

Forage Fish Spawning Survey 2025

Snohomish County Marine Resources Committee

BACKGROUND

Forage fish are small, schooling fish common in the Puget Sound, and are extremely important links in the marine ecological food web. As a middle link in the marine food web, they feed on microscopic organisms called zooplankton. In turn, forage fish and their eggs are important menu items for birds, seals, fish (including salmon), and other animals. They are obligate spawners in the nearshore, depositing their eggs in vast quantities on nearshore vegetation and beaches. The nearshore also acts as a nursery for juvenile forage fish, which take refuge and feed in the shallow, vegetated waters. With such a key role both up and down the food chain, they are considered indicators of the health and productivity of marine ecosystems.

Forage fish are not a phylogenetic group, but rather an ecological group. For this project two species of concern are monitored (Figure 1): Surf smelt (*Hypomesus pretiosus*) that can grow up to 9 inches long with olive green dorsal, silver or yellow band on sides, an adipose fin and small scales; and Pacific sand lance (*Ammodytes hexapterus*) that can grow up to 8 inches long with gray to green dorsal, silver sides, a large dorsal fin, elongated pointed body, no adipose fin, and their scales almost invisible.



Figure 1: Species of forage fish monitored by Snohomish County MRC. (Left) Adult surf smelt, (WDFW). (Right) Adult Pacific sand lance (Puget Sound Encyclopedia).

They are a vital part of the Puget Sound ecosystem, and monitoring their status is an important component to the recovery of Puget Sound and the Salish Sea. This project of the Snohomish County Marine Resources Committee (SnoCo MRC) focuses on spawning at nearshore restoration sites and index sites. Index sites are locations identified by the Washington Department of Fish and Wildlife (WDFW) that have both public access and previous documentation of spawning. Since 2011 SnoCo MRC has collected over 700 samples, and this number continues to grow. This effort contributes to WDFW's much larger [Forage Fish Spawning Map](#).

SITE INFORMATION

SnoCo MRC collects data at three different sites: Howarth Park, Picnic Point Park, and Meadowdale Beach Park (Figure 1). Each site has a North and a South sampling station.

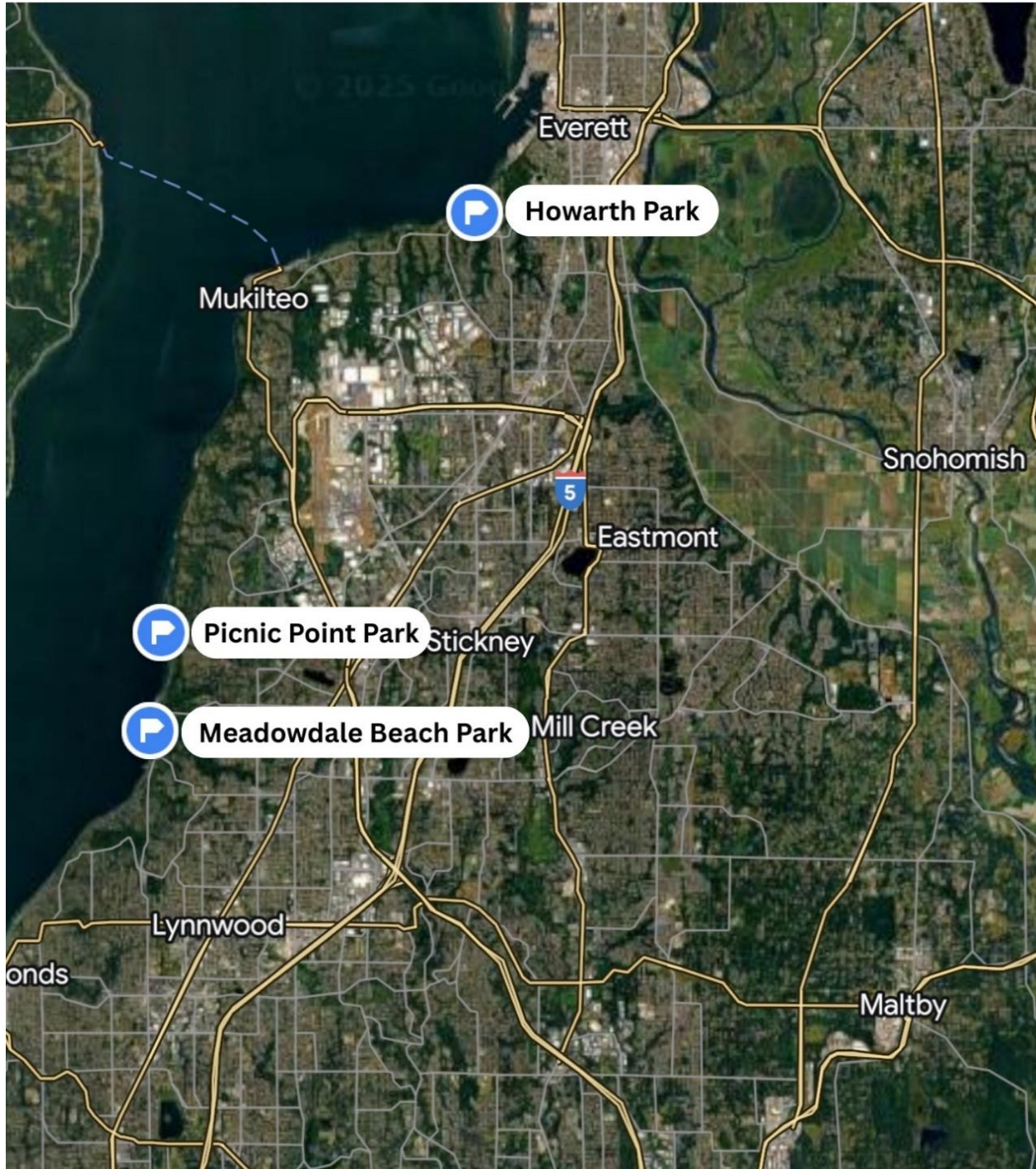


Figure 2: Map showing the location of the 2025 sampling locations.

Howarth Park

Howarth Park is owned and managed by the City of Everett Parks Department. Here, forage fish sampling began in 2011. Restoration of the park was completed in 2016. The restoration consisted of removing a bulkhead, renourishment and regrading of the beach, and planting native plants in 4 planting zones. The monitoring at this site is conducted and completed by a dedicated group of MRC members and volunteers, without the assistance of SnoCo staff.



Figure 3: (Left) Howarth Park North sampling station. (Right) South sampling station. Both photos were taken in February.

Picnic Point Park

Picnic Point Park is managed by Snohomish County. Here, forage fish sampling has been sporadic since 2017, but during the last few years, it has been more consistent. This site is both an index site for WDFW and a comparable location for the Meadowdale restoration project. Currently, there are no plans for restoration at Picnic Point, but forage fish data could be used as a pre-restoration baseline.



Figure 4: (Left) Picnic Point North sampling station. (Right) South sampling station. Both photos were taken in May.

Meadowdale Beach Park

Meadowdale Beach Park is managed by Snohomish County. Here, forage fish sampling began sporadically in 2017 but has been more consistent in the last few years. Restoration was completed in December of 2023, and the park has been undergoing continued monitoring. The restoration consisted of restoring the estuary of the Lunds Gulch Creek, replacing an undersized culvert through the railroad embankment with a 5-span railroad bridge, creating new trail access to improve public and ADA access to the beach, as well as excavation and restoration of a 1.5-acre estuary upstream of the bridge.



Figure 5: (Left) Meadowdale Beach Park North sampling station. (Right) South sampling station. Both photos were taken in April.

METHODS

Forage fish spawning surveys use WDFW protocols and focus on two species, surf smelt and Pacific sand lance, which lay eggs on intertidal sand-gravel beaches in the nearshore environment. Sampling is done by staff and volunteers. Volunteers are encouraged to attend WDFW training, but can still join even if they haven't been trained, as SnoCo staff and project leads, both of whom have attended WDFW training, can do an informal training as they go. To sample for the presence or absence of eggs, sediment samples are taken along a 100-foot pre-defined transect location. Volunteers collect sand from the top 1-2 inches of the beach, where eggs would be deposited. In total, about 1.5-2 liters of sand is collected along the transect.

While on the beach, staff and volunteers record data using digital iForms. These forms capture observations such as sediment type (gravel and sand size), the extent of human impacts on the upland beach (e.g., shoreline armoring), beach length, tide height,

GPS location, and shading levels. Volunteers and staff also submit photos of the beach and transect line through the iForms, which are then sent directly to WDFW staff.

Shortly after sampling, the sand that is collected is then processed. The first step in processing the sample is to sieve the sample through progressively finer sieves (4 mm, 2 mm, and 0.5 mm mesh). Only the material collected in the 0.5 mm sieve is retained for further processing. The condensed material collected in the 0.5 mm sieve is added to a hydrocyclone device consisting of a circular bowl and a recirculating electric water pump to create a vortex that concentrates the light material. This device is called the “blue vortex.” The light material is collected and retained for laboratory analysis (examination of material by microscope) to identify and count the eggs.

SnoCO MRC also collects additional sediment samples at each site for sediment size analysis by the SnoCo Materials Lab. This information can be compared to forage fish egg detections to determine preferred grain size.

DATA AND RESULTS

Due to a high volume of samples being processed by WDFW, some of our sites samples have not been processed as of the date of this report. As such, Table 1 below is incomplete, and Figures 6-8 only include data through February 2025.

Table 1: Monthly surveys and results in terms of egg presence for 2025.

Year	2025																							
Month	1		2		3		4		5		6		7		8		9		10		11		12	
Species	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL	SS	SL
Meadowdale	--	--	--	--																				
Howarth	--	126	6	--																				
Picnic Point	--	--	--	--																				

KEY	
	Sampled in Month
--	No Eggs Present in Sample
	Eggs Present
X	Number of eggs for site by species
SL	Sand Lance
SS	Surf Smelt
	Samples in queue for analysis
	t.b.d work in progress

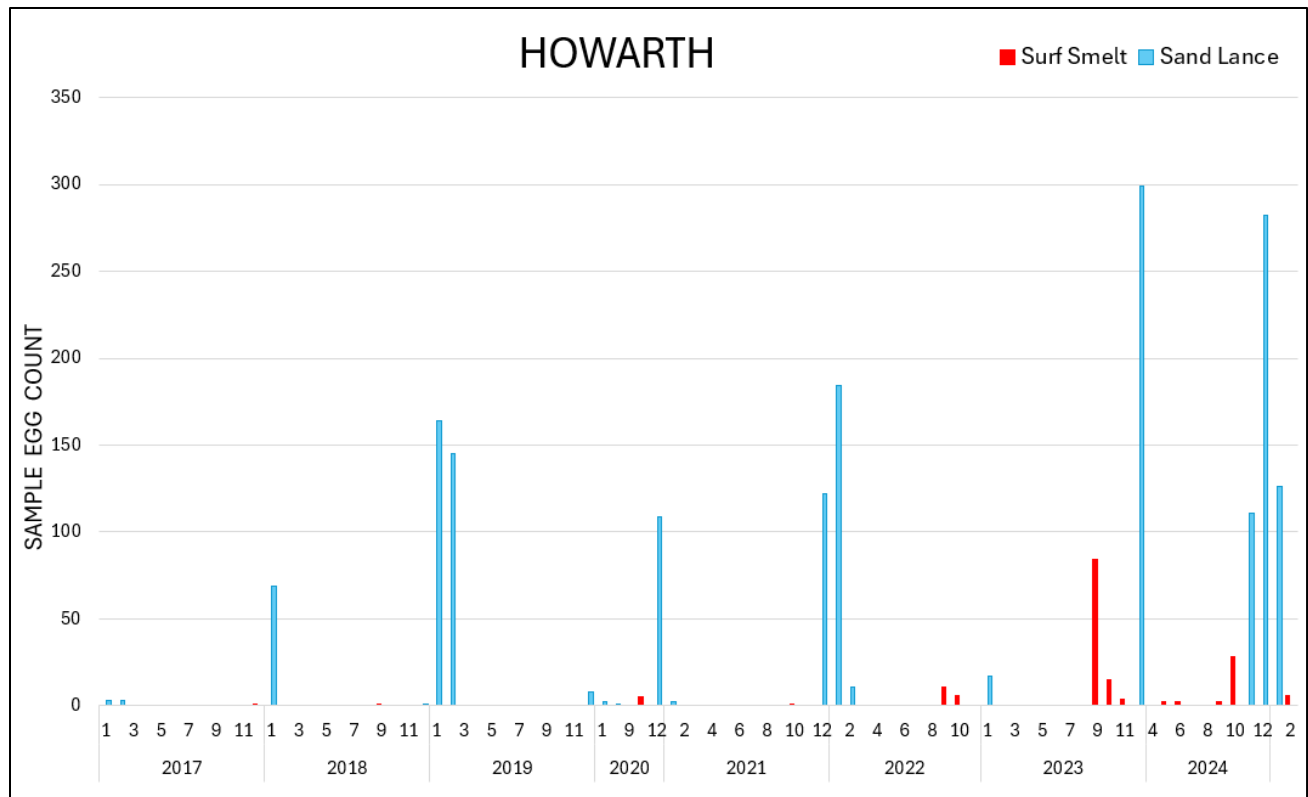


Figure 6: Sample egg counts at Howarth Park since 2017. Data collected between 2011 and 2017 is available in paper format but was not digitized for inclusion in this trend. Data was only included until February 2025, as final samples have not yet been processed by WDFW. In 2020, data was only collected during January, February, September, October, and December.

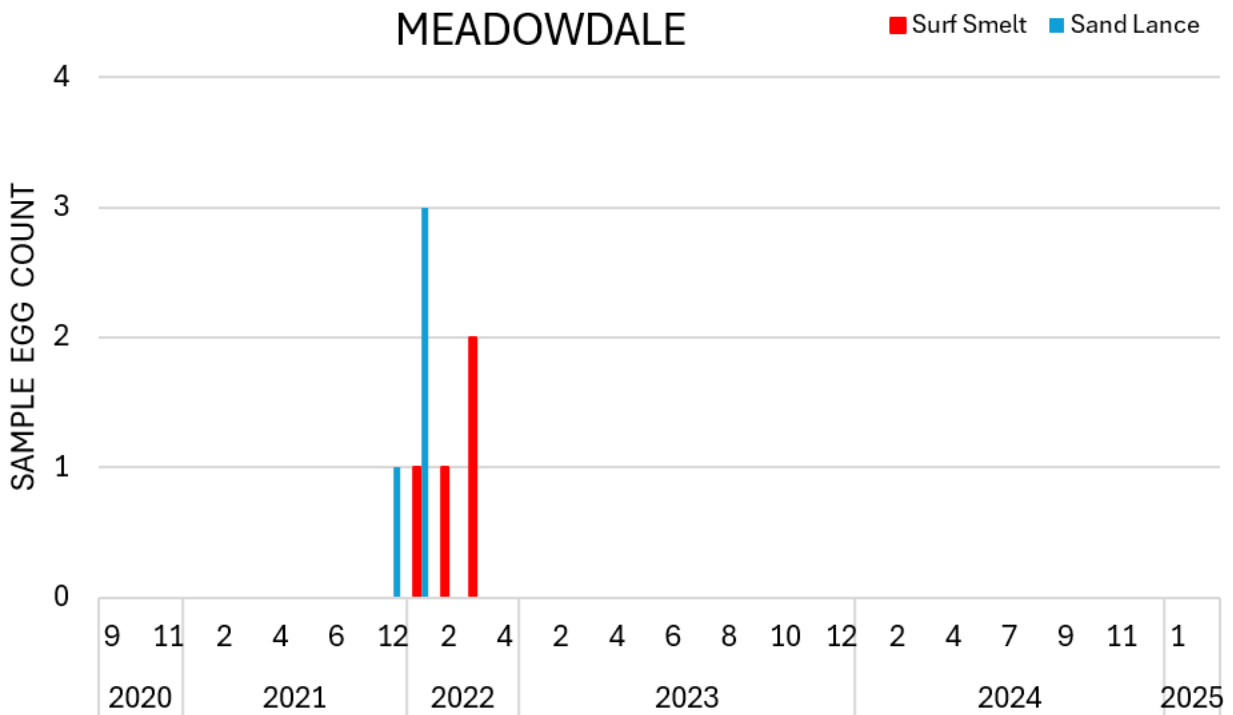


Figure 7: Sample egg counts at Meadowdale Beach Park since 2020. Data collected between 2017 and 2020 is available in paper format but was not digitized for inclusion in this trend. Data was only included until February 2025, as final samples have not yet been processed by WDFW. In 2020 data was only collected during September-November. In 2021 data was not collected from July- October. In 2022 data was not collected after April.

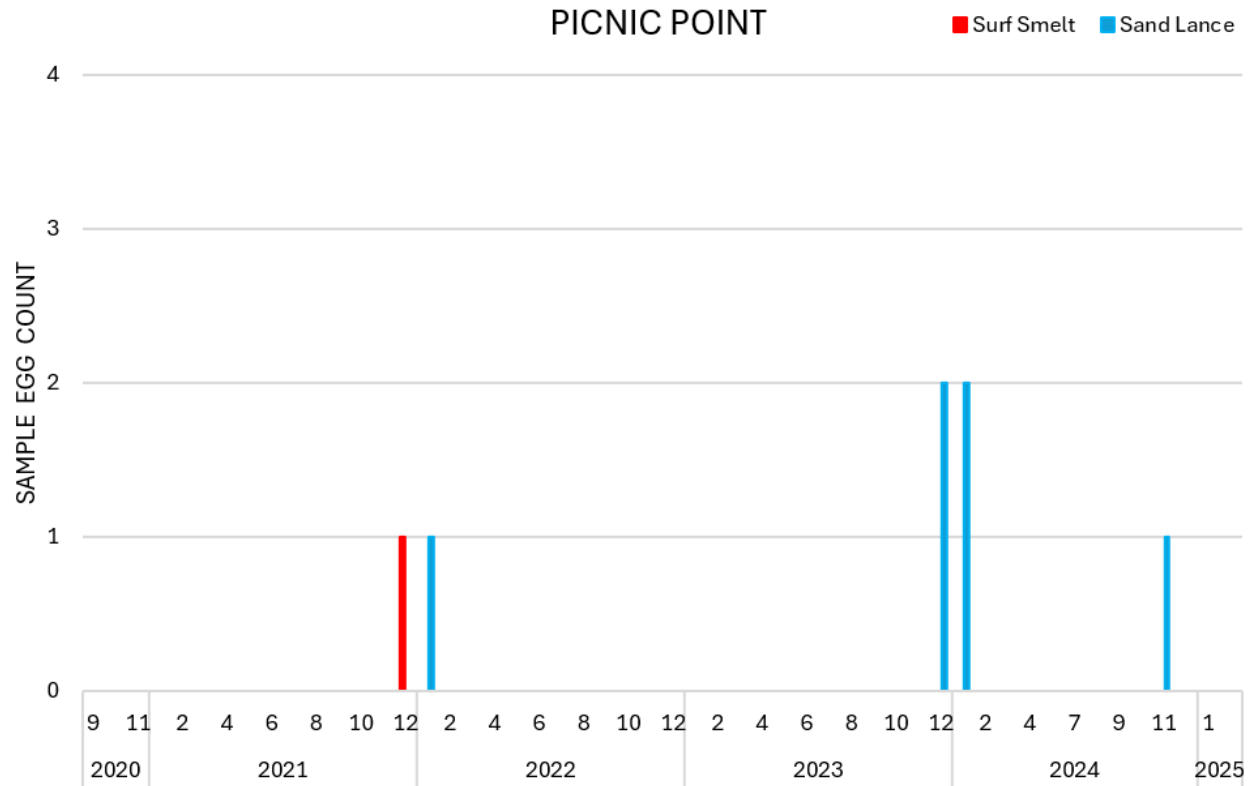


Figure 8: Egg abundance at Picnic Point Park since 2020. Data collected between 2017 and 2020 is available in paper format but was not digitized for inclusion in this trend. Data was only included until February 2025, as final samples have not yet been processed by WDFW. In 2020 data was only collected from September to November.

PROJECT PARTICIPANTS

This work would not be possible without the hard work and dedication of many volunteers and staff (Table 2). The MRC would like to extend its thanks to the volunteers and staff who help make this program possible. Collectively, volunteers reported 171 hours of invaluable service to this project through September of the 2025 season.

Table 2: 2025 Forage Fish monitoring volunteers and staff.

Volunteer/Staff	Role	Survey Locations
Joycelyn Blue	Project Lead, Staff	Picnic Point, Meadowdale
Cali Weber	Staff	Picnic Point, Meadowdale
Phil Salditt	Survey Co-Lead	Picnic Point, Meadowdale
Cory Champagne	MRC Volunteer	Picnic Point, Meadowdale
Richard Strickland	MRC Volunteer	Picnic Point, Meadowdale, Howarth
Julie Schlenger	Survey Co-Lead	Howarth
Joelle Hamilton	Volunteer	Picnic Point, Meadowdale
Rachel Quindlen	Volunteer	Picnic Point, Meadowdale
Brie Townsend	MRC Volunteer	Howarth
Dawn Presler	MRC Volunteer	Howarth
Tim Ellis	MRC Volunteer	Howarth
Becky Passarella	Volunteer	Howarth
Laura Gurley	Volunteer	Howarth
Bryan Lee	Volunteer	Howarth
Michael	Volunteer	Howarth
Sara Maxwell	MRC Volunteer	Picnic Point, Meadowdale
Anna Sievers	Volunteer	Picnic Point, Meadowdale

SOURCES

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