

Water Quality Monitoring Project Interim Report

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Whatcom County Public Works- Stormwater

June 16, 2008

for
Whatcom County Marine Resources Committee



NORTHWEST STRAITS
marine conservation initiative



This report was funded in part through a cooperative agreement with the National Oceanic and Atmospheric Administration.

The views expressed herein are those of the author(s) and do not necessarily reflect the views of NOAA or any of its sub-agencies.

Introduction

Shellfish - those both recreationally and commercially harvested - are a key marine resource for Whatcom County. Water quality degradation has been a concern for shellfish growing areas in Drayton Harbor, Birch Bay and Chuckanut Bay. Drayton Harbor has historically provided tribal and recreational shellfish harvesting opportunities, as well as commercial harvest. The current status for shellfish harvest is “Conditional” in portions of in Drayton Harbor and “Prohibited” in others. Birch Bay has been and is one of the largest and most productive clamming areas in the state of Washington and is listed as a “Threatened” shellfish growing area by DOH due to degrading water quality. In 1994 DOH closed Chuckanut Bay to recreational shellfish harvest based upon water quality and sewage disposal conditions in the area.

The MRC developed a water quality monitoring project to collect water quality information at freshwater discharges to Drayton Harbor, Birch Bay and Chuckanut Bay.

The goals of the water quality monitoring project are:

- to collect fecal coliform bacteria data and loading estimates at priority freshwater inputs around the west shore of Drayton Harbor and at Chuckanut Bay in order to augment data collected by other programs;
- to collect baseline fecal coliform bacteria data and loading estimates for freshwater inputs to Birch Bay;
- to involve volunteers in the collection of water quality data;
- to assist in community outreach efforts emphasizing the need for clean marine waters for safe shellfish harvesting; and
- to assist in the selection of future clam enhancement projects;

The water quality monitoring project began in 2006 and is scheduled to occur until June, 2009. This interim report describes the procedures used to collect water quality information and presents a preliminary review of data collected between 2006 and 2008.

Background

In 2006, the MRC began a 3-year volunteer water quality monitoring project at Drayton Harbor, Birch Bay, and Chuckanut Bay. MRC members, Whatcom County staff, and volunteers were trained to collect grab surface water samples for fecal coliform analysis and estimate stream flow by time of travel or catchment method. Sample collection and flow measurement occurs monthly during a low tide at up to 5 sites in Drayton Harbor, 18 in Birch Bay, and 4 in Chuckanut Bay, dependent on flow conditions. Fecal coliform bacteria results are compared to water quality criteria to determine water quality status. Flow data are used to calculate fecal coliform loads.

The following two MRC members and thirteen volunteers assisted with sample collection:

- | | | |
|--------------------------|------------------|------------------|
| ▪ Gerald Larson
(MRC) | ▪ Dave Church | ▪ Katie Siegel |
| ▪ Susan Burke (MRC) | ▪ Katy Hicks | ▪ Terry Sullivan |
| ▪ Beverly Ashworth | ▪ Eugene Hoerauf | ▪ Marcie Toby |

- Mary Bradshaw
- Phil Buly
- Dick Myhre
- Becky Noble
- Bob Toby
- Lynn Trzynka

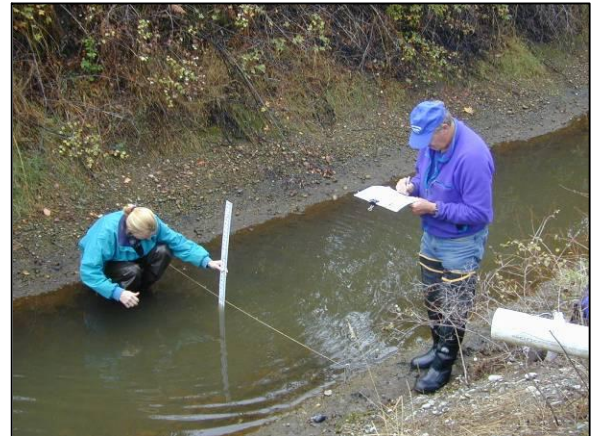
Sample dates, number of volunteers per event, and volunteer hours are presented in the table below.

Sample Date	Number of Volunteers	Volunteer Hours
July 11, 2007	9	10
August 8, 2007	10	13.5
September 5, 2007	8	9
October 3, 2007	11	15
November 5, 2007	11	12.5
December 4, 2007	11	14
January 14, 2008	9	11
February 13, 2008	10	13
March, 12, 2008	10	16
April 23, 2008	6	6
May 21, 2008	10	13
June 18, 2008	<i>Estimate 10</i>	<i>11</i>
Total Hours:		Estimate 144

Methods

Procedures for sample collection and flow measurements are contained in the *Quality Assurance Project Plan-Whatcom County Volunteer Monitoring Program for Drayton Harbor, Birch Bay, and Chuckanut Bay Watersheds* (Hirsch Consulting Services, 2006).

Care is taken to collect samples that represent flowing conditions; therefore, samples are not collected if water is stagnant. Water samples are collected directly into 100ml sterile plastic bottles by hand dipping in midstream. Samples are stored on ice in a cooler and delivered to the laboratory within 8 hours of sampling.



Stream flow is measured using the time of travel method. Stream segment length, width, and depth are determined and a floatable object timed as it travels between point A and point B. Velocity and area are calculated to determine flow rate. Piped flow

measurements are estimated using the catchment method (time it takes to collect a known volume of water) or, if possible, time of travel through the culvert.

Water Quality Criteria

The Washington State Department of Ecology classifies Drayton Harbor and Chuckanut Bay as Class A waterbodies, with excellent water quality. Birch Bay is classified as AA with extraordinary water quality (WAC, 1997). Tributaries of the waterbodies are given the same classification as the waterbody into which they merge.

Fecal coliform criteria for Class A and AA waters are:

- A - Geometric mean shall not exceed 100 colonies/100mL *and* not more than 10% of all samples (or any single sample when less than 10 sample points exist) shall exceed 200 colonies/100mL
- AA - Geometric mean shall not exceed 50 colonies/100mL *and* not more than 10% of all samples (or any single sample when less than 10 sample points exist) shall exceed 100 colonies/100mL

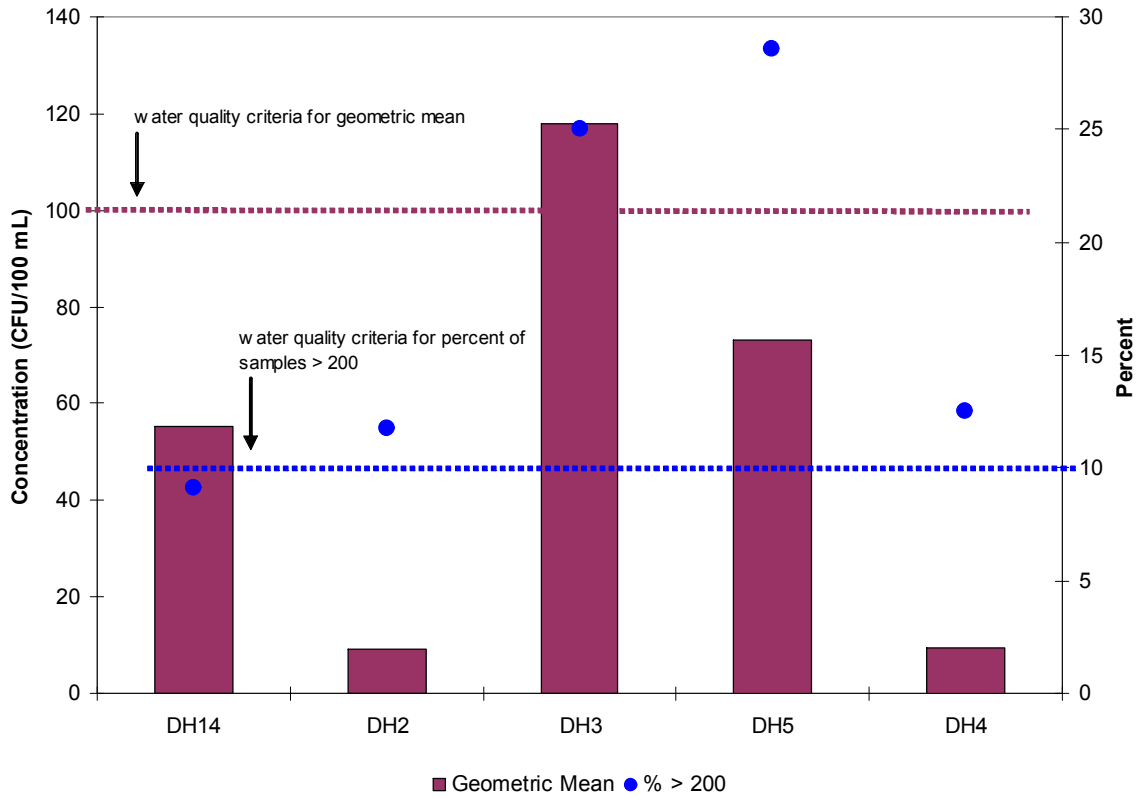
Results

A preliminary review of the water quality results is provided in this section. A final data review will be performed on completion of this project in June 2009. Water quality summaries for Drayton Harbor, Birch Bay, and Chuckanut Bay are provided in the Attachments.

Drayton Harbor

As of May, 2008, 17 samples have been collected at DH2, 16 at DH3, 8 at DH4, 14 at DH5, and 11 at DH14. The geometric mean at one site (DH3 - 118 colonies/100mL) exceeds the water quality standard of 100 colonies/100mL. The percent of samples with fecal coliform concentrations exceeding 200 colonies/100mL is greater than 10 percent at all sites, except DH14. DH14 meets the water quality standard. DH2, DH4, and DH5 partially meet the water quality standard. DH3 exceeds the water quality standard. A comparison of water quality data at Drayton Harbor to water quality criteria is presented in Figure 1.

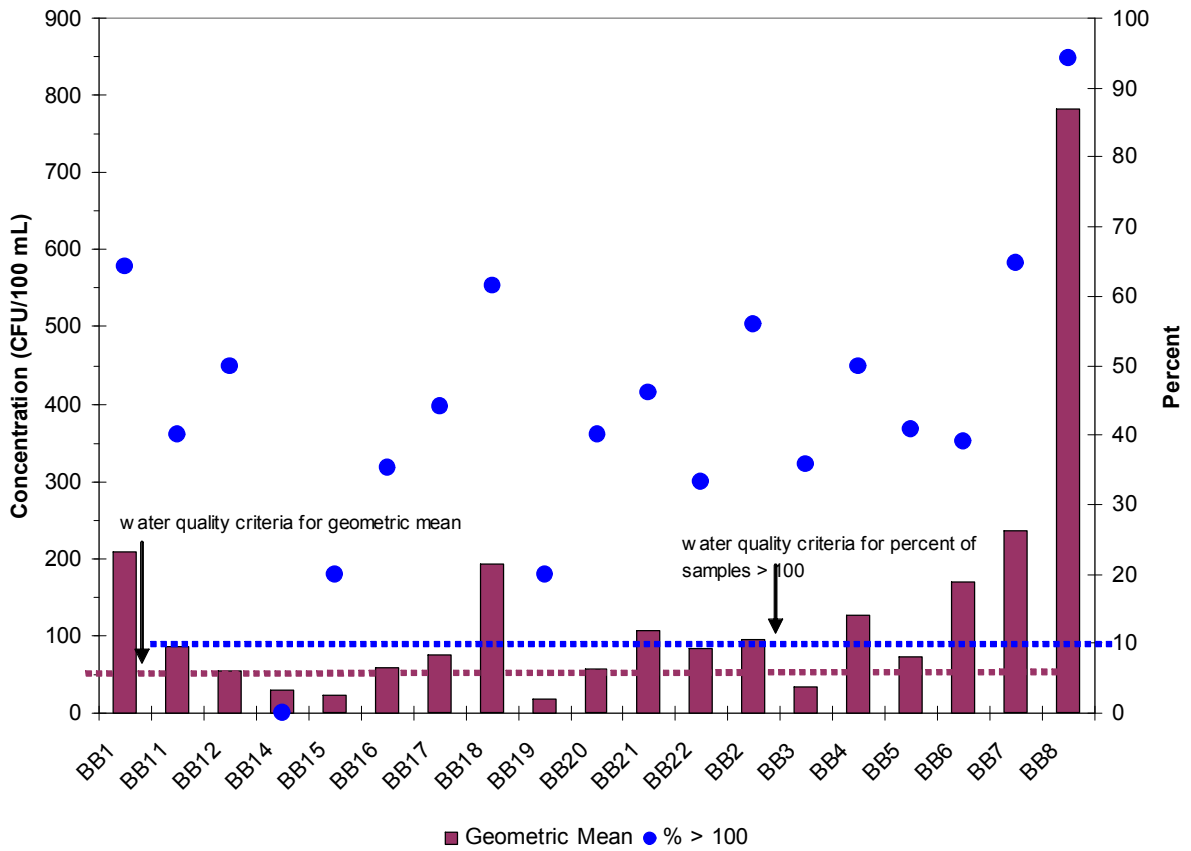
Figure 1. Comparison of Drayton Harbor Data to Water Quality Criteria



Birch Bay

As of May, 2008, 14 samples have been collected at BB1, 25 at BB2, 14 at BB3, 22 at BB4, 22 at BB5, 23 at BB6, 17 at BB7, 17 at BB8, 10 at BB11, 6 at BB12, 15 and BB15, 17 at BB16, 13 at BB18, 10 at B19, 15 at BB20, 13 and BB21, and 12 at BB22. The geometric mean at all sites, except BB3, BB15, and BB19, exceeds the water quality standard of 50 colonies/100mL. The percent of samples with fecal coliform concentrations exceeding 100 colonies/100mL is greater than 10 percent at all sites. A comparison of water quality data at Birch Bay to water quality criteria is presented in Figure 1.

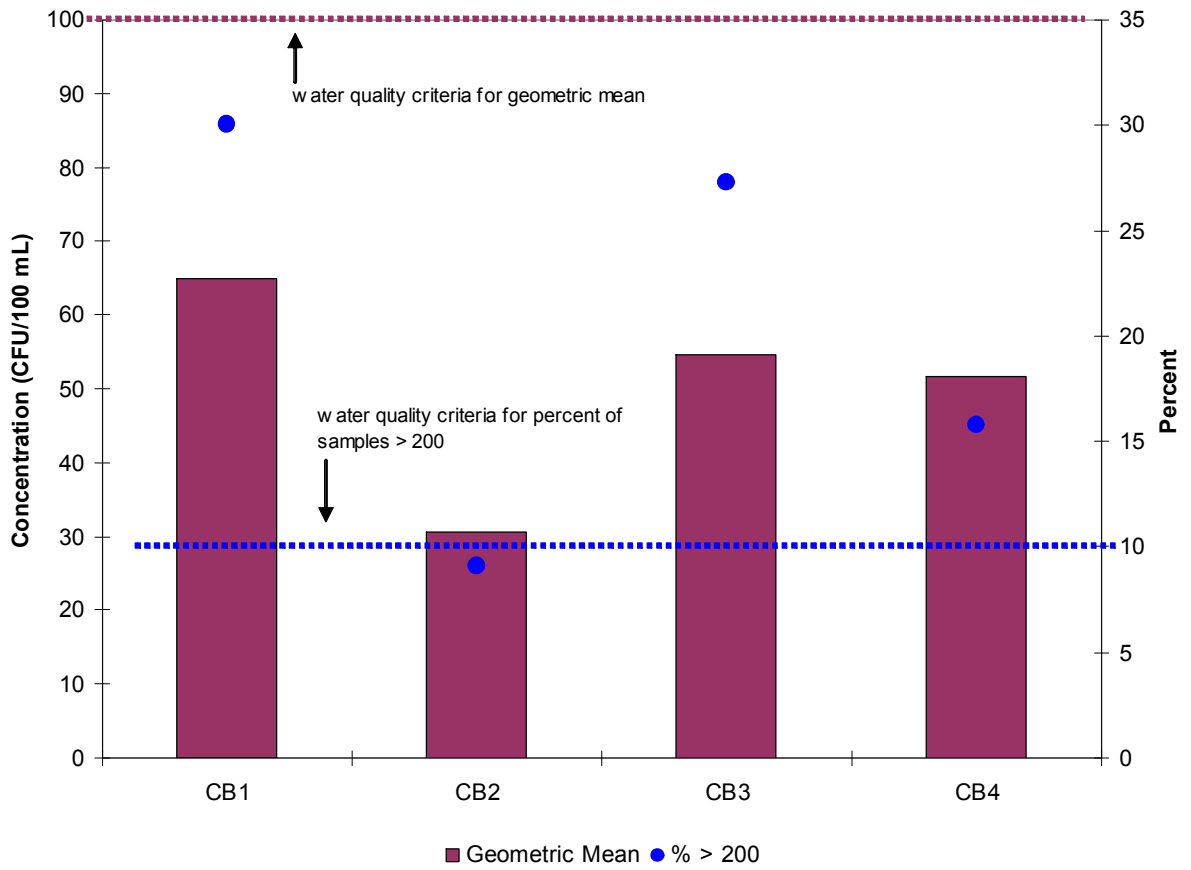
Figure 2. Comparison of Birch Bay Data to Water Quality Criteria

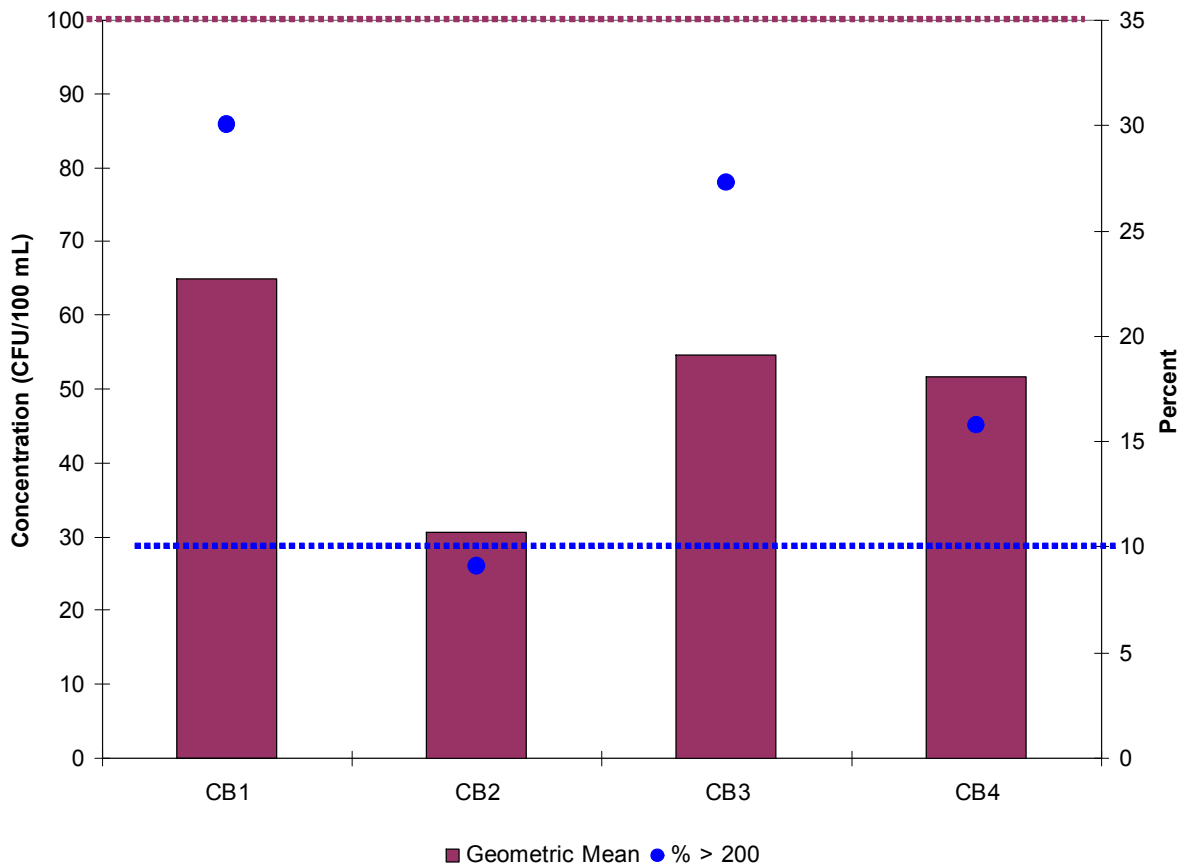


Chuckanut Bay

As of May, 2008, 20 samples have been collected at CB1, 22 at CB2 and CB3, and 19 at CB4. The geometric mean at all sites is less than the water quality standard of 100 colonies/100mL. The percent of samples with fecal coliform concentrations exceeding 200 colonies/100mL is greater than 10 percent at CB1, CB3, and CB4. CB2 meets the water quality standard; whereas, CB1, CB3, and CB4 partially meet the water quality standard. A comparison of water quality data at Chuckanut Bay to water quality criteria is presented in Figure 1.

Figure 3. Comparison of Chuckanut Bay Data to Water Quality Criteria





Discussion

The preliminary data suggest that fecal coliform is a pollutant of concern entering the marine waters of Drayton Harbor, Birch Bay, and Chuckanut Bay. The data also indicate that Birch Bay is of particular concern and should be a high priority area for follow-up action.

The MRC water quality monitoring project is currently funded through June 2009. The MRC is working with Whatcom County to continue fecal coliform monitoring beyond this date and to develop outreach and response strategies to identify and control fecal coliform sources.

References

Hirsch Consulting Services. 2006. Quality Assurance Project Plan-Whatcom County Volunteer Monitoring Program for Drayton Harbor, Birch Bay, and Chuckanut Bay Watersheds.

WAC, 1997. WAC-173-201-A-100 (2)(b), Table 200 (1)(c).

Attachments

Water Quality Summary – Drayton Harbor

Water Quality Summary – Birch Bay

Water Quality Summary – Chuckanut Bay