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
Baseline Water Quality

- Monthly grab samples
- Conventionals 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 conventionalals 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)

Washington State Class AA Marine Water Quality Criterion = 14 CFU/100 ml
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