

# An Intensive Field Sampling Program in Support of a Marine Outfall Siting Study

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# Overview

- ⌘ New Wastewater Treatment Plant
- ⌘ Sampling Design
- ⌘ Puget Sound Water Quality
- ⌘ Future Monitoring

# Need for New Wastewater Treatment Plant

- ⌘ Population growth
- ⌘ System capacity
- ⌘ Protect public health and environment
- ⌘ Needed by about 2010



# Study Overview

⌘ Engineering and Geolophysics/Geotech

⌘ Physical Oceanography

▣ current meters, drogues, drift cards

⌘ Water Quality

▣ Automated Sampler, CTD, metals, organics, bacteria

⌘ Modeling

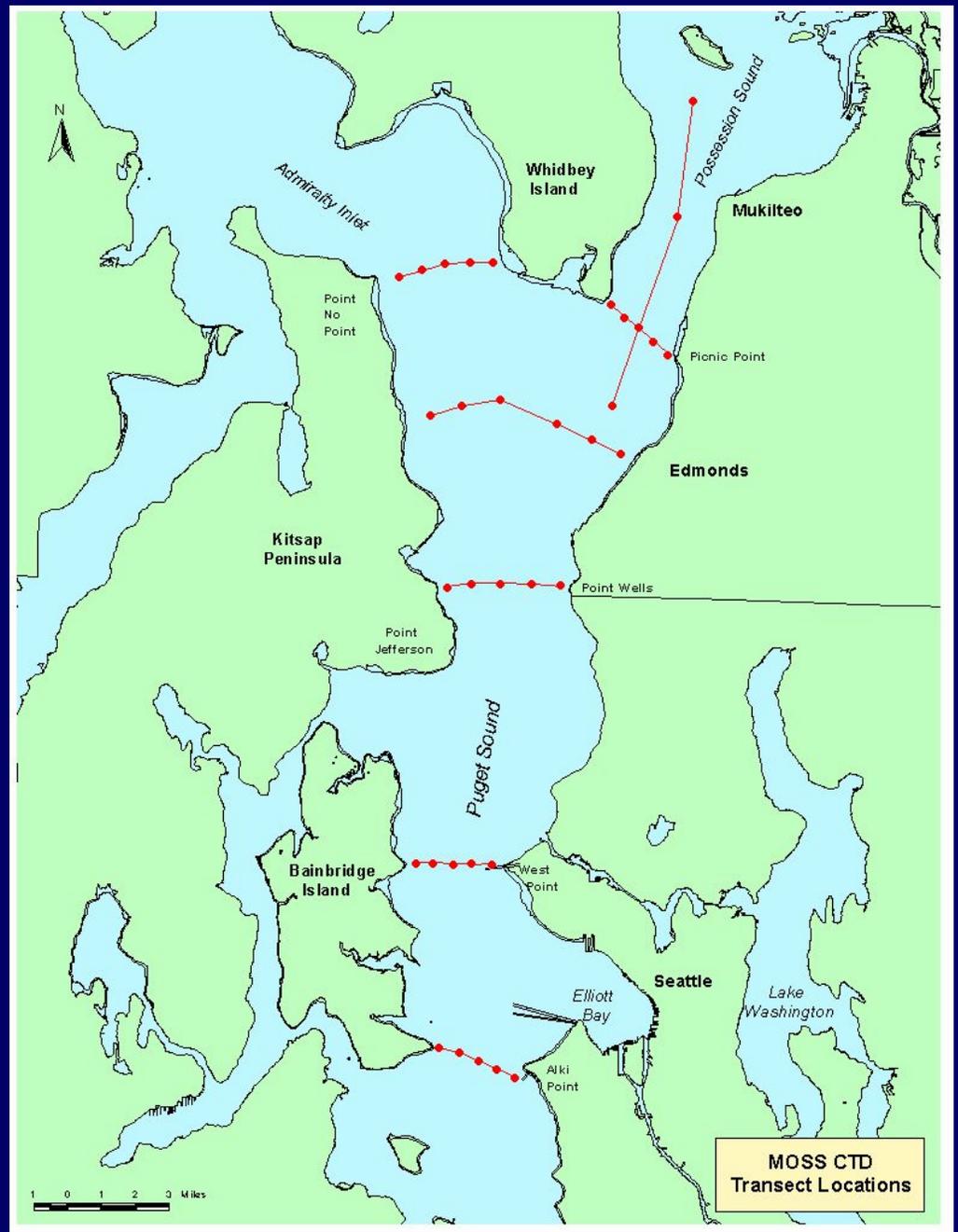
▣ nearfield and farfield plume dilution

⌘ Biology

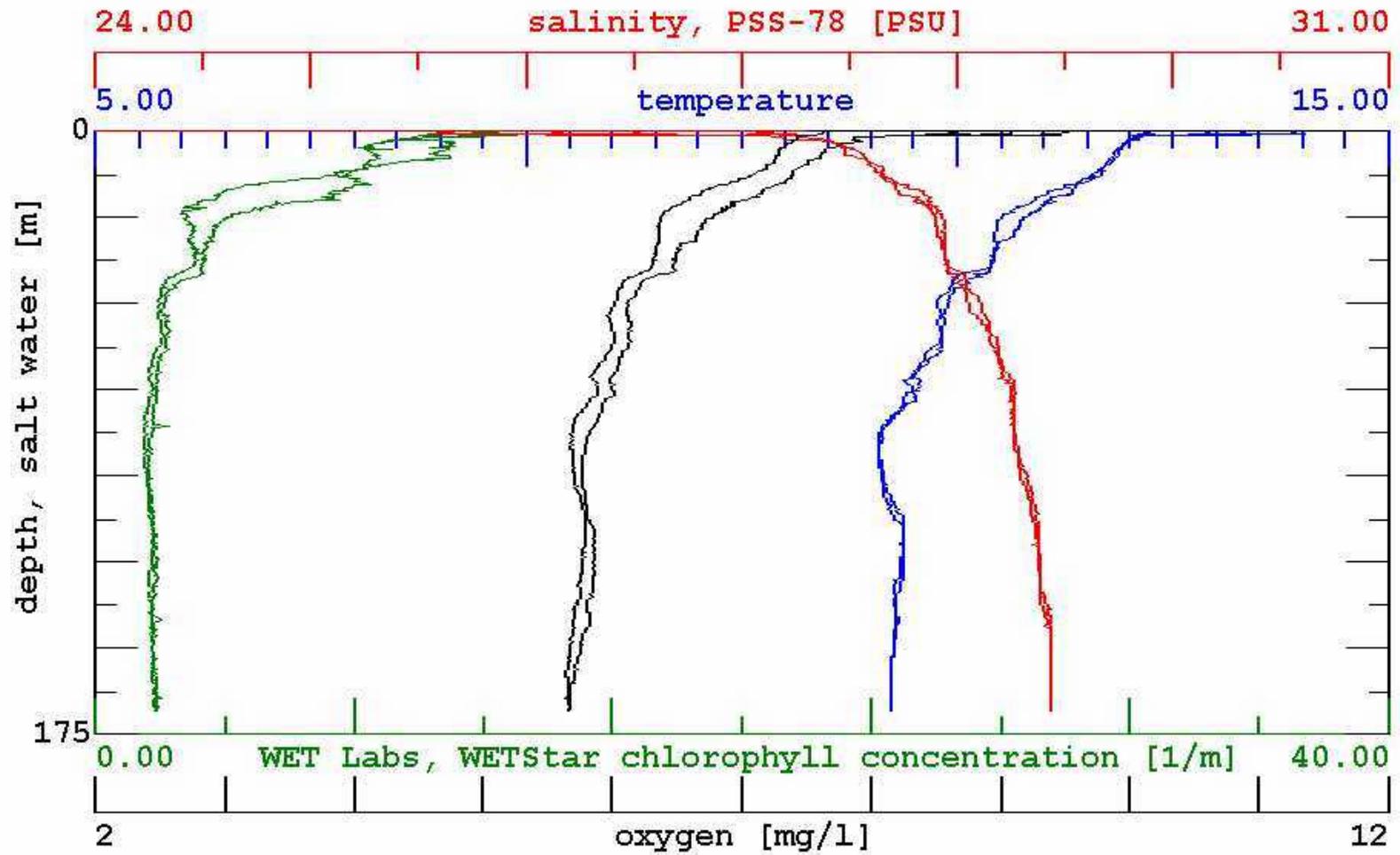
▣ primary productivity, tissue chemistry, benthos, eelgrass, geoduck surveys

# CTD Transects

- Monthly samples
- Entire water column
- Temperature
- Dissolved Oxygen
- Turbidity
- PAR
- Fluorescence

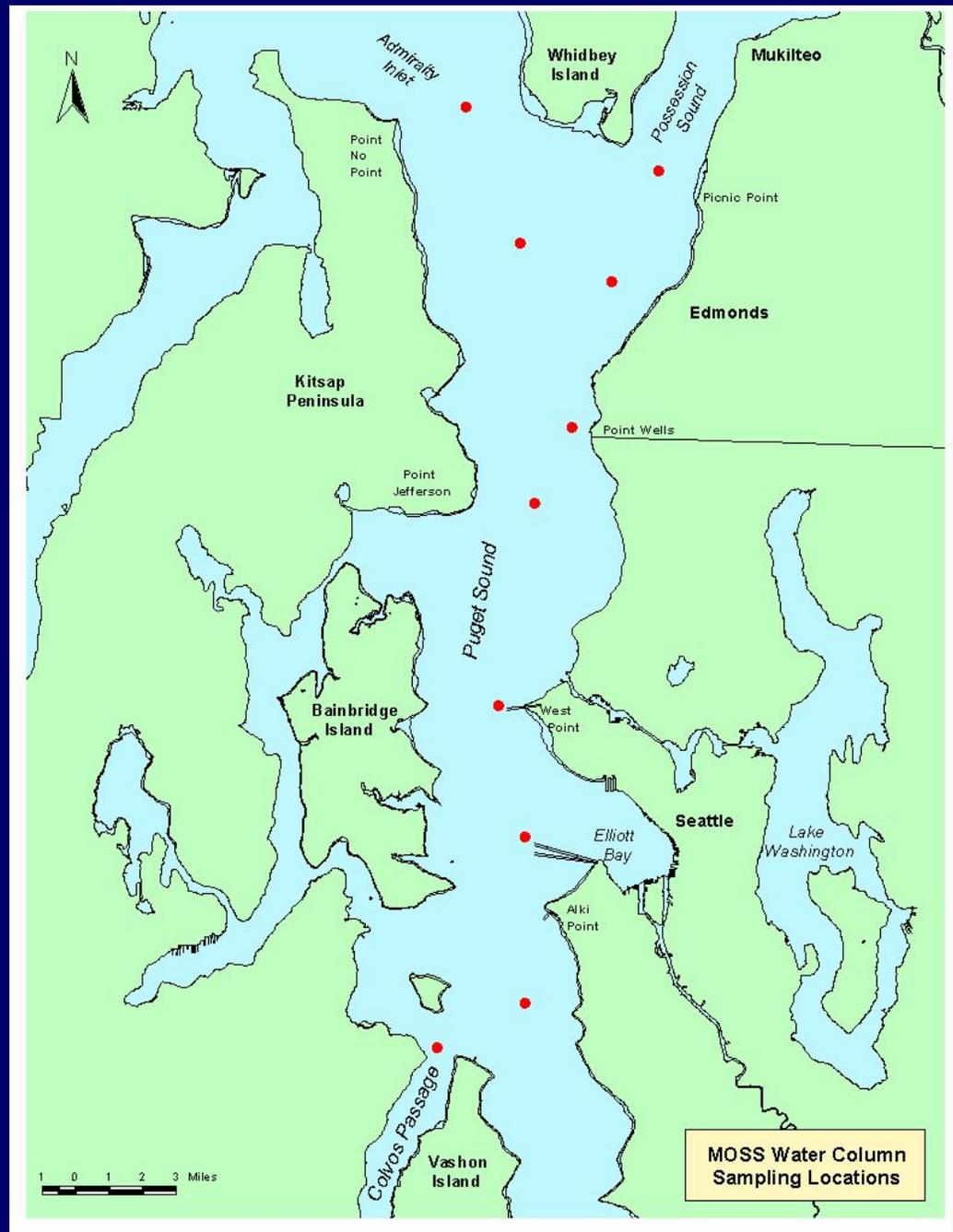


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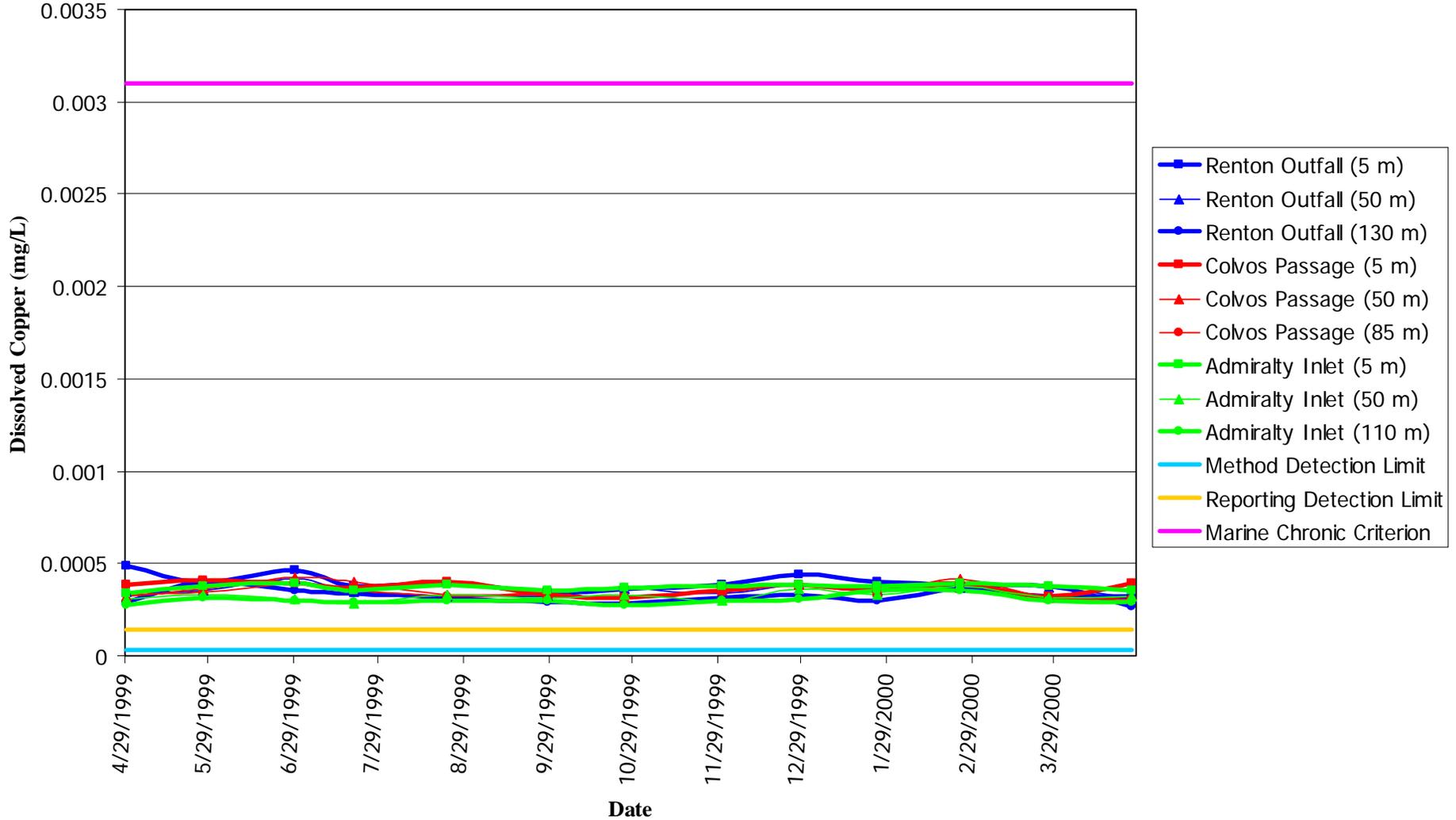


# Baseline Water Quality

- Monthly grab samples
- Conventional and bacteria: 31 months
- Metals monthly: 15 months
- Organics monthly: 12 months

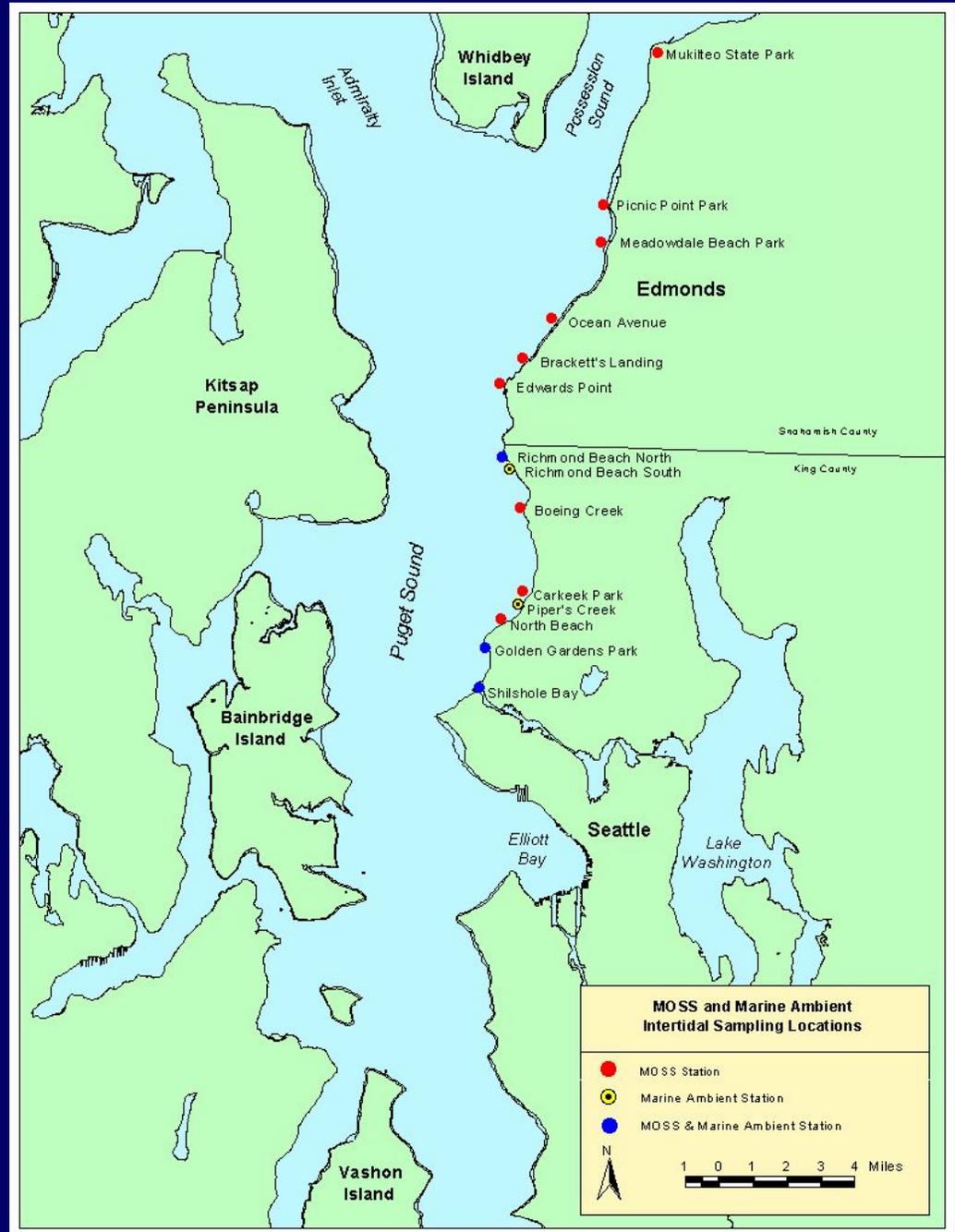


# Puget Sound Water Column Dissolved Copper Concentrations Compared to WA State Marine Chronic Water Quality Criterion of 0.0031 mg/L

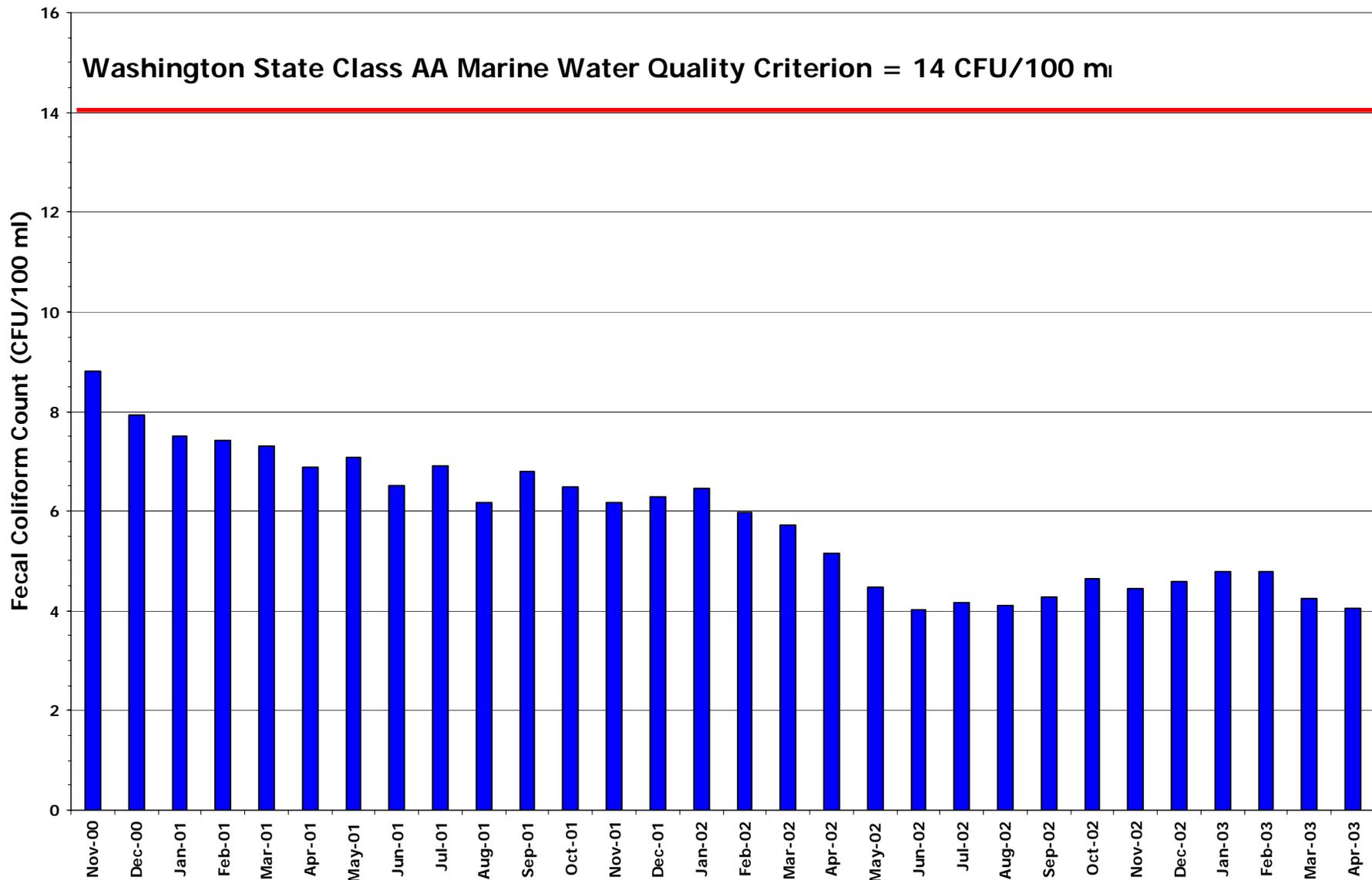


# Intertidal Water Beach Sampling Program

- 13 beaches
- 1 year
- monthly  
conventionals and  
bacteria
- quarterly for  
metals and  
organics

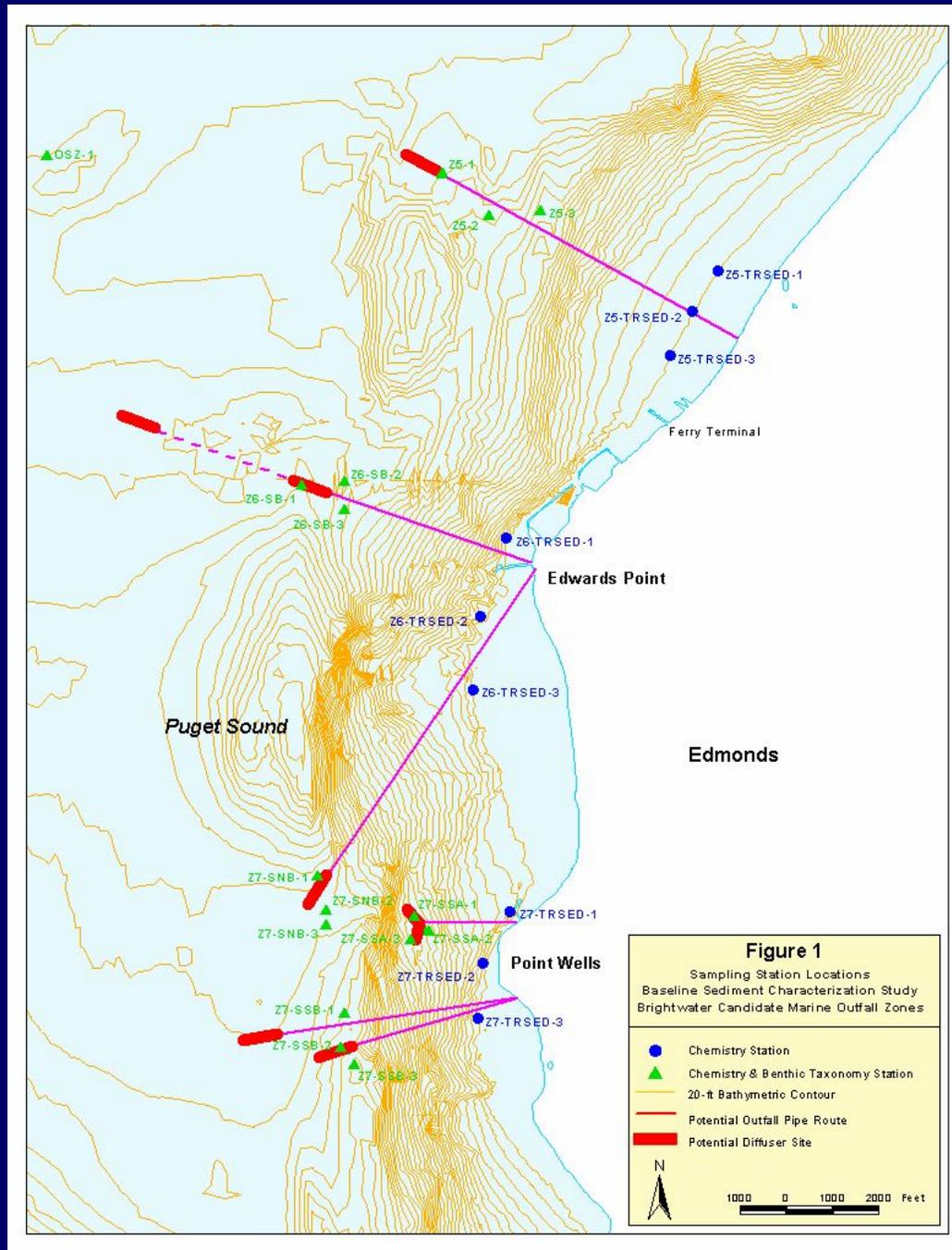


# Running Geometric Mean of Salt Water Fecal Coliform Counts at Richmond Beach near Point Wells (Based on 30 Previous Samples)



# Baseline Sediment Quality

- 15 samples at possible diffuser sites
- 9 samples from nearshore
- top 10 cm of sediments
- Chemistry (conventionals, metals, organics)
- Benthic community analysis (diffuser sites only)



# Sediment Study Results

## ⌘ Chemistry

- ☑ Low concentrations
- ☑ Meet state sediment quality criteria

## ⌘ Benthic community

- ☑ Dominated by a single species of bivalve, *Macoma carlottensis* at deep sites
- ☑ Typical of other Puget Sound sites with similar depth and physical characteristics

# Geoduck Tissue Analysis

- ⌘ 27 geoducks
- ⌘ Chemical and bacterial analysis
- ⌘ Also measured age, weight, lipid content
- ⌘ Both whole animal and “edible portion” (siphon skin and visceral ball removed)



# Geoduck Tissue Study Results

- ⌘ Maximum age 95, median age 54
- ⌘ Median weight 1.16 Kg, median lipid 0.24%
- ⌘ Bacteria levels meet FDA guidance for commercially traded shellfish
- ⌘ Lead detected at higher concentrations in visceral ball than “edible meat”
- ⌘ Mercury levels increased with organism age
- ⌘ Safe to eat

# Factors in Decision-Making

- ⌘ Diffuser site location and access
- ⌘ Eelgrass location and density
- ⌘ Dissolved oxygen in late summer
- ⌘ Coordination with treatment plant and conveyance system locations

# Proposed Monitoring Program

- ⌘ Offshore Water Column, monthly
- ⌘ Subtidal Sediments 1 per 5 years
- ⌘ Subtidal Benthic Community 1 per 5 years
- ⌘ Intertidal Water, monthly
- ⌘ Intertidal Sediments, annually
- ⌘ Shellfish and Algae, Summer months

# Reporting of Program

⌘ King County publishes annual monitoring report

☞ *Water Quality Status Report for Marine Waters*

⌘ Results also on King County's *Marine Waters* website

☞ *<http://dnr.metrokc.gov/wlr/waterres/marine/index.htm>*

