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# WHATCOM MARINE RESOURCES COMMITTEE CHUCKANUT POLLUTION, IDENTIFICATION AND CORRECTION (PIC)

*2017-2018 Final Report*

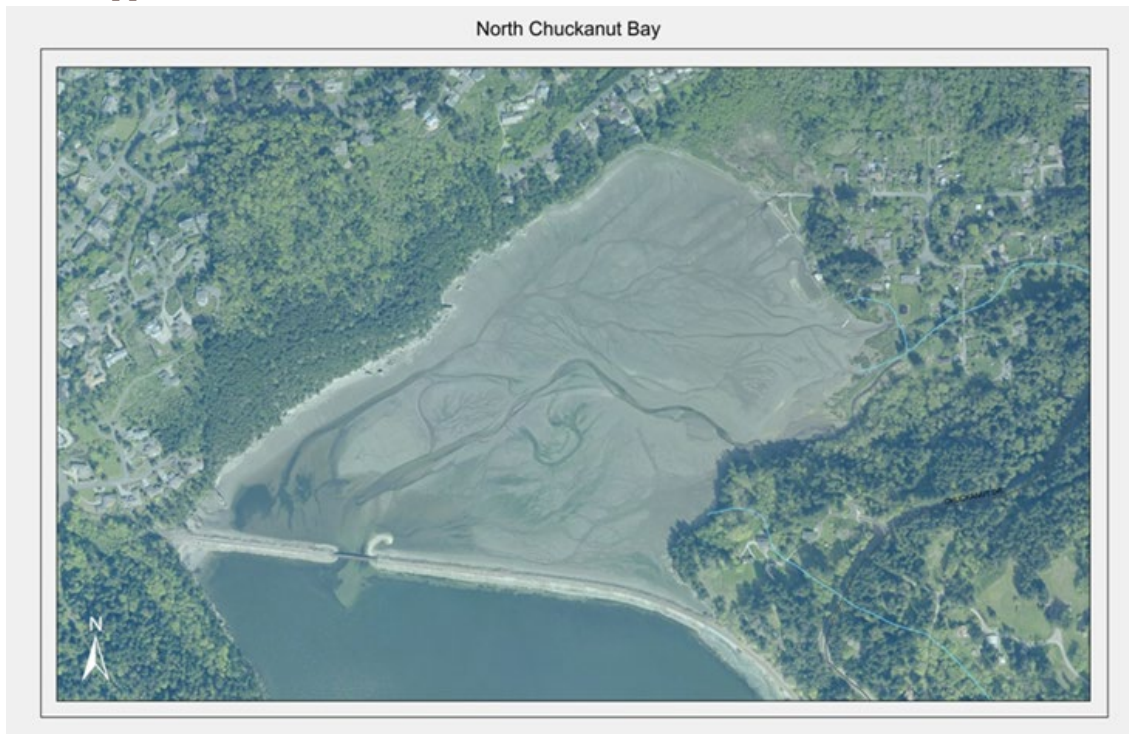
Final report of water quality monitoring in North Chuckanut Bay led by the  
Whatcom Marine Resources Committee that occurred from October 1, 2017  
– September 30, 2018

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Whatcom Marine Resources Committee Coordinator  
9/30/2018



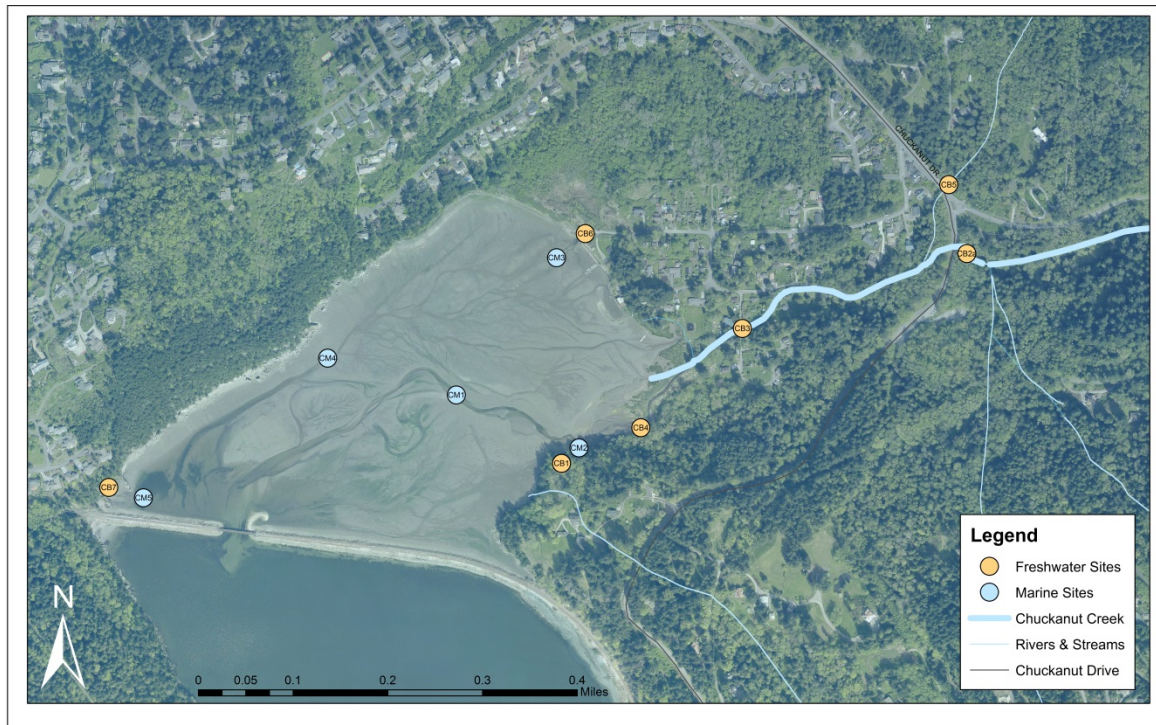
## NORTH CHUCKANUT BAY POLLUTION IDENTIFICATION AND CORRECTION (PIC) PROGRAM

Northern Chuckanut Bay, often referred to as Mud Bay, is a small embayment in south Bellingham with a railroad trestle crossing the mouth and restricting tidal circulation. The primary freshwater discharge to this bay is Chuckanut Creek with a seven square mile watershed. There are also smaller drainages from the residential area on the northwest side of the bay and a seasonal creek that runs through the City of Bellingham Woodstock Farm. Land uses in the Chuckanut Creek watershed include a residential area (Chuckanut Village), a forested park with hiking and biking trails (Arroyo Park), and rural residential and forested areas in the upper watershed.



North Chuckanut Bay is a recreational shellfish harvesting area with elevated bacteria levels and has been closed to recreational shellfish harvest since 1994, by the Washington Department of Health. Bacteria criteria are set to protect public health. Department of Ecology water quality standards use fecal coliform as an indicator bacteria, and as such, presence of fecal coliform bacteria indicates the presence of fecal material from human or other warm-blooded animals in the waterbody.

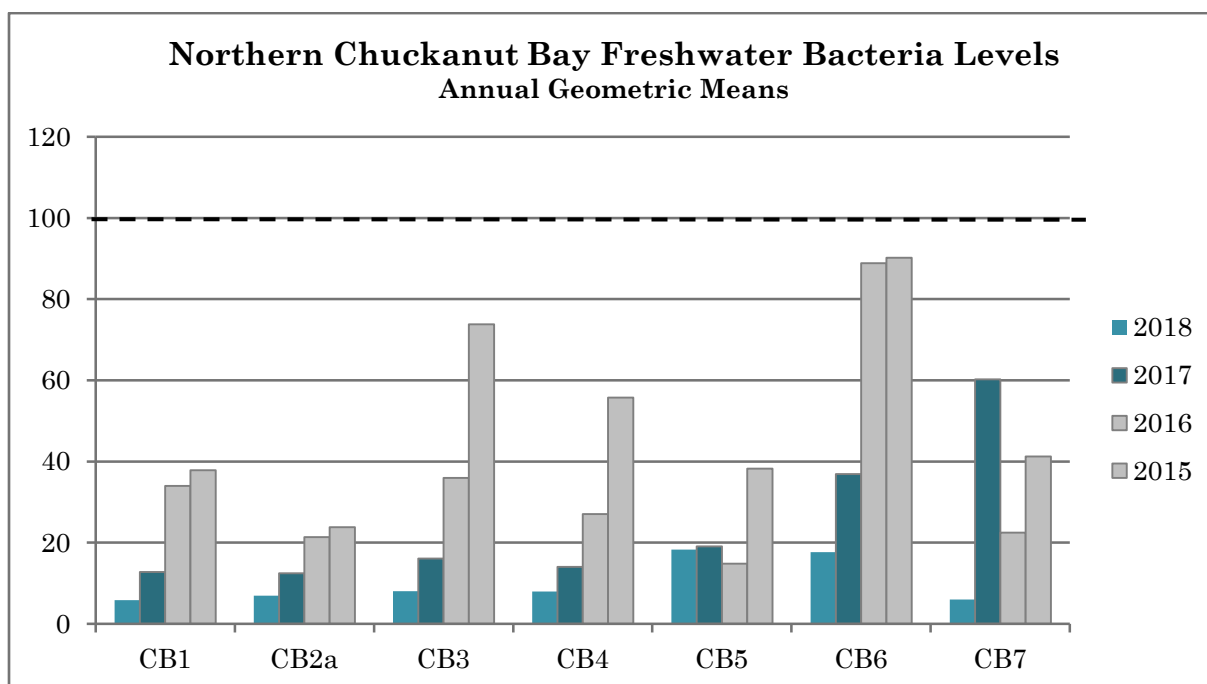
Figure 1.



The MRC has been working with the Whatcom County Health Department, Whatcom County Public Works – Natural Resources, Washington Department of Health, citizen volunteers, and the local community to conduct intensive water quality sampling (in both the freshwater and marine water), establish a community driven Pollution Identification and Correction Program, and ultimately restore the recreational shellfish area. The goal of this work is to characterize fecal coliform levels within the Chuckanut watershed and seasonal variation of those bacteria levels to identify sources of pollutants, suggest water quality improvement projects, attain water quality standards, and protect beneficial uses (including recreational shellfish harvesting). Seven freshwater sites and five marine sites are sampled on either a monthly or bi-monthly basis, simultaneously – unless weather prevents marine sampling (see Figure 1).

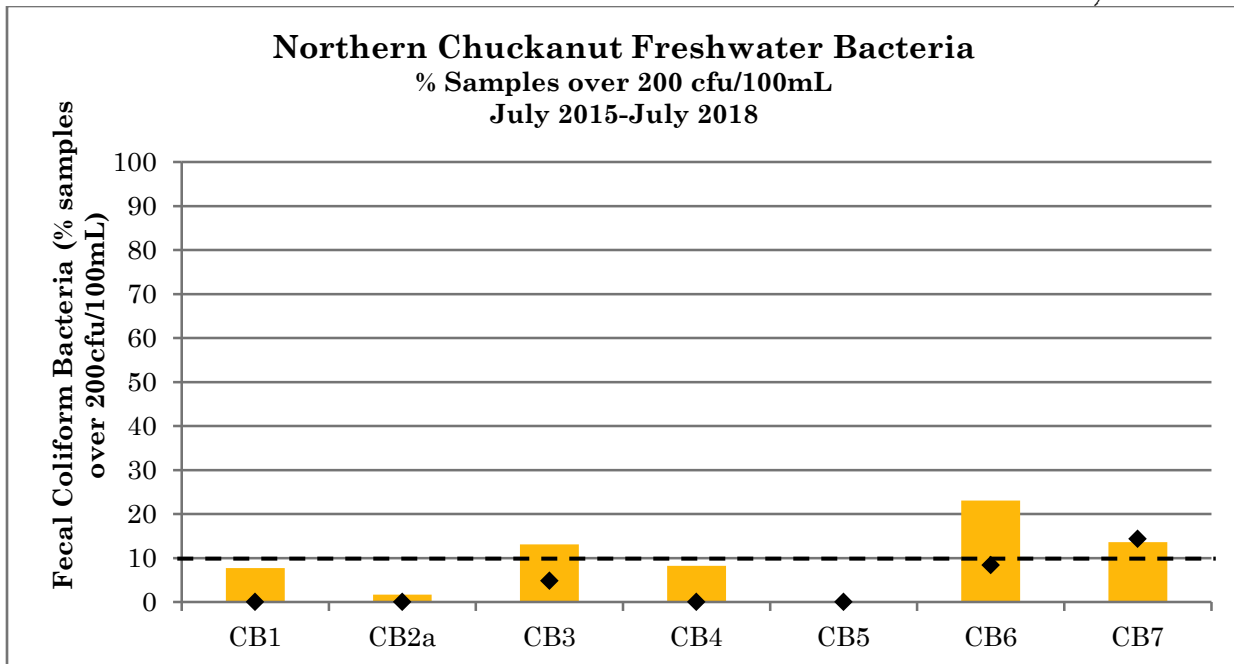
Improvements have been made to protect water quality, including work on septic systems, implementing enhanced management practices on farms plans, installing dog waste stations, and providing outreach on other watershed stewardship activities. Water quality improvements have been demonstrated at freshwater stations (Figures 2 and 3), however elevated bacteria results are still experienced in portions of the bay, particularly during the dry season.

Figures 4 and 5 illustrate the differences in patterns observed between the freshwater and marine stations. The freshwater stations adjacent to the marine station CM2 are all meeting water quality standards for fecal coliform. However, fecal coliform levels observed at CM2 are elevated with an estimated 90<sup>th</sup> percentile four times the standard for fecal coliform. Thus, a special study was established to evaluate bacteria results in the shoreline areas immediately adjacent to CM2 to help determine the zone impacted by elevated bacteria levels and potential areas with bacteria sources.



**Figure 2: Fecal coliform annual geometric means at routine Northern Chuckanut Bay watershed freshwater stations (2015-2018).** Bars indicate annual fecal coliform geometric and dashed black line indicates the water quality standard. All stations meet the geometric mean standard for fecal coliform bacteria. Blue bars illustrate the reduced geometric means observed over the past two years at all stations except CB7 in 2017.





**Figure 3: Percent of fecal coliform results above 200cfu/100mL at Northern Chuckanut Bay freshwater stations.** Bars indicate percent of samples collected over the past three years with fecal coliform results over 200 cfu/100mL. Black diamonds indicate the percent of samples over 200cfu/100mL in the last 12 months. Black diamonds below the top of the red bar indicate a declining number of bacteria spikes. The black dashed line indicates the water quality standard.



**Figure 4: Status of fecal coliform bacteria at Northern Chuckanut Bay freshwater stations.** Blue dots indicate sites with geometric mean < 20 cfu/100mL, green dots indicate sites with geometric means between 20 and 40 cfu/100mL, and yellow dots indicate sites with geometric means > 40 cfu/100mL.

between 40 and 60 cfu/100mL. All freshwater sites are well within the fecal coliform geometric mean standard.



**Figure 5: Status of fecal coliform bacteria at marine stations in Northern Chuckanut Bay watershed.** Dots indicate estimated 90<sup>th</sup> percentile of established marine sites sampled on a bi-monthly basis by the MRC. Green dots indicate sites that are well within standards (< 20 MPN/100mL), yellow dot indicates bacteria results of concern (20-30 MPN/100mL), orange dot indicates bacteria results at a threatened level (30-43 MPN/100mL), and red dot indicates bacteria results above the standard (>43 MPN/100mL). White box indicates the area of the special marine sampling project (Figure 5).

## SPECIAL SAMPLING PLAN

### Goals and Objectives:

The goal of the special sampling plan is to characterize fecal coliform concentrations in the area around CM2 to identify sources of pollutants to guide water quality improvement projects, reduce fecal coliform bacteria levels, and protect beneficial uses (including primary contact recreation and shellfish harvesting).

The objectives of the study are:

- To identify bacteria hot spots and/or patterns in Northern Chuckanut Bay to assist with tracking potential sources of bacteria impacting station CM2.
- To share data with the Washington State Department of Health for consideration in shellfish classification review.

### Study Design:



In coordination with the Marine Resources Committee bi-monthly marine routine sampling run, samples will be collected at a fixed-network of additional 5 marine stations described in Table 1 and Figure 6. These stations represent the main channel of Chuckanut Creek and a 50-200ft zone around CM2.

**Table 1: Marine stations for special monitoring project.**

Site Id	Description	Latitude	Longitude
CMS1	In line with CM2, in main Chuckanut Creek channel	N 48.69905	W 122.49744
CMS2	NE of CM2, where small drainage from mudflat enters main channel from north	N 48.69907	W 122.49731
CMS3	Between CM2 and CB4, adjacent to black box on shoreline (above short channel connected to CM2)	N 48.69890	W 122.49716
CMS4	Location where Woodstock Farm Creek (CB1) enter bay	N 48.69887	W 122.49767
CMS5	Above mudflat with seep from Woodstock Farm bank, to the west of CB1 discharge		
CMS6	Main tidal channel of Chuckanut Creek out from eastern point at Woodstock	N 48.69915	W 122.49833
CMS7	Main channel of Chuckanut Creek between CMS1 and CB4		

Sites were identified through review of historical monitoring, field reconnaissance and aerial images of tidal channels. Marine site CM2 is located adjacent to a large rock just below the bank from Woodstock Farm. This site is along a short, side-channel between the main channel of Chuckanut Creek and the shoreline. Special sample sites were located at sites where freshwater is entering the marine system, the main channel of Chuckanut Creek, and over a mudflat with seeps and an abundance of animal tracks. These sites were selected to help determine the extent to which the elevated bacteria levels at CM2 radiate from this site and to assist with evaluation of potential bacteria sources near CM2. Grab samples will be collected and analyzed for fecal coliform bacteria. Salinity and temperature will be measured and compared between sites to characterize freshwater influence.

Data from the special marine sampling will provide data sets to meet the following needs:

- Provide a characterization of the zone around CM2 that is impacted by elevated bacteria results during the dry season.
- Provide identification of bacteria hot spots in the zone of CM2 for further source identification and correction efforts.

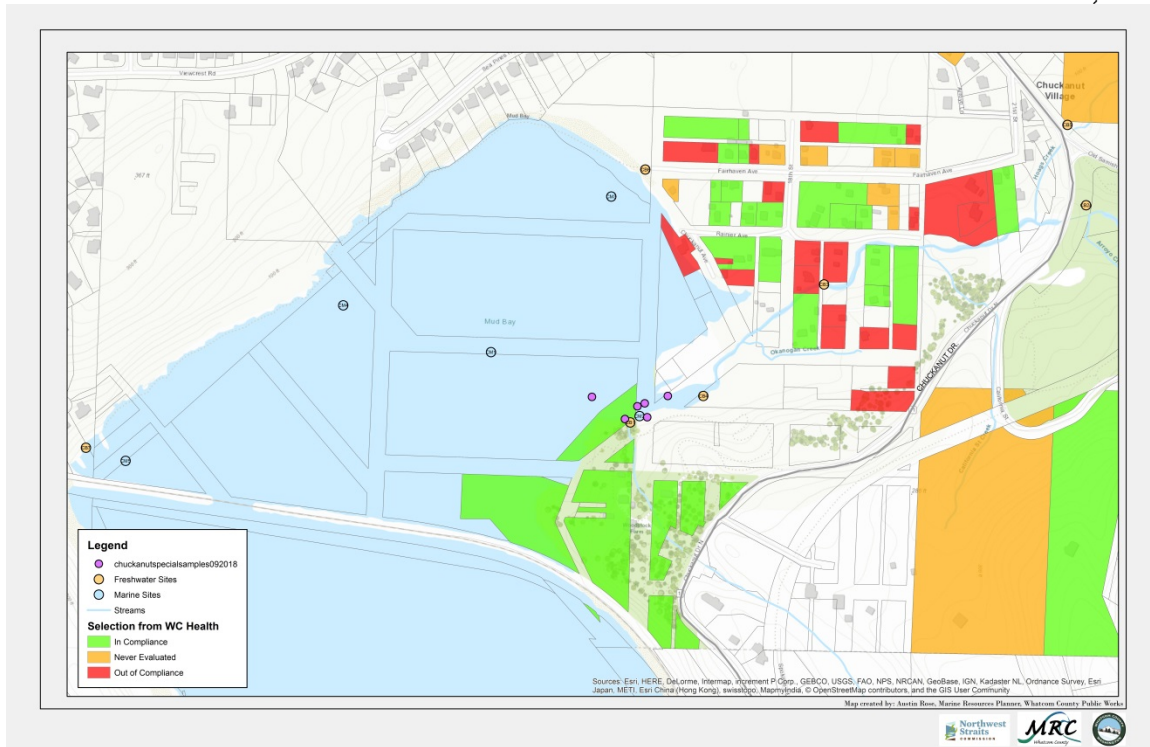




**Figure 6: Northern Chuckanut Bay special marine sampling sites.** Red dot indicates established marine station sampled on a bi-monthly basis by the MRC. Orangedots indicate additional marine stations that will be sampled twice per month through this study.

## UPDATE FROM WHATCOM COUNTY HEALTH

The MRC has been working with Whatcom County Health to ensure the septic systems in the Chuckanut Village area are up to date. The spreadsheet included with this final report shows the evaluation status of OSS in the Chuckanut Village, current as of June 27, 2018. Based on this information there are still some systems in the Village that are out of compliance, that is, the system is past due for evaluation. See map below.



## CONCLUSION

The MRC continues to share data with the Whatcom County Health Department, Washington Department of Health, and with the general public through the MRC website <https://www.whatcomcountymrc.org/projects/water-quality-monitoring/>, the Whatcom County Public Works website [http://www.whatcomcounty.us/DocumentCenter/View/35923/ChuckanutSummary\\_06-18-2018?bidId=](http://www.whatcomcounty.us/DocumentCenter/View/35923/ChuckanutSummary_06-18-2018?bidId=) and the Online Results Map <http://www.whatcomcounty.us/2618/Interactive-Water-Quality-Maps> for the Whatcom Clean Water Program featuring routine/ambient and source tracking preliminary fecal coliform results collected by Whatcom County Public Works, Whatcom Conservation District, Washington Department of Agriculture, and Ecology. It is hoped that the continued effort to provide fecal coliform data from N. Chuckanut Bay to DOH and continued work with the community on best management practices to reduce potential pollution to the bay, will results in a reclassification of the recreational shellfish area.

