Beach Spawning Habitat in British Columbia

“To Conserve and Protect”
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 course 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

FORAGE FISH BEACH SPAWNING HABITAT IN BRITISH COLUMBIA

* Tidal elevation and biophysical configuration of a beach will vary based on location | ** Chart Datum
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
  o 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
  o Under this Act, protection to all fish and fish habitat was re-established.
  o Fish habitat is identified as the intertidal and subtidal habitat found below the Higher High Water Line (HHWL)
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.
MABRRRI 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
FORAGE FISH SAMPLE PROCESSING: SIEVING
FORAGE FISH SAMPLE PROCESSING: VORTEX

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FORAGE FISH SAMPLE PROCESSING: LAB
FORAGE FISH EMBRYOS

Pacific sand lance

Surf smelt

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POSITIVE SITES
CITIZEN SCIENTISTS
LONG TERM DATA COLLECTION
The Strait of Georgia Data Centre