



Division of Water

Field Report 2025

Ambient Water Quality, Aquatic Resource Surveys

Southern Kenai Peninsula Coastal Survey

July 20 – September 20, 2025

Prepared by: E. McCarthy¹

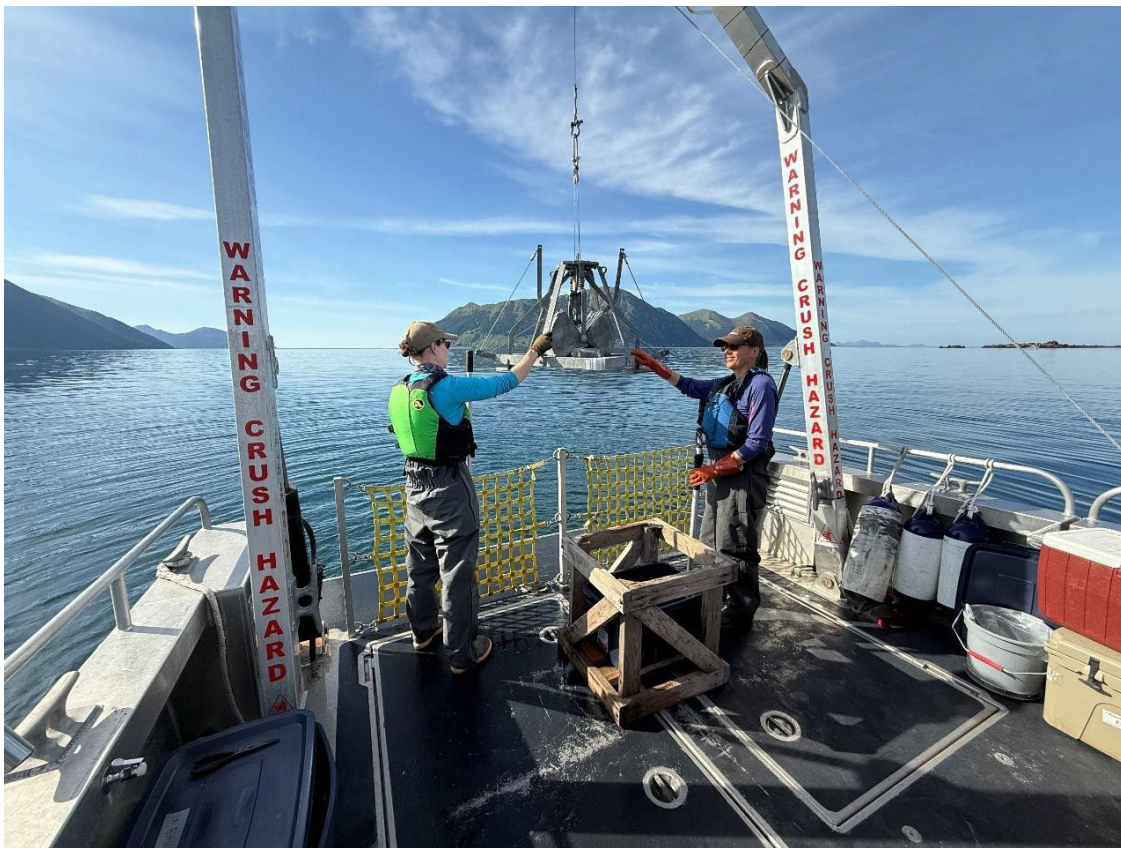


Figure 1. Deployment of sediment sampler onboard R/V Nanuq near Koyuktolik Bay.

¹ Monitoring and Assessment, Water Quality, Division of Water, Department of Environmental Conservation

Map of 2025 Coastal Survey Sites

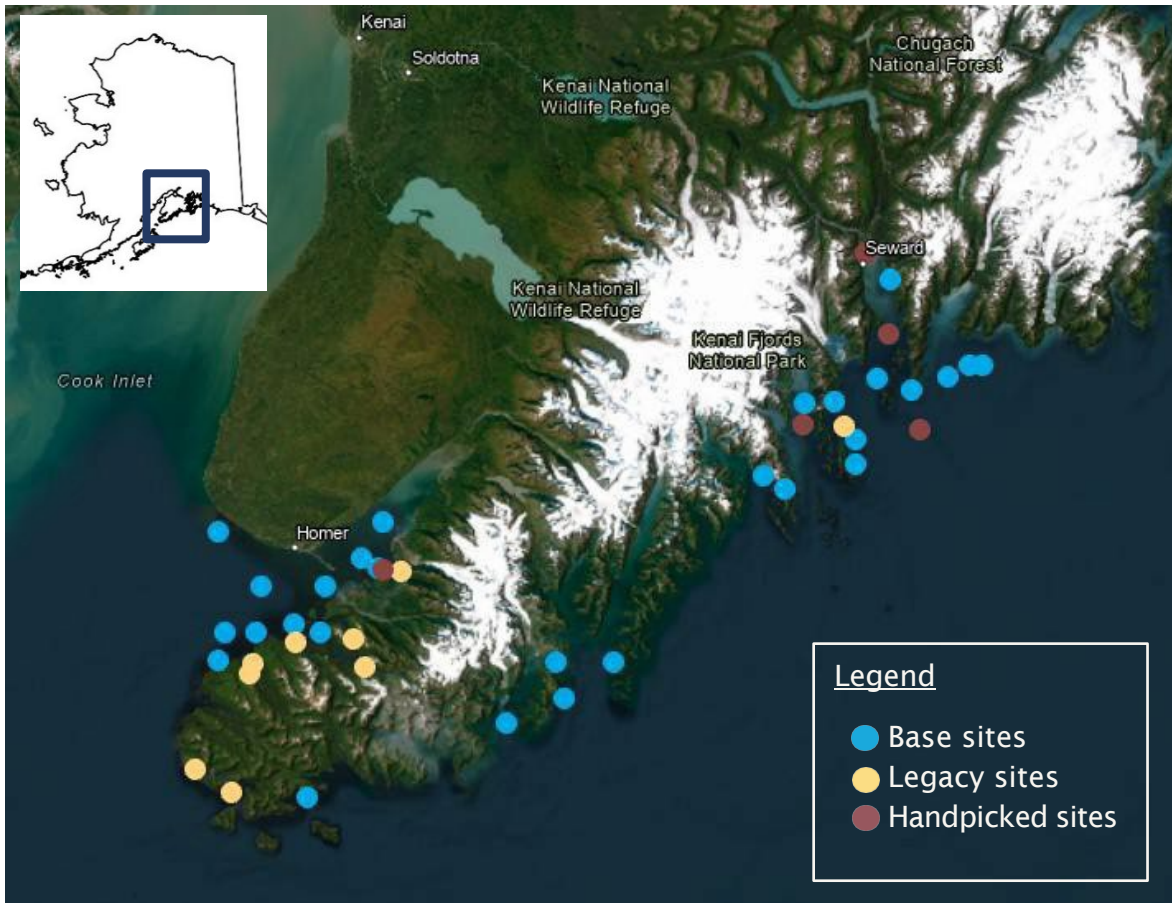


Figure 2. Map of sites surveyed in the 2025 coastal survey. The blue circles represent randomly selected sites, the yellow represent legacy sites and the brown represent handpicked sites.

Acknowledgements

This survey was funded through the Environmental Protection Agency (EPA) National Aquatic Resource Surveys. Work was completed by Alaska Department of Environmental Conservation (DEC) in cooperation with DEC Environmental Health Lab, DEC Fish Monitoring Program, and University of Alaska Seward Marine Center.

Project Summary

The Alaska Department of Environmental Conservation (DEC) conducted an EPA National Coastal Condition Assessment (NCCA) along a portion of the Southern Kenai Peninsula in summer 2025. Each year, the EPA partners with states and Tribes to complete one of several rotating National Aquatic Resource Surveys (NARS), which assess coastal waters, wetlands, lakes, rivers and streams. These surveys evaluate the health of the nation's waters based on a variety of indicators including water chemistry, sediment, macroinvertebrate community structure and habitat characteristics. The NARS program, including the NCCA, uses a probabilistic sampling design in which sites are randomly selected to represent the broader population of a waterbody. This scientifically-defensible approach supports long-term monitoring and tracking of changes in the condition of the nation's waters over time.



Figure 3. R/V Nanuq docked in Seward Harbor.

Survey Design

The target population for the survey included estuarine waters from Kachemak Bay to Blying Sound. Random site selection was stratified based on two ecoregions: the Southeastern Cook Inlet – Kodiak Upwelling and the Northern Gulf of Alaska Shelf. As defined by the NCCA (USEPA 2024), estuarine waters extend inland to the Mean High Water (MHW) mark and seaward to the outer boundary – typically a straight line connecting two land features that fully enclose a coastal water body within state waters.

In addition to randomly selected sites, legacy and handpicked (target) sites were included. Legacy sites consisted of locations within the study area previously surveyed in 2002 or 2009. Handpicked sites were identified through the marine monitoring program to represent areas of heavier cruise ship use. All sites were further evaluated based on target status, accessibility and safety considerations. Locations with depths less than 10 feet or greater than 600 feet were excluded due to equipment limitations and safety concerns.

Data Collection

Data were collected at 43 of 50 sites, listed in Table A1, following the NCCA protocols (USEPA 2024). Upon arrival at each site, sample feasibility was verified. Sites were dropped due to hazardous conditions, inaccessible depths, and boat mechanical issues. Additionally, site characteristics such as shoreline disturbances and visible pollution were recorded. From July 20 – August 10, the Imaging FlowCytobot (IFCB) was deployed onboard

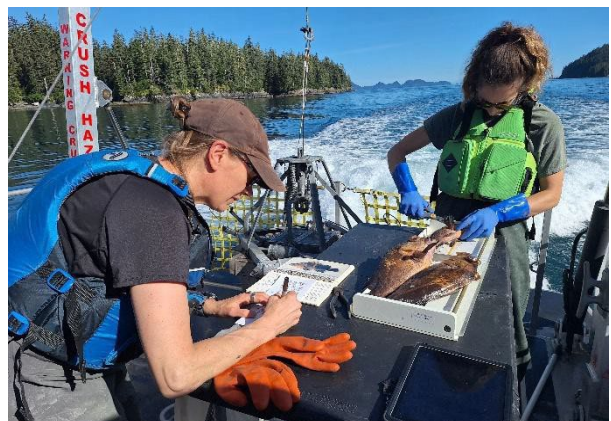


Figure 4. Crew processing fish tissue samples.

in partnership with the Alaska Ocean Observing System to collect algal data and support improved early detection of harmful algal blooms.

Water quality measurements were taken first at each site and included Secchi depth measurements, hydrographic profiling with an In-Situ Aqua Troll and light attenuation readings. Water chemistry parameters were then collected, as summarized in Table A2. Sediment samples were subsequently collected using a Ponar grab sampler, with multiple grabs taken to support analysis of various indicators detailed in Appendix A. Sediment sampling could not be conducted at sites with rocky substrate types and depths exceeding 600 feet. Fish sampling was carried out using active hook-and-line methods. Across 28 sites where fish were captured, a total of 25 fish species were recorded, including cod, halibut, flounder, sole, rockfish, greenling, sculpin, and salmonid.

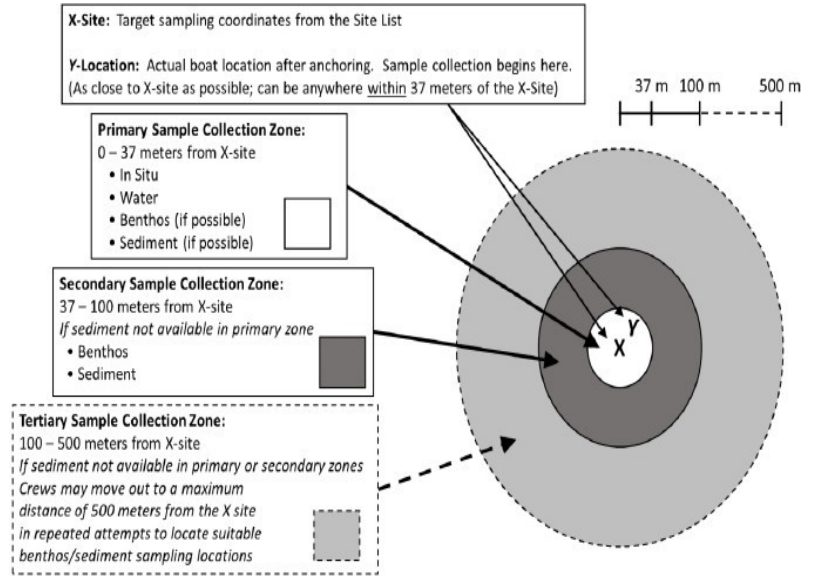


Figure 5. Description of x-site and y-location for sample collection. Protocol summarized for primary, secondary and tertiary sample collection zones from NCCA Field Operations Manual (USEPA 2024).

Following sample collection at each site, water samples were filtered. Samples were chilled or frozen as needed, including fish samples, which were preserved by freezing whole. All samples were shipped weekly to designated laboratories for analysis. A complete list of water, sediment, and fish indicators submitted for analysis is provided in Table A2.

Results

Final data will be available in the Water Quality Portal in 2026. A preliminary water quality data summary is available in Appendix A and more detailed data is available upon request. The success of this project is attributed to the following personnel below:

- Erin McCarthy, DEC
- Amber Crawford, DEC
- Terri Lomax, DEC
- Melinna Faw, DEC
- Maryann Fidel, DEC
- Jenny Petitt, DEC
- Luke Porter, DEC
- Paul Gabriel, DEC
- Emily Mailman, NOAA
- Edyth Hermosillo, EPA
- Brian Mullaly, UAF



Figure 6. Crew left to right: Melinna Faw, Amber Crawford, Emily Mailman, Erin McCarthy, Terri Lomax.

We would like to extend our utmost gratitude to Captain Brian Mullaly of the R/V *Nanuq* – this project would not have been possible without his support. This work was also assisted by the resources at the Seward Marine Center in Seward, Alaska and the Kasitsna Bay Laboratory in Seldovia, Alaska, and was thereby supported in part by NOAA’s National Centers for Coastal Ocean Science and the University of Alaska Fairbanks.



Figure 7. R/V *Nanuq* Capt. Brian Mullaly holding a yelloweye rockfish.

References

USEPA. 2024. National Coastal Conditions Assessment 2025 Field Operations Manual. V 1.1. U.S. Environmental Protection Agency, Washington, D.C. EPA 841-B-24-002.

Appendix A.

Table A1. Sites sampled during the 2025 coastal survey. Highlighted in blue are sites included in the Southeastern Cook Inlet-Kodiak Upwelling (SCI) ecoregion and all other sites are in the Northern Gulf of Alaska Shelf (NGOA) ecoregion.

Monitoring Location ID	Monitoring Location Name	Latitude (WGS84)	Longitude (WGS84)	Depth (m)	Date Sampled
-Northern Gulf of Alaska Ecoregion-					
NCA25_AK-10002	Southcentral	59.809	-149.548	123.5	9/14/2025
NCA25_AK-10016	Resurrection Bay	60.068	-149.346	20.8	7/26/2025
NCA25_AK-10017	Harris Bay	59.729	-149.855	54.4	9/13/2025
NCA25_AK-10018	Chugach Bay	59.192	-151.537	29.1	7/27/2025
NCA25_AK-10019	Nuka Bay	59.411	-150.428	33.0	8/23/2025
NCA25_AK-10020	Blying Sound	59.866	-149.297	89.8	9/14/2025
NCA25_AK-10022	Nuka Passage	59.310	-150.819	150	8/22/2025
NCA25_AK-10023	Blying Sound	59.784	-149.514	57.0	9/14/2025
NCA25_AK-10024	Blying Sound	59.903	-149.085	159.3	9/19/2025
NCA25_AK-10026	Nuka Bay	59.349	-150.612	37.0	8/23/2025
NCA25_AK-10027	Crater Bay	59.704	-149.781	12.0	9/12/2025
NCA25_AK-10028	Blying Sound	59.901	-149.033	97.7	9/19/2025
NCA25_AK-10029	Aialik Bay	59.857	-149.685	130.5	9/13/2025
NCA25_AK-10030	Nuka Passage	59.416	-150.631	45.5	8/22/2025

NCA25_AK-10031	Blying Sound	59.854	-149.582	13.2	9/14/2025
NCA25_AK-10041	Blying Sound	59.884	-149.165	215.9	9/17/2025
NCA25_AK-10043	Resurrection Bay	59.893	-149.422	270.3	9/17/2025
NCA25_AK-10044	Pony Point	59.740	-149.520	68.4	9/13/2025
AK_2025-SE07	Blying Sound	59.971	-149.365	194.5	7/25/2025
AK_2025-SE08	Blying Sound	59.795	-149.277	269.4	9/17/2025
AK_2025-SE03	Resurrection Bay	60.117	-149.428	11.5	9/15/2025
AK_2025-SE04	Resurrection Bay	60.118	-149.427	6.0	9/15/2025
AK_2025-ALK01	Aialik Bay	59.816	-149.701	243.8	9/13/2025
-Southeastern Cook Inlet-Kodiak Upwelling Ecoregion-					
NCA25_AK-10003	Chrome Bay	59.206	-151.804	24.0	7/28/2025
NCA25_AK-10004	Jackolof Bay	59.472	-151.560	20.1	7/30/2025
NCA25_AK-10005	Seldovia Bay	59.418	-151.727	12.4	8/5/2025
NCA25_AK-10006	Sadie Cove	59.475	-151.351	52.7	8/1/2025
NCA25_AK-10007	Seldovia Harbor	59.437	-151.715	7.8	8/5/2025
NCA25_AK-10010	Tutka Bay	59.422	-151.317	65.0	8/3/2025
NCA25_AK-10011	Southcentral	59.591	-151.174	5.0	8/4/2025
NCA25_AK-10013	Koyuktolik Bay	59.250	-151.930	13.6	7/28/2025
NCA25_AK-10032	Kachemak Bay	59.575	-151.674	64.0	7/29/2025
NCA25_AK-10033	Tutka Bay	59.488	-151.471	25.9	8/2/2025
NCA25_AK-10035	Kachemak Bay	59.494	-151.813	72.0	7/30/2025
NCA25_AK-10036	Halibut Cove	59.599	-151.253	16.0	8/4/2025
NCA25_AK-10037	Kachemak Bay	59.677	-151.820	17.6	7/29/2025
NCA25_AK-10038	Kachemak Bay	59.618	-151.309	75.2	7/31/2025
NCA25_AK-10039	Kachemak Bay	59.570	-151.446	142.9	8/1/2025
NCA25_AK-10046	Kachemak Bay	59.445	-151.835	29.7	7/30/2025
NCA25_AK-10047	Kachemak Bay	59.682	-151.228	13.7	7/31/2025
NCA25_AK-10048	Kachemak Bay	59.506	-151.565	79.0	8/3/2025
NCA25_AK-10049	Kachemak Bay	59.492	-151.699	28.2	8/5/2025
AK_2025-HC01	Halibut Cove	59.595	-151.236	5.2	8/6/2025

Table A2. Coastal survey indicators.

Water Quality Indicators	Sediment Indicators	Fish Tissue Contaminants
<ul style="list-style-type: none"> • In Situ: dissolved oxygen, pH, salinity, specific conductance, temperature, turbidity • Alkalinity • Chlorophyll-a • Enterococci • Microcystins • Nutrients: ammonia, dissolved and total nitrogen, phosphorous • Dissolved and total metals 	<ul style="list-style-type: none"> • Grain size • Macroinvertebrates • Metals • Nitrogen isotope • PAHs • PCBs • Pesticides • Total organic carbon • Toxicity 	<ul style="list-style-type: none"> • Lipids • Mercury • Metals • PCBs • Pesticides • PFAS



Figure 8. Crew collecting a sediment sample.



Figure 9. Crew collecting a water sample.



Figure 10. Crew filtering water samples.



Figure 11. Pre-site arrival activities including gear organization and labeling sample containers.

Preliminary water quality sample results.

Table A3. Summary of in situ parameters at 0.5-meter depth for Southeastern Cook Inlet – Kodiak Upwelling (SCI) ecoregion and Northern Gulf of Alaska Shelf (NGOA) ecoregion.

Parameter	SCI (n=20)		NGOA (n=23)	
	Mean	Standard deviation	Mean	Standard Deviation
Dissolved Oxygen (mg/l)	10.02	0.64	9.15	0.56
Specific conductance (uS/cm)	48367	6827	41505	6465
Salinity (ppt)	31.39	4.77	29.39	4.07
Temperature, water (deg C)	12.58	1.66	12.38	1.38
pH	8.12	0.09	8.18	0.07

Table A4. Nutrient results for Southeastern Cook Inlet – Kodiak Upwelling (SCI) ecoregion and Northern Gulf of Alaska Shelf (NGOA) ecoregion. Result values that are bolded are an estimate.

Parameter	SCI (n=20)		NGOA (n=23)	
	Mean	Standard deviation	Mean	Standard Deviation
Ammonia-N (mg/L)	0.2	0	1.0	0.5
Total Kjeldahl Nitrogen (mg/L)	27.0	47.3	11.7	8.3
Total Nitrate/Nitrite-N (mg/L)	0.3	0.1	0.2	0.0
Total Phosphorous (ug/L)	Not detected		Not detected	

Table A5. Chlorophyll results for Southeastern Cook Inlet – Kodiak Upwelling (SCI) ecoregion and Northern Gulf of Alaska Shelf (NGOA) ecoregion.

Parameter	SCI (n=20)		NGOA (n=23)	
	Mean	Standard Deviation	Mean	Standard Deviation
Chlorophyll a, corrected	0.47	0.29	0.31	0.17

Table A6. Total metal results for Southeastern Cook Inlet – Kodiak Upwelling (SCI) ecoregion and Northern Gulf of Alaska Shelf (NGOA) ecoregion. Samples were run with different dilution factors that resulted in low and high method detection limits. Laboratory results that were not detected are denoted as ND and were not used when calculating the mean. Result values that are bolded are an estimate.

Parameter	Low Method Detection Limits	High Method Detection Limits	SCI (n=20)			NGOA (n=23)		
			Mean (ug/L)	Standard deviation	# of results not detected	Mean (ug/L)	Standard deviation	# of results not detected
Aluminum	15	1500	3559	3787	8	4251	4155	20
Antimony	0.31	31	64.0	78.1	10	47.0	34.0	19
Arsenic	1.5	150	2.80	0.76	13	5.14	0	22
Barium	0.94	94	199	218	6	262	224	20
Beryllium	0.13	13	13.0	8.28	16	14.2	6.48	21
Cadmium	0.15	15	10.0	3.46	18	13.4	0	21
Calcium	3750	15000	7592450	10144207	0	2093522	5798207	0
Chromium	2.5	250	ND	ND	20	2.58	0	22
Cobalt	1.2	120	ND	ND	20	70.8	0	22
Copper	1	100	1.86	0.48	13	2.92	0	22
Iron	78	7800	167	81	14	3981	5429	21
Lead	0.5	50	1.17	0	18	116	0	22
Magnesium	3750	1500	19402050	25857745	0	5403130	14797201	0
Manganese	0.35	35	161	201	6	218	227	20
Mercury	2	0.1	2.83	0.69	17	4.27	0.46	20
Molybdenum	0.62	62	240	242	6	302	254	20
Nickel	0.62	62	56.8	148	12	32.2	37.7	21
Potassium	3750	15000	6068200	8096889	0	1677826	4619006	0
Selenium	1.5	150	811	810.98	12	1131	809	19
Silicon	310	31000	598	87.7	18	ND	ND	23
Silver	0.31	31	64.4	0	19	ND	ND	23
Sodium	150000	75000	8992000	2210103	0	8333043	1625049	0
Thallium	0.31	31	ND	ND	20	ND	ND	23
Tin	0.31	31	ND	ND	20	ND	ND	23
Titanium	7.75	775	ND	ND	20	ND	ND	23
Vanadium	6.2	620	556	74.13	13	544	108.89	21
Zinc	3.1	310	1994	3491	6	6252	9430	20