

Strait of Juan de Fuca Action Area



A Sampling of Assessments

Western Strait of Juan de Fuca Assessments/ Monitoring

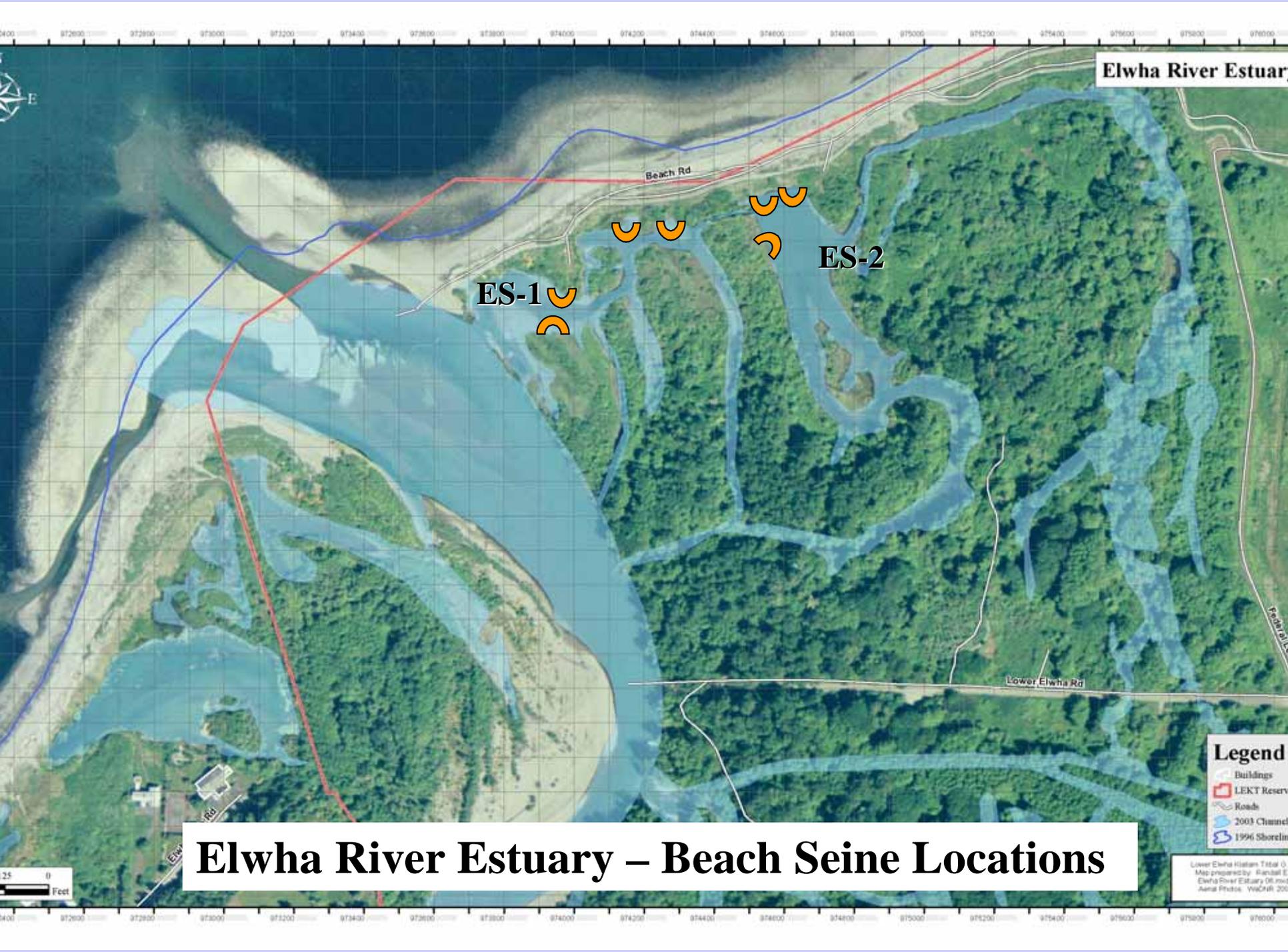
- Rayonier Mill Site / Pt. Angeles Harbor
- Elwha River and Nearshore
- Western Stream Assessments
- Nearshore Assessments

Rayonier / Pt Angeles Harbor

- Sediment Sampling – Contaminants
- Biota Sampling – Clams, Crab, Shrimp
- PCBs, Dioxins
- Wood Waste and Anoxia also a problem

Elwha Baseline Studies

- In-River – primary productivity, secondary productivity, nutrients, wood budget, juvenile, smolt, and adult monitoring, temperature
- Estuary – salmonids, macroinverts, terr. Insects, salmon lavage, WQ, vegetation
- USGS – River mouth delta bathymetry



Elwha River Estuar

Beach Rd

ES-1

ES-2

Lower Elwha Rd

Elwha River Estuary – Beach Seine Locations

Legend

- Buildings
- LEKT Reserve
- Roads
- 2003 Channels
- 1996 Shoreline

Lower Elwha History Trail 0
Map prepared by: Rural E
Elwha River Estuary 06.mxd
Aerial Photo: WDC/01.200

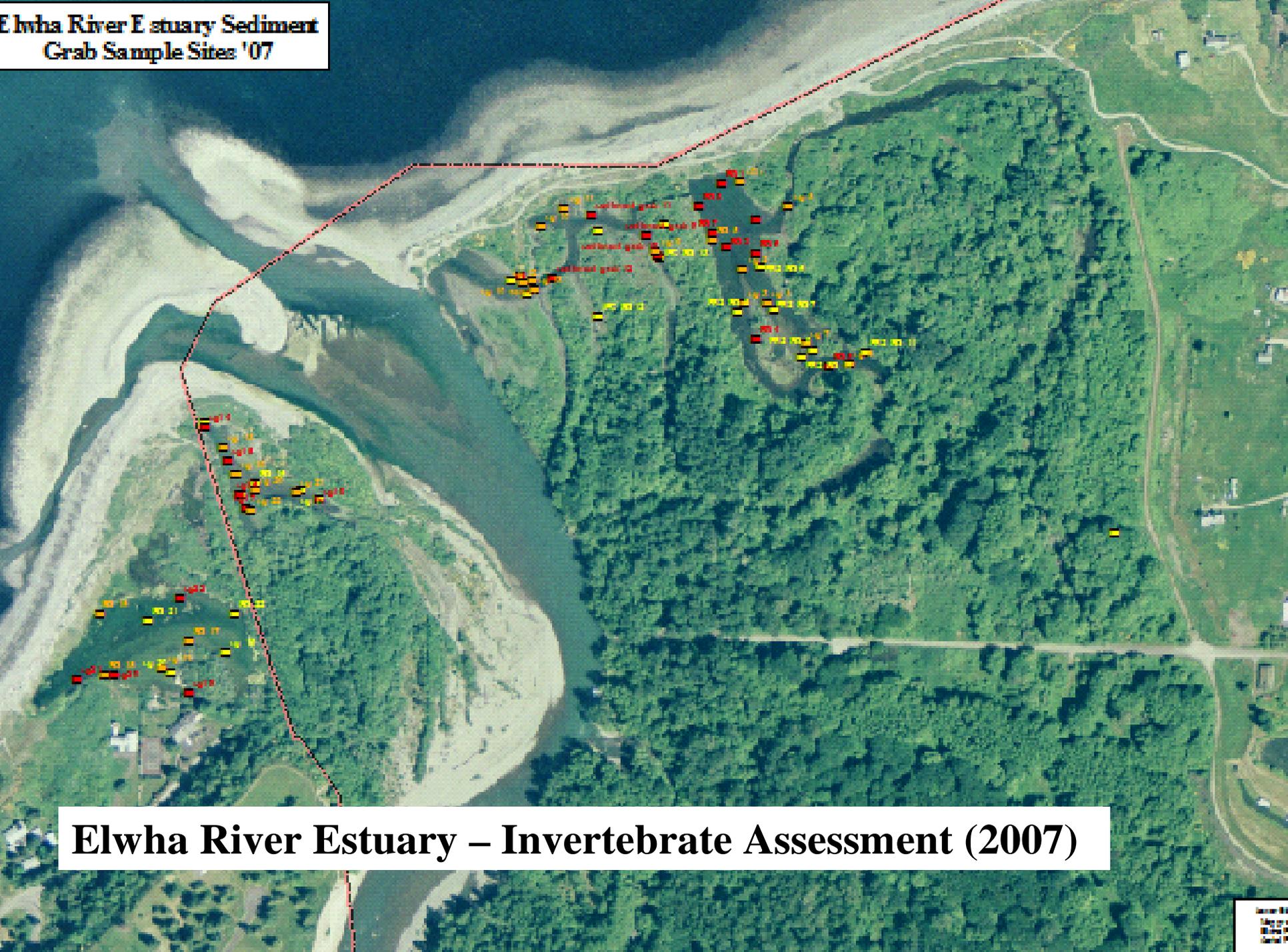
0 25
Feet

Beach Seining

- 14 species of fish identified.
- 5 species of salmonids.
- Chinook and coho were most abundant salmonids.
- Variability in habitat use among species.

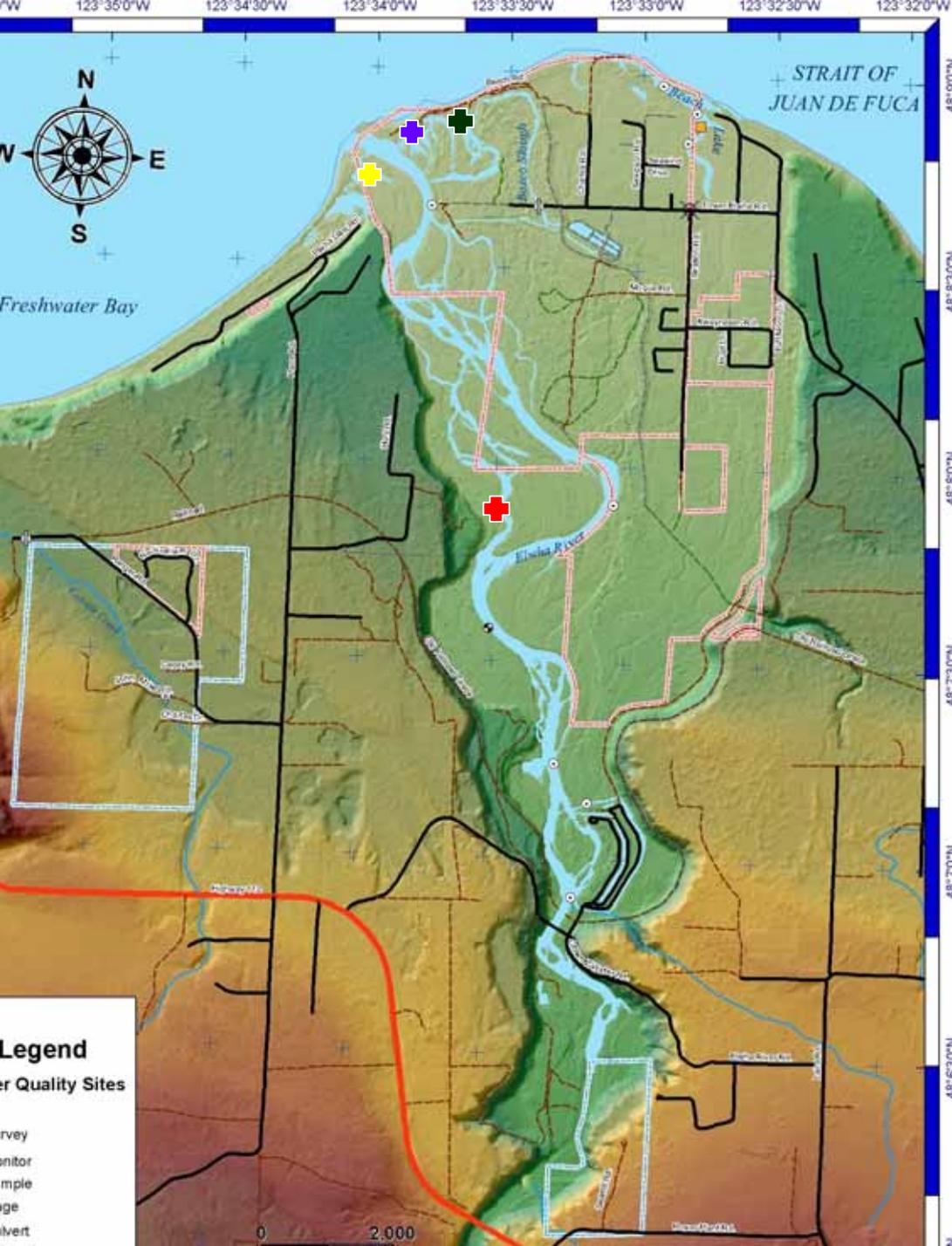


**Elwha River Estuary Sediment
Grab Sample Sites '07**



Elwha River Estuary – Invertebrate Assessment (2007)

Scale
North
Legend



2007 Stomach Lavage collection sites

+ Estuary Site 1 (ES1)

+ Estuary Site 2 (ES2)

+ Hunt Road Channel

+ West Elwha Mouth

West End Assessments

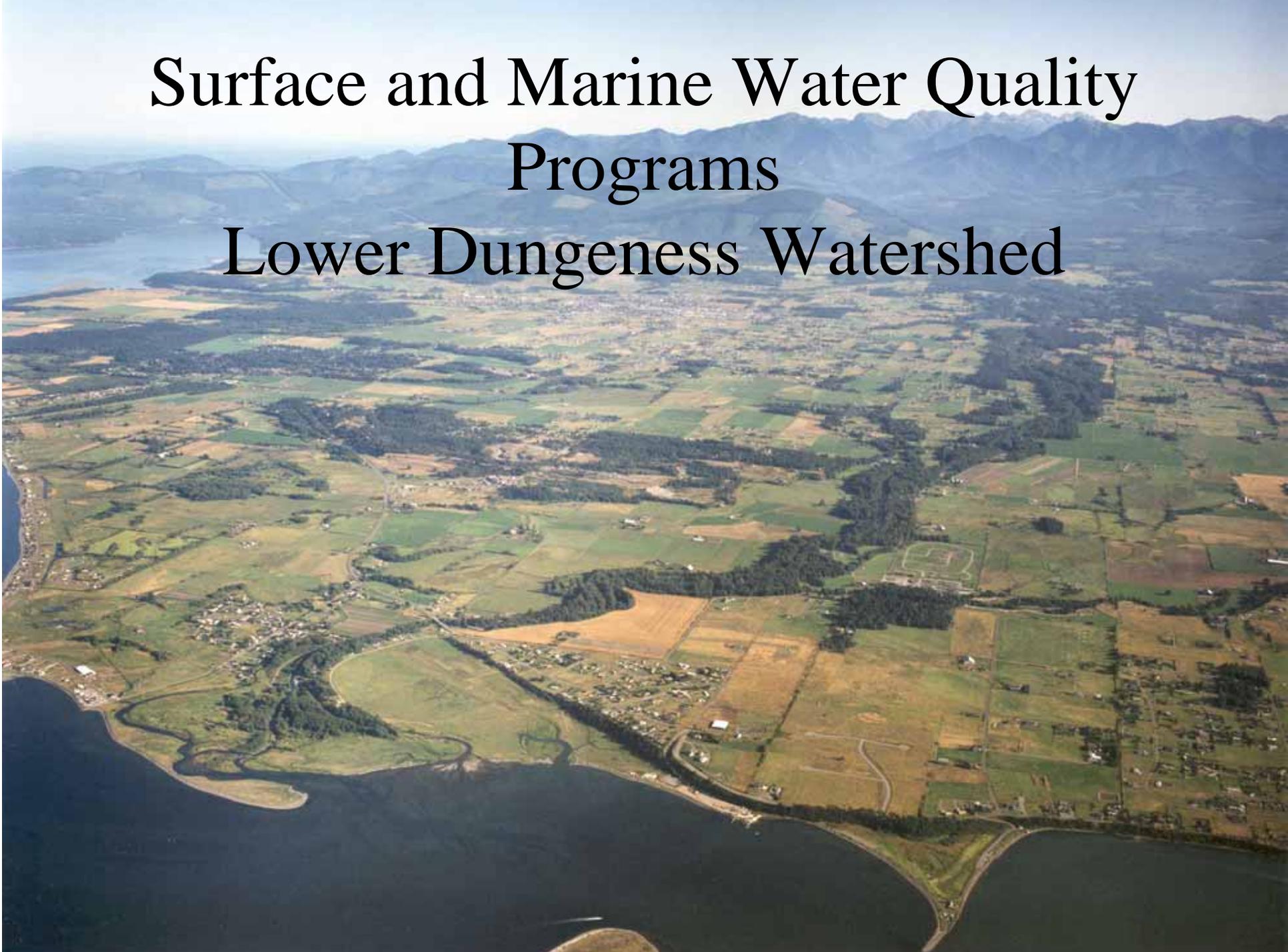
- Salt Creek, Pysht River, Clallam River
 - Basis for future restoration projects
- IMW – E. Twin, W. Twin, Deep Cr.
 - Juvenile, Smolt, Adult enumeration
 - Habitat monitoring, WQ monitoring
- Water Quality – Temperature since 1992
 - Clallam River – Wria 19 citizens
 - Salt Creek – Surfrider
 - Streamkeepers – throughout the county
- Ambient Monitoring since early 1990s - LEKT

Nearshore Assessments

- Forage Fish monitoring
- Kelp beds (Shaffer 2000)
- Fecal Coliforms – LEKT & DOH
- PSP sampling – Clallam MRC/ Makah
- Beach Seining – Shaffer, Fresh
- Eel Grass Surveys – Clallam MRC

Surface and Marine Water Quality Programs

Lower Dungeness Watershed



Dungeness Bay Water Quality

A “Work in Progress”



View of its sand spits



The mouth of Dungeness River

Human Health and the Environment



Butter Clams



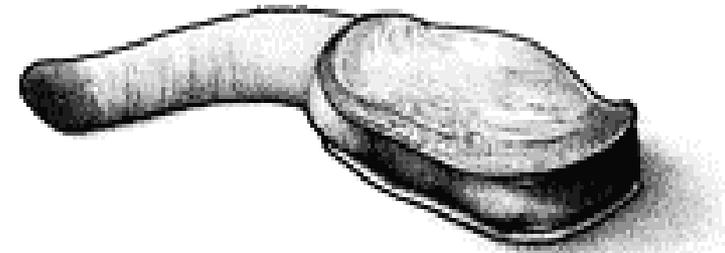
Pacific Oysters



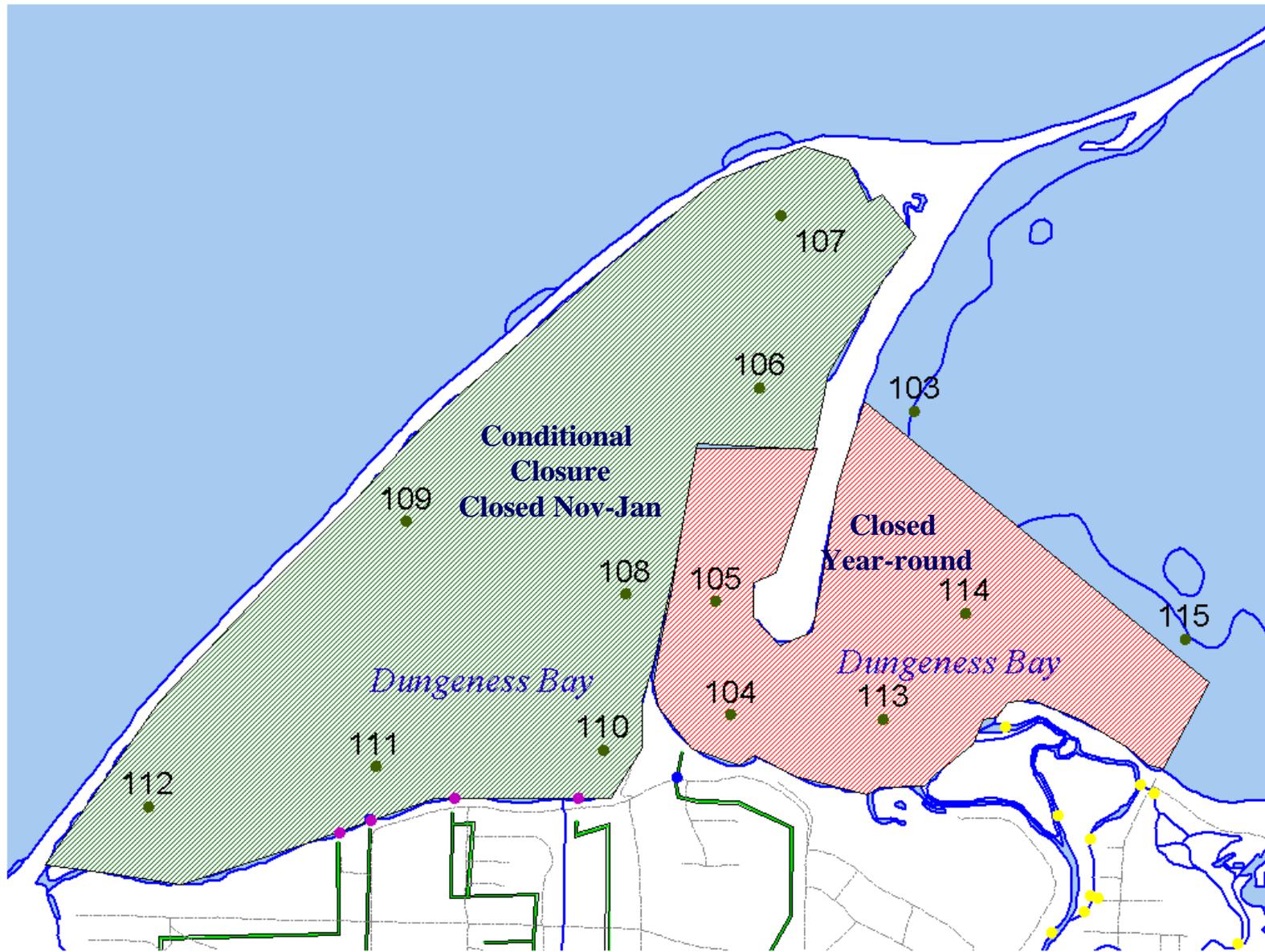
Horse clam

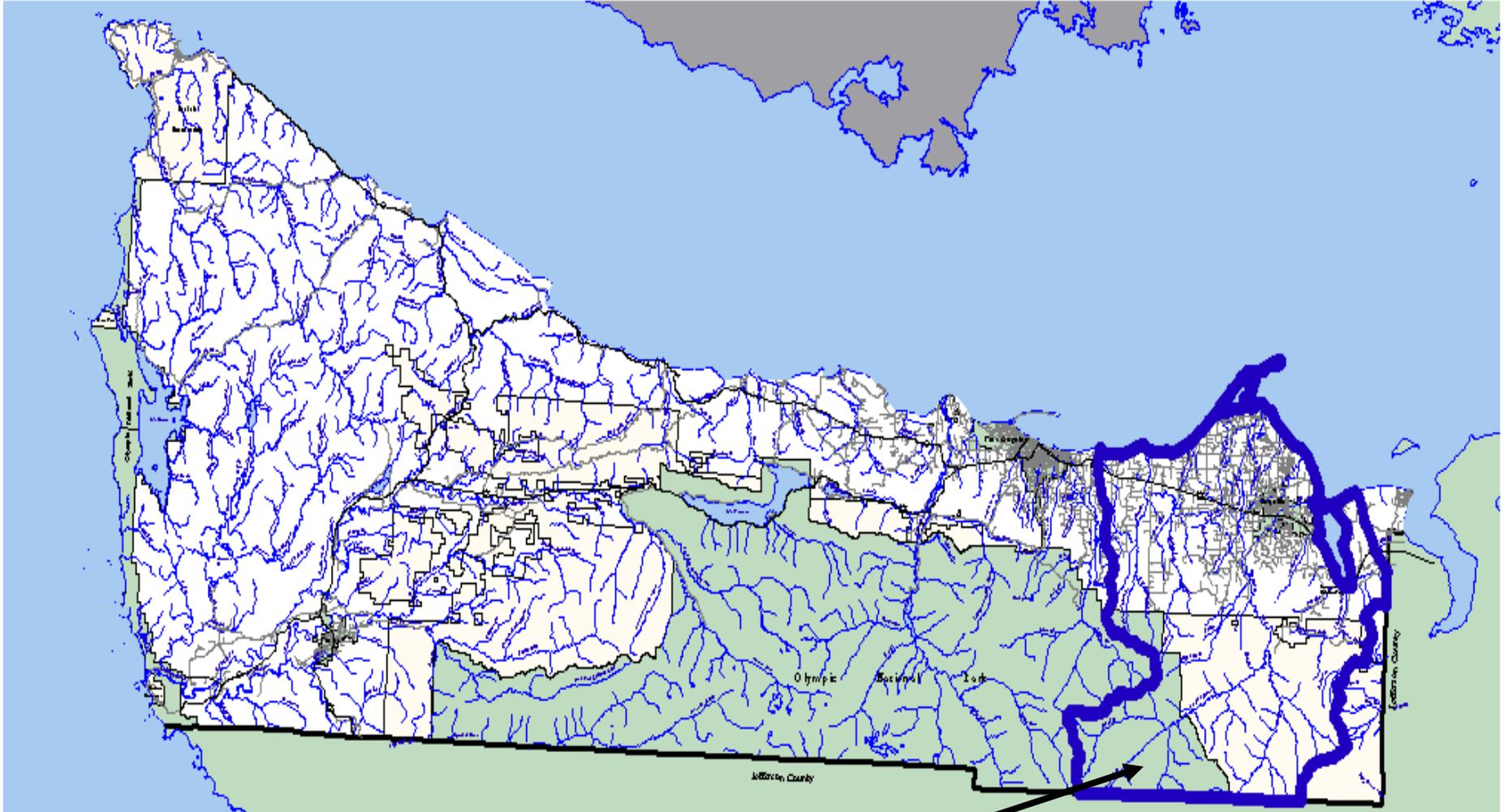


Littleneck Clams

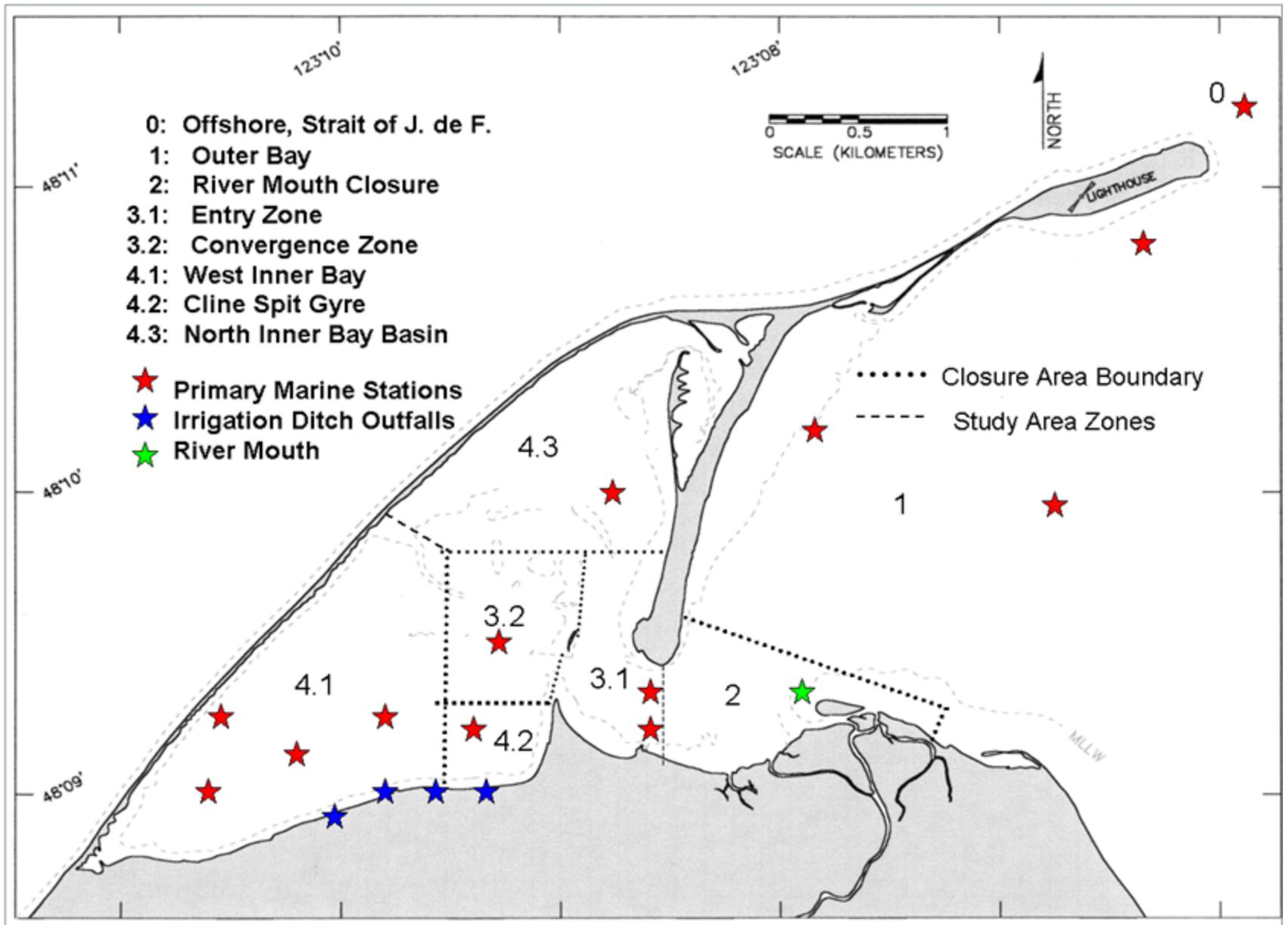




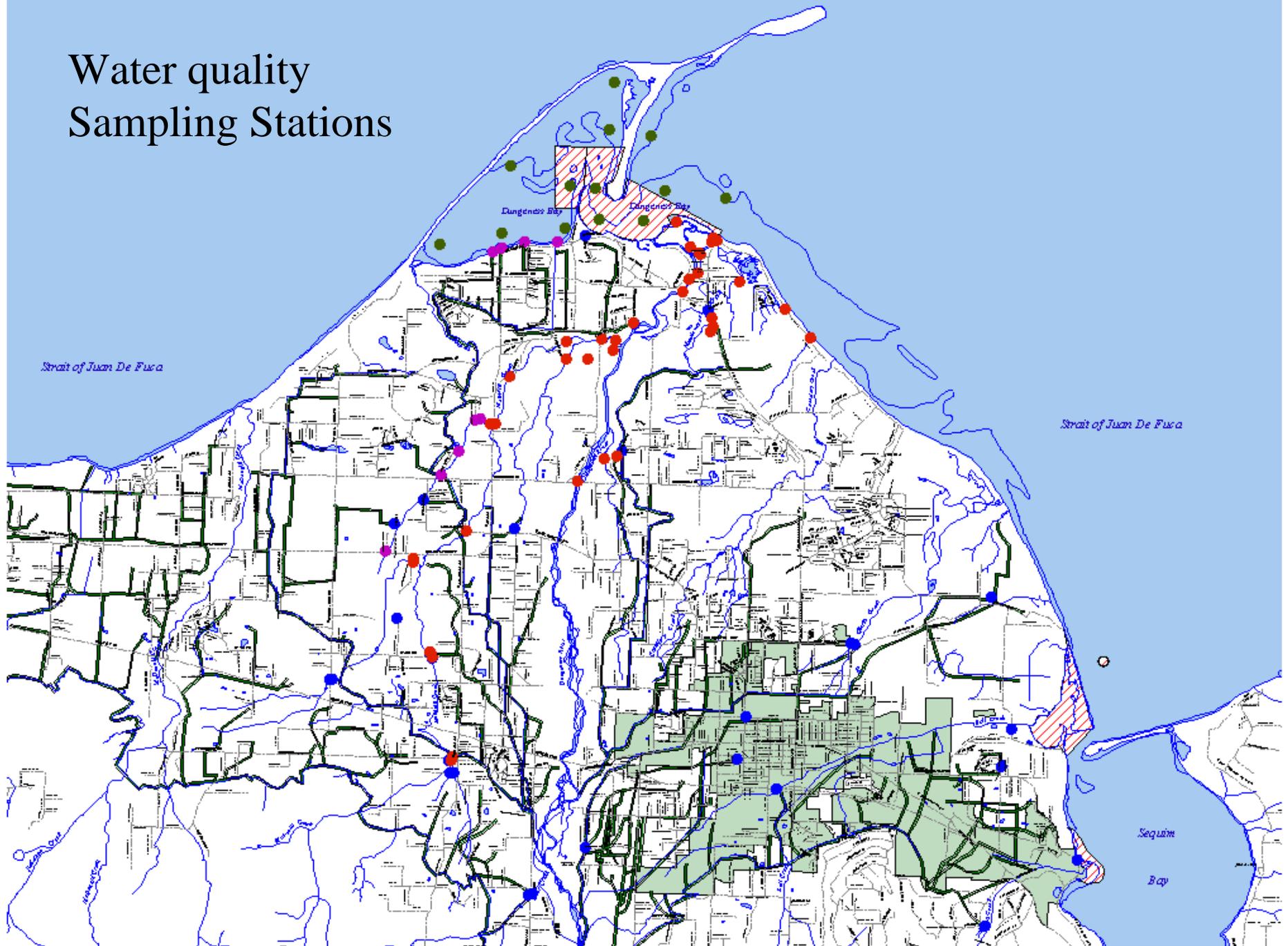


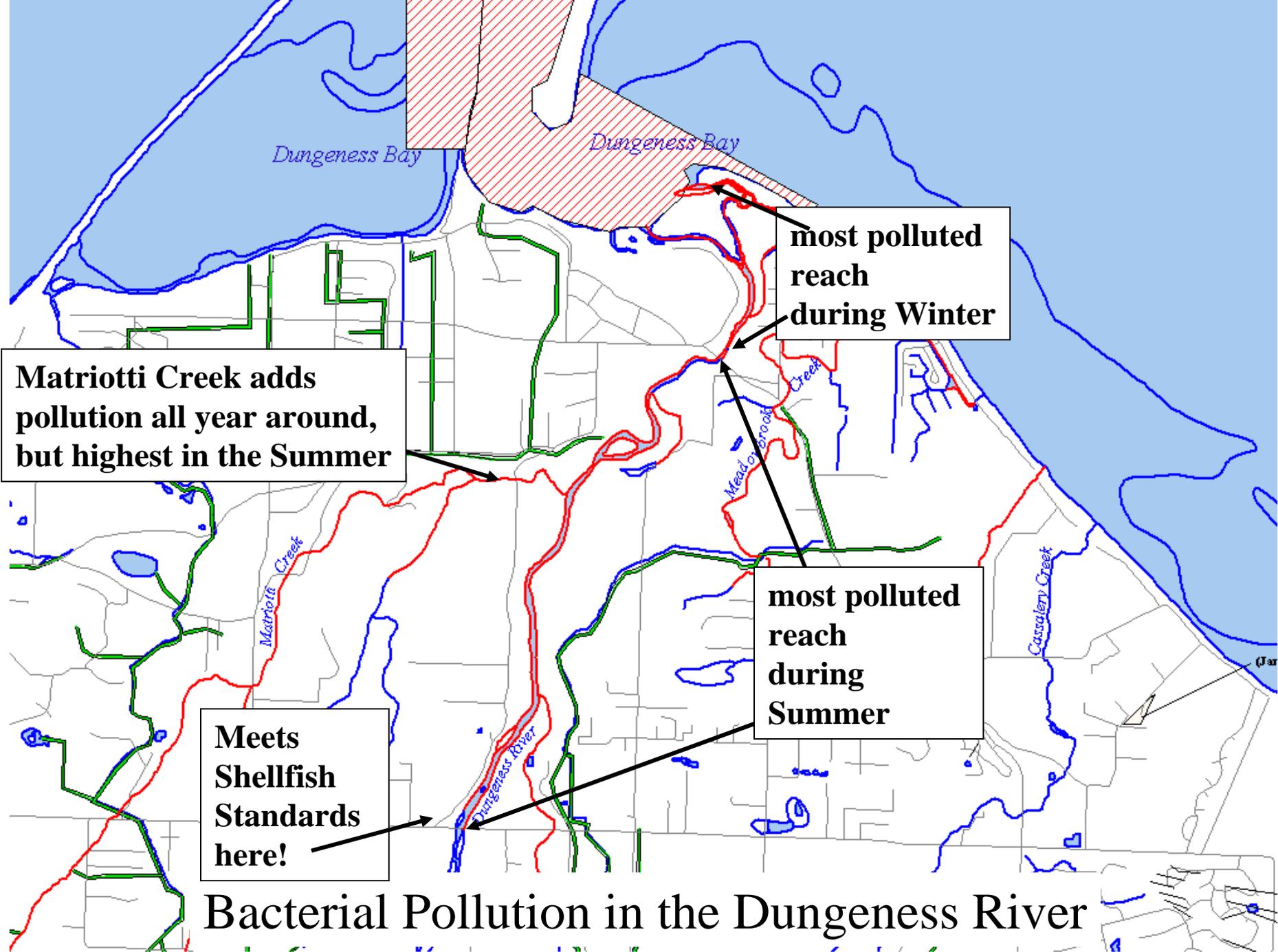


The Sequim-Dungeness Clean Water District



Water quality Sampling Stations





Bacterial Pollution in the Dungeness River

Bathymetry and Circulation

- More Shallow than 1967 (depths were up to 2 feet deeper throughout the Inner Bay)
- 45% of the water leaving the bay on an outgoing tide is brought back into the bay on the next incoming tide.

Science at work...

- Bathymetry & Circulation
- Bacterial Sampling

Fecal Coliform
Concentration

\times

Water
Volume

+

Reflux

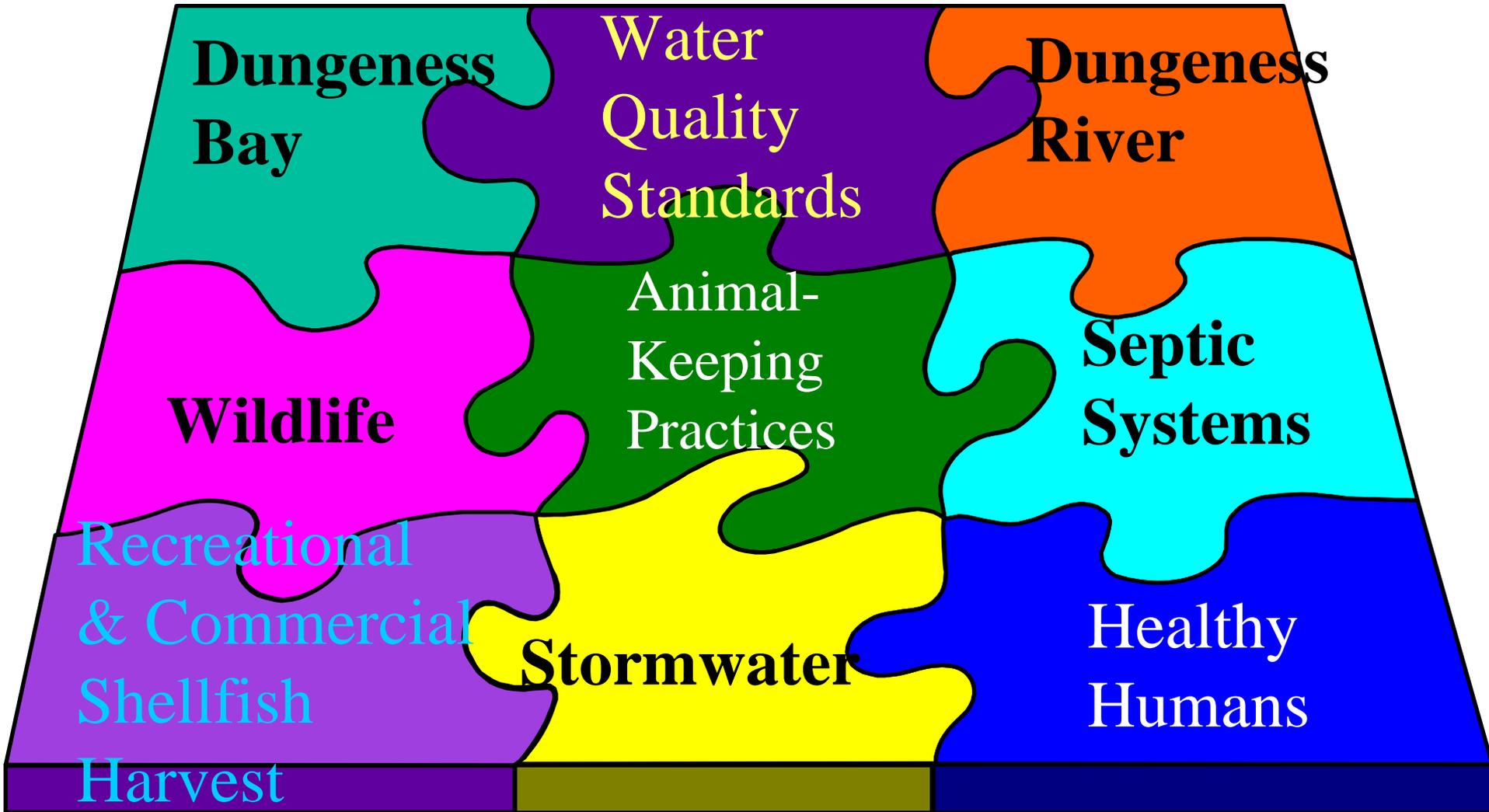
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Die-off

Dr. Jack Rensel, consultant
to the Jamestown S'klallam
Tribe



Putting the Puzzle together...



Water Cleanup Plan Documents

Water Cleanup Plan for Bacteria in Lower Dungeness Watershed (TMDL Submittal Report) (Ecology publication)

www.ecy.wa.gov/biblio/0210015.html

Clean Water Strategy/Detailed Implementation Plan (Ecology publication)

www.ecy.wa.gov/biblio/0410059.html

Quality Assurance Project Plan: Dungeness River/Matriotti Creek Fecal Coliform Bacteria Total Maximum Daily Load Study (Ecology publication)

www.ecy.wa.gov/biblio/0003080.html

Dungeness River Basin Fecal Coliform Bacteria TMDL Study (Ecology publication)

www.ecy.wa.gov/biblio/0203014.html

Water Cleanup Plan for Bacteria in Dungeness Bay (Ecology publication)

www.ecy.wa.gov/biblio/0410026.html

Dungeness Bay Fecal Coliform Bacteria Total Maximum Daily Load Study (Ecology publication)

www.ecy.wa.gov/biblio/0403012.html

Dungeness River and Matriotti Creek Post-Total Maximum Daily Load Data Review (Ecology publication)

www.ecy.wa.gov/biblio/0403053.html

Report on Implementation of the Dungeness Bay/Matriotti Creek Clean Water Strategy and Detailed Implementation Plan - April 2007 (PDF)

www.ecy.wa.gov/programs/wq/tmdl/dungeness/dungeness_implemen-status0407.pdf

**Washington State Department of Health
Shellfish Water Quality Data**

Fecal Coliform Pollution in Puget Sound, Status and Trends
DOH's annual report of commercial shellfish growing areas affected by fecal
pollution.

<http://www.doh.wa.gov/ehp/sf/sfpubs-bytitle.htm>

**Washington State Department of Health
Beach Environmental Assessment Communication and Health (BEACH)
Program**

Water Contact Bacterial Data for Human Health

<http://www.doh.wa.gov/ehp/ts/WaterRec/beach/default.htm>

Clallam County On-site Septic System Management Plan

- [http://www.clallam.net/assets/applets/OSSApprovedManagementPlan
WithMapsJuly07.pdf](http://www.clallam.net/assets/applets/OSSApprovedManagementPlanWithMapsJuly07.pdf)

Sequim-Dungeness Bay Clean Water Work Group

- Agenda
- Introductions
- DOH 2006 Annual Shellfish Growing Area Review Greg Holmes
- Recent FC results and FC Data Project Lori Delorm
- TWG MST, Mycoremediation, and
- Effectiveness Monitoring Dana Woodruff
- Task Updates
- ECY TMDL Effectiveness Monitoring Project Debbie Sargeant
- Septic Inspections/Surveys/Repair Update Janine Reed
- Dungeness Wildlife Refuge Survey Update Pam Sanguinetti
- Puget Sound Partnership Update John Cambalik
- TMDL Clean-up Strategy Update Christine Hempleman

Implementation Progress

Federal

US Fish & Wildlife Service

State

WA Dept. of Ecology

WA Dept. of Health

Puget Sound Partnership

WA Dept. of Fish & Wildlife

Local

Landowners

Residents

Clallam County

Clallam Conservation District

Jamestown S' Klallam Tribe

Clallam Co. PUD

City of Sequim

Sequim Water Users Association

Dungeness River Management Team

Clallam Co. Marine Resources Committee

Battelle Marine Sciences Lab

Jamestown Seafood

NW Corner Oyster Farm

Dungeness River Audubon Center

What's Next

- Microbial Source Tracking (MST) Study
- Myco-remediation Demonstration
- Effectiveness Monitoring Report
- Storm Water Sampling Data
- Homeowner On-site Septic System Homeowner Training – Inspection- Reporting pilot study (2009)

Multi-scale Analysis for Shoreline Planning



Michelle McConnell, Associate Planner
Shoreline Master Program Comprehensive Update

Puget Sound Partnership – Strait of Juan de Fuca Action Area Workshop

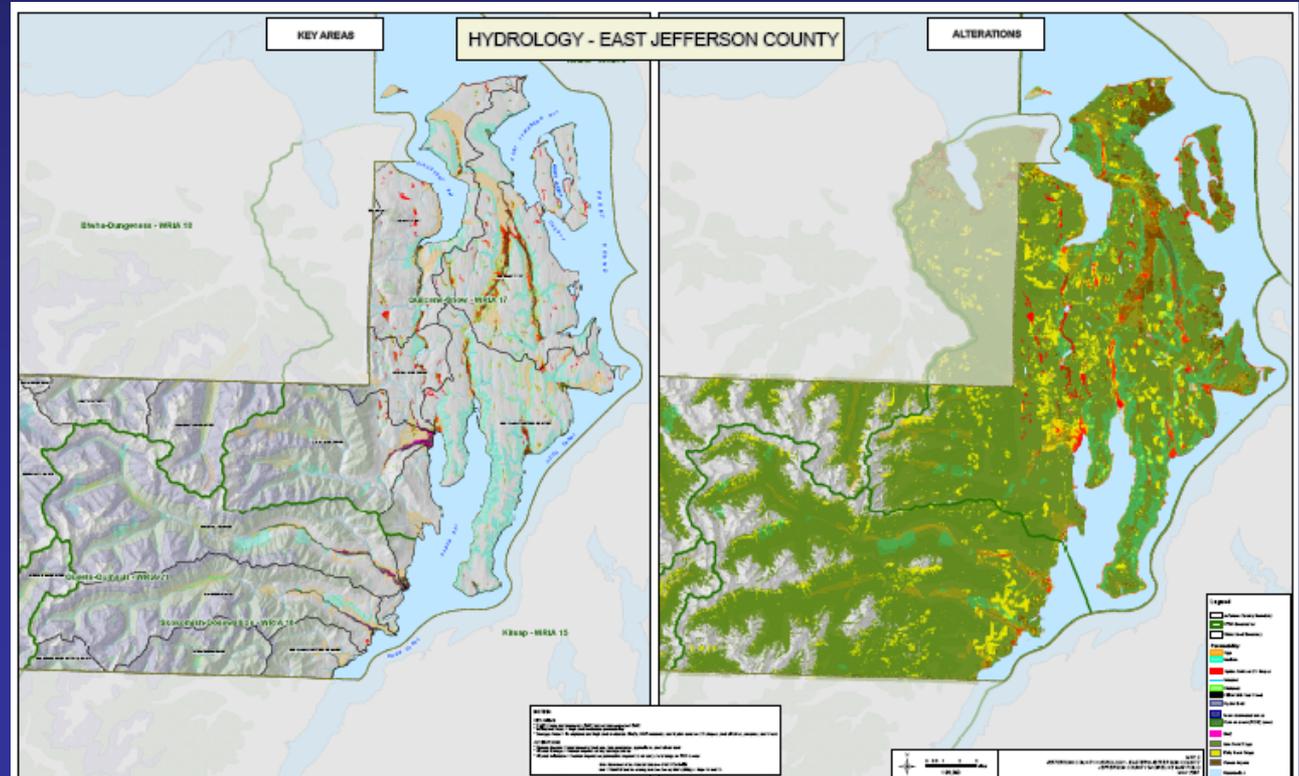
March 7, 2008 Jamestown S’Klallam Tribe – Red Cedar Room

Landscape Analysis



- Hydrology
- Water Quality
- Sediment

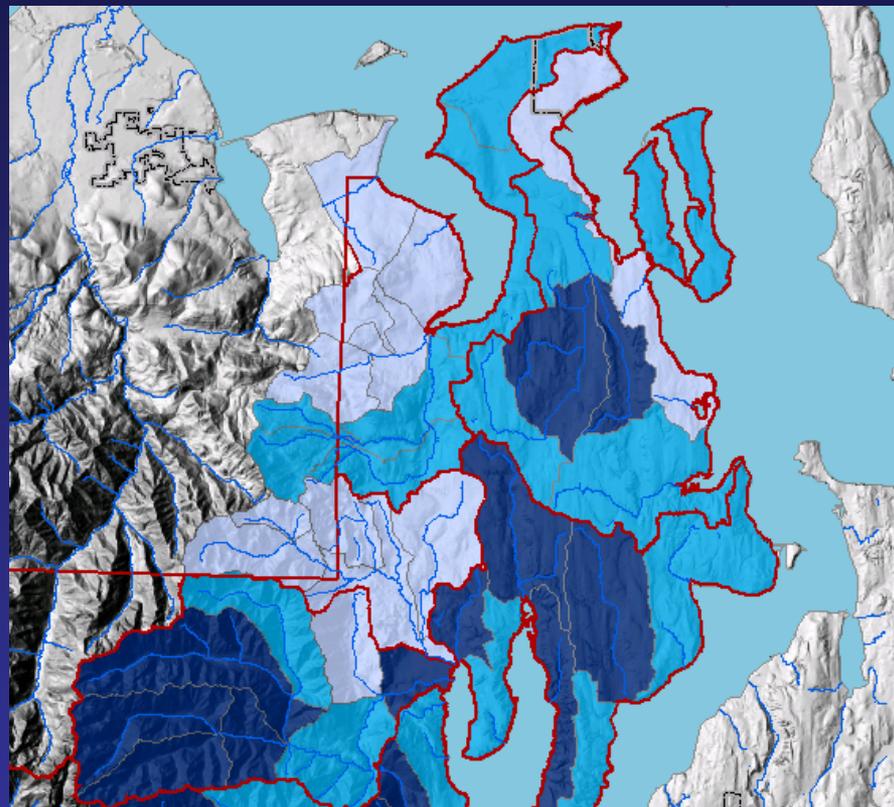
Protecting Aquatic Ecosystems: A Guide for Puget Sound Planners to Understand Watershed Processes – WA Dept. Ecology 2005



Watershed Analysis



Important Areas & Alterations



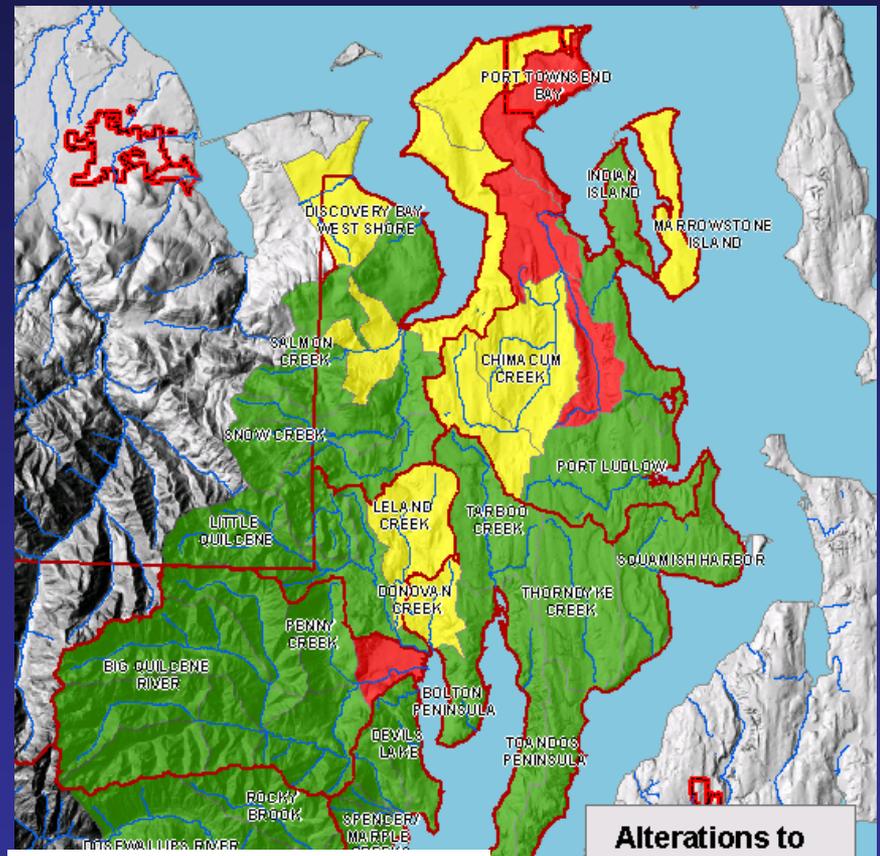
Hydrologic Process Scoring

- Surface water
- Groundwater
- Evapotranspiration

Important Areas to Water Process

Legend (KW_TOTL_G)

- High
- Moderate
- Low



Alterations Scoring

- Forest clearing
- Wetland filling
- Impervious surfaces

Alterations to Water Process

Legend (AW_TOTL_AD)

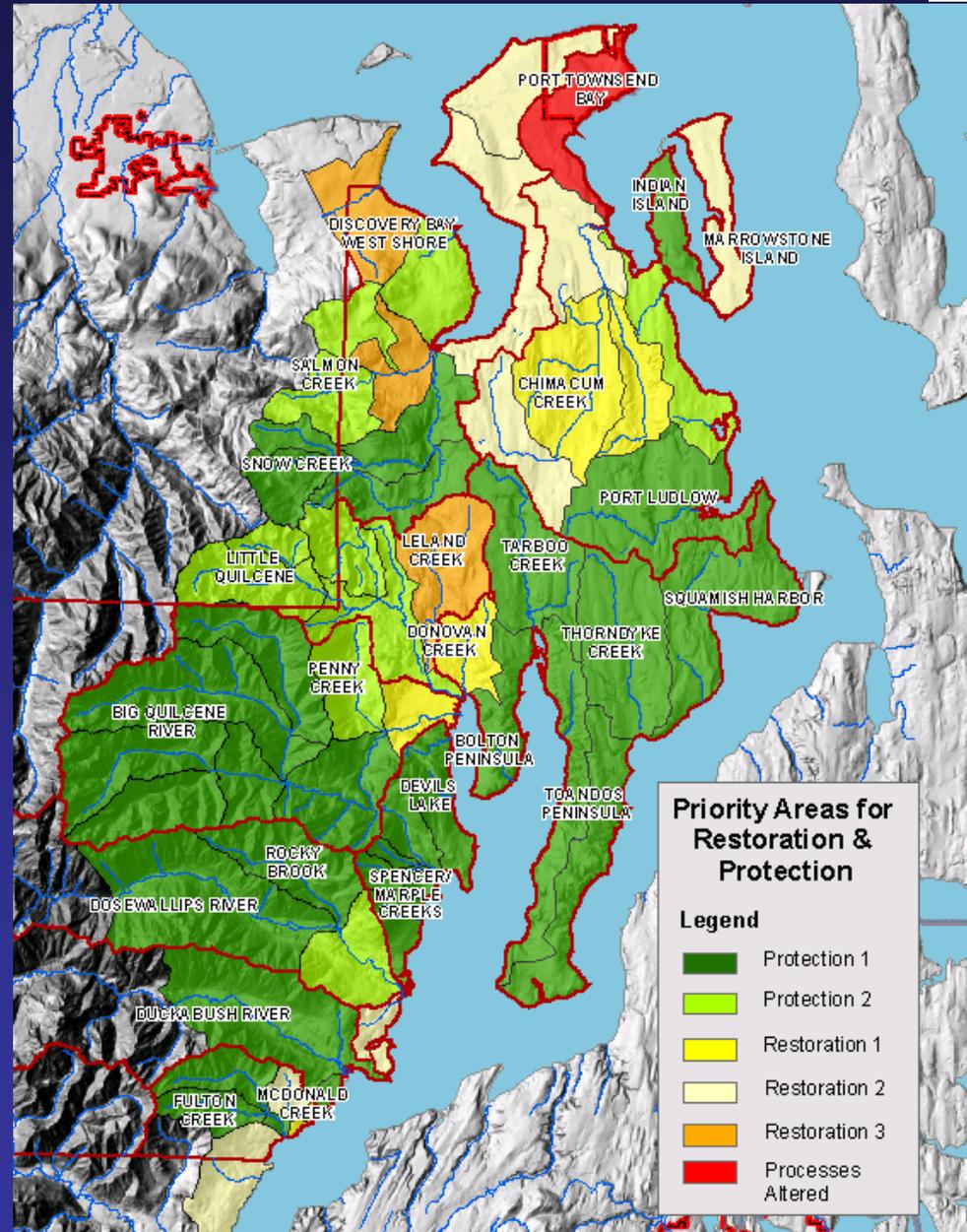
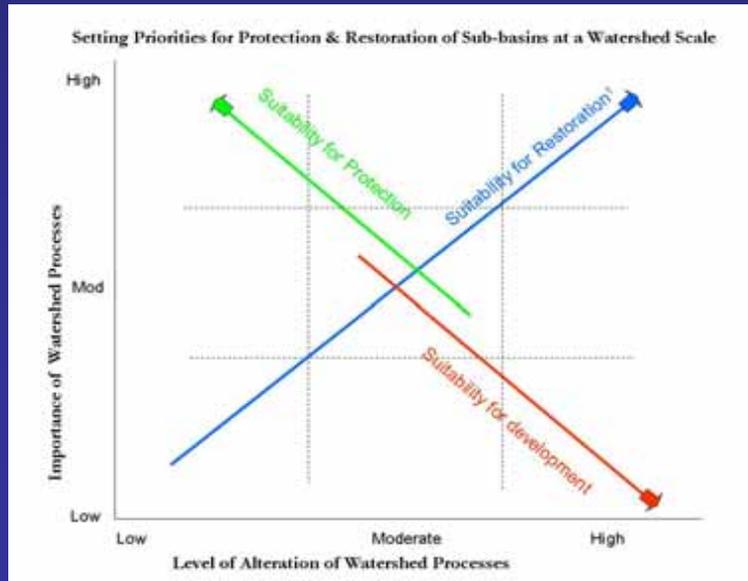
- Low Alteration
- Moderately Altered
- Highly Altered

WA Dept. of Ecology, 2007

Watershed Analysis



Final Map of Protection & Restoration Areas

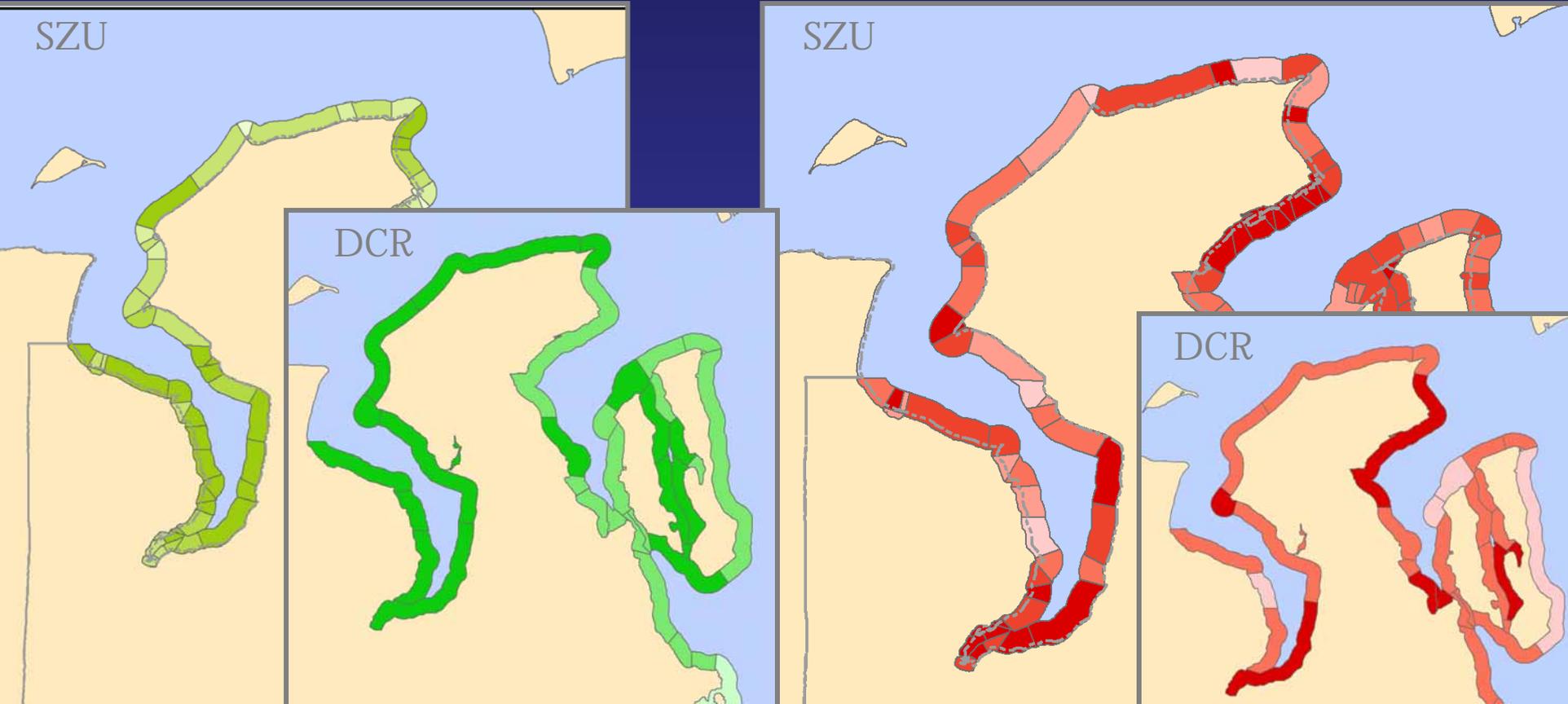


Nearshore Analysis



Scores: ShoreZone Unit (SZU) & Drift Cell Reach (DCR)

- **Functions:** Forage Fish Spawn/Hold Areas, Geoducks, Rare Plants, Wetlands, Eelgrass & Algae, Feeder Bluffs, Proximity to Fish Bearing Streams
- **Stressors:** Roads, Fish Barriers, Armoring, Land Use, High Risk Septic, Marinas, Shore Modifications (e.g. docks, stairs, boat ramps)



Documents Available



- **Final Shoreline Inventory & Characterization Report – STAC Draft (May 2007)**
- **Draft Shoreline Restoration Plan (October 2007)**

**[www.co.jefferson.wa.us/commdevelopment/
ShorelinePlanning](http://www.co.jefferson.wa.us/commdevelopment/ShorelinePlanning)**

Strait of Juan de Fuca Salmonid Stock Assessment Activities

- 1) Adult Assessments
 - a) Redd counts
 - b) Spawner counts
 - c) Weir/Trap counts
- 2) Juvenile Assessments
 - a) Pre-migration population measures
 - b) Tributary smolt traps
 - c) Mainstem outmigration traps
- 3) Stock Production Assessments
 - a) Freshwater production
 - b) Marine survival
 - c) Spawner-recruit







Redds counted indicate number of adults that spawned



Results in fish born



Fish in freshwater habitat grow to smolt

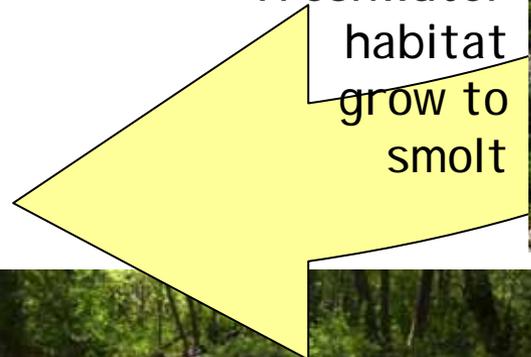
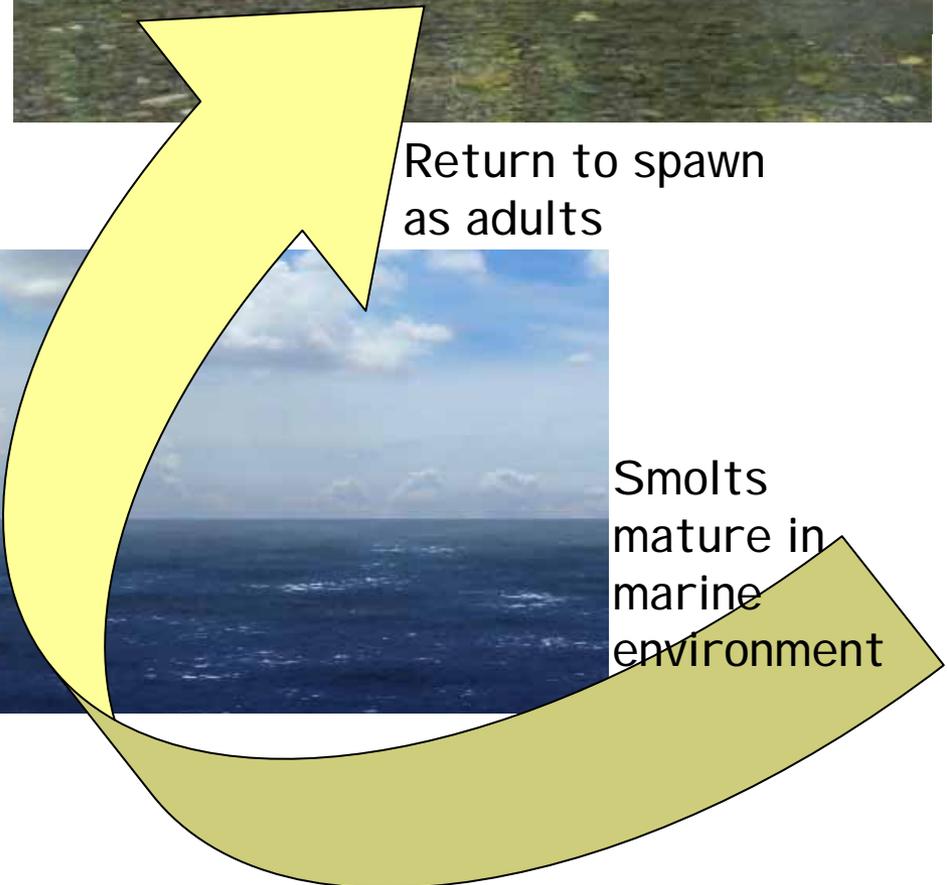


Return to spawn as adults

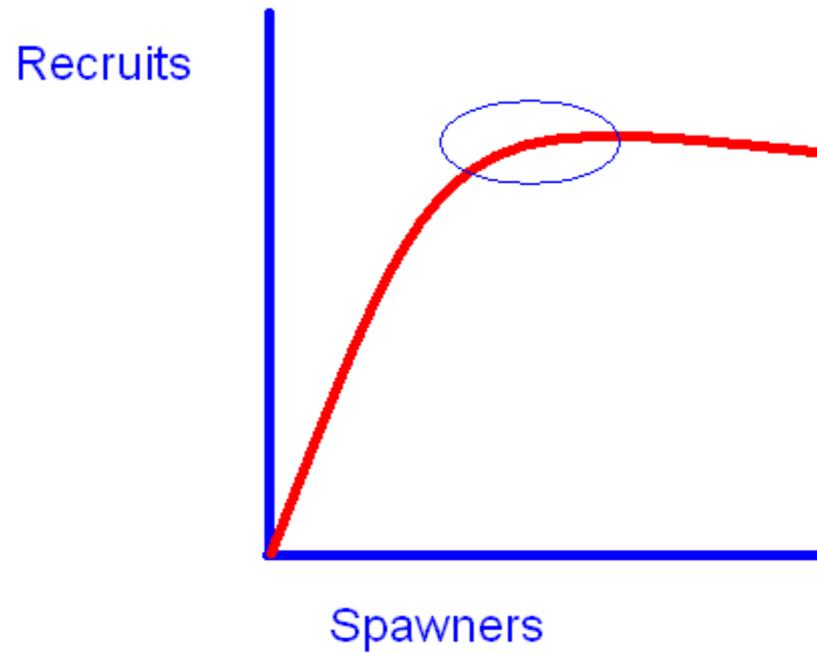
Smolts mature in marine environment



Smolts are counted as they migrate to sea



Simple Stock Production Relationship



Sources of Information

<http://wdfw.wa.gov/fish/sassi/intro.htm>

- 1992 Salmon and Steelhead Stock Inventory
- 1998 Salmonid Stock Inventory Bull Trout/Dolly Varden
- 2000 Salmonid Stock Inventory Coastal Cutthroat
- 2002 Salmonid Stock Inventory Stock Reports

<http://www.pnptc.org> (see Publications)

- 2008 Strait of Juan de Fuca Preseason Forecast
- 2007 Management Framework Plan and Salmon Runs' Status for the Strait of Juan de Fuca

Strait of Juan de Fuca

Action Area

