



## **Conserving forage fish beach spawning habitats in British Columbia**

*Rachel Wang, WWF-Canada*

*Haley Tomlin, Mount Arrowsmith Biosphere Region Research Institute, Vancouver Island University (VIU)*

### **Outline**

- State of beach protection in British Columbia
- State of beach monitoring in British Columbia
- Technical document for beach surveys
  - Predictive mapping tool for potential spawning habitats
  - Methods adapted and developed with subject experts
  - Pilot sites with partners
- Next steps moving forward

### **State of beach protection in British Columbia**

- Some industry-led efforts in the past; Green Shores credits and ratings program currently building some good momentum; but, limited best practices to date
- No existing policies that specifically identify forage fish beach spawning habitat protection, but there has been recent attention from Fisheries and Oceans Canada (DFO):
  - November 2016: Launched Coastal Restoration Fund; \$75M CAD over 5 years to restore coastal aquatic habitats; British Columbia has 11 projects, including for eelgrass and watershed restoration
  - February 2018: Introduced Bill C-68; Restores protection for all fish and fish habitat, which were lost under the Fisheries Act in 2012; Explicitly references rights of Indigenous peoples and use of traditional knowledge
  - March 2018: Hosted “Filling the Forage Fish” Gap Science Workshop for non-commercial species on the Pacific coast; US experts invited; Developed recommendations for DFO

### **State of beach monitoring in British Columbia**

- Very limited; 3-4 decades behind Puget Sound surveying
- 2008: BC Shore Spawners Alliance, championed by Ramona de Graaf, began conducting beach surveys throughout Strait of Georgia
- 2013-2018: Islands Trust Fund produced suitable spawning habitat assessments for the Gulf Islands, specifically for Pacific sand lance and surf smelt; The areas highlighted in green on this image represent the Gulf Islands.
- Presently still lacking data on spawning habitats; Poor database management

### **British Columbia Beach Survey Technical Document**



- To ensure consistent data collection, management and use in British Columbia (and broader Salish Sea)
- Adapting Washington Department of Fish and Wildlife methods and existing methods in British Columbia
- Structured similarly to Moulton & Penttila's Field Manual. Sections include:
  - Site selection (predictive modelling)
  - Beach survey (Washington's vortex method); Quality Assurance Quality Control challenges remain for lab analysis and data reporting
- Currently finalizing first draft for US and Canada expert input and review; Will circulate to those that request

### **ShoreZone predictive tool**

- WWF worked with Coastal and Ocean Resources to develop a predictive mapping tool, which could be used to identify potential spawning habitat where no inventories of spawn have been conducted
- Compared 2 datasets: (1) with attributes of potential habitat attributes (such as beach form, exposure, dominant substrate) and the BC ShoreZone database.
- ShoreZone is a shoreline classification system based on aerial imagery and video.

### **British Columbia ShoreZone predictive tool**

- When you run the codes from that table, you get map outputs like the one on this slide with suitable spawning habitats identified
- It is important to note that, with any model, there are limitations; Here, the date of imaging/mapping should be noted when considering the predictive power of the tool
- Should also understand there are seasonal changes and other drivers of spawning habitat that may not be fully captured in the maps
- One way of strengthening your model or tool is by ground truthing, which is what Haley will be speaking to next.

### **Mount Arrowsmith Biosphere Region Research Institute (MABRRI)**

- Established in 2014 at Vancouver Island University, the Mount Arrowsmith Biosphere Region Research Institute (MABRRI) is the engine behind the Mount Arrowsmith Biosphere Region's (MABR) research and educational programs.
- MABRRI also works to uphold VIU's Research and Academic plan by creating projects and initiatives that have a regional impact.
- MABRRI's mission is to advance a program of inquiry that involves regional stakeholders in meaningful explorations of issues of local relevance.
- By harnessing the knowledge of the MABR community and the interdisciplinary strengths of students and faculty at Vancouver Island University, MABRRI is a centre for collaborative



research, innovation, and knowledge sharing that elevates the relationship between people and nature on Vancouver Island and within the Mount Arrowsmith Biosphere Region.

- MABRRI contributes to the success of VIU and the MABR through research and education. Our team envisions, funds and coordinates research projects and educational programs or initiatives that advance “environmental, economic and social (including cultural and spiritual) sustainability” (UNESCO. 2008. Madrid Action Plan. Paris: UNESCO MAB Secretariat.)

### **Predictive Mapping**

- MABRRI hired a GIS intern from the Advanced Diploma in GIS at VIU to generate predictive mapping for forage fish spawning habitat along the southeastern coast of Vancouver Island from Bowser south to Sooke.
- Additionally, the intern created maps for those Gulf Islands that had not yet been produced by Coastal and Ocean Resources.
- Coastal and Ocean Resources same predictive tool that they developed was used to develop the maps, in addition to Islands Trust sediment suitability data, which identifies pieces of coastline that have sediment favourable to spawning forage fish.

### **Beach Surveying**

- Phillip Dionne, of the WDFW, travelled up to VIU to train seven MABRRI employees and two WWF-Canada employees in WDFW’s sampling and surveying methodology.
- Phillip also went through the required equipment and set up to use the Vortex Method that is used throughout Washington State now for forage fish embryo sampling, it is the most effective method of embryo collection.

### **MABRRI’s Sample Sites**

- To start, focused on the Parksville Qualicum Beach area
- Established sites that we will monitor frequently in the upcoming summer and winter spawning seasons
- A variety of situations, including late equipment arrival and modifications to the methodology resulted in MABRRI’s first year sampling occurring less frequently than what had been originally been anticipated by the team.
  - However, now that the methodology is set and the necessary materials have been acquired, the team will be heading into the surf smelt spawning season prepared for ample sampling efforts.

### **Next steps**

- Resume conducting beach surveys along the Vancouver Island and Gulf Island coastlines, beginning in May
- Finalize Technical Document for BC beach surveys



- Work towards developing and implementing an updated training program that can be used throughout the BC Salish Sea