



WHATCOM MARINE RESOURCES COMMITTEE (MRC) FORAGE FISH MONITORING FINAL REPORT

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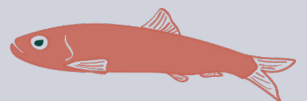


ABSTRACT

The Whatcom MRC participates in a regional effort, led by the Washington Department of Fish and Wildlife (WDFW), to characterize populations of the two species of forage fish that spawn on Puget Sound beaches: Pacific sand lance and surf smelt. This project has included successful collaboration between WDFW, the Northwest Straits Commission, local partners, and the MRC's citizen scientists, which has improved knowledge of forage fish spawning grounds in Washington State.

The MRC recruits and trains volunteers to conduct forage fish spawning surveys at priority beaches in Whatcom County as identified by the MRC, WDFW, and local partners. During the reporting period, surveys were conducted monthly at Little Squalicum Beach and every other month at Clayton Beach using survey protocols developed by WDFW. MRC staff and volunteers conducted the forage fish survey sample collection and processing, then sent the processed samples to WDFW for egg counting, identification, and analysis. From June of 2025 to April of 2026, 507 surf smelt eggs were found at Little Squalicum Beach, with the highest numbers found during late summer through fall. At Clayton Beach, 2 surf smelt eggs and 1 sand lance egg were found from June of 2025 to April of 2026. Forage fish samples from the remainder of the reporting period (May-September) are awaiting analysis by WDFW.

Gathering data on forage fish spawning grounds can result in legal protections of spawning beaches, inform potential soft shore restoration projects for Whatcom County, and be used to assess the effectiveness of local restoration projects. The MRC will continue to work with local partners to identify and prioritize critical areas to be monitored for forage fish spawning throughout Whatcom County.



PROJECT GOALS

Because forage fish are a vital component of the food web in the Salish Sea, the Washington Department of Fish and Wildlife (WDFW) monitors their population status, spawning locations, and responses to shoreline development. The MRC serves as a local partner to WDFW to support their statewide sampling efforts, expanding the impact of the study. As such, the goal of the project is to survey local beaches for forage fish to support statewide sampling and to assess and inform soft-shore restoration projects in Whatcom County.

PROJECT ENGAGEMENT

Forage fish monitoring efforts rely on community volunteers and staff from Whatcom County Public Works (WCPW). The scope of forage fish monitoring efforts in Whatcom County is shaped in part by project partners including the City of Bellingham, the Port of Bellingham, and the Salish Sea Alliance. The MRC has conducted forage fish surveys along Little Squalicum Beach since 2016 and along Clayton Beach since 2023. Little Squalicum Beach was selected to support monitoring efforts associated with shoreline restoration projects recently completed by the City of Bellingham and the Port of Bellingham. Clayton Beach was selected in partnership with the Salish Sea Alliance and the Skagit MRC in preparation for a proposed shoreline restoration project.



Forage fish survey sites at Little Squalicum Beach (left) and Clayton Beach (right). Photo credits: Dana Daniels, MRC staff.



PARTNER ORGANIZATIONS

- **Washington Department of Fish and Wildlife (WDFW):** Coordinated data analysis, supplies for volunteers, training, and on the beach sampling practice and refreshers. Developed and provided sampling protocols.
- **Northwest Straits Commission (NWSC):** Coordinated with MRC project managers and WDFW staff to provide supplies/materials and training to volunteers. Received samples from the MRC and transferred to WDFW.
- **Whatcom County Public Works (WCPW) MRC Staff:** Set sampling dates, managed volunteer coordination, led sampling and processing efforts following protocols, tracked training needs, and coordinated with NWSC and WDFW. Created county reports and managed data.
- **The City of Bellingham:** Completed restoration of the Little Squalicum Estuary in 2024, aiming to restore tidal and sedimentary processes to improve fish passage and to return saltmarsh, mudflat and estuary habitats to an area where historical wetlands had been lost. Completed beach nourishment at 2 of the sampling sites at Squalicum Beach.
- **The Port of Bellingham:** Completed a shoreline enhancement project at Squalicum Beach to remove industrial fill, wood waste, and large slabs of broken concrete from the shoreline, creating a much larger and more accessible beach, increasing priority habitat for forage fish.
- **The Salish Sea Alliance:** Provided guidance and recommendations to the MRC to monitor Clayton Beach in partnership with the Skagit MRC in preparation for a proposed shoreline restoration project at this location.



PARTICIPANTS

Forage fish survey efforts depend on community volunteers and staff with WCPW. A full volunteer list is included in Appendix A. Throughout the reporting period, 23 volunteers participated, contributing over 80 hours of volunteer time to the project.



Volunteers conduct forage fish surveys at Little Squilicum Beach and Clayton Beach. Photo credits: Dana Daniels, MRC staff.



METHODS

Sample collection, processing, and analysis were conducted according to WDFW protocols (See Appendix B). Activities were conducted by or under direct supervision of MRC staff and volunteers that completed the WDFW forage fish survey training. The MRC also follows a Standard Operating Procedure (See Appendix C), that provides instructions on survey logistics and gear cleaning. Surveys were conducted monthly when the tide was below 5 feet for the entirety of the process.



Bulk sediment samples are collected at sampling locations. One bag is collected per sampling site. Photos are taken to characterize each site.



Once the samples are collected, each sample is sieved to separate the larger grained materials from any potential eggs.



After sieving the sample, the remaining sediment is separated from the forage fish eggs using the vortex method. Any eggs in the sample are collected in the sieve under the blue bowl.



The eggs and remaining sediment from the sieve are transferred into a sample jar and preserved for transport to WDFW, who conducts the microscopic analysis.

All photos provided by Dana Daniels, MRC staff and Michael Cecil, volunteer.

METHODS: LITTLE SQUALICUM BEACH

The MRC collects bulk sediment samples from 4 locations along Little Squalicum Beach, within the restoration and beach nourishment areas completed by the City of Bellingham and Port of Bellingham.

Site Name	Latitude, Longitude
LSE-1 (Reference Site)	48° 45.804, -122° 30.834
LSE-2 (Near Estuary Tidal Channel)	48° 45.870, -122° 30.027
LSE-3 (Beach Nourishment)	48° 45.936, -122° 31.261
LSE-4 (Beach Nourishment)	48° 45.967, -122° 31.391

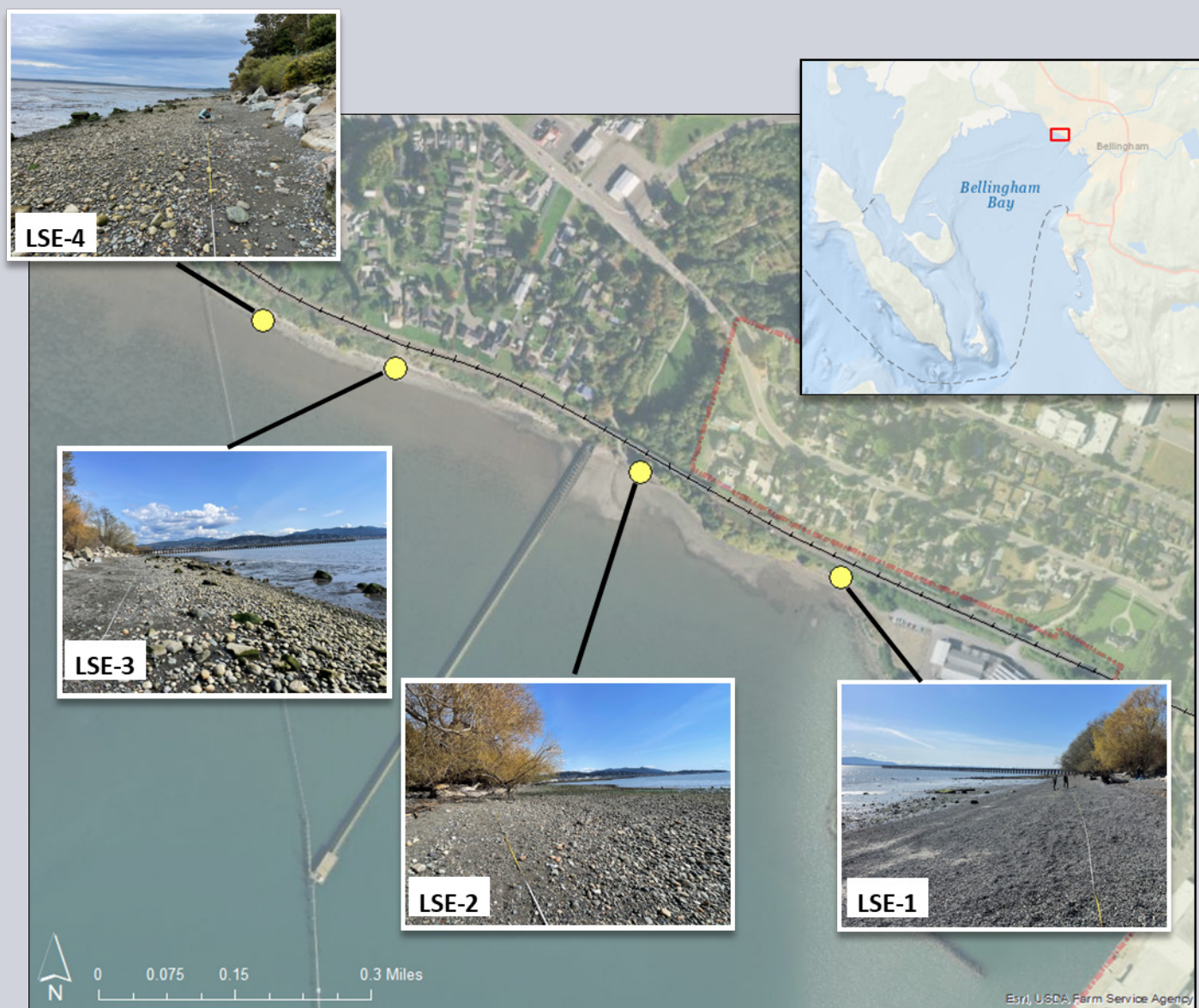


Figure 1: Sampling locations along Little Squalicum Beach. Photo credits: Dana Daniels, MRC staff.

METHODS: CLAYTON BEACH

In partnership with the Salish Sea Alliance and the Skagit MRC, the Whatcom MRC conducts forage fish surveys at Clayton Beach every other month. The Whatcom MRC alternates with the Skagit MRC as this site is right on the county line. The MRC collects bulk sediment samples from 2 locations that are randomly selected relative to an established midpoint on the beach. These surveys are conducted in anticipation for a proposed nearshore restoration project at Clayton Beach.

Site Name	Latitude, Longitude of Midpoint
Clayton Beach (Restoration Site)	48° 38.41236, - 122° 28.89498



Figure 2: Sampling locations along Clayton Beach. Photo credits: Dana Daniels, MRC staff.

RESULTS: LITTLE SQUALICUM BEACH

From June 2025 to April 2026, 507 surf smelt eggs were found at Little Squalicum Beach. Most eggs were found during the late summer and fall, with the majority found at LSE-1 (reference site). Surf smelt eggs were observed consistently at the beach nourishment sites (LSE-3 and LSE-4) from November 2025 - February 2026, which has not been seen in previous years.

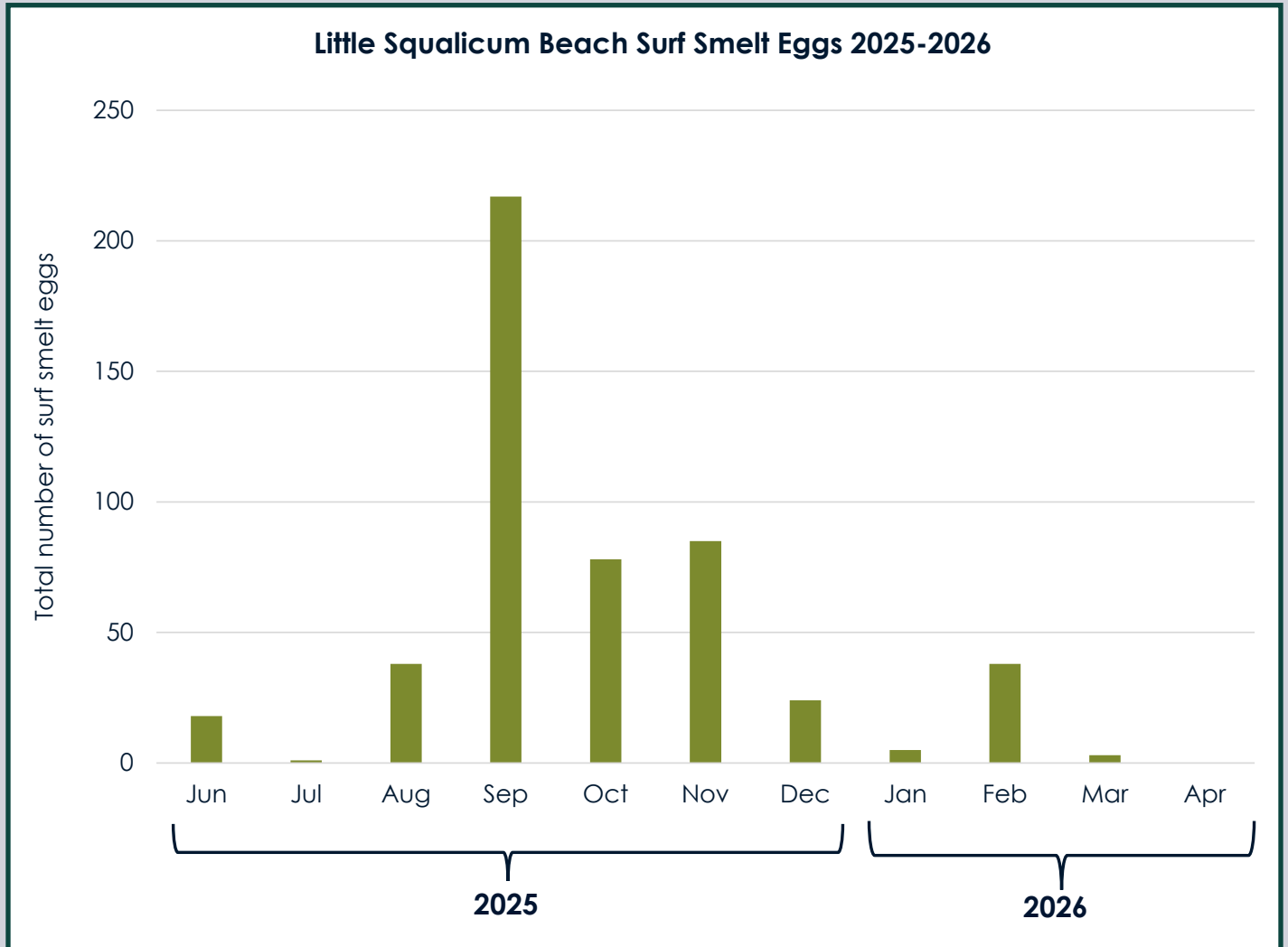


Figure 3: Surf smelt eggs found at Little Squalicum Beach from June of 2025 - April of 2026. Total number of surf smelt eggs represent the combined counts at each of the 4 sites at Little Squalicum Beach. However, site LSE-1 had the majority of the eggs. Data from 2026 is only available up to April as WDFW has not yet processed the samples from May-September of 2026 due to capacity limitations. All raw data are included in Appendix D.

RESULTS: CLAYTON BEACH

From June 2025 to April 2026, 2 surf smelt eggs and 1 sand lance egg were found at Clayton Beach.

OUTCOMES

The MRC continued to gather data on forage fish spawning grounds by monitoring two locations in Whatcom County for forage fish eggs. This project included successful collaboration between WDFW, the Northwest Straits Commission, local partners, and MRC volunteers, improving knowledge of forage fish spawning grounds in Washington State.

OUTPUTS

From October 2025 through September of 2026:

- **60 samples** were collected across **18 sampling events** at Little Squalicum Beach and Clayton Beach
- **507 surf smelt eggs** were found at Little Squalicum Beach
- **23 volunteers** participated
- Over **80 hours of volunteer time** were contributed



Little Squalicum Beach sampling site. Photo credit: Dana Daniels, MRC staff.

RESULTS IN CONTEXT

For the first time since sampling began in 2023 at the beach nourishment sites at Little Squalicum Beach, surf smelt eggs were consistently observed from November 2025 through February 2026. This has not been seen in previous years, indicating increased forage fish spawning preference for these areas. Participants also reported that sediment grain size at the beach nourishment sites appeared to have decreased over the past year. This shift toward finer substrate conditions is consistent with forage fish spawning habitat preferences.

All of the finalized data statewide is currently available in WDFW's online Forage Fish Spawning Map. While the spawn 'presence' data is visible, this map includes and can display all surveys that were conducted in the history of this project, regardless of egg presence. The public map hosted on WDFW's website allows the user to filter by date, organization, species, etc, this data is also available in ArcGIS online as a public layer (search "forage fish") which allows further analysis to be conducted.

LESSONS LEARNED AND NEXT STEPS

WDFW manages reporting obligations and field requests from numerous programs and groups throughout the year, which can result in delays in the processing and delivery of forage fish survey data from the collected samples. MRC staff communicated with WDFW early in the reporting period with the goal of obtaining all available data for inclusion in this report. However, WDFW's limited processing capacity constrained the timeline for sample analysis and data availability. As a result, some survey results were not available in time for inclusion.

As coastal development and the impacts of climate change and sea level rise continue to impact shorelines throughout Whatcom County, identifying areas of critical forage fish spawning habitat will be essential to effectively protect these vital populations. The MRC will continue to work with local partners to identify and prioritize critical areas to be monitored for forage fish spawning throughout Whatcom County.



APPENDICES

- **Appendix A:** Volunteer List
- **Appendix B:** WDFW Forage Fish Survey and Processing Protocols
- **Appendix C:** Forage Fish Survey MRC Standard Operating Procedures
- **Appendix D:** Raw Forage Fish Data from WDFW

