeholders
  - ENVVEST
  - Kitsap County Health District
  - Department of Health
  - Kitsap County Surface and Storm Water Management
  - Bremerton, Port Orchard, Bainbridge Island
  - Suquamish Tribe
- Identified Numerous Sources of Pollution and Impacts on Water Quality in the Inlets



**Sampling stations and watershed boundaries used during the microbial pollution TMDL study for Sinclair and Dyes Inlets. The watershed scale is the appropriate scale to address environmental issues and engage stakeholders.**

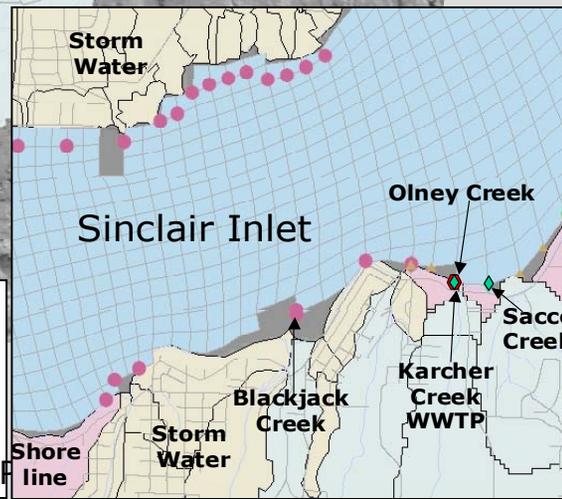
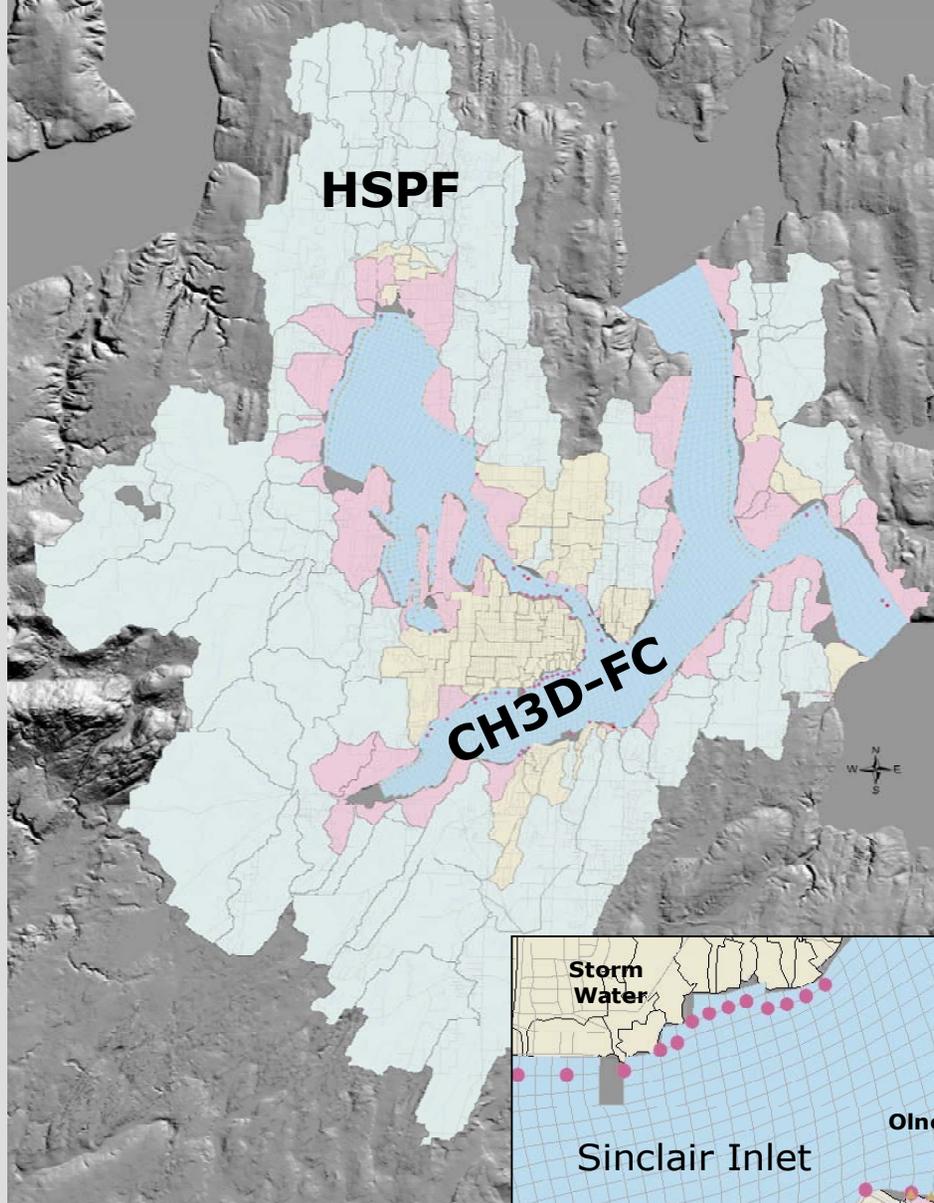
- Stream**
- Stormwater**
- Nearshore**
- Marine**



# Integrated Modeling of the Sinclair and Dyes Inlet Watershed

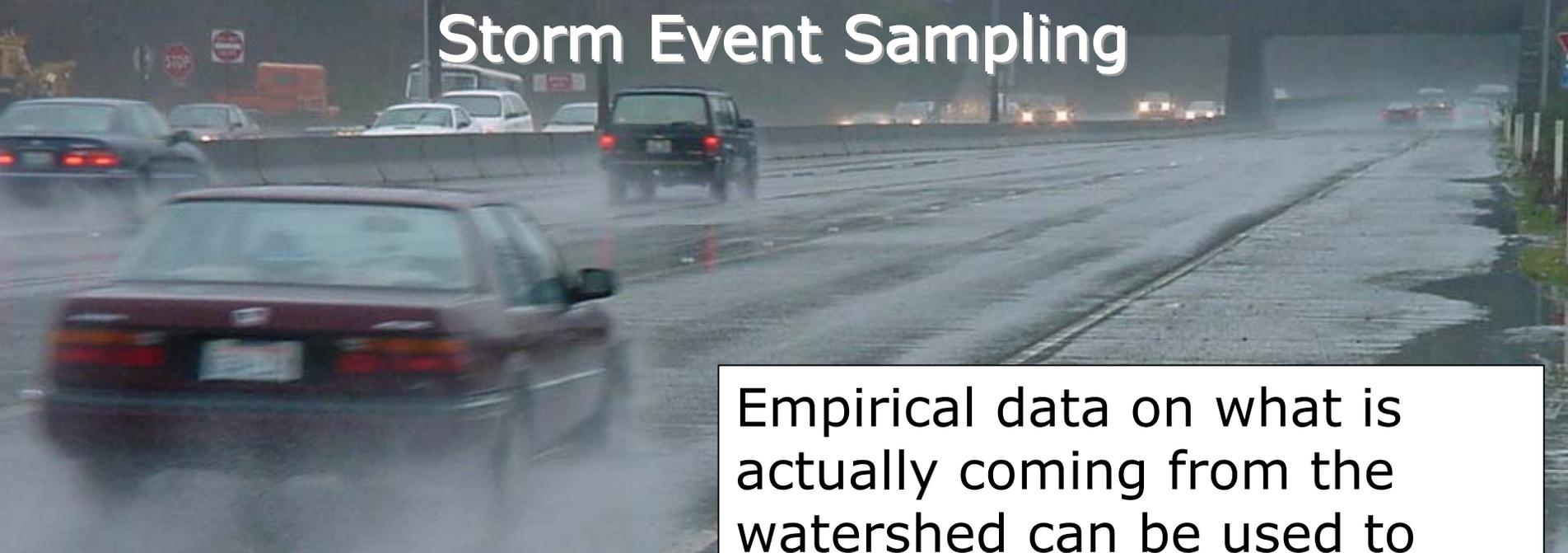
The integrated watershed (HSPF) and receiving water (CH3D-FC) model is capable of modeling runoff and transport of pollutants from specific sources.

- Current Configuration:
- 39 Streams
  - 50 Stormwater Outfalls
  - 44 Shoreline Drainages
  - 4 Treatment Plants
  - 
  - 137 Separate Inputs



- Inputs**
- ◆ Stream
  - Storm water
  - ▲ Shoreline runoff
  - ◈ Wastewater Treatment Plant (WWTP)

# Storm Event Sampling



Empirical data on what is actually coming from the watershed can be used to calculate loading as a function of upstream landuse.

- Heavy Metals
- Toxic Organics
- Nutrients
- Particulates and Organic Matter

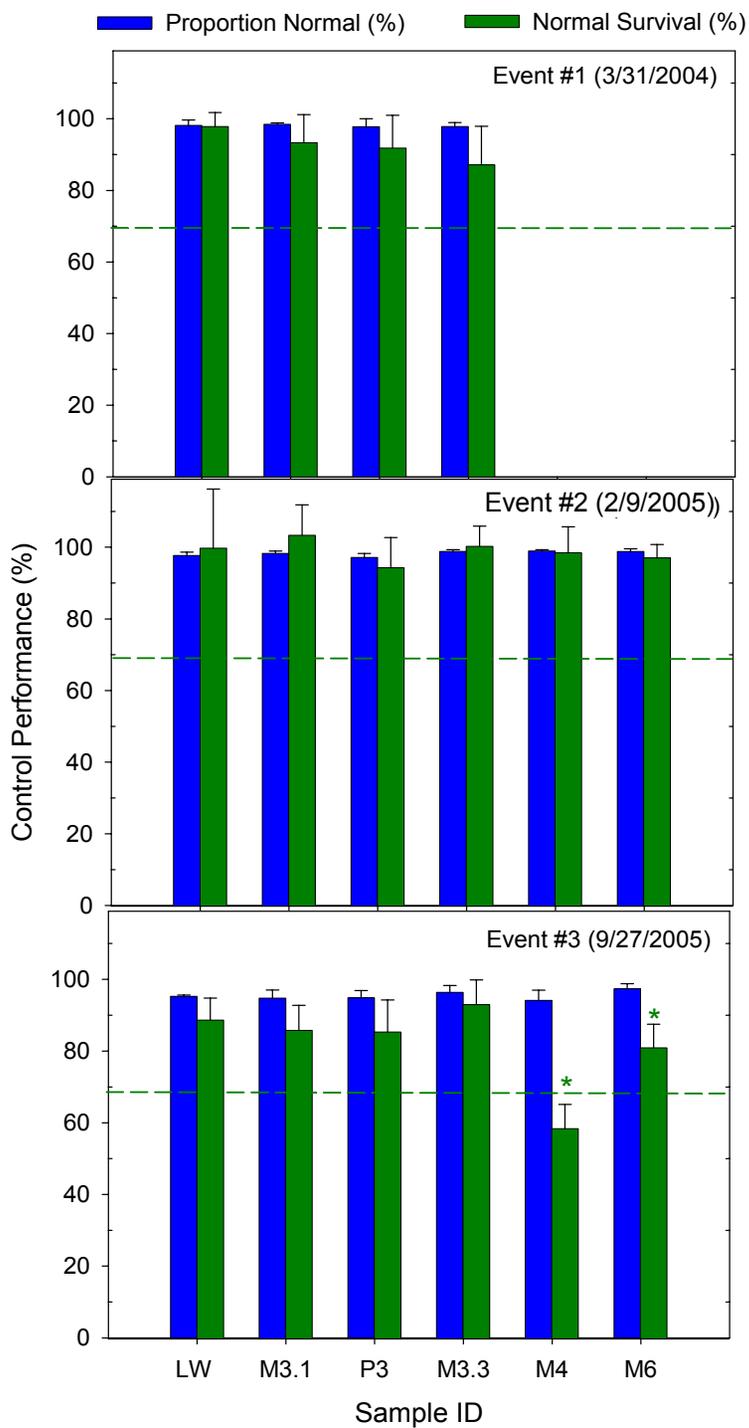


# Ambient Water Quality Monitoring

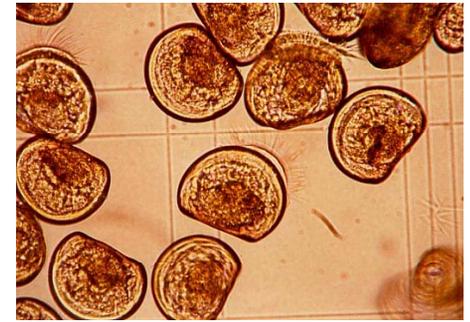


Ambient marine monitoring was conducted to measure the impact of runoff on receiving waters and obtain data needed to verify modeling results.





*Mytilus galloprovincialis*



Normal D-shaped larvae after 48 h

Results of copper toxicity studies showed no indication of ambient toxicity in the waters of the Inlets. The toxicity detected at two stations during event #3 was due to a bloom of toxic algae that was present during the sampling event.

**Toxic Algae Cells > 10<sup>5</sup> cells/L**

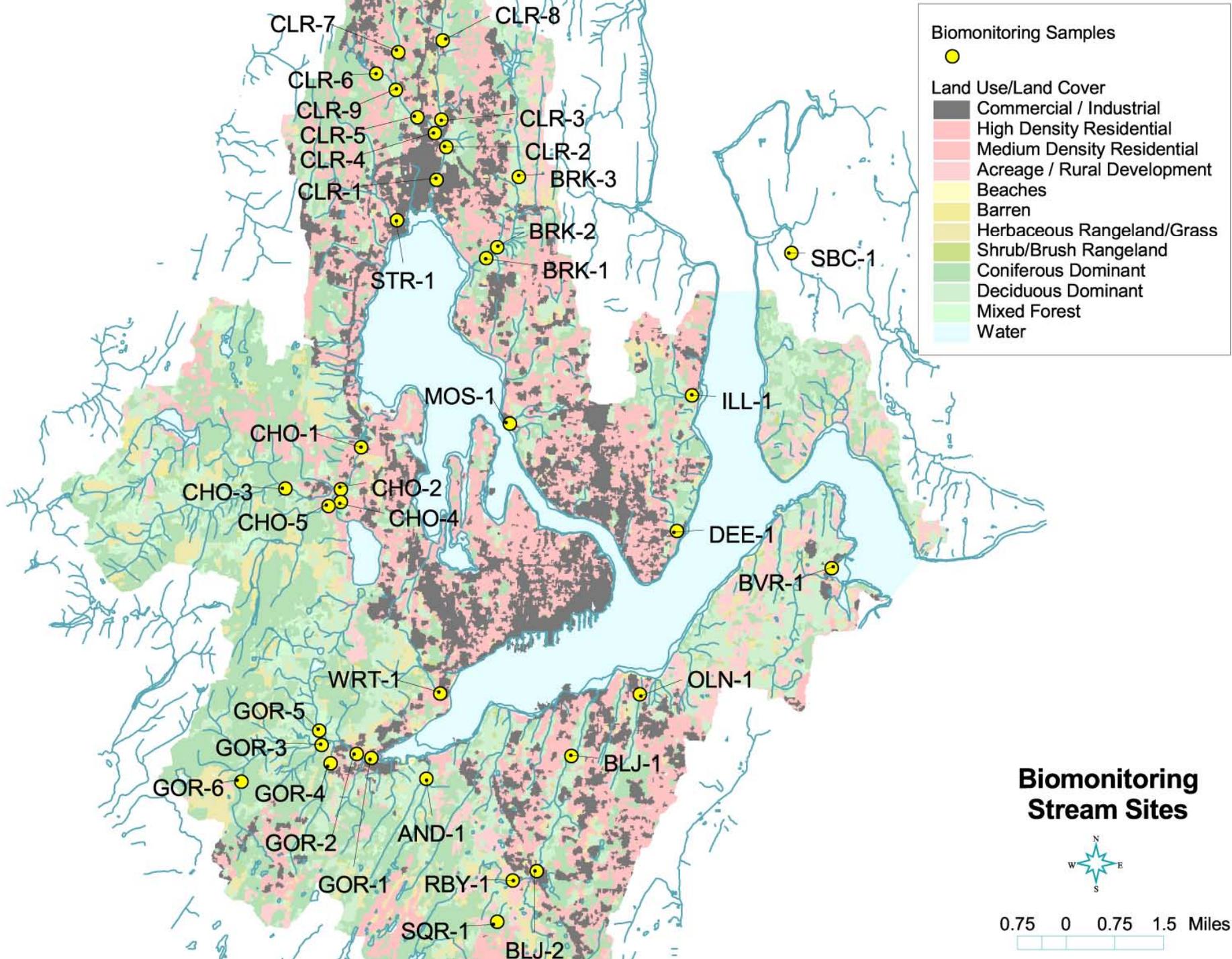


*Gymnodinium splendens*

40-80 μm

# Watershed Monitoring

- **Established Network of Stream and Stormwater Flow Monitoring Stations**
  - Kitsap Public Utilities District
  - Kitsap County Surface and Storm Water
  - City of Bremerton
  - City of Bainbridge Island
  - PSNS & IMF
- **Stream Benthic Macroinvertebrate (Bug) Sampling**



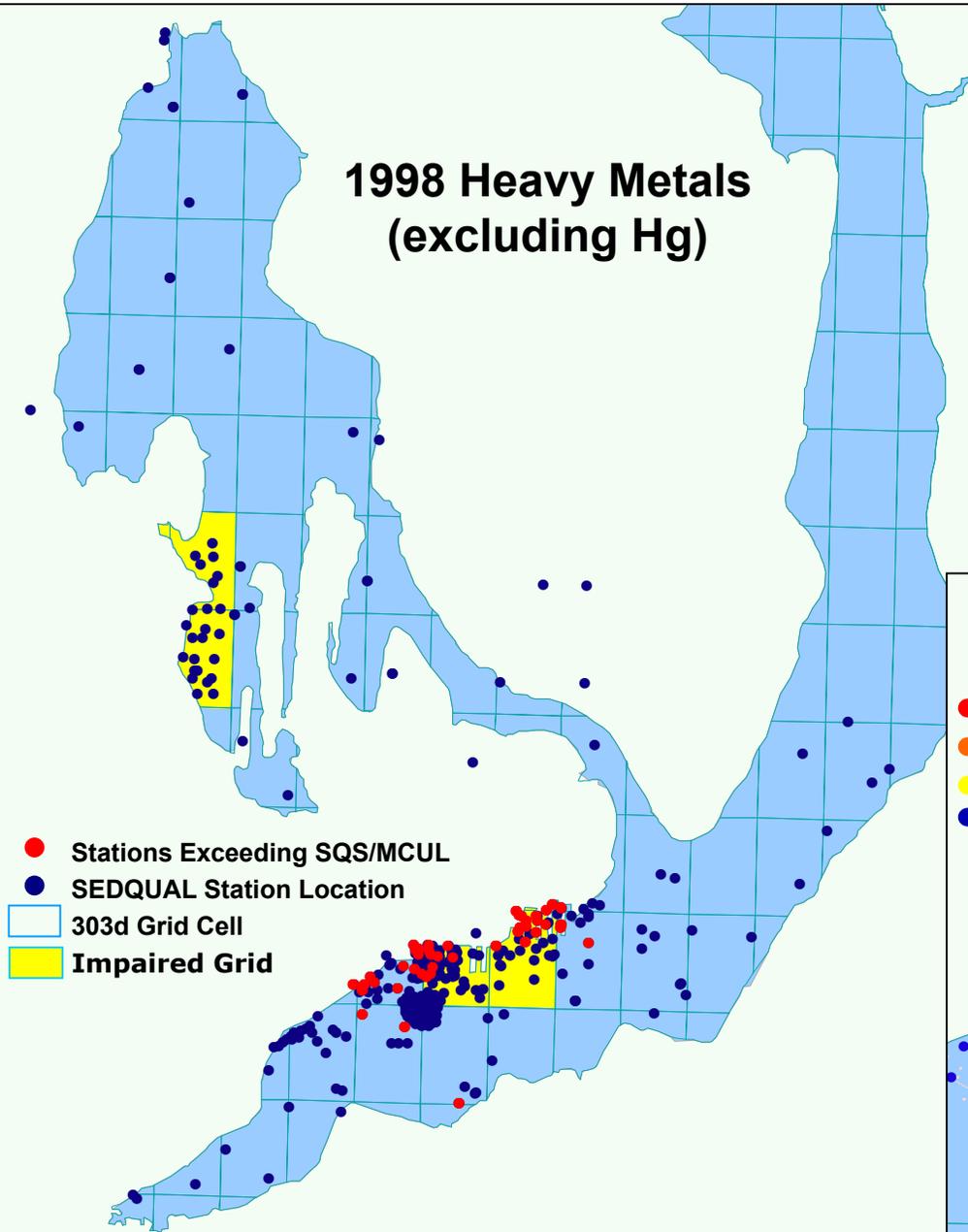


Bugs and insects that live in the stream bed provide food for fish and are an indication of the quality of the habitat.



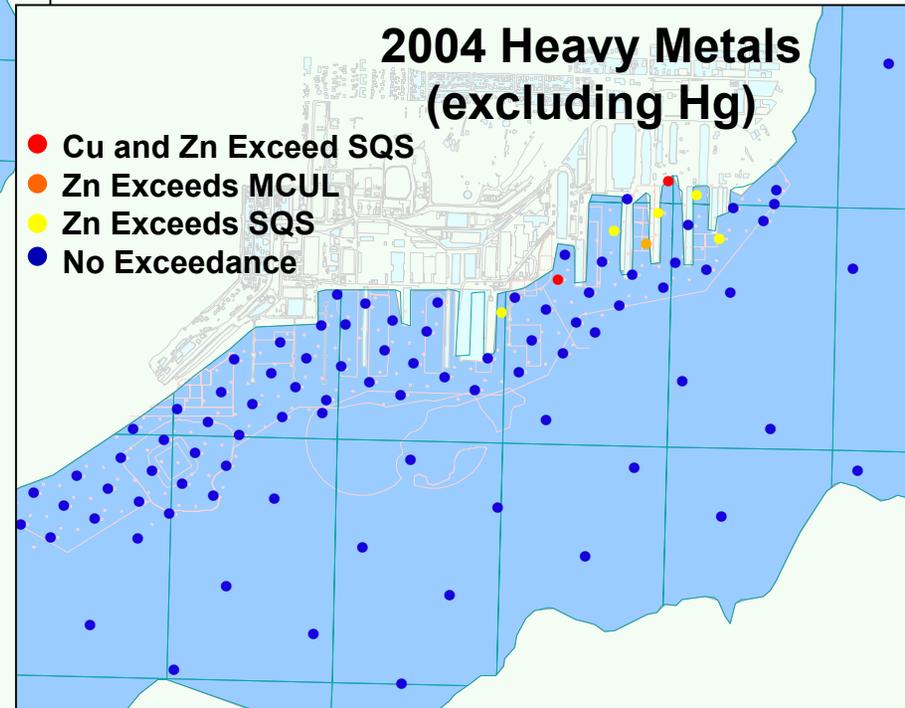
# Sediment Studies

1998 Heavy Metals  
(excluding Hg)



Sediment monitoring showed a significant improvement in sediment quality within the Inlets.

2004 Heavy Metals  
(excluding Hg)



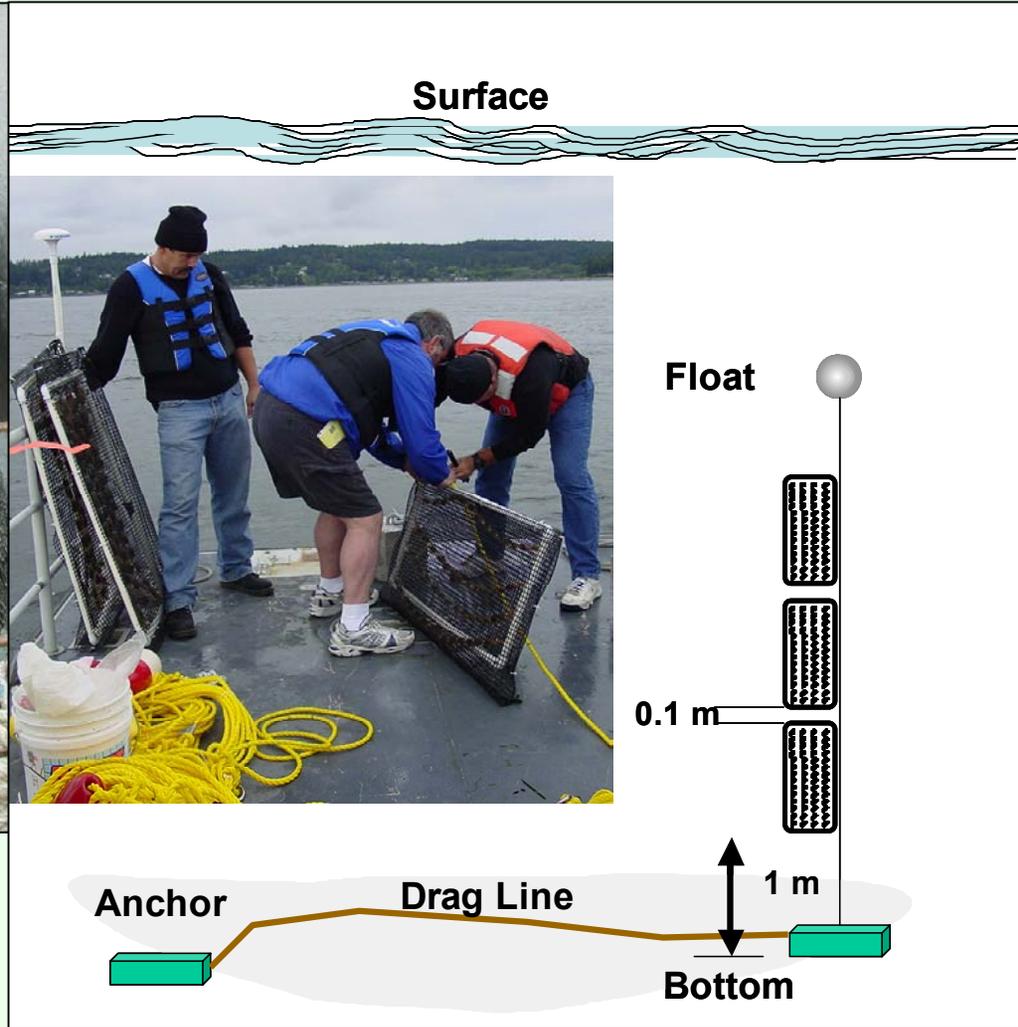
# Biota Sampling

## Bottom Fish Sampling

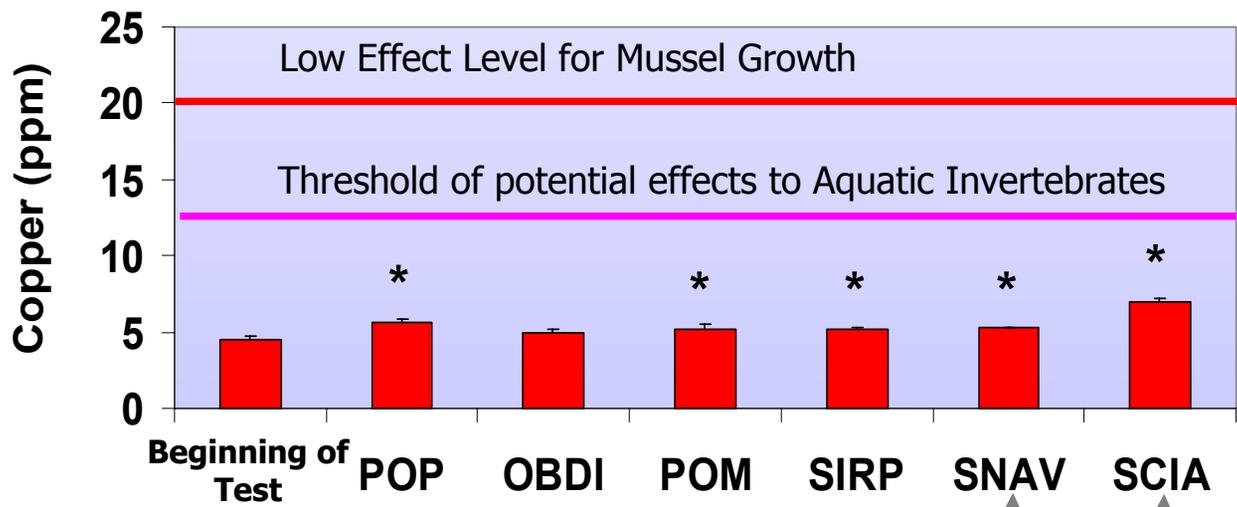


Bottom fish trawl in Sinclair Inlet.

## Caged Mussel Study

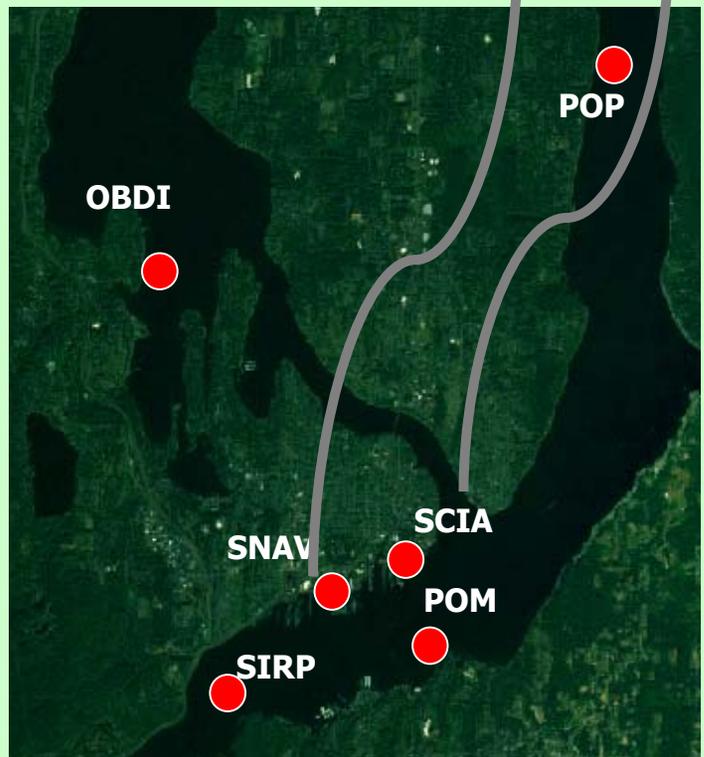


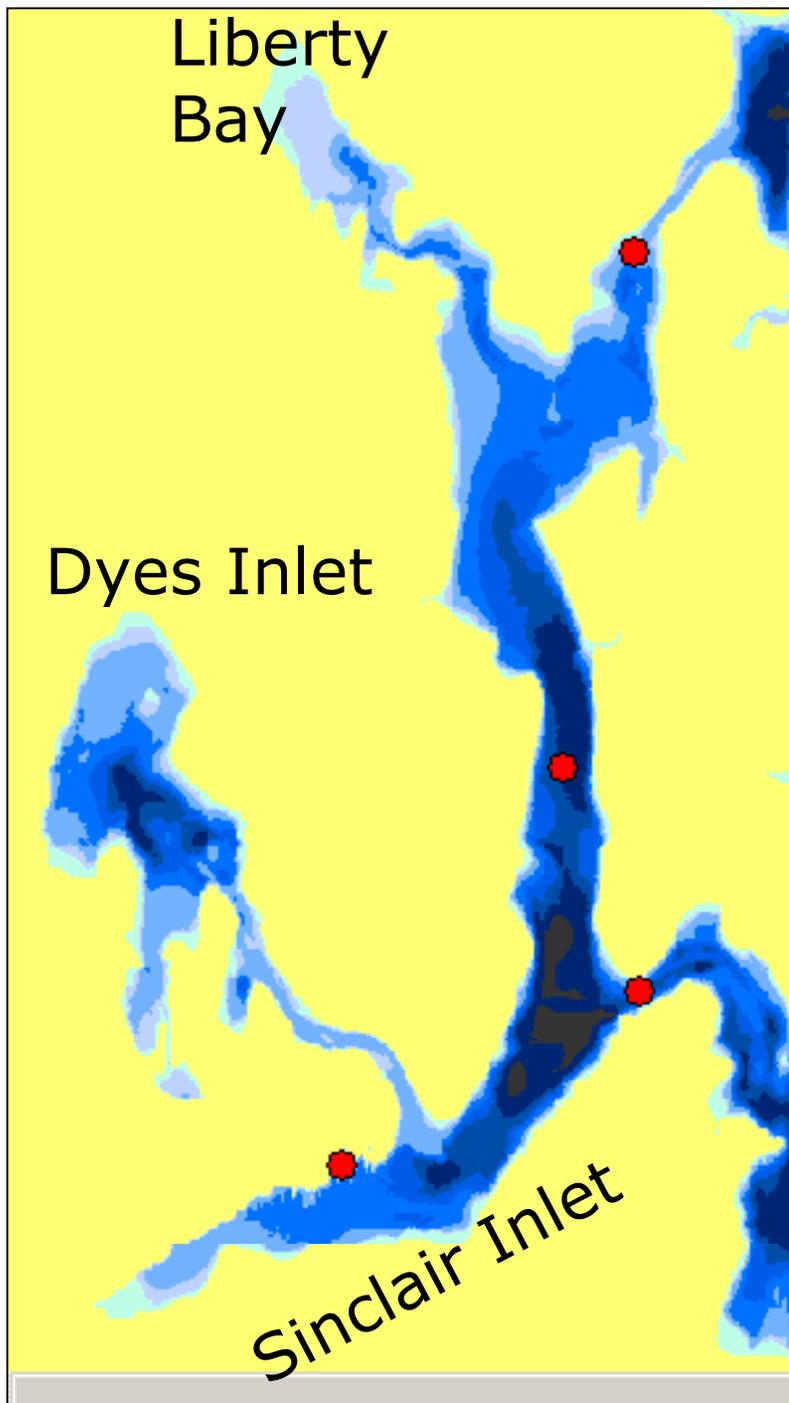
Mussel cage configuration.



Copper levels accumulated by mussels after being deployed for 84 days (Jun - Sep 2005)

\* Indicates levels were statistically higher than at the beginning of the test





## Current Meter Study

Depth contours and location of current meter monitoring stations.

Current data were collected to support linking the ENVVEST Inlet-scale model (CH3D) with UW's Puget Sound-scale model (POM).

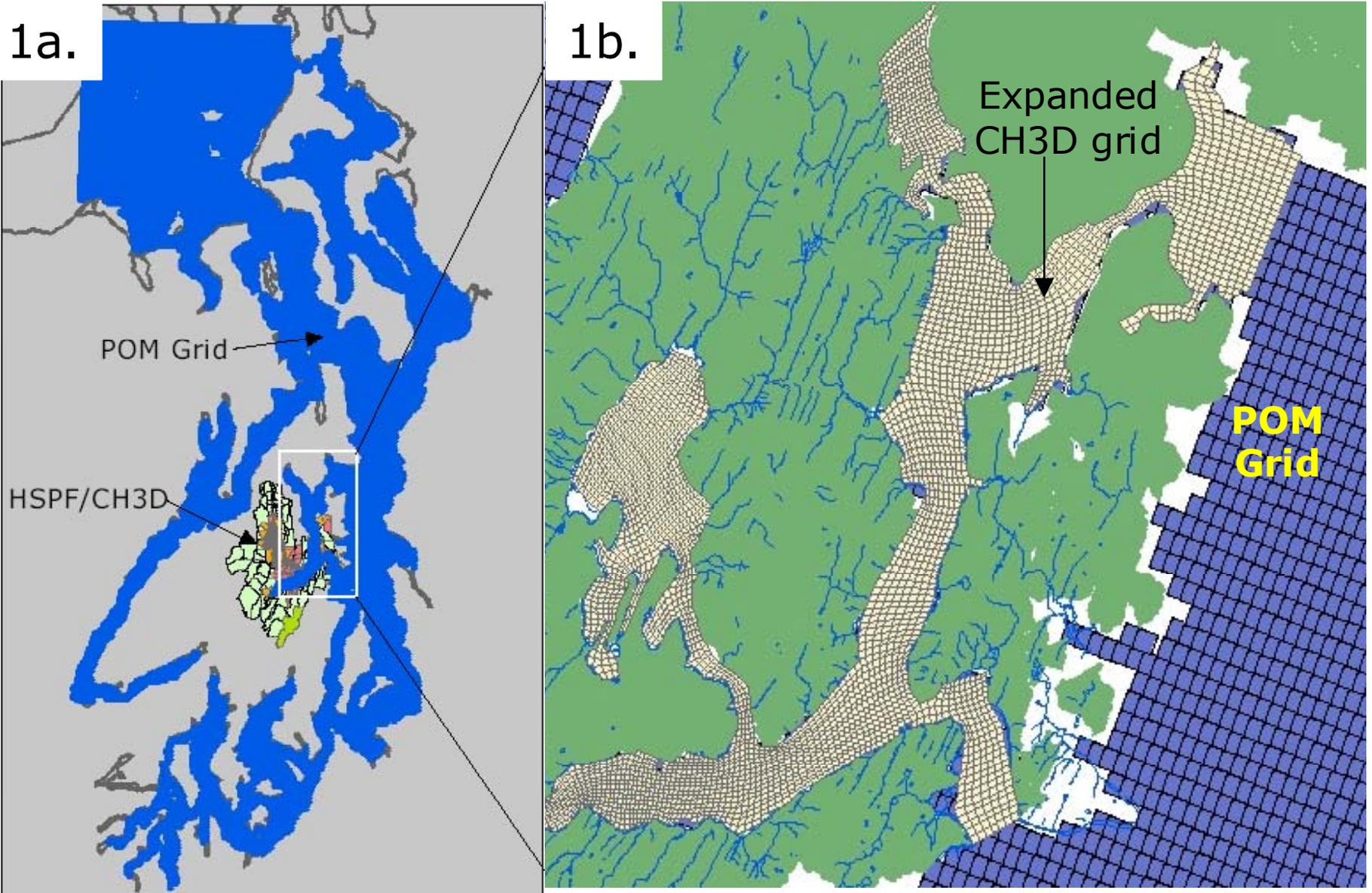
# Current Meter Deployment



# Retrieving Current Meter in Agate Pass (Nov 8, 2005)



# Linkage between CH3D and POM





# Community Update CD



File Edit View Favorites Address E:\ENVVESTCD\_2006\read\_me.htm Go

## Puget Sound Naval Shipyard & Intermediate Maintenance Facility

### Project ENVVEST

June 2006

The contents of this CD are provided as an update of activities being conducted by Project ENVVEST.

- [Project ENVVEST Community Update June 2006](#) (PDF file)
- [Review Status, Progress, Reports, and Deliverables](#)
- [Sinclair/Dyes Inlet Water Cleanup Plan Home Page](#) (on Ecology's web site)
- [Fecal Coliform TMDL Technical Report](#)
  
- [Browse this CD](#)

The ENVVEST Government Tribes logo features a circular emblem with a landscape scene and the text 'ENVVEST GOVERNMENT TRIBES'. Below it is the logo for the Puget Sound Naval Shipyard & Intermediate Maintenance Facility, which includes the text 'Puget Sound Naval Shipyard', 'Northwest Regional Maintenance Center', and 'One Team for Fleet Readiness'. At the bottom is the logo for the Department of Ecology, featuring a stylized plant and the text 'Department of Ecology'.

# Summary

- Completed microbial TMDL study
- Developed integrated model for the Inlets
- Watershed approach used to obtain data
  - Pollutant loading during storm events
  - Ambient water and sediment quality
  - Biological monitoring
  - Currents for model verification
- Data will support the development of a Phase II proposal to regulate discharges at PSNS & IMF

# *For More Information:*

Patricia  
Hubler

Congressional & Public Affairs Office  
Puget Sound Naval Shipyard & IMF  
Phone: (360) 476-7111  
Email: [pao@psns.navy.mil](mailto:pao@psns.navy.mil)

DouGlas  
Palenshus

Water Quality Program, Northwest Regional Office  
WA Department of Ecology  
Phone: (425) 649-7041  
Email: [dpal461@ecy.wa.gov](mailto:dpal461@ecy.wa.gov)

