

Fidalgo Bay Aquatic Reserve Forage Fish Surveys from January, 2018 through December, 2018

A report for the Fidalgo Bay Aquatic Reserve Citizen Stewardship Committee



Here are volunteers working to process a sample with the “blue bowl” while also explaining all about Forage Fish to local bystanders. We get to do a lot of this “Outreach”. Especially during the nice-weather months.



INTRODUCTION

Forage fish—particularly Surf Smelt—are an important inhabitant of the Fidalgo Bay Aquatic Reserve and attending to their well being is part of the Management Plan for the Reserve.

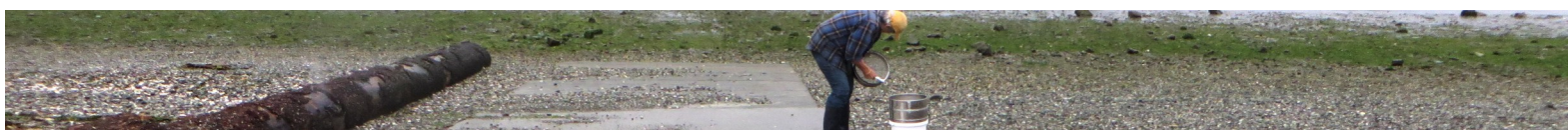
We are a group of trained volunteers that survey the beaches in the Reserve four times a month, since mid-2012, to collect information about them. Our detailed data resides with the State Departments of Natural Resources and Fish and Wildlife.

The survey purpose is mainly to document, in detail, where, when and how much the Surf Smelt spawn. We also take every opportunity to provide education, about the forage fish and our project, both on the beach and in formal presentations and this report. We have interacted with hundreds of people and hopefully advanced the awareness of the importance of this little silver fish. This report shows our tools, methods, and results.

During the 12 months of this activity in 2018, more than 27 different individual volunteers have participated. Some infrequently, many often. We have conducted 48 two hour surveys, all year around. We have collected and processed 216 samples and found eggs in more than 60% of those; primarily during the April through December months. Of the beach areas we cover, eggs have been found at all 72 possible sample sites, at least once, often many times and in huge amounts. Data later in the report suggests 2018 was a very good spawning year.

The Trail Tales Project of the Friends of Skagit Beaches designed and assembled an Interpretation Stand which was deployed where we are working more than 10 times during periods of nice weather when we expected observers. More than 200 people were engaged.

Many organizations and individuals have generously assisted us, with both information and training and also monetary support for equipment and supplies.





These dead Surf Smelt were stranded high on the beach during a massive spawning event.

Surf Smelt are schooling fish and are an important food source for birds, salmon, and other animals and fish. They are one of the several “Forage Fish.” Surf Smelt are caught recreationally, usually with dip nets but also by jigging. Many folks have fine ways to prepare them for eating. Surf Smelt are present all year and spawn heavily, at high tides, between mid-April and mid-October.

Here is a sprinkling of eggs spawned at high tide during the previous evening in May. This is on gravel in the southern portion of Fidalgo Bay, along the east side. There are not many good spawning spots in the southern portion, but this one is well shaded and will have a good hatching percentage.





We often give talks and demonstrations to various groups during the year. Here is a demonstration for the Skagit Conservation District Watershed Masters class.

Fidalgo Bay is a very prolific place for Surf Smelt to spawn. This happens along high tides mostly during April through December. They prefer a mix of sand and small gravel, which covers much of the Fidalgo Bay shoreline.

The fish come in large schools and the eggs and milt are mixed in the water and settle on the fine gravel and sand. Each egg has a small, sticky “foot ” which hopefully attaches to a piece of gravel or sand. Tidal action will then agitate them and some will become buried down where they might stay cool and moist. Incubation is about two weeks. Newly hatched fish will wash out to sea on the next high tide.

Most of the eggs are too exposed to sun and heat and do not survive. Perhaps 5%—10% hatch. No one knows what percentage actually become mature fish. Fidalgo Bay does not have much shade to protect the newly spawned eggs, and the summer sun covers most of the areas used. But even so, enough survive to provide for a continuing prolific spawning.

Trained volunteers, using State approved protocol and equipment, collect samples all year around from much of the portion of Fidalgo Bay that is within the State Aquatic Reserve. Samples are processed and recorded and data is provided to the State.

The following pages show pictures and descriptions of our work, along with summarized results.

Several volunteers use microscopes to count eggs and determine stages of development. A BIG thanks to the Padilla Bay Research Reserve for use of their room and microscopes



Fidalgo Bay Aquatic Reserve

Forage Fish Beach Spawning Habitat



WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES



The light blue lines are placed along stretches of beach where surveys are conducted. The light green is the actual Aquatic Reserve—shoreline and bedlands owned by the State. The portion south of the Tommy Thompson Trail and trestle is generally not suitable for spawning. Sample locations there, in the past, have had few results, but another location used this year has shown significant amounts of spawning. On the west side there is a gap between survey beaches. This is where the large private residence is, with generally unsuitable spawning habitat. Each side of the Reserve has about 3500 linear feet of beach and this is where most of the survey work occurs.



Here is some of the gear we use. Buckets, sample jars, hand-lenses, GPS unit, sieves, tubs for “winnowing,” preservative fluid, and some other things not visible including clip boards, recording sheets, pencils, scoops, and the Blue Bowl.

Three sieves with smaller and smaller mesh are stacked on the bucket. A sample bucket of gravel is dumped in the top and rinsed with the hose. Eventually only the small particles, and eggs (if any) are trapped in the bottom half-millimeter mesh sieve.



All the material from the bottom sieve is washed into a winnow tub.

The tub is sloshed vigorously to bring the eggs, which are light, to the top and one corner. This “winnowing” is a fine art! Some can, some can not!





The sediment in the white tub is carefully rinsed into the “Blue Bowl.” A bilge pump in the lower tub of water shoots water through the black hose into the blue bowl and creates a vortex of water. By slowly stirring the material from the winnow tub, lighter particles and eggs float up and then down the hole in the middle and into the fine-mesh sieve below the blue bowl. What is in that sieve is then rinsed into a sample jar, along with preservative and the sample tag. Jar lids are labeled with date and location. The result is much less material in the sample jar and a higher percentage of the possible eggs.



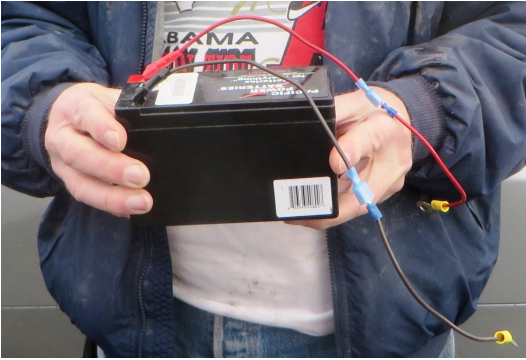
Those jars, along with the field sheet, will go to Olympia where they are analyzed with microscopes to count the eggs and determine mortality and various stages of development. A LOT of eggs in that middle picture.



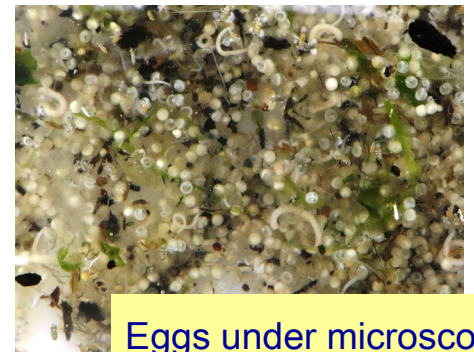


12/13/2018

Lots of folks stop to see what we are up to! Pretty amazing to see all the smiles, the education, the good times ... even in some pretty nasty weather. Often some glorious weather and fine sights too. Thanks to all who help and support.



02/05/2018



Eggs under microscope

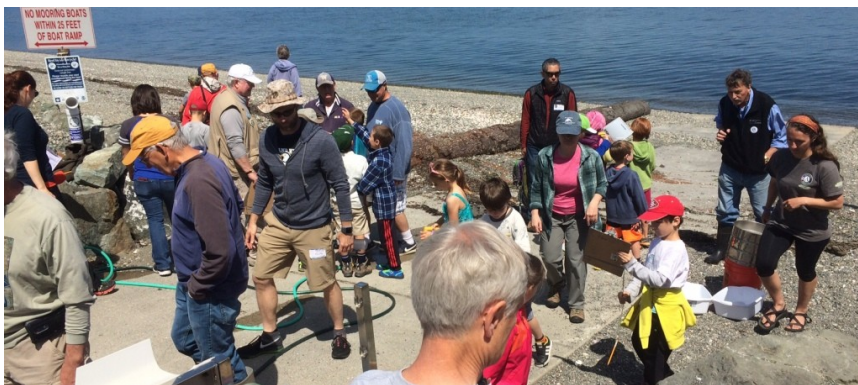




Surf smelt spawn high on the beach and will take up to 2 weeks to hatch. They need to be cool and moist. Shaded areas are most productive for hatching while unshaded beaches can result in immediate loss of eggs if a warm sunny day follows a spawning event. Most of the spawning beach areas in Fidalgo Bay are unshaded and represent an opportunity for ways to provide more shade.



Beside just sampling, we have many chances to bring kids of all ages to the beach and participate along with us. Some are formal school programs and some are more ad hoc. All worthwhile!

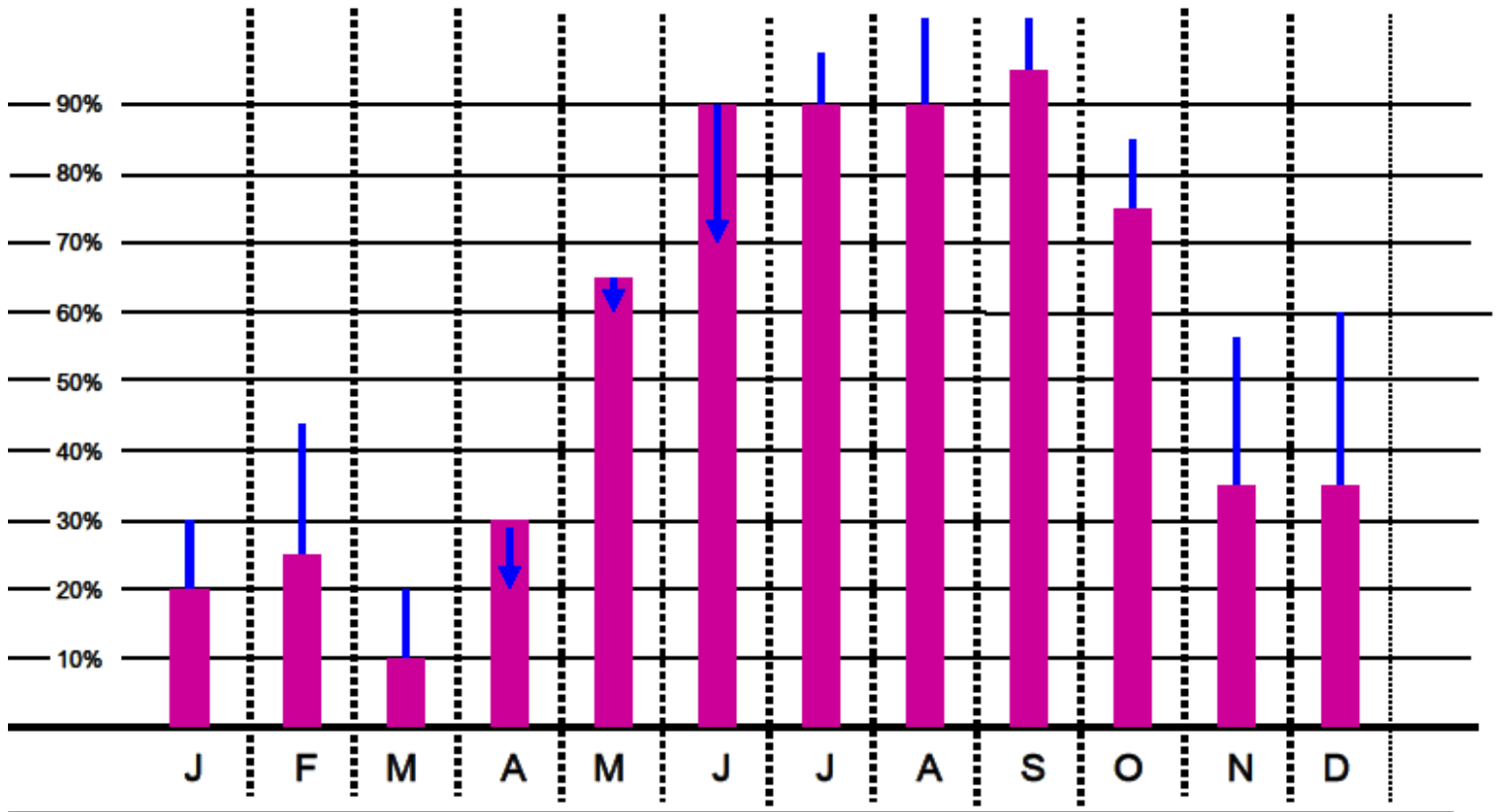


Fidalgo Bay Surf Smelt Spawning

SAMPLES WITH EGGS: BY MONTH (2013—2018 avg.)

(15 — 20 samples per month)

Blue line is 2018 only



This chart shows the percent of samples that had eggs in them. It compares 2018 (blue lines) with the average for all the years from 2013 through 2018 (purple bars.)

We are interested in comparing 2019 as that data becomes available

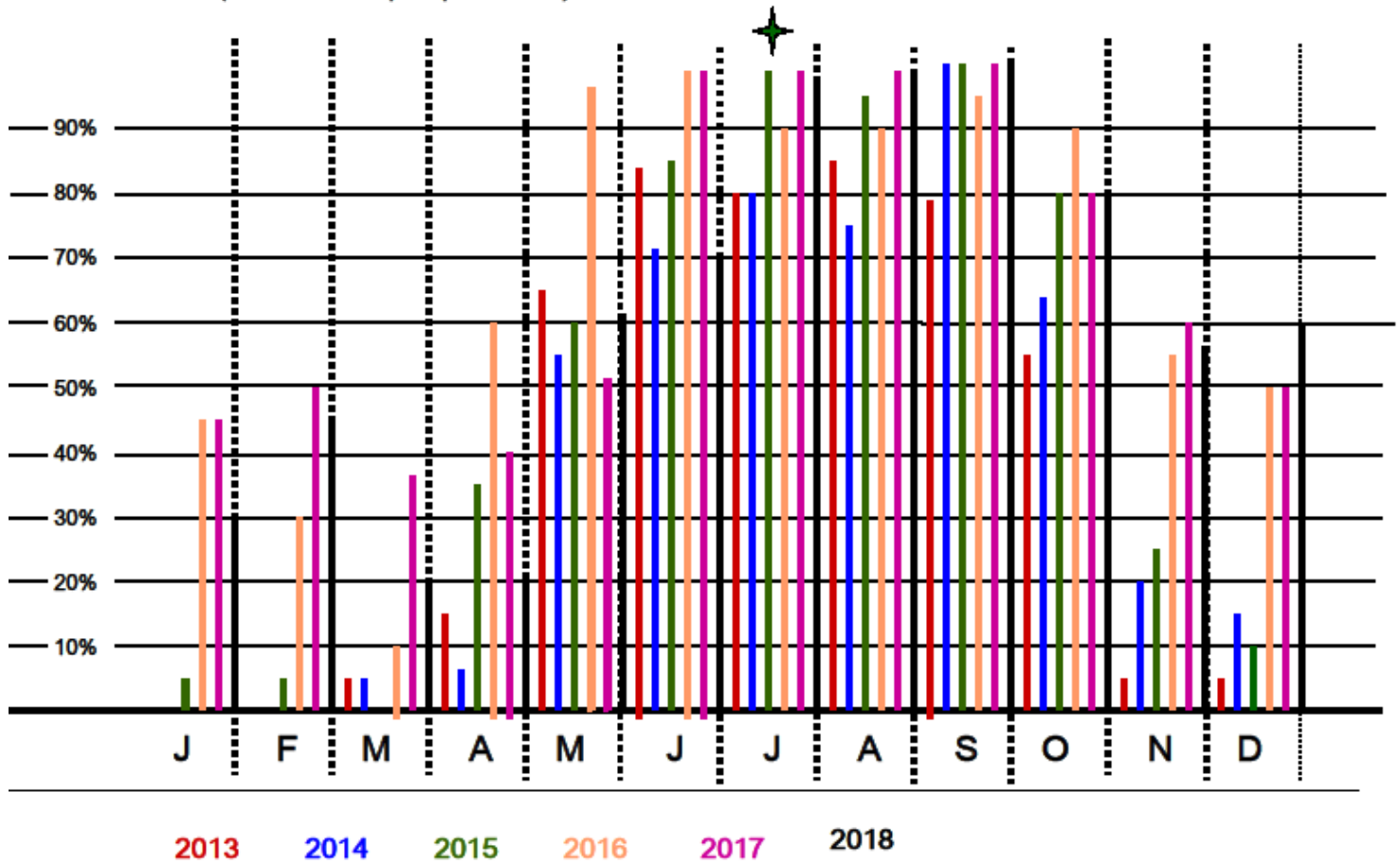
Fidalgo Bay Aquatic Reserve Surf Smelt Spawning



"Blue Bowl" vortex method begins July, 2015.

Percent of Samples with Eggs: by Month and Year

(15 — 20 samples per month)



This data (black bars) suggests that 2018 was another good year for spawning.

October and November especially, and this is when eggs have better chances of survival to hatching.