Marine

Division of Water

Annual Summary Report 2025

Ambient Marine Water Quality, Harbors and Shipping Lane Project

Executive Summary

The Ambient Marine Water Quality, Harbors and Shipping Lane Project by the Department of Environmental Conservation (DEC) has been collecting water quality data in harbors and shipping lanes used by the cruise ship industry for over a decade. Monitoring Alaska's high traffic harbors and shipping lanes provides information about water quality conditions to determine if those marine waters meet Alaska Water Quality Standards (WQS). In 2025, all waters monitored in this project met WQS and will be included in the Alaska Integrated Water Quality Monitoring and Assessment Report, which provides an overview of waterbody health across the state.

DEC has initiated a review of this project to evaluate if the project should incorporate new technologies, include additional sampling sites where vessel traffic is increasing, and incorporate additional methods to better understand existing and emerging contaminants. Routine water quality monitoring is planned in marine waters near Valdez and Ketchikan. An additional bacteria source identification study is planned in Tongass Narrows, near Ketchikan.

Introduction and Background

DEC monitors water quality in and around Alaska's high traffic harbors and shipping lanes used by cruise ships. This information contributes to two program goals:

- Monitoring of state waters for attainment of the Alaska Water Quality Standards (18 AAC 70[1]), and
- Evaluating potential impacts from cruise ships to marine waters

From 2015-2019, monitoring efforts focused on collecting detailed information in the Skagway, Juneau, Sitka, Hoonah, and Seward harbors. In 2020, the program expanded sampling to 18 harbors and the busiest shipping lanes used by cruise ships, for a total of 150 sample sites (Figure 1). DEC uses a rotating focus to regularly sample at all sites. Sites that receive frequent cruise ship traffic are sampled 1-5 times annually, while those that receive less traffic are sampled every few years. Long-term sampling allows tracking of changes over time. Pollutants regulated in the Vessel General Permit (18 AAC 69) are sampled as part of this effort.

[1] Alaska Water Quality Standards, 18 AAC 70 (2025). More information is available at http://dec.alaska.gov/water/water-quality/standards/

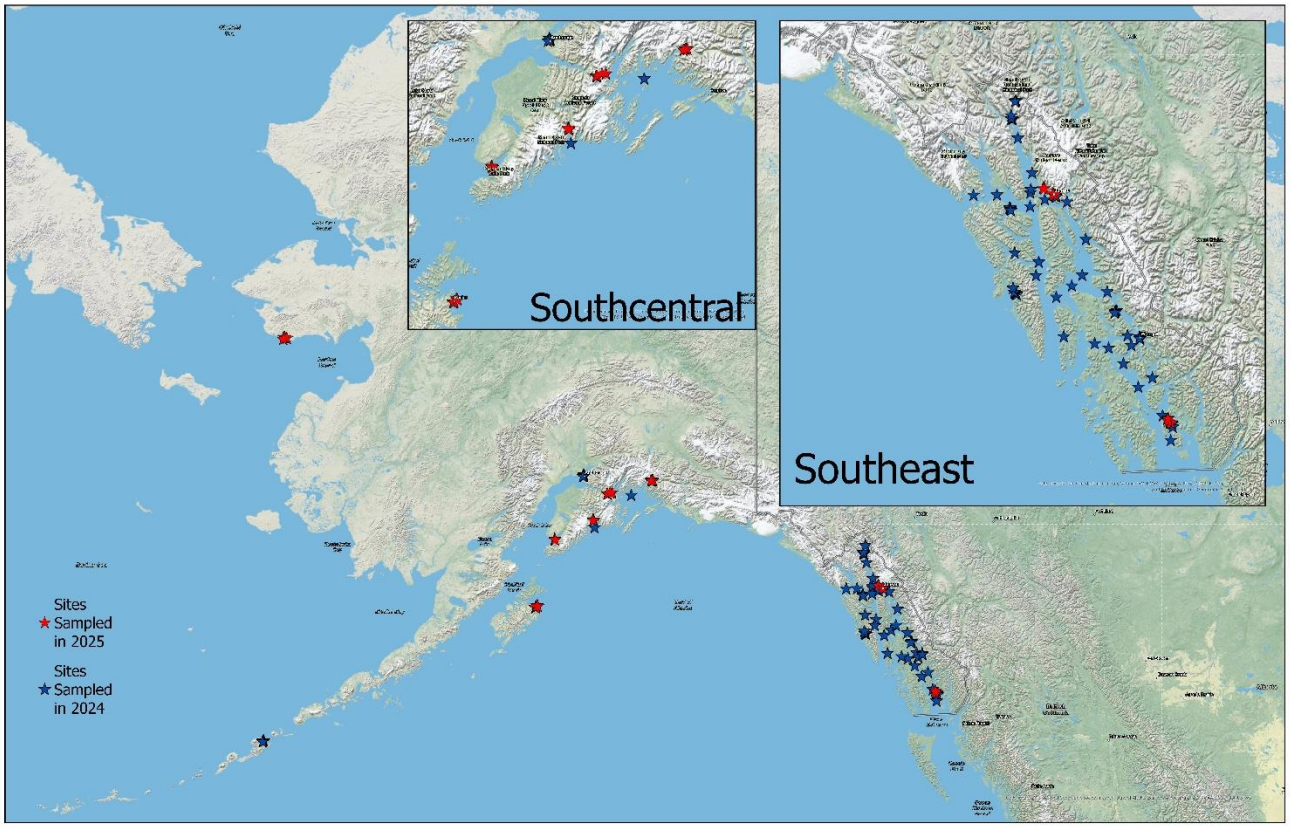

Figure 1. Map showing sites sampled in 2024 (blue stars) and 2025 (red stars)

More information about the program can be found on the DEC marine monitoring website Ambient Marine Water Quality Monitoring | AK Dept. of Environmental Conservation.[2] This website includes a link to the raw data, a map-based data dashboard to explore and visualize data, and water quality monitoring reports.

Data Summaries

Monitoring was reduced in 2025 to initiate a comprehensive review of the project. The review will include data analysis and visualization, a scientific literature review of potential impacts of cruise ships, summaries of regulatory and monitoring programs in different states and nations, and recommendations on future monitoring activities.

In 2025, a total of 544 samples from 10 harbors were analyzed. Physical parameter measurements were taken at each site (pH, dissolved oxygen, temperature and salinity). Samples were analyzed for metals (total and dissolved copper, nickel, zinc), ammonia as nitrogen, and bacteria (fecal coliform and *Enterococcus*). No elevated values were observed during 2025. Water quality standards were attained at all locations sampled.

[2] https://dec.alaska.gov/water/water-quality/monitoring-and-assessment/watershed-health-and-data-analysis/ambient-marine-water-quality-monitoring

Figures 2 and 3 present monitoring results from the 2025 season alongside averaged data from 2015-2024. Note that the number of samples varies from year to year, and in 2025 sampling occurred only in May and June, which could explain why levels are lower than average in many places.

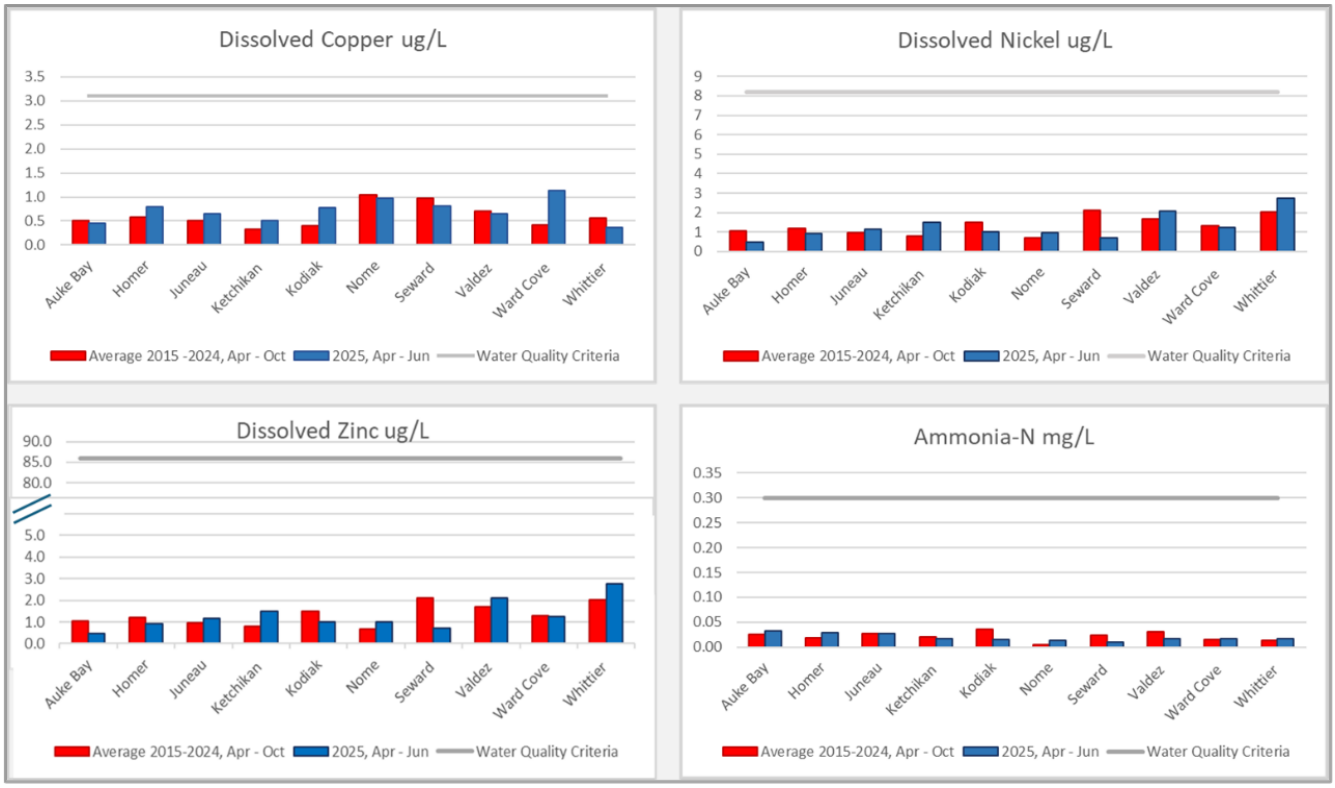

Figure 2. Sample results averaged for 2015 - 2024 alongside 2025 averaged results. Results are included for dissolved copper, nickel, zinc and ammonia as nitrogen. The water quality criteria for those parameters are shown with a grey bar.

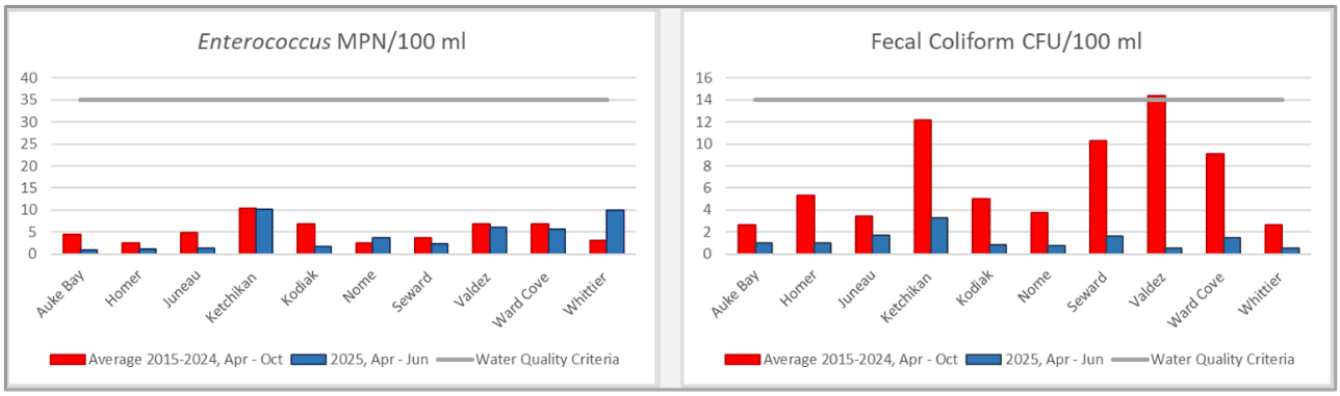

Figure 3. Results for Enterococcus and fecal coliform showing the annual geometric means averaged for 2015-2024 alongside the geometric mean for 2025. The water quality criteria are shown with a grey bar.

Microbial Source Tracking

Microbial Source Tracking (MST) detects unique microbes found in the digestive tracts of warm-blooded animals, which can be used to identify host species and potential sources of bacteria. Limited MST samples have been taken in the Tongass Narrows for the past three years. In 2025 samples were taken near the Thomas Basin Harbor and in the shipping lane in the middle of the Narrows. Samples were analyzed for human, canine, and avian host species. The only detectable result was for human host species near Thomas Basin.

Continuous Water Quality Measurements

Three water quality monitoring instruments equipped to record and upload data remotely were successfully redeployed in Ketchikan, Juneau, and Seward. This data helps build a better understanding of natural water quality fluctuations, providing greater context for sampling occurring at these locations. Instruments record pH, temperature, salinity, dissolved oxygen, and turbidity every 30 minutes, enabling near real-time monitoring. Data are publicly available on the Alaska Ocean Observing System's Ocean Data Explorer Map Ocean Data Explorer: Map portal.[3] This effort was made possible through partnerships with the Alaska Ocean Observing System, Ketchikan Indian Community, the City of Ketchikan, the City of Seward, the City and Borough of Juneau.

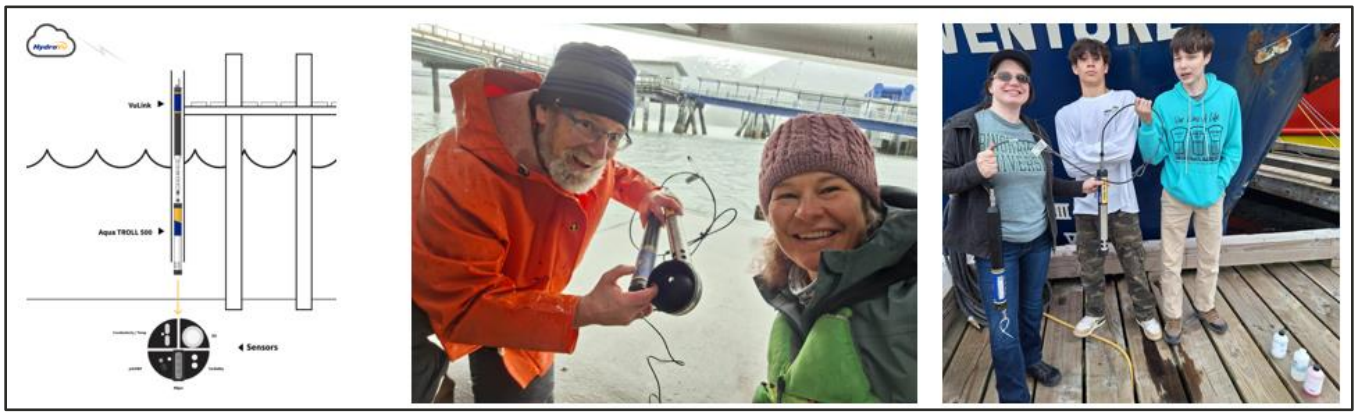

Figure 4. From left to right, a schematic of water quality sensors equipped with HydroVu, sensor installation in Juneau, sensor installation in Ketchikan with partners the Ketchikan Indian Community

Marine Comprehensive Report

DEC is currently working with a contractor to develop a Marine Comprehensive Report. The report will review relevant scientific literature; examine how other states, tribes and nations with considerable cruise ship traffic monitor water quality; compile collected marine water quality data, complete in-depth analyses with mapped visualizations, and provide recommendations to guide

[3] https://portal.aoos.org/#map

future monitoring efforts. The Marine Comprehensive Report will be completed in June 2027 and posted to DEC's web page.

Conclusion

With an estimated 1.67 million cruise ship passengers in 2025 and expected increases, including six additional vessels in Alaskan waters in 2026[4], it is important that DEC continues to monitor marine water quality. This will ensure WQS are met and that cruise ship permits are protective of human health and the environment.

It is difficult to assess large marine waterbodies with certainty due to their size, and the volume of water moving through these systems, as such, these data do have limitations. The program uses established tools found in DEC's Alaska Consolidated Assessment and Listing Methodology[5] to conduct a data-driven assessment of waterbodies, while recognizing limitations. Although there have been occasional excursions of bacteria criteria in the Tongass Narrows and near Valdez, assessments indicate that WQS are being met. DEC will be collecting additional data in these areas.

Assessment results are reported through the Alaska Integrated Water Quality Monitoring and Assessment Report, and on our webpage at https://dec.alaska.gov/water/water-quality/monitoring-and-assessment/watershed-health-and-data-analysis/ambient-marine-water-quality-monitoring.

Next Steps

In 2026, efforts will be focused on finalizing the Marine Comprehensive Report and developing a monitoring strategy to support future sampling in areas with the heaviest cruise ship traffic. During open water season in 2026, DEC will continue routine monitoring in Valdez and Ketchikan for physical parameter measurements (pH, dissolved oxygen, temperature and salinity), metals (total and dissolved copper, nickel, zinc), ammonia as nitrogen, and bacteria (fecal coliform and *Enterococcus*). An expanded bacteria and MST sample collection will also occur at several locations in the Tongass Narrows outside of Ketchikan. This expanded effort will identify potential bacteria sources and seasonal variations. Information gained could be used to inform local mitigation efforts. Continuous sampling equipment will remain year-round in Ketchikan, Juneau, and Seward harbors.

[4] 6 New Ships Cruising to Alaska in 2026 - Alaskan Cruisers

[5] Alaska Consolidated Assessment and Listing Methodology. DEC. 2021 https://dec.alaska.gov/water/water-quality/integrated-report/