Stormwater Action Monitoring

Project Title

2010-2015 Bacteria Data Compilation from Nearshore Marine Areas in Puget Sound

Receiving Waters

Lead Entity

Washington Department of Ecology Environmental Assessment Program

Partners

Washington Departments of Health

Ecology Beach Environmental Assessment, Communication, and Health (BEACH) Program

Collectively improving stormwater management

Stormwater Action Monitoring (SAM) is a collaborative, regional stormwater monitoring program that is funded by more than 90 Western Washington cities and counties, the ports of Seattle and Tacoma, and the Washington State Department of Transportation. SAM's goal is to improve stormwater management to reduce pollution, improve water quality, and reduce flooding. We do this by measuring stormwater impacts on the environment and evaluating the effectiveness of stormwater management actions.

Questions about SAM? Send an email to SAMinfo@ecy.wa.gov

Study goals

Bacteria is a vexing stormwater problem. The sources are varied and ubiquitous. When SAM was launched in 2014, stakeholders agreed that before initiating a new nearshore marine status and trends monitoring program for bacteria we should first conduct a data and gaps assessment based on existing marine bacteria monitoring programs. The goals of this project were:

- Assess current collective understanding of bacteria levels in Puget Sound nearshore areas along the urban shoreline.
- Make recommendations for future monitoring to assess changes as a result of stormwater management.



Stormwater management problem

Bacteria is the most common cause of stormwater-related water quality impairment listings. Total maximum daily load (TMDL) pollution reduction strategies for this parameter are mostly focused on public education. While TMDLs also require monitoring to assess progress, they are focused at an individual watershed scale.

Project findings

Throughout Puget Sound, bacteria is sampled for many reasons, including ambient monitoring to protect public health and targeted monitoring to identify and solve specific problems. The most consistent ambient monitoring programs are the Washington Department of Health (DOH) Shellfish Program and Washington Departments of Health and Ecology Beach Environmental Assessment, Communication, and Health (BEACH) Program. Several counties collect nearshore marine bacteria data, particularly Kitsap and King. Few cities collect nearshore bacteria data. The Lummi Nation and Nooksack Indian Nation also conduct some ambient monitoring.

For this data review, 27 entities that conduct Puget Sound nearshore monitoring provided bacteria data. The combined dataset has over 42,000 bacteria data points from 2010-2015 including 27,050 for fecal coliform, 14,750 for enterococci, and 848 for E-coli. The DOH Shellfish Program data made up 74% of the available fecal coliform data from 2010-2015, and the BEACH Program made up 85% of the enterococci data (during the May-August period). MAP

The amount of data varied between entities and sub-regions. Some areas like Kitsap County have comprehensive nearshore bacteria data sets due to their ongoing monitoring program. Most areas had localized data but no comprehensive shoreline coverage. Rural areas with shellfish beds had good nearshore fecal coliform bacteria coverage through the DOH Shellfish Program. While the urban corridor shoreline from Tacoma to Everett did not have DOH Shellfish Program data, it did have some nearshore enterococci bacteria data coverage through Ecology's BEACH Program.

The data sets from entities with different sampling goals showed diverse results, as expected. Ambient monitoring programs tend to have lower bacteria levels. Programs that focus on monitoring storm events or source identification tend to have higher bacteria levels.

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Recommendations

A new monitoring program may not be needed to answer key questions. The BEACH and DOH programs might provide sufficient information to measure whether bacteria levels in Puget Sound are changing over time. If new monitoring is pursued:

- Focus on specific sites to consistently monitor. Because there is such a large area to cover (Phase I and II permittees in the Puget Sound area as well as the Strait of Georgia and Strait of Juan de Fuca), it is not possible to monitor all areas. One approach is to develop a list of core sites that are monitored consistently over time.
- Consider focusing on monitoring nearshore sites adjacent to small stream discharges or large stormwater discharge areas. Sampling for the BEACH Program has shown that these areas have higher bacteria levels during and immediately after storm events, especially in densely populated urban areas.
- Ensure consistent sampling methodology (i.e., wade-in versus from-a-boat) to ensure that the depth of the sample obtained is consistent for all sample events.

Why does this study matter?

The goal of stormwater management is to protect Puget Sound and the rivers and streams that flow into it. Stormwater has been found responsible for shellfish and beach closures in Puget Sound and lakes in our region. Understanding the breadth of the bacteria problem and the sources, help us target management actions. These results tell us where we should focus best management practices (BMPs) and whether those practices are working over time.

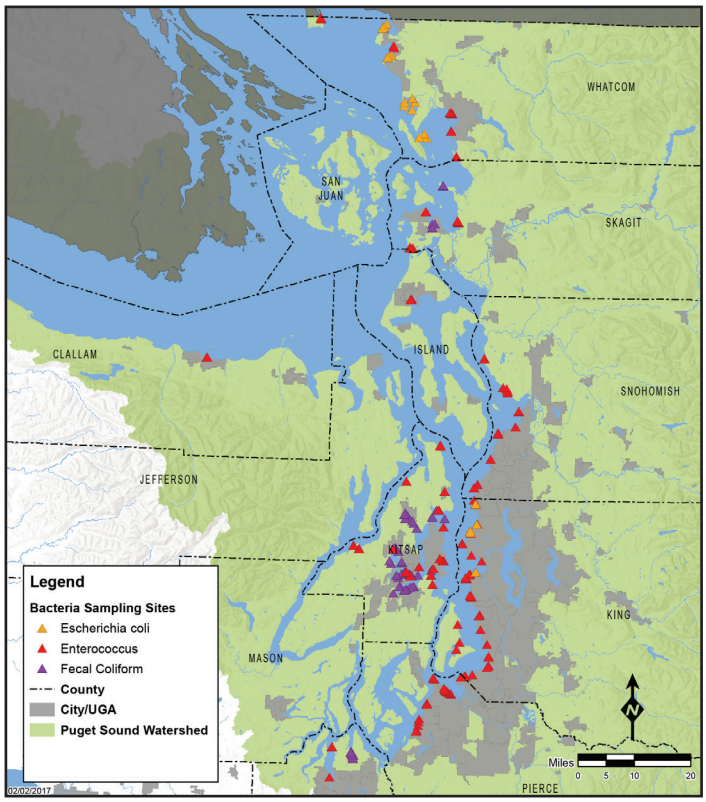
What should we do with this information?

Stormwater managers should consider how their local data fits into the regional picture. Have you been collecting ambient bacteria data or targeting sources? Permittees should focus bacteria monitoring on identifying and removing sources, and confirming effectiveness of outreach programs and other source-specific BMPs.

What will Ecology do with this information?

Ecology will continue to invest in efforts to develop tools and technologies and to identify, prevent, and reduce bacteria from various sources in stormwater discharges.

Shoreline bacteria sampling locations



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For more information

Visit the project website at www.ecology.wa.gov/SAM. The full report is at https://fortress.wa.gov/ecy/publications/SummaryPages/1703004.html.

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