Whatcom Marine Resources Committee (MRC) 2024 North Chuckanut Bay Pollution Identification and Correction Project Final Report

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Whatcom County Public Works—Natural Resources

Reporting Period: October 2023-September 2024

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Abstract

North Chuckanut Bay is a small embayment located in south Bellingham that has exhibited poor water quality since initial water samples were taken from 1989-1991. In 1994, the bay officially closed for recreational shellfish harvest, and remains closed today. Despite the health advisory and shellfish closure, North Chuckanut Bay has remained a popular location for recreational shellfish harvest. In 2014, the MRC added this location to Whatcom County Public Work's county-wide Pollution Identification and Correction project.

The goal of this project is to provide the Washington State Department of Health with sufficient data demonstrating an improvement in water quality so that recreational shellfish harvesting restrictions may be appropriately modified. To achieve this goal, the MRC conducted monthly water quality sampling events and has continued outreach and education efforts to the local community to encourage best practices and messaging around water quality protection in the bay.

Monthly water quality sampling occurred at 7 freshwater inputs to the bay and at 7 marine locations within the bay. While water quality has shown improvements at some of the sampling locations, many of the sites still fail to meet one or both of the water quality standards as set by the Washington Department of Ecology. Because water quality has not improved throughout North Chuckanut Bay, the MRC is focusing efforts on reopening a segment of the shoreline in the northwest portion of the bay. Water quality in this area continues to show improvements and provides more suitable substrate for shellfish as compared to other areas of the bay. The MRC will continue to conduct monthly water quality sampling and education and outreach efforts to the local community in hopes of improving and maintaining healthy water quality to potentially support recreational shellfish harvest.

Background

North Chuckanut Bay, often referred to as Mud Bay, is a small embayment in south Bellingham within Whatcom County (see map below). A railroad trestle crosses the mouth of the bay, restricting tidal circulation and preventing adequate flow throughout the bay. The primary freshwater discharge to this bay is Chuckanut Creek, which has a seven square mile watershed. There are also smaller drainages from the residential area on the northwest side of the bay and from 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.

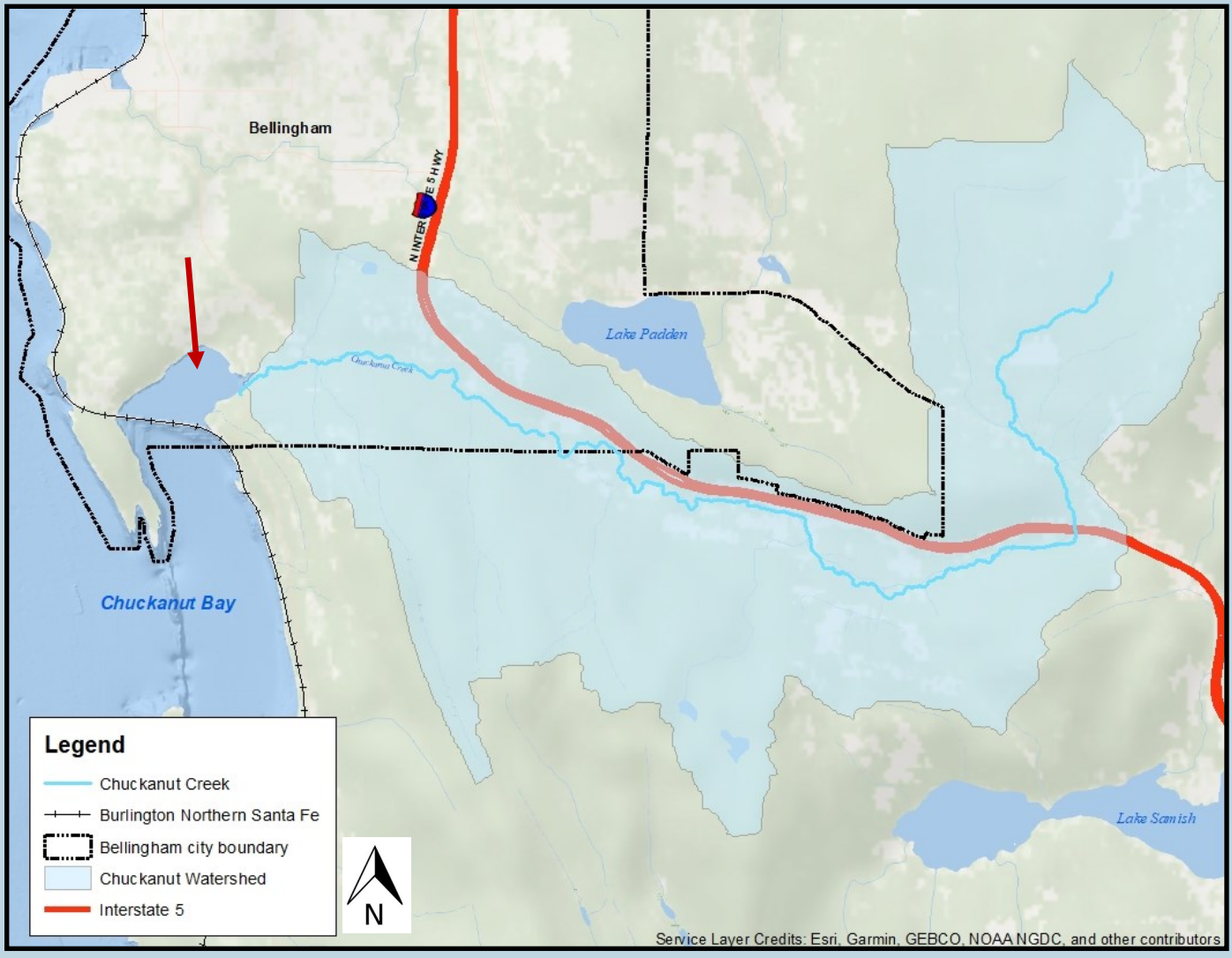


Figure 1: Map of the Chuckanut watershed and surrounding areas. The red arrow indicates North Chuckanut Bay.

Background

North Chuckanut Bay is a popular shellfish harvesting area that supports many species of clams. However, there have been concerns about bacteria levels in the bay for over 25 years. Initial water quality samples collected between 1989 and 1991 showed elevated bacteria levels at the sampling station closest to the shellfish harvesting area, just outside the railroad trestle. In 1994, the Washington State Department of Health (WA DOH) conducted a shoreline survey of Chuckanut Bay Park and recommended that the recreational shellfish harvesting area in the bay be closed due to poor water quality conditions. Despite the health advisory and shellfish closure, the area has remained a popular location for recreational shellfish harvest. As capacity allowed, the MRC continued water quality sampling in the freshwater systems flowing into North Chuckanut Bay from 2006-2013. In 2014, the MRC decided to contribute to Whatcom County Public Work's (WCPW) county-wide Pollution Identification and Correction (PIC) project, focusing their efforts in North Chuckanut Bay.

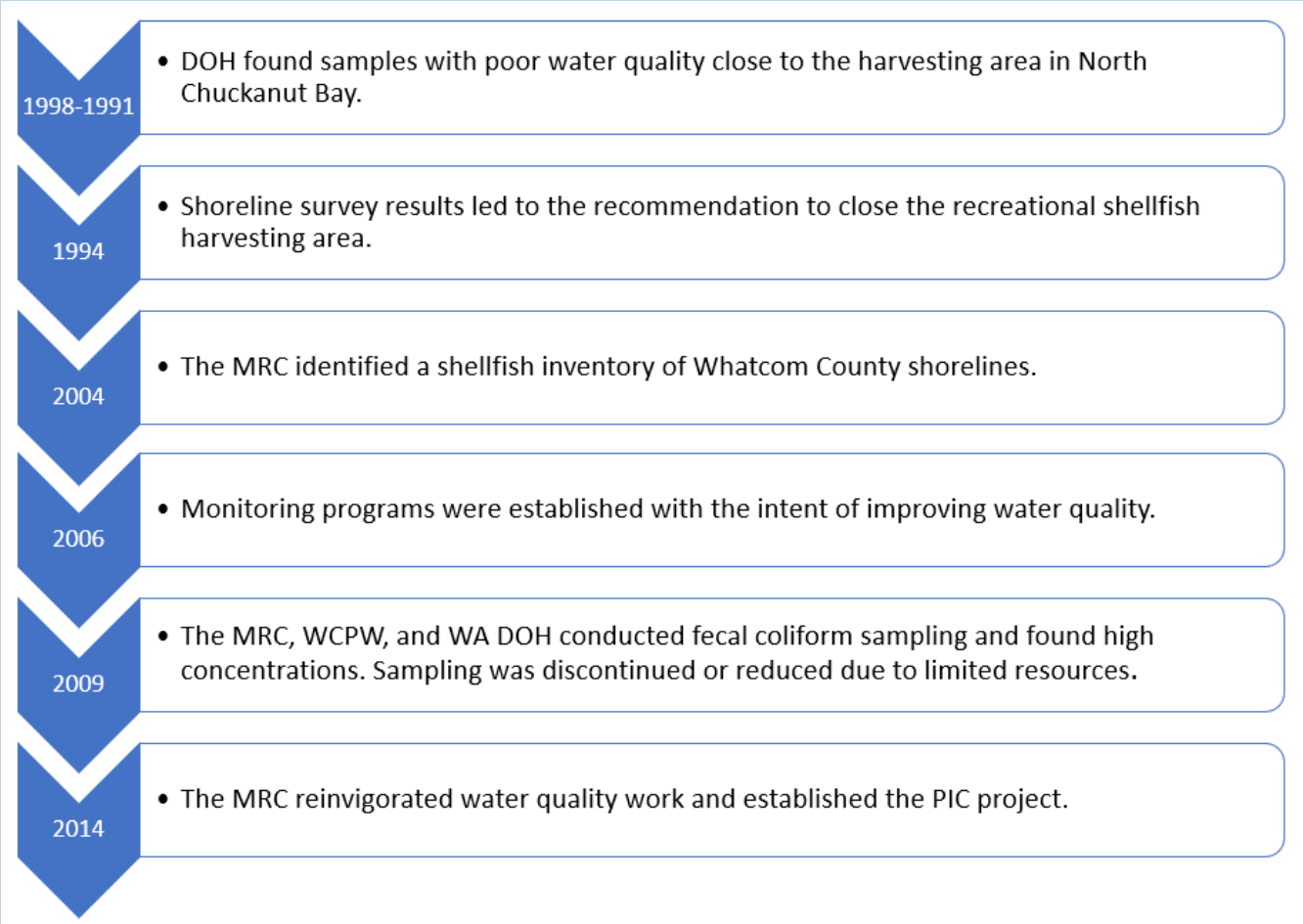


Figure 2: Timeline of efforts in North Chuckanut Bay.

Project Goals

The goal of this project is to provide WA DOH with sufficient data to demonstrate improvements in water quality to modify the recreational shellfish harvesting restrictions within North Chuckanut Bay. Another goal of the project is to continue outreach and education efforts within the Chuckanut Village community to encourage best practices and to support messaging around water quality protection in North Chuckanut Bay.

Project Engagement

To achieve the water quality sampling goals of this project, the MRC relied heavily on volunteers and staff with WCPW to conduct monthly sampling. A full list of volunteers and staff is included in Appendix A.

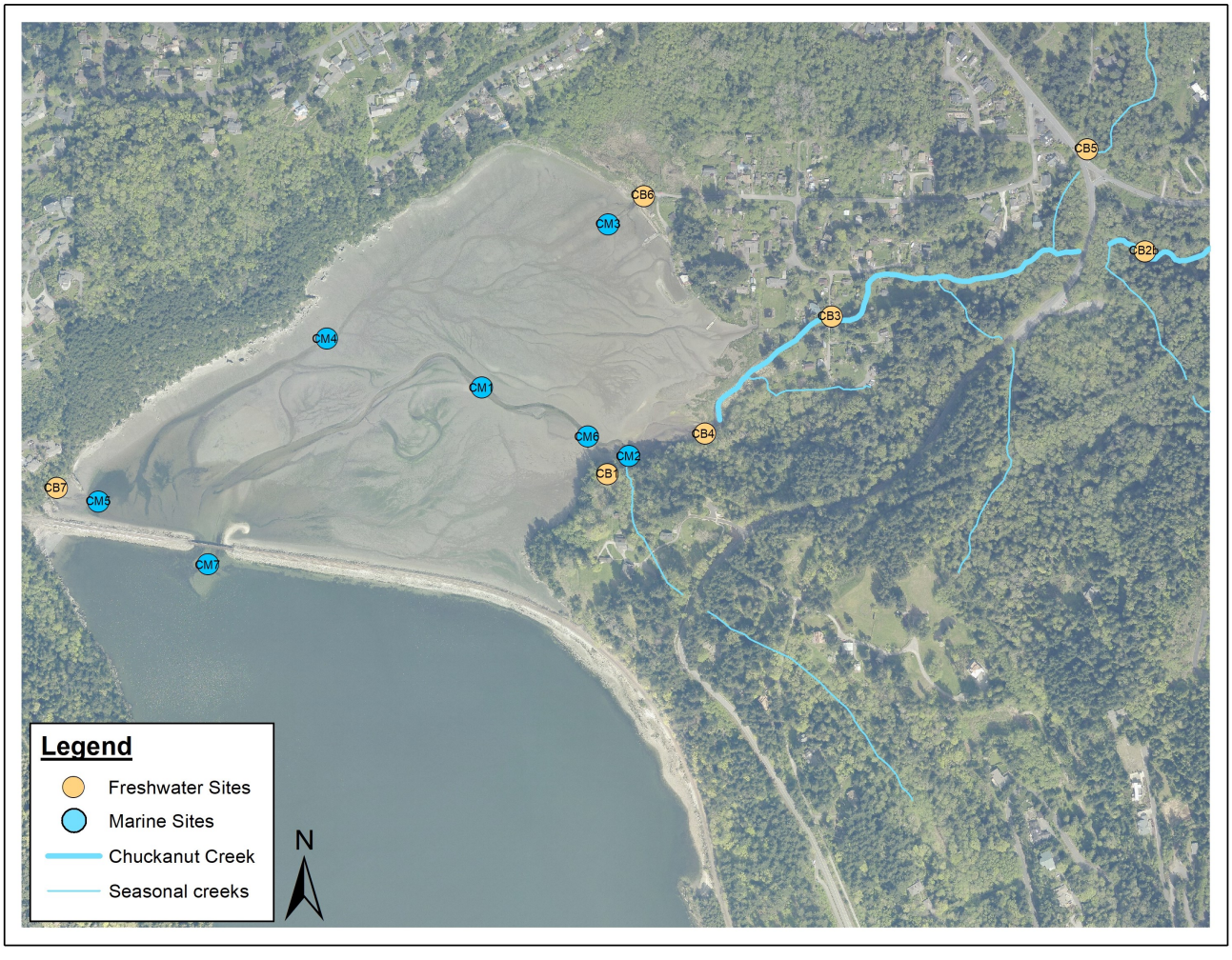
Volunteers assist with collection of marine water quality samples in North Chuckanut Bay. Photo credit: Dana Flerchinger, MRC staff.

Partners

- **Whatcom County Public Works (WCPW):** Provided staff and support for PIC efforts in North Chuckanut Bay.
- **Washington State Department of Health (WA DOH):** Communicated about water quality conditions within North Chuckanut Bay.
- **Whatcom County Health and Community Services:** Assisted in sampling and outreach efforts.
- **Whatcom County Conservation District**: Helped promote best management practices to small farms within the Chuckanut watershed.

Project Methods

Sampling occurred once per month at 7 freshwater sites and 7 marine sites from October 2023 through September 2024. Sample collection was conducted according to the grab sample collection protocols shown in Appendix B. Sample collection relied on two sampling teams: A freshwater team that collected samples from freshwater inputs to the bay, and a marine team that collected the marine samples from the bay plus the CB7 freshwater site via kayak. Field sheets for both the freshwater and marine environments are shown in Appendix C. Sites were identified through review of historical monitoring programs, drainage areas, and land use types. Data from the routine sampling provides an estimate of the geometric mean and the 90th percentile for fecal coliform.



Map created by: Austin Rose, Whatcom County Public Works, February, 2023

Figure 3: Map of North Chuckanut Bay freshwater (yellow) and marine (blue) sampling locations. CB7 was collected with the marine samples via kayak due to limited accessibility to this site from land.

Project Methods

Monthly water quality data, including both raw data and water quality summaries, are included in Appendix D. For North Chuckanut Bay to be considered for reclassification, two water quality standards for shellfish must be met in both the marine and freshwater environments, but the standards are different for each. The table below outlines the freshwater and marine standards as set by the Washington Department of Ecology.

Marine Water Standards for Fecal Coliform (FC) Bacteria	Freshwater Standards for Fecal Coliform (FC) Bacteria
• Geometric Mean: 14 FC/100 mL • 90th Percentile: 43 FC/100 mL	• Geometric Mean: 100 FC/100 mL • No more than 10% of the samples exceed 200 FC/100 mL

Table 1: Department of Ecology Water Quality Standards for Whatcom County Watersheds.

To calculate the geometric mean and 90th percentile, WA DOH uses the last 30 samples that were collected. For the shellfish standard in the marine environment, a calculated 90th percentile is used, while in the freshwater environment, the percent of samples over a threshold is used.

Left: Freshwater samplers collect a grab sample in Chuckanut Creek. **Right:** Signage indicating closures for recreational shellfish collection in North Chuckanut Bay. Photo credit: Dana Flerchinger, MRC staff.

Results: Freshwater

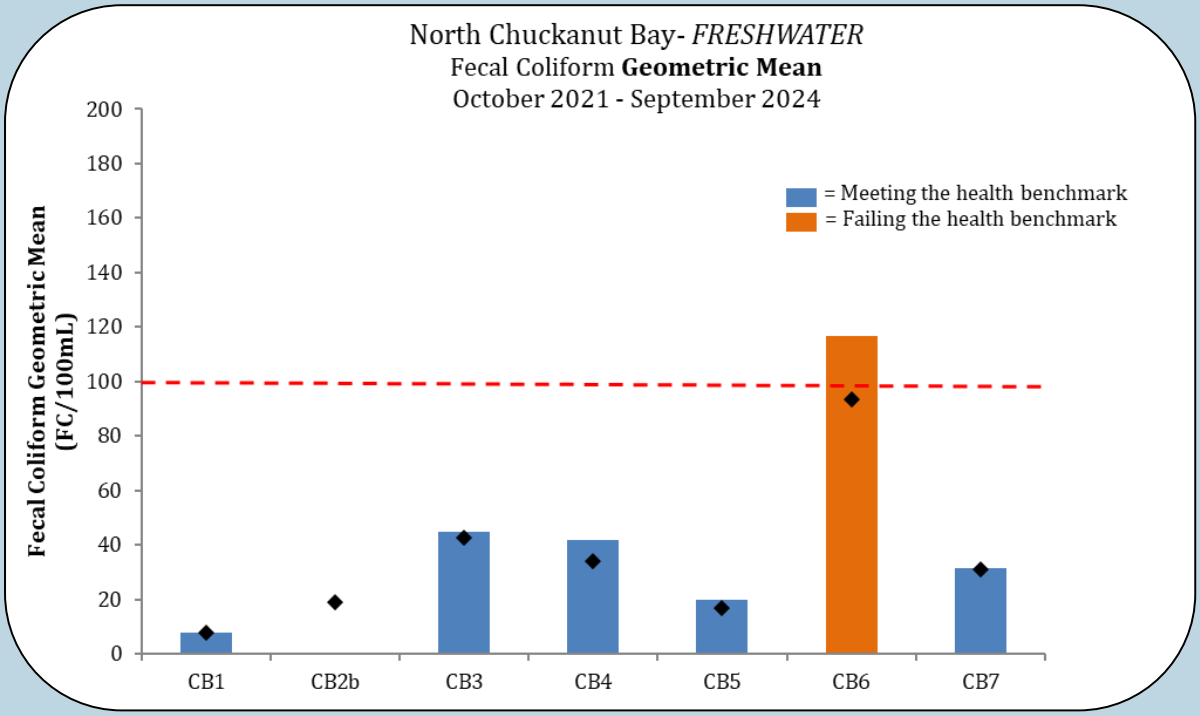


Figure 4: Bars show the 30 sample geometric mean for samples collected in the freshwater environment. The red dotted line indicates the freshwater geomean water quality standard for fecal coliform of 100 FC/100 mL. Sites with orange bars exceed the water quality standard. Black dots above the bars indicate that fecal bacteria levels have been increasing over the past year. There is no bar for CB2b as this site lacks 30 samples worth of data.

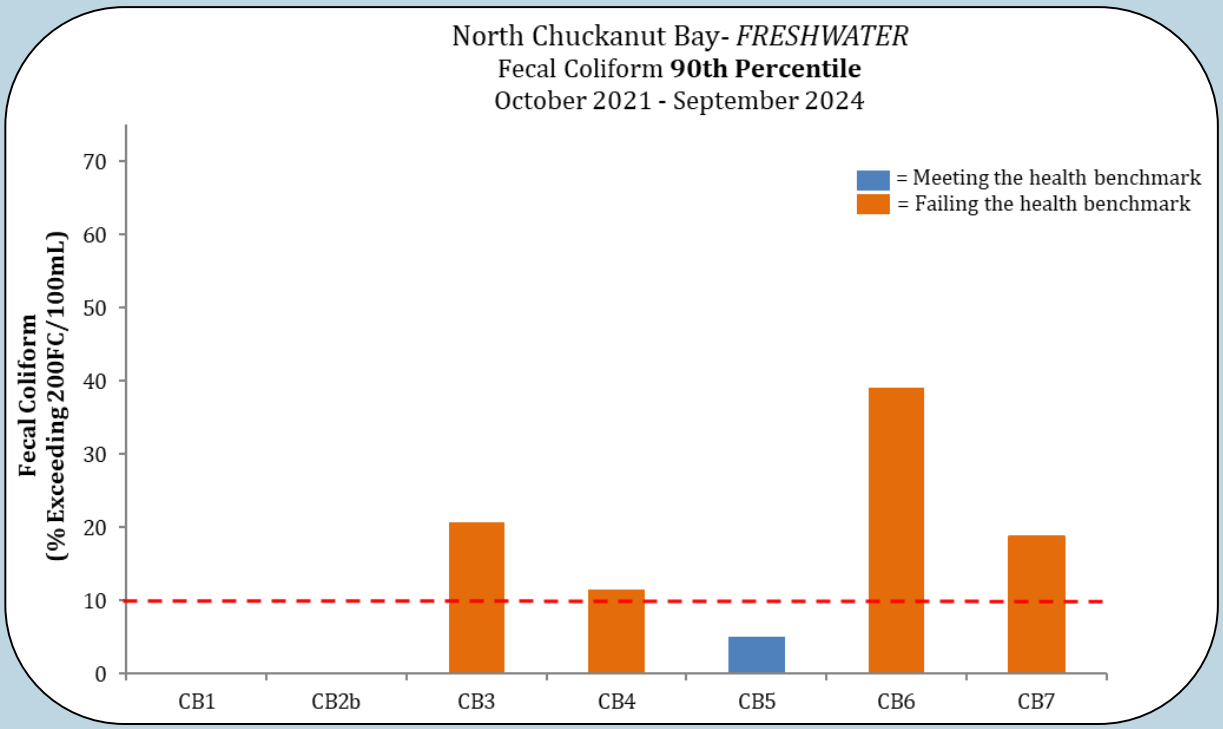


Figure 5: Bars show the 30 sample 90th percentile for samples collected in the freshwater environment. The red dotted line indicates the percentage of samples that exceed the freshwater fecal coliform standard of 200 FC/100 mL. Sites with orange bars exceed the water quality standard. There is no bar for CB2b as this site lacks 30 samples worth of data.

Results: Marine Water

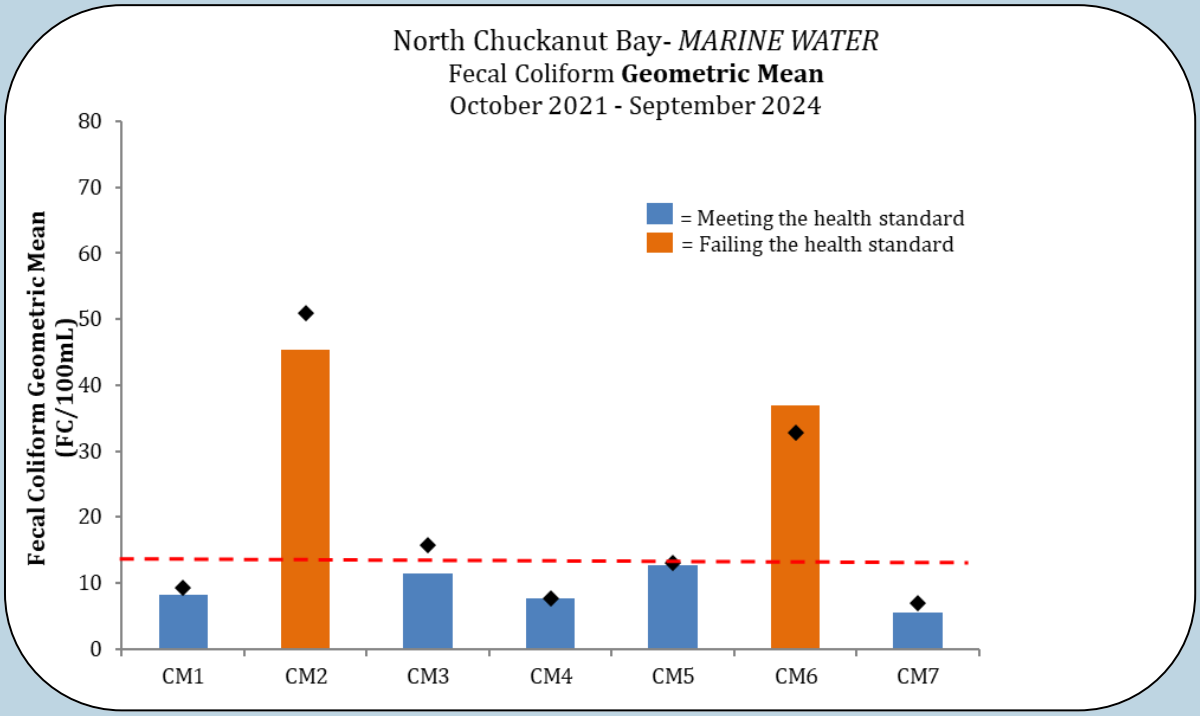


Figure 6: Bars show the 30 sample geometric mean for samples collected from the marine environment. The red dotted line indicates the marine water quality geomean standard for fecal coliform of 14 FC/100 mL. Sites with orange bars exceed the water quality standard. Black dots above the bars indicate that fecal bacteria levels have been increasing over the past year.

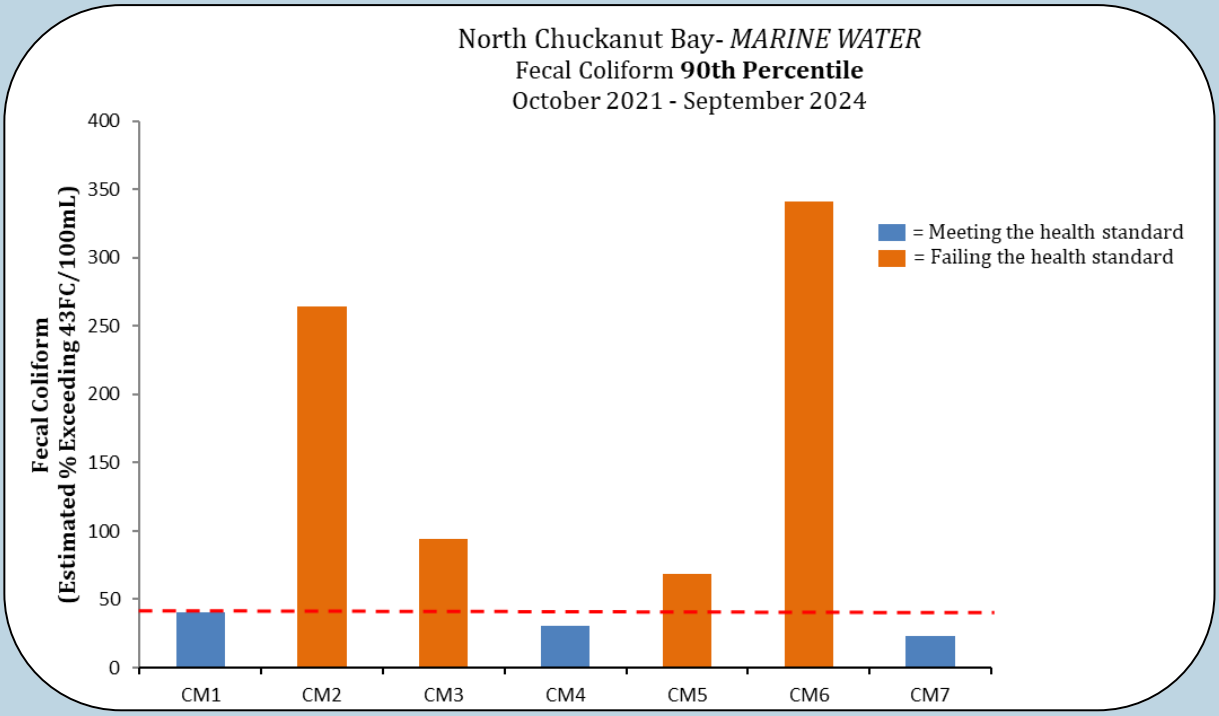


Figure 7: Bars show the 30 sample estimated 90th percentile for samples collected from the marine environment. The red dotted line indicates the marine water quality health standard of 43 FC/100 mL. Sites with orange bars exceed the water quality standard.

Results in Context

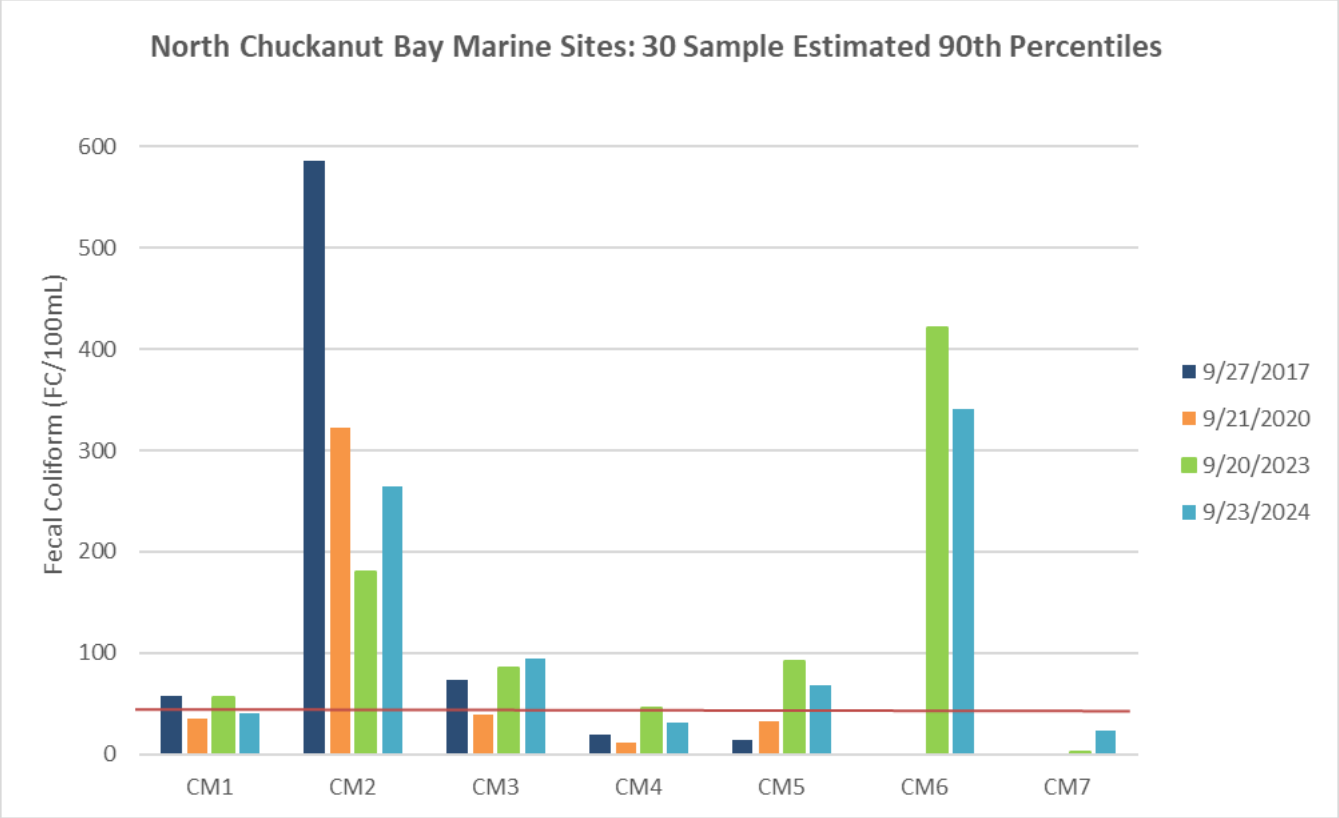
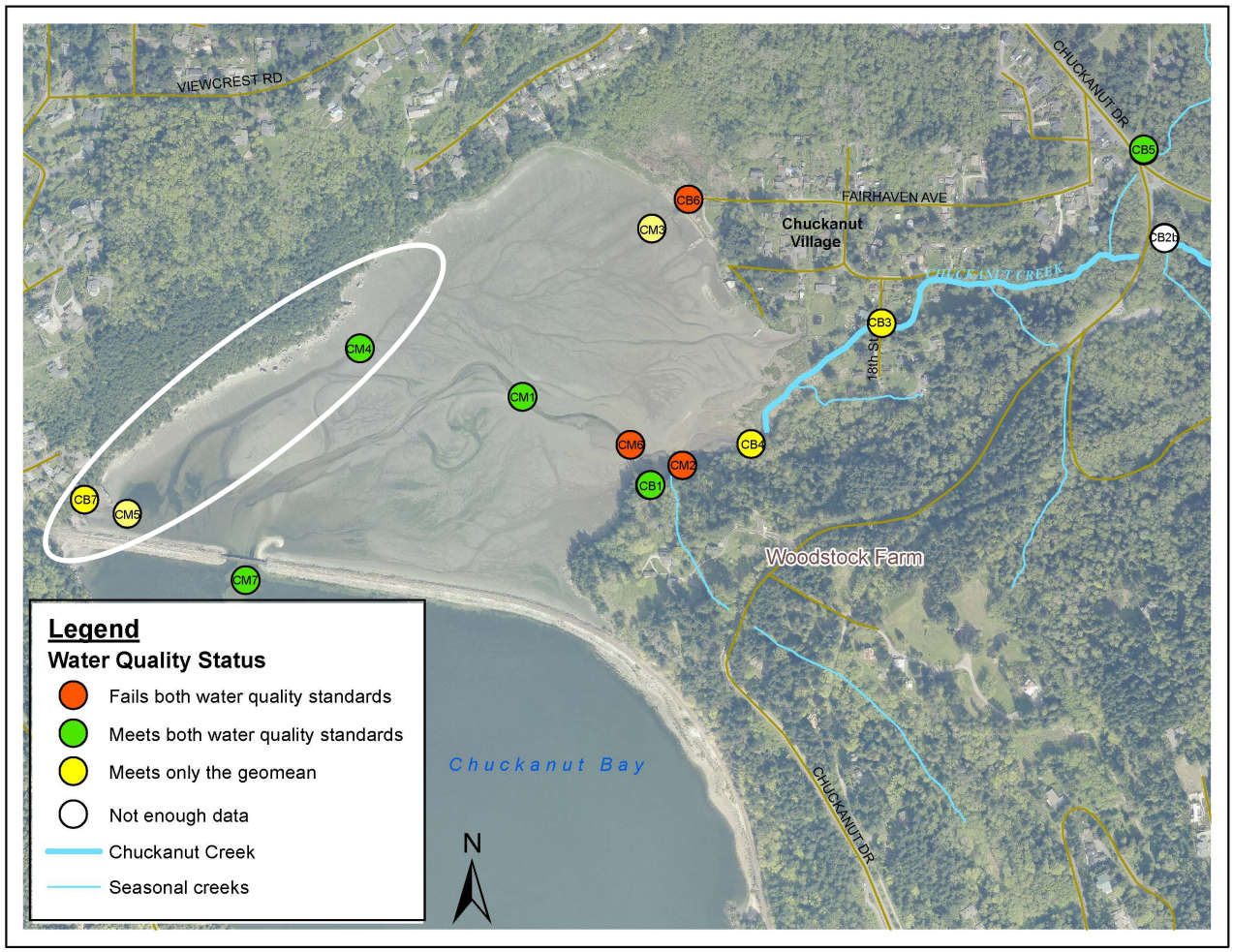


Figure 8: The rolling 30 sample 90th percentile for marine sites from September of 2017 through September of 2024. The red line represents the 90th percentile marine water quality standard at 43 FC/100mL. Historical data for CM6 and CM7 is limited as these locations weren't established until 2021. As of September 2024, CM1 , CM4, and CM7, were below the 90th percentile marine water quality standard while CM2, CM3, CM5, and CM6 exceeded the standard. Improvements in water quality were seen in 2024 as compared to 2023 at all marine sites except for CM2, CM3, and CM7. The spike in the 90th percentile at most sites from 2020 to 2023 is suspected to be attributable to a decrease in septic evaluations and reduced outreach efforts due to the COVID pandemic. This trend was found at many of WCPW's other sampling locations as well.

Results in Context and Next Steps



Map created by: Austin Rose, Whatcom County Public Works, September, 2024

Figure 9: Map showing which sampling locations are currently meeting both water quality standards (green), one of the two standards (yellow), or neither of the standards (red). The circled shoreline of the bay was identified as being more suitable for a potential reopening of shellfish harvest due to the substrate and improving water quality conditions.

Because water quality has not improved at many sites throughout North Chuckanut Bay, MRC staff met with project partners to determine the next steps for the project. One shorter term goal that was identified during this meeting was working towards reopening one segment of the shoreline in the northwest portion of the bay. This location continues to show improvements in water quality and provides more suitable substrate for shellfish as compared to other areas of the bay.

Outcomes

Monthly water quality data was collected from October of 2023 through September of 2024. While the water quality has improved in some locations throughout North Chuckanut Bay, water quality still needs to show improvements throughout the entirety of the bay for this location to be considered for reclassification for recreational shellfish harvest. One goal that fell short during this reporting period was continuation of outreach and education efforts within North Chuckanut Bay. MRC staff engaged with members of the Chuckanut Village community while sampling, but no formal outreach events, mailers, or other forms of outreach and education were utilized over the past year.

Outputs

From October 2023-September of 2024:

- 12 water quality sampling events took place (one per month)
- 12 water quality summaries were generated (one per month)
- 5 volunteers and 4 WCPW staff participated in sampling.
- Over 70 hours of volunteer time were contributed.

Next Steps

Besides focusing efforts on reopening the northwest portion of the bay for recreational shellfish harvest as water quality continues to improve in this location, the MRC is also partnering with the WCPW PIC Program and the Environmental Protection Agency (EPA) on an eDNA project to potentially help identify sources of fecal coliform at priority sites. These priority sites include CM6, CB6, and CB3 which have seen consistently high concentrations of fecal coliform over the past 10 years.

Appendices

- **Appendix A:** Volunteer List
- **Appendix B:** Sample Collection Protocols
- **Appendix C:** Blank Field Sheets
- **Appendix D:** Monthly Water Quality Summaries and Raw Data