Waterbody Field Report
Inner Point Sophia Beach and Gartina Harbor Way Beach, Hoonah, Alaska

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Abstract

The objective of the study was to assess bacteria concentrations in recreational beaches near Hoonah, AK. Gartina Harbor Way Beach and Inner Point Sophia Beach were sampled by Hoonah Indian Association and the Southeast Alaska Watershed Coalition weekly from June to September, 2022 for fecal coliform and enterococci bacteria, and once in June for Microbial Source Tracking. This was the second year of sampling, and no Alaska water quality criteria for recreation, seafood processing, or raw shellfish harvest were exceeded at either beach during the 2022 sampling season. At Gartina Harbor Way Beach, Microbial Source Tracking detected fecal bacteria from bird and human sources, but no dog source. At Inner Point Sophia Beach, Microbial Source Tracking did not detect bacteria from human, dog, or bird on the sampling day. Similar to 2022, bacteria concentrations were also generally low during the 2021 sampling season at both beaches, although the most stringent water quality standards – for seafood processing and harvest of shellfish for raw consumption – were exceeded at Gartina Harbor Way Beach during 2021. Additionally, during the 2021 sampling season, MST analyses detected dog, bird, and gull sources of bacteria at Gartina Harbor Way Beach, and bird and gull sources of bacteria at Inner Point Sophia Beach (both sites tested for human, dog, gull, and bird). Overall, results do not indicate serious sources of fecal pollution to marine waters, although efforts to address human and dog fecal pollution at Gartina Harbor Way Beach may be warranted.

Basic Waterbody Information

Table 1. Basic Waterbody Information

Assessment Unit ID	AK_B_1021109_001 (21AKBCH – AK998211)	AK_B_1021109_002 (21AKBCH – AK103349)
Assessment Unit Name	Inner Point Sophia Beach (HB-InnerPtSoph)	Gartina Harbor Way (HB-GartinaHbrWay)
Location description	Port Frederick-Frontal Icy Strait; HUC 190102110906	
Water Type	Marine beach	
Area sampled	Point sample representing 0.36 miles of coastline	Two point samples representing 0.43 miles of coastline
Time of year sampled	June 7 – September 8, 2022	

[1] Southeast Alaska Watershed Coalition, project # ACWA-21-B10 funded by DEC from an EPA pass-through grant.

Water Quality Evaluation

Background

Inner Point Sophia Beach and Gartina Harbor Way Beach are two recreational beaches near Hoonah, AK, a community of approximately 800 people on northern Chichagof Island in southeast Alaska (Figure 1). Local residents use the areas for boating, swimming, fishing, and shellfish harvesting. The two locations were identified as Tier I[2] beaches by the Alaska Department of Environmental Conservation (DEC) in 2021 and were high priority for sampling to assess potential fecal contamination. Potential sources of bacteria include the city wastewater treatment facility, onsite septic systems, landfill, stormwater drain outfalls, a small boat harbor, commercial vessel dock, cruise ship, ferry, and barge passages, a seafood processing plant, a sawmill, wildlife, and pet feces (Figure 2).

The sampling location at Inner Point Sophia Beach is just south of the cannery site and dock. At Gartina Harbor Way Beach, sampling occurred at two locations that are used recreationally, including inside the harbor and at Gus's Beach, just to the east of the harbor. The mouth of Gartina Creek is near Gus's Beach, and the amount of freshwater influence at this site varies with the tide.

No known monitoring of fecal bacteria has occurred at these beaches previously (other than sampling for this project during 2021 and permit- required monitoring at the wastewater treatment plant outfall, DEC permit AKG572022). A Quality Assurance Project Plan (QAPP) was developed for this project and is available at beaches.alaska.gov and from DEC Southeast staff in Juneau, AK.

[2] The Alaska Beach Program uses a tiered monitoring approach that addresses bacteria testing at recreational marine water beaches based on the nature, extent and frequency of recreational use by the public, the proximity of recreational waters to known point and nonpoint sources of pollution, and the effect of storm events. Tier 1 are the highest priority beaches due to high risk of bacteria in the marine water and/or high public use of the beach.

Figure 1. *Map of sampling locations at Inner Point Sophia Beach and Gartina Harbor Way Beach and the beach areas they represent. Two sampling locations at Gartina Harbor Way Beach are shown in the insert – one inside the harbor and one at Gus's Beach just to the east of the harbor.*

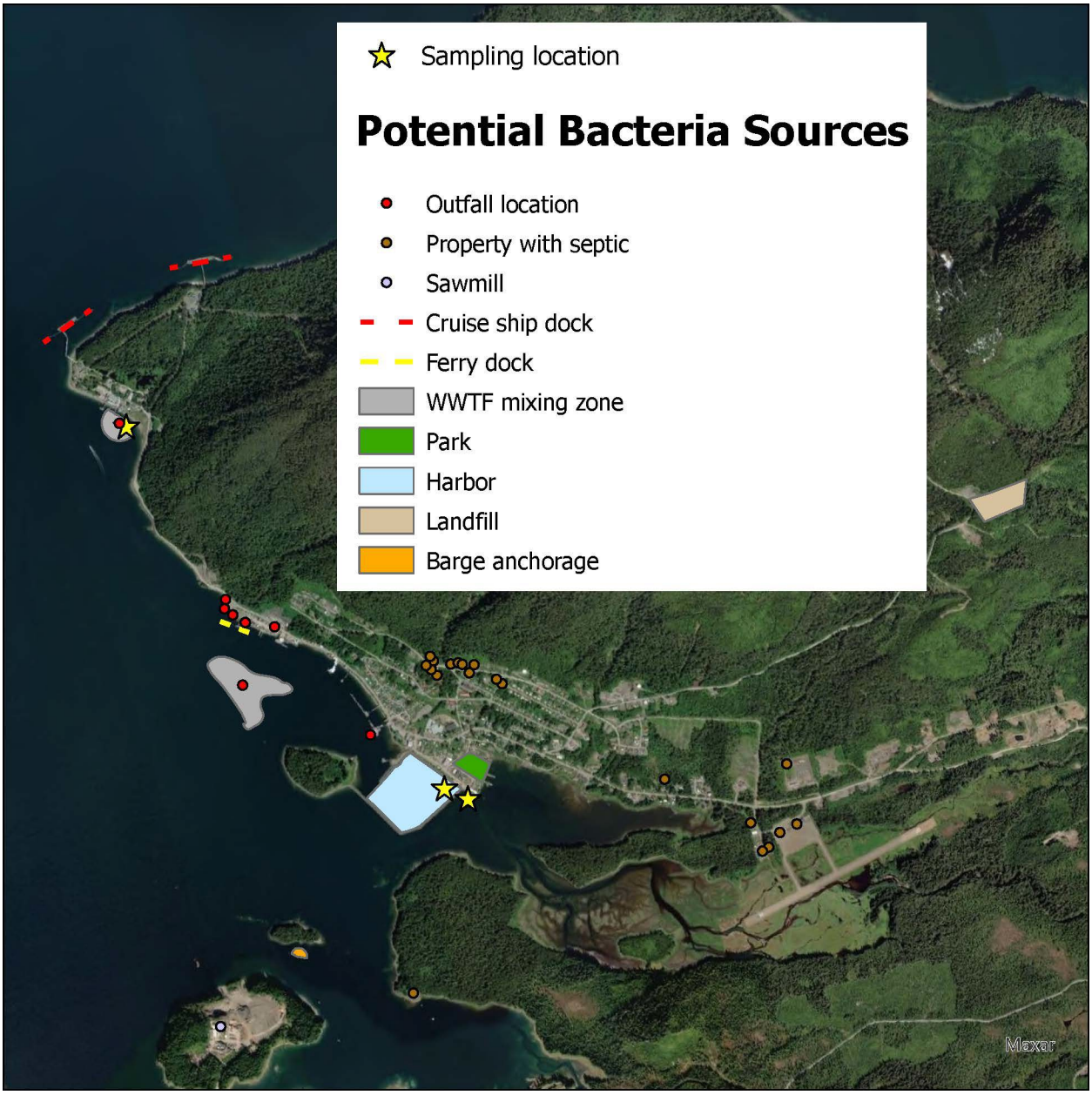

Figure 2. *Locations of potential fecal bacteria sources to Hoonah area beaches.*

Objective

The primary objective of this DEC BEACH Monitoring Program project is to protect human health and the environment by sampling the beaches for fecal indicator organisms (fecal coliforms and enterococci bacteria) that signify the presence of fecal contamination. This information will be used to notify the public in the event of an exceedance of allowable levels of indicator organisms in accordance with Alaska Water Quality Standards (WQS).

Methods

One grab sample was collected at each beach weekly from June 7 through September 8, 2022, except for a one-week break before the last sample. The sampling plan called for five samples to be collected at

each location within a 30-day period to allow calculation of the geometric mean. Samples were shipped to Admiralty Environmental laboratory in Juneau for fecal coliform and enterococci analyses. Modified EPA Marine Sanitary Surveys were conducted for each beach and sampling date, and in situ water quality parameters (temperature, pH, turbidity) were collected using a hand-held Hanna meter and a Hach turbidimeter. Grab samples for Microbial Source Tracking (MST) were collected once on June 22 at both beach locations, and shipped to LuminUltra laboratory in Miami Lakes, FL for analysis.

Data Quality Review Summary

Field staff followed procedures for sample collection and transport as outlined in the project's QAPP. All laboratory preparation was completed within holding times, the cooler temperatures were within required limits, and no discrepancies, errors, data qualifiers, or QC failures were identified by the laboratory. Field calibration was completed as specified in the QAPP, and records indicate no calibration issues. However, turbidity calibration standards expired on June 1 and were not replaced until July 26. The expired standards were used to validate the instrument during this period, and no noticeable drift occurred. One duplicate sample per analyte per sample event at one location was collected and analyzed. Relative percentage difference (RPD) was only calculated for fecal coliform and enterococcus twice, when values met the minimum threshold for calculating RPD (5 times the PQL for fecal coliform and 2 times the PQL for enterococcus). All were below the goal of 60%. The QAPP stated completeness goal of 80% was met at 100% and the data is usable[3].

In one deviation from the sampling plan, the last sampling event was delayed by just over a week because staff were not able to be on site. This resulted in less than five samples collected within the last 30 days of the project, and geomean was not calculated for enterococcus during that time period.

Results Summary

Bacteria concentrations at both Inner Point Sophia Beach and Gartina Harbor Way Beach were generally low during the 2022 sampling season (Table 2, Figures 3 and 4). There were no water quality standard exceedances for recreation (for enterococci, in a 30-day period the geometric mean may not exceed 35 CFU/100 ml, and not more than 10% of samples may exceed 130 CFU/100 ml[4]) or seafood processing and shellfish harvest for raw consumption (for fecal coliform, the geometric mean of samples may not exceed 14 CFU/100 ml, and not more than 10% of the samples may exceed 31 CFU/100 ml[4]). However, the last sample at Gartina Harbor Way Beach had high fecal coliform concentration relative to other sample dates (Figure 3). This sample was taken at Gus's Beach at low tide when freshwater influence from Gartina Creek was high, and the sample is not likely representative of marine conditions generally. No recreational advisories or public notices of beach bacteria pollution were issued during the recreational season.

The MST analyses indicated the presence of bacteria from human and bird fecal sources at Gartina Harbor Way Beach, which was sampled in the harbor on June 22; no dog source was detected there. No

[3] A completed Quality Assurance Checklist for the 2022 Hoonah beaches monitoring season is available from DEC upon request.

[4] 18 AAC 70(14)(D) Water Quality Standards amended as of March 5, 2020

human, bird, or dog-sourced fecal bacteria were detected with MST at Point Sophia Beach on the sampling date (Table 3).

In situ water quality measurements varied relatively little across the sampling season, were similar between sites, and did not indicate any water quality concerns (Table 4).

Sanitary surveys were conducted each week. Recreators were only observed during one sampling event at Inner Point Sophia Beach; however, sampling occurred during early weekday mornings each week to meet shipping limitations, so this is not reflective of beach use during usual recreational times. Additionally, no floatables, debris, harmful algal blooms, or wildlife were observed during the sampling events.

Complete water quality and sanitary survey data can be obtained from the DEC Southeast staff in Juneau, AK.

Table 2. *Enterococci and Fecal Coliform sample results summary*

Sample Site	Pollutants	Mean	Median	Range	Max Geomean*
Inner Point Sophia Beach	Enterococci (MPN/100 ml)	9.6	ND	ND - 20	11.5
	Fecal Coliform (CFU/100 ml)	3.6	2	ND - 8	2.5
Gartina Harbor Way	Enterococci (MPN/100 ml)	10.1	ND	ND - 31	10.0
	Fecal Coliform (CFU/100 ml)	24.8	3	ND – 280	3.8

ND = Not Detected. The detection limit for enterococci was 10 MPN/100 ml. The detection limit for fecal coliform was 1 CFU/100 ml.

*For enterococci, geomean of at least 5 samples over 30 days. For fecal coliform, geomean over the entire sampling season.

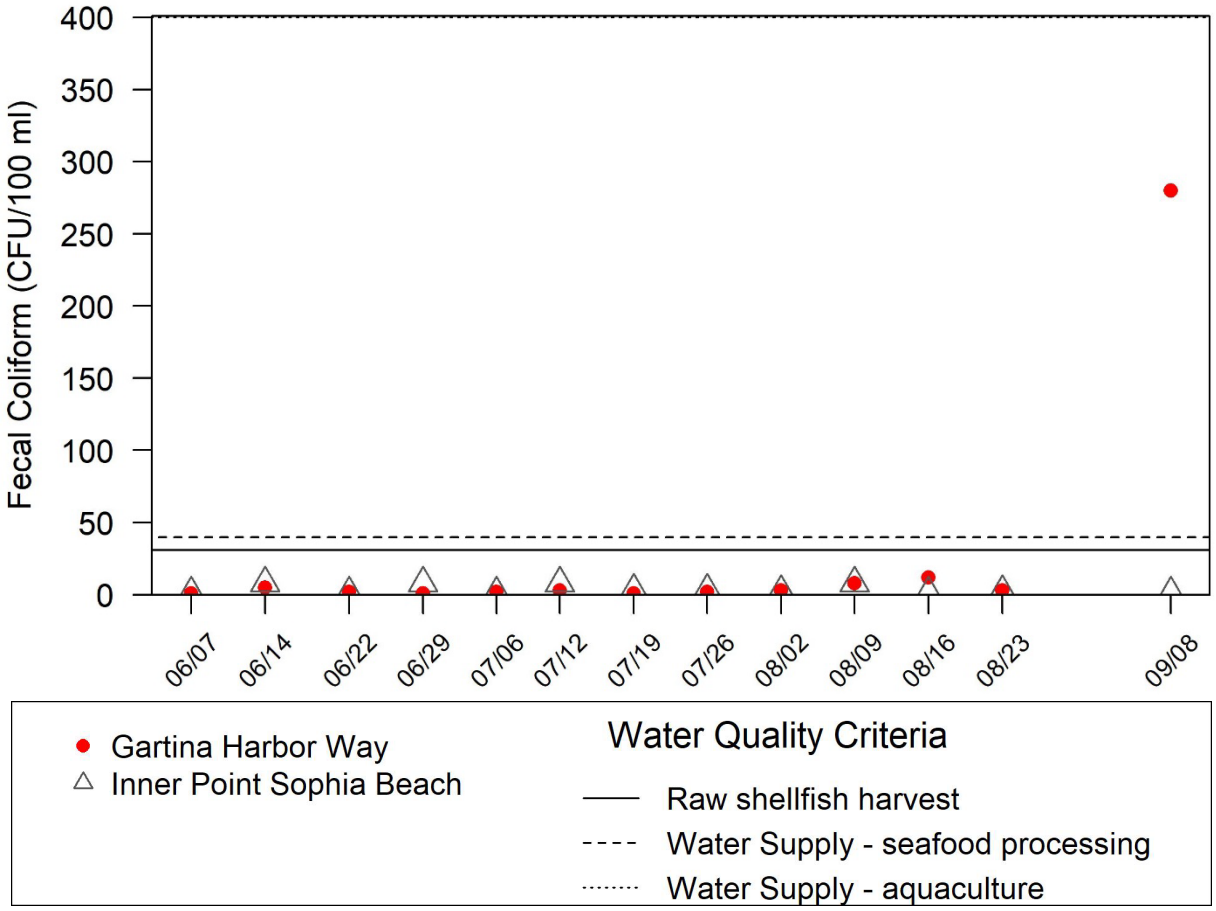

Figure 3. Fecal coliform bacteria sampling results. Samples at Gartina Harbor Way Beach were collected from the harbor, except for July 19, Aug 9, 16, and 23, and Sep 8, when samples were collected at Gus's Beach (Figure 1). On Sep 8, the tide was very low and the sample at Gus's Beach had little marine influence.

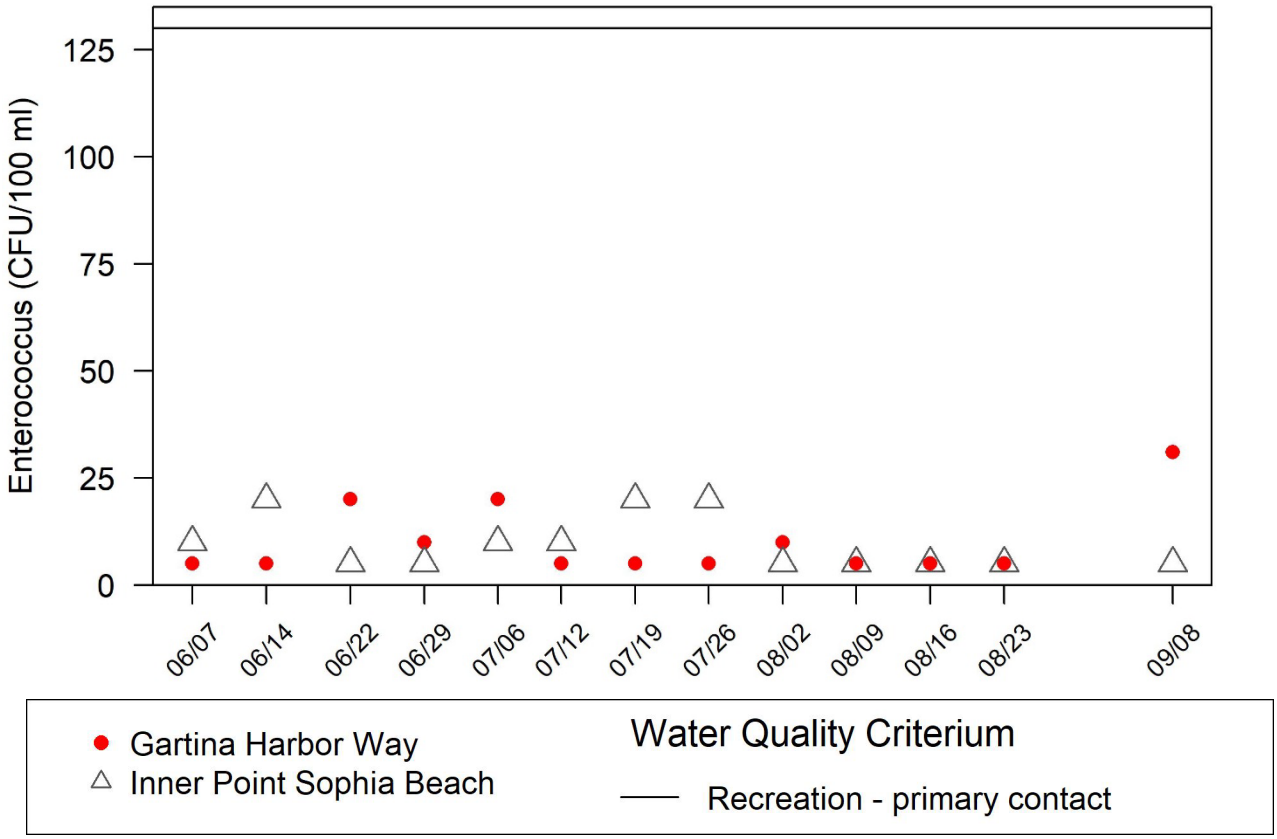

Figure 4. Enterococci bacteria sampling results. All samples at Gartina Harbor Way Beach were collected from the harbor, except for July 19, Aug 9, 16, and 23, and Sep 8, when samples were collected at Gus's Beach (Figure 1). On Sep 8, the tide was very low and the sample at Gus's Beach had little marine influence.

Table 3. *Microbial Source Tracking results from June 22, 2022. The sample at Gartina Harbor Way Beach was collected from inside the harbor.*

Sample Site	Bacteroidetes	Result Value*
Inner Point Sophia Beach	Human	ND
	Dog	ND
	Bird	ND
Gartina Harbor Way	Human	2,060**
	Dog	ND
	Bird	DNQ

*ND = Not detected; DNQ = Detected, not quantifiable

**units are copies/100 ml

Table 4. *In situ water quality data summary*

Sample Site	Parameter	Mean	Median	Range
Inner Point Sophia Beach (HB-InnerPtSoph)	Turbidity (NTU)	2.6	2.6	0.8 - 4.6
	pH	7.4	7.3	6.9 - 8.2
	Temperature (°C)	13.1	13.7	10.7 - 15.6
Gartina Harbor Way (HB-GartinaHbrWay)	Turbidity (NTU)	2.2	1.8	1.1 - 3.8
	pH	7.3	7.3	7.0 - 7.6
	Temperature (°C)	13.0	12.7	10.9 - 15.5

Conclusion

The second year of fecal bacteria sampling at Inner Point Sophia Beach and Gartina Harbor Way Beach near Hoonah, AK indicated that bacteria concentrations were generally low. Alaska water quality standards for recreation and harvesting shellfish for raw consumption were met at both beaches throughout the season. Only one sample with elevated fecal coliform concentration was collected from Gartina Harbor Way Beach during 2022, which was taken at Gus's Beach at low tide with very little marine influence. Similarly, during 2021, all water quality standards were met, except for the most stringent - for seafood processing and harvest of raw shellfish for consumption – which were exceeded at Gartina Harbor Way Beach. Additionally, microbial source tracking detected fecal bacteria from only gull and bird sources at Inner Point Sophia Beach during 2021, while no sources were detected in 2022. At Gartina Harbor Way Beach, dog, gull, and bird-sourced bacteria were detected during 2021 (at the shellfish harvest site just outside of the harbor jetty), while bacteria from humans and birds were detected in 2022 (at the sampling location inside the harbor). Overall, results do not indicate serious fecal pollution at these recreational beaches.

Recommended Next Steps

2022 was the second and final year of beach sampling funded through the Alaska BEACH Grant Program. Although fecal bacteria concentrations were generally low, results indicate that efforts to address human and dog sources of fecal bacteria at Gartina Harbor Way Beach may be warranted. Adherence to best management practices in the harbor, including for wastewater treatment and disposal, should be assessed. Additionally, fecal coliform concentration was elevated (although not exceeding water quality standards) in the final sample at Gus's Beach at low tide, suggesting that upstream sources of bacteria may merit further investigation. Freshwater samples could be collected for fecal coliform and E. coli to clarify the extent to which Gartina Creek may be contributing fecal bacteria to the marine environment.