

Beach Spawning Habitat in British Columbia



“To Conserve and Protect”



PICES Annual Meeting – Session 9
Coastal Ocean Observing Systems, Essential
Biological Variables and Community-based Monitoring

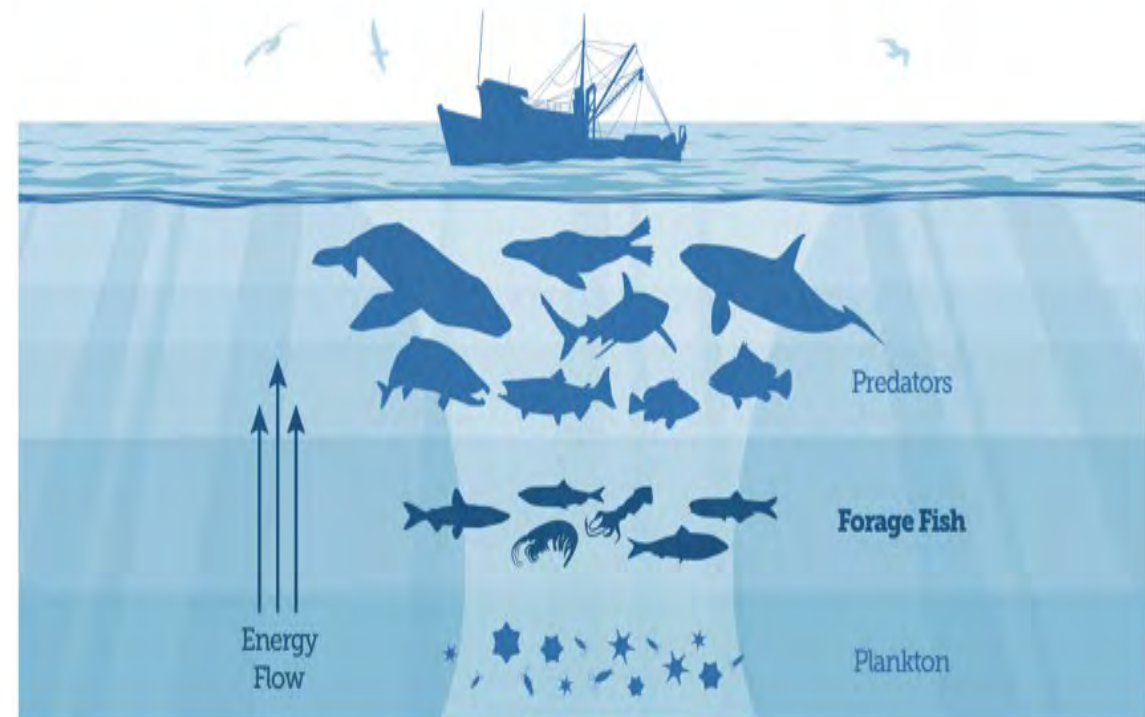
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Outline

- Forage Fish & Their Importance
- Habitat Requirements & Threats to Habitat
- State of Beach Protection & Monitoring in BC
- MABRRI Forage Fish Program
- Long Term Data Collection
- Data Storage

FORAGE FISH

- Typically small schooling fish, but includes larger invertebrates that school (e.g., krill and squid)
- Important source of food for other fish, sea birds and marine mammals
- Key links in the marine food web
- Data gaps exist around ecologically important forage fish species in British Columbia (i.e., Pacific sand lance and surf smelt)



HABITAT REQUIREMENTS FOR PACIFIC SAND LANCE & SURF SMELT

PACIFIC SAND LANCE (*Ammodytes personatus*)

- Found in nearshore shallow environments from Alaska to northern California:
 - Feed in pelagic waters
 - Rest and over-winter in benthic/subtidal habitat (medium to coarse sand 0.25 to 2 mm)
 - Spawn in intertidal habitat (beaches with medium sand 0.2 to 0.5 mm, but can spawn in pea gravel up to 7 mm)

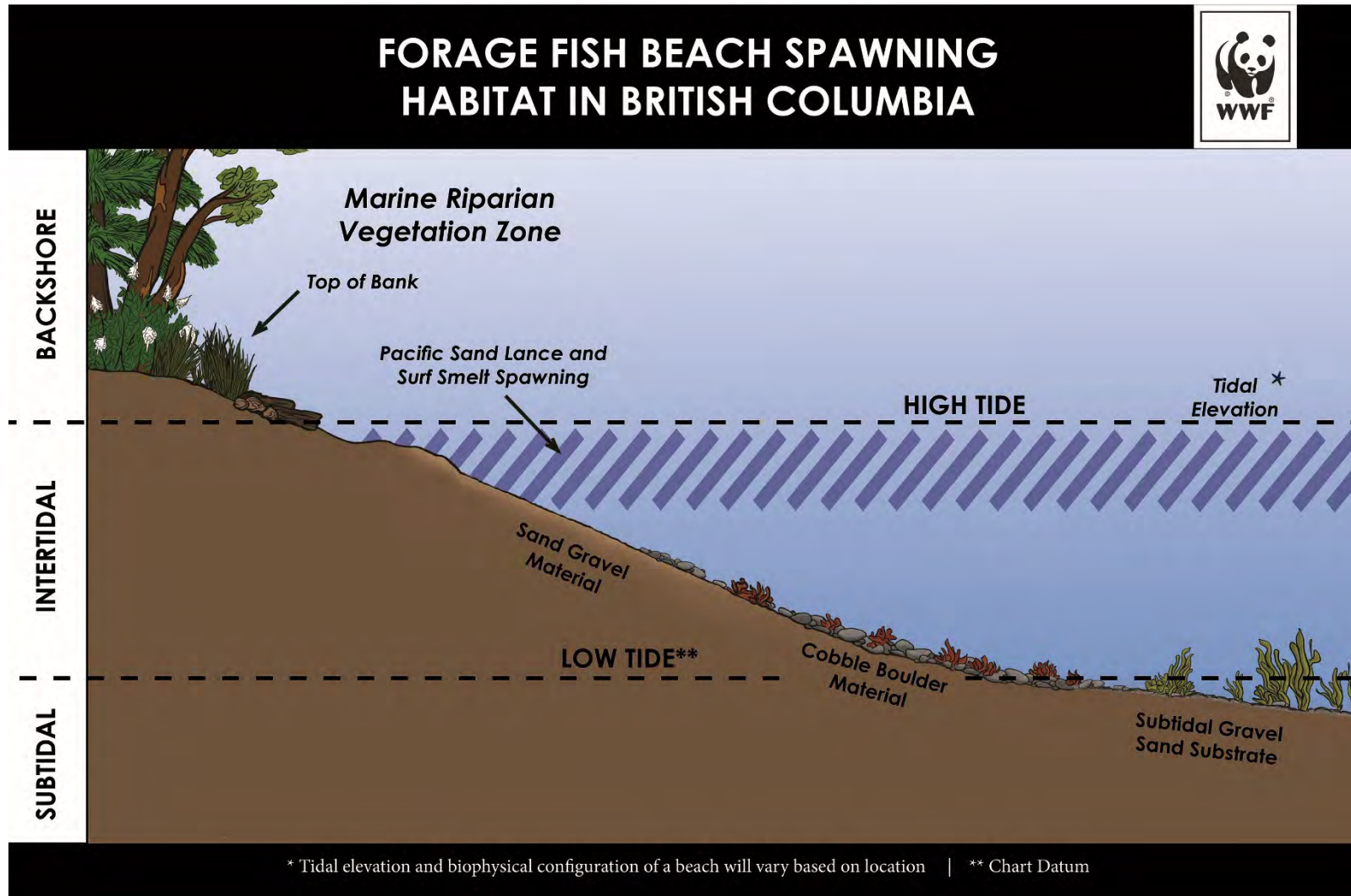


SURF SMELT (*Hypomesus pretiosus*)

- Nearshore coastal species ranging from Alaska to northern California:
 - Feed in the nearshore pelagic environment, closer to the intertidal waters as juveniles and shifting slightly further off the shoreline as adults
 - Spawn in the intertidal habitat (beaches with course sand to pea gravel of 1 to 7 mm)

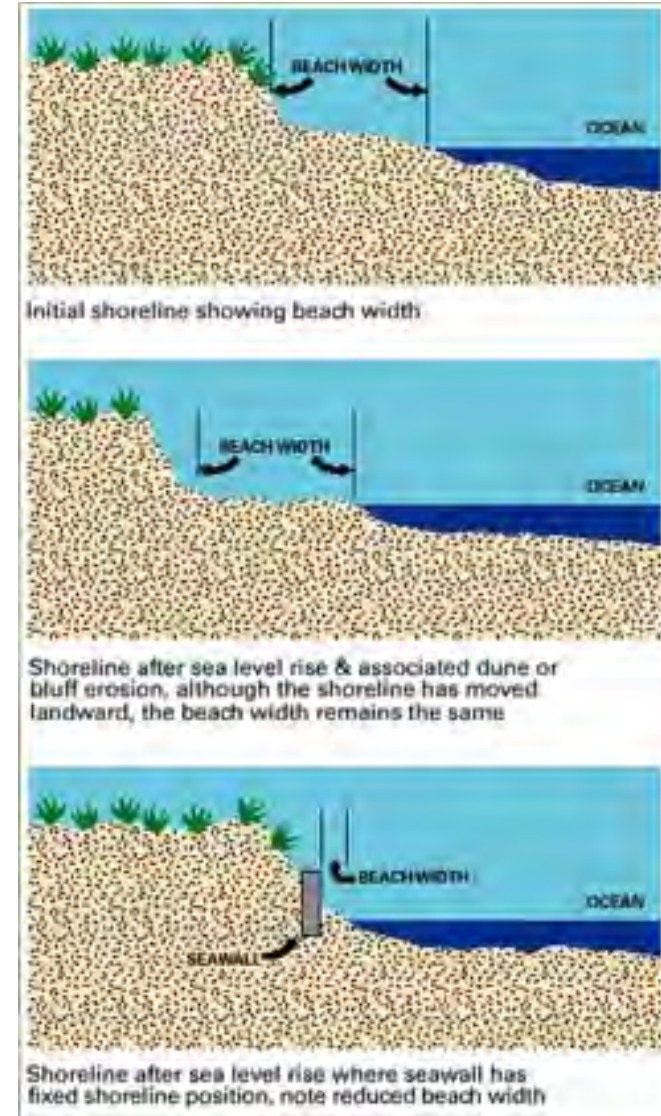


INTERTIDAL HABITAT – BEACH SPAWNERS



THREATS TO BEACH SPAWNING HABITAT

- Seaweed harvesting
- Pollution from stormwater and other sources
- Riparian vegetation removal
- Climate change (e.g., sea level rise)
- Shoreline protection (e.g., seawall, bulkhead, revetments, etc.)



STATE OF BEACH PROTECTION IN BRITISH COLUMBIA



- Limited Best Management Practices
 - Develop with Care 2014, British Columbia Ministry of Environment and Climate Change Strategy
- In British Columbia, the federal, provincial, local, and Indigenous governments jurisdiction overlaps in complex ways in the coastal regions
- On June 21, 2019, the new *Fisheries Act* received royal assent and became law
 - Under this Act, protection to all fish and fish habitat was re-established.
 - Fish habitat is identified as the intertidal and subtidal habitat found below the Higher High Water Line (HHWL)

STATE OF BEACH MONITORING IN BRITISH COLUMBIA

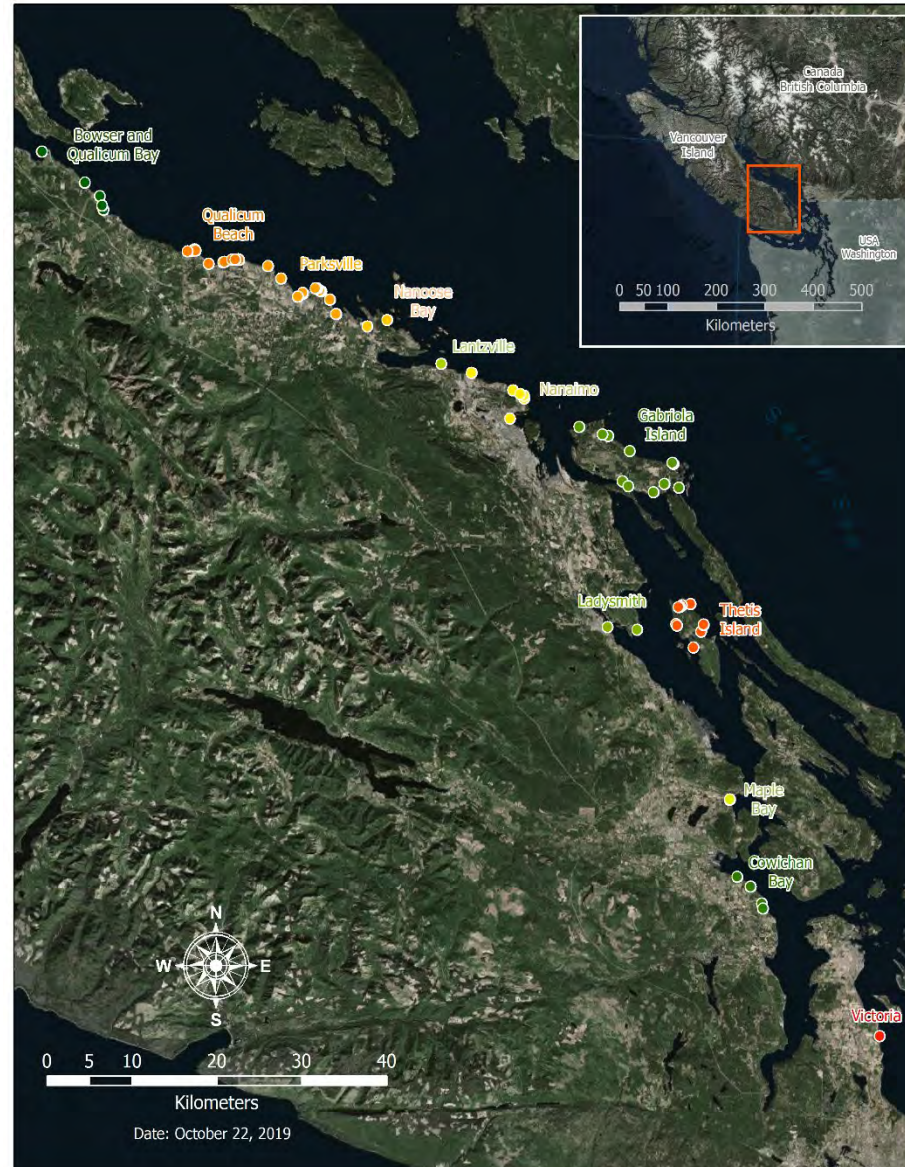


- In 2005: BC Shore Spawners Alliance initiated spawning surveys in the Strait of Georgia
- Between 2013 to 2018: Island Trust Fund conducted habitat suitability assessments for the BC Gulf Islands
- Spawning beach surveys were sporadic, thus data is still limited
 - Inconsistent data management
- Requirement to have more consistent beach monitoring to identify spawning sites in BC.

MABRRI BEACH MONITORING



MABBRI SAMPLE LOCATIONS



FORAGE FISH SAMPLING

- Information collected
 - Tidal information
 - Current/past weather conditions
 - Site aspect & slope
 - Dominant sediment type & extent of shading
 - Human impacts
- 4L sediment sample collected

MAORRI
Vancouver Island University

Forage Fish Spawning Habitat Beach Survey

Samplers

Name(s)	
Organization	
Date (mni/dd/yy)	
Time (24hr)	
Camera ID	

Access Database ID: _____

Region	Municipality	Beach	DFO Mngt Area
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Last High Tide Time (24hr): _____ Elevation: _____

2nd Effective High Tide Time (24hr): _____ Elevation: _____

Calculating Tidal Elevation

Station	Elevation Change	Subtract Eye Height	Elevation Difference	Time	Elevation Relative to Chart Datum	Tidal Elevation (Chart Datum)
A						
B						
C						
D						
Total						

Current Conditions

Weather Conditions:	
Air Temp (°C)	
Wind Direction	
Wind Speed (km/hr)	
Water Temp (°C)	

Episodic Events (determined prior to or after sampling)

Has there been a storm event in the last week? Yes No

Date of Storm	
Maximum Wind Speed	Precipitation from Event (mm)
Storm Category	

Evidence of beach wrack harvesting? Yes No

Site Attributes

Aspect	Direction:				Bearing:	
Beach Slope	Flat (<5°)	Inclined (5°-20°)	Steep (>20°)	Slope of Beach (°):		
Max. Fetch Distance*						
Exposure**	Very Protected	Protected	Semi-Protected	Semi-Exposed	Exposed	Very-Exposed

* Determined from chart measurements
** Determined based on Maximum Fetch Distance

Sediment Sample Collection

Sample Station #	Time (24hr)	UTM (m)	Beach	Backshore	Width (m)	Length (m)	Sample #	Landmark Object	Landmark Distance (m)	Tidal Elevation	Shading	Sample Type	Surf-Smelt	Sand Lance	Photo #

Comments

Forage Fish Spawn Sample Lab Analysis

Sample Station #	Sample #	Species	# of Eggs	Alive:Dead	Comments

Processed by: _____

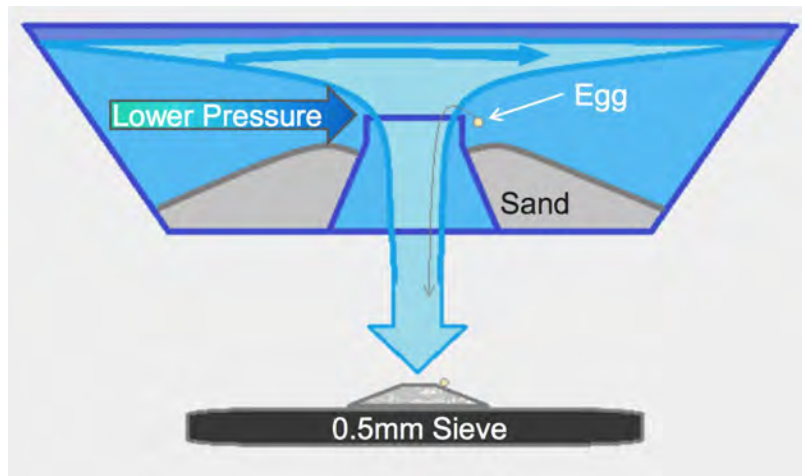
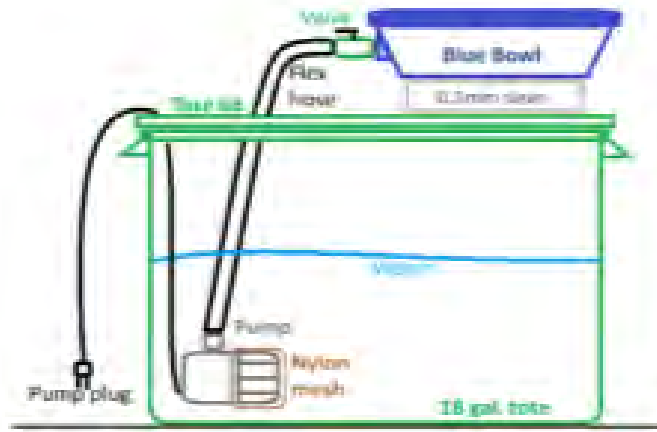
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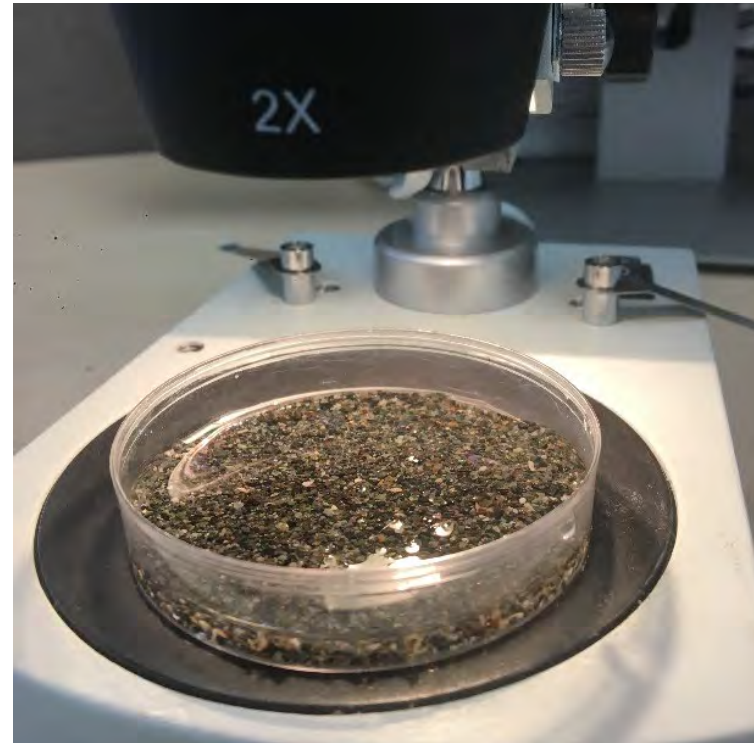
FORAGE FISH SAMPLE PROCESSING: SIEVING



FORAGE FISH SAMPLE PROCESSING: VORTEX



FORAGE FISH SAMPLE PROCESSING: LAB



FORAGE FISH EMBRYOS

Pacific sand lance



© MABRRI, 2018

Surf smelt



© Brian Kovel, Peninsula Stream Society, 2019

POSITIVE SITES



CITIZEN SCIENTISTS



CITIZEN SCIENCE GROUPS



LONG TERM DATA COLLECTION



STRAIT OF GEORGIA DATA CENTRE



The screenshot shows the homepage of the Strait of Georgia Data Centre. At the top, there is a dark navigation bar with the following elements from left to right: the text "STRAIT OF GEORGIA DATA CENTRE", the UBC logo, the text "THE UNIVERSITY OF BRITISH COLUMBIA", the text "Institute for the Oceans and Fisheries", and the Pacific Salmon Foundation logo. Below this bar is a horizontal menu with buttons for "About", "Why", "Biota", "Environment", "People", "Data", "Search Literature", "Map Catalogue", and "Contact Us". The main content area features a large, vibrant photograph of salmon swimming in water. A white rectangular box with the text "DATA CONTENTS" is overlaid on the left side of the image. Below the image is a row of four small circles, with the second circle from the left being filled black, indicating the current slide. At the bottom of the page, a light gray box contains the text "The Strait of Georgia Data Centre".