

Nearshore fish populations within St. Paul's Inlet, an estuarine system in Western Newfoundland

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Introduction

Management of the coastal marine resources surrounding the Island of Newfoundland has been seen as being increasingly required as a response to continued declines in abundances of commercially fished species. The importance of fisheries to the ecological, social and economic well-being of the communities which exist in these coastal regions is realized by the Community-University Research for Recovery Alliance (CURRA) (<http://www.curra.ca>). One focus of the CURRA is the community of St. Pauls Inlet and description of the fish fauna of it's brackish-water estuarine fjord.

St. Paul's Inlet is located in western Newfoundland, near the northern limits of Gros Morne National Park. The Inlet is 11 km in length and ranges from a 6 km width at its widest point in the eastern portion, tapering to approximately one km width at the western end. The surface area of the Inlet is approximately 30 km² (Figure 1).

St. Paul's represents a transition zone between temperate and arctic environments. An initial study of the inlet in 1976/1977 suggested moderate near-shore fish diversity (23 species; Carter & MacGregor 1979, Report to Parks Canada, GMNP), with no further studies conducted since that time.

Objectives of this study were to

- Document the nearshore fish fauna within St. Paul's Inlet and compare with other regional data sets (such as Bonne Bay in Gros Morne National Park) as well as with the 1979 marine inventory done by Carter & MacGregor.
- Assess variability in species composition associated with different habitats at different sites, and relate to possible within-inlet variability in salinity (future work)

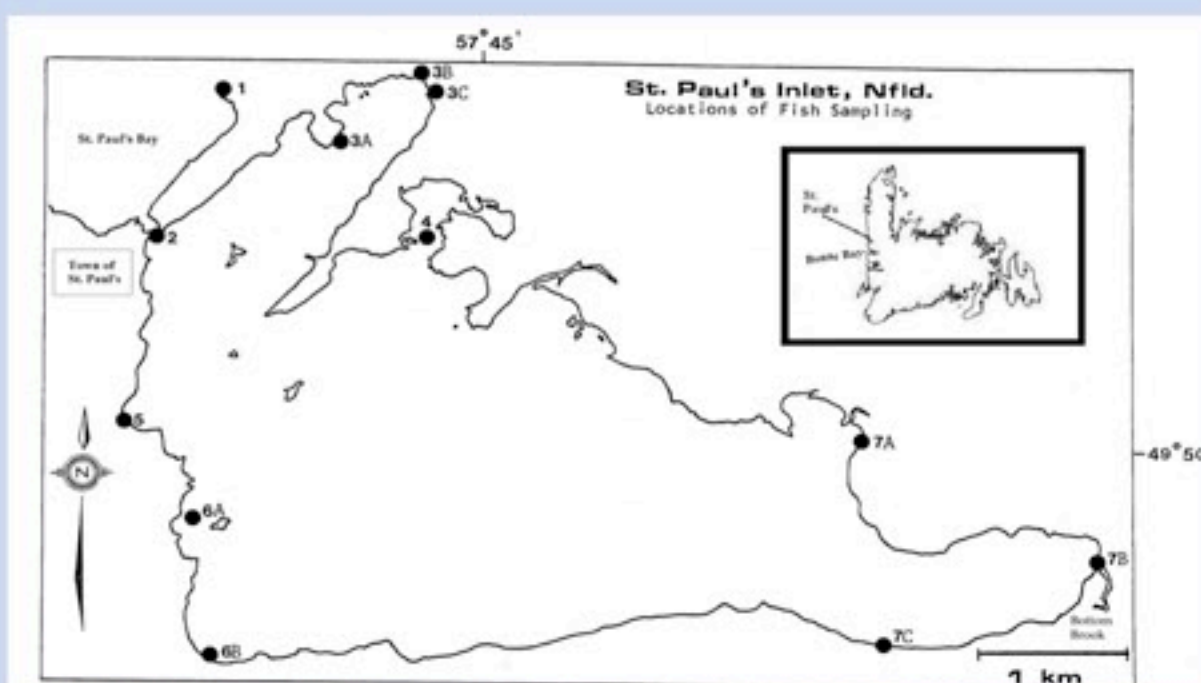


Figure 1. Location of study sites within St. Paul's Inlet. Sites 1 and 2 are most saline.

Methods

Sampling took place during the month of August of 2010, with 7 sites sampled. Sites were chosen to best represent a potential range in salinities, as well as for ease of accessibility. The most marine environments were expected to be found nearest the opening into St. Paul's Bay and the most fresh nearest the western portion of the Inlet. Not all sites were sampled with the same gear types as the substrates at some locations did not permit their use. Certain sites were given supplementary sub-sites to more comprehensively sample the fish fauna.

During sampling 3 different gear types were utilized: small 10 m beach seine, minnow traps and multi-paneled gill nets. Salinity, dissolved oxygen and water temperature were taken at every sampling location using a YSI model 85; sites were plotted with GPS coordinates.

Table 1. Benthic substrates and method used for sampling sites in St. Paul's Inlet August, 2010.

Site	Substrate	Sampling Method
1	sandy with boulders	min trap/seine
2	exposed bedrock with cobblestone	min trap/seine
3A	sandy	min trap
3B	cobblestone with boulders	min trap
3C	sandy with few cobblestones	min trap
4	sandy	min trap
5	cobblestone with boulders	min trap/seine
6	gravel	min trap/seine
7A	sandy with gravel	min trap
7B	sandy with gravel	gill net/seine
7C	cobblestone with boulders	gill net/seine



Figure 2. Shoreline of site 2 in St. Paul's Inlet. **Many thanks to Mr. Willis Payne for assistance with field work.**

Results

A total of 1451 fish were caught comprising 15 species and representing 10 families (Table 2).

Cluster analysis (UPGMA) was performed using NTSYS software and Jaccard's similarity for 10 m beach seine data.

Little differentiation in fish assemblage was observed between sites in St. Paul's Inlet (sites showed at least 76% similarity; Figure 3).

Comparison between St. Pauls Inlet (August 2010) and Bonne Bay (2002-2008) produced a dendrogram with a distinct marine cluster comprised of Bonne Bay sites and a distinct estuarine cluster comprising the St. Paul's sites (Figure 4).

Table 2. Species caught in St. Paul's Inlet during August 2010

Family Anguillidae
<i>Anguilla rostrata</i>
Family Salmonidae
<i>Salvelinus fontinalis</i>
Family Osmeridae
<i>Osmerus mordax</i>
Family Gadidae
<i>Microgadus tomcod</i>
<i>Urophycis tenuis</i>
Family Gasterosteidae
<i>Gasterosteus aculeatus</i>
<i>Gasterosteus wheatlandi</i>
<i>Apletodes quadracus</i>
<i>Pungitius pungitius</i>
Family Labridae
<i>Tautoglabrus adspersus</i>
Family Pholidae
<i>Pholis gunnellus</i>
Family Cottidae
<i>Myoxocephalus octodecemspinosus</i>
<i>Myoxocephalus scorpius</i>
<i>Myoxocephalus aeneus</i>
Family Pleuronectidae
<i>Pseudopleuronectes americanus</i>

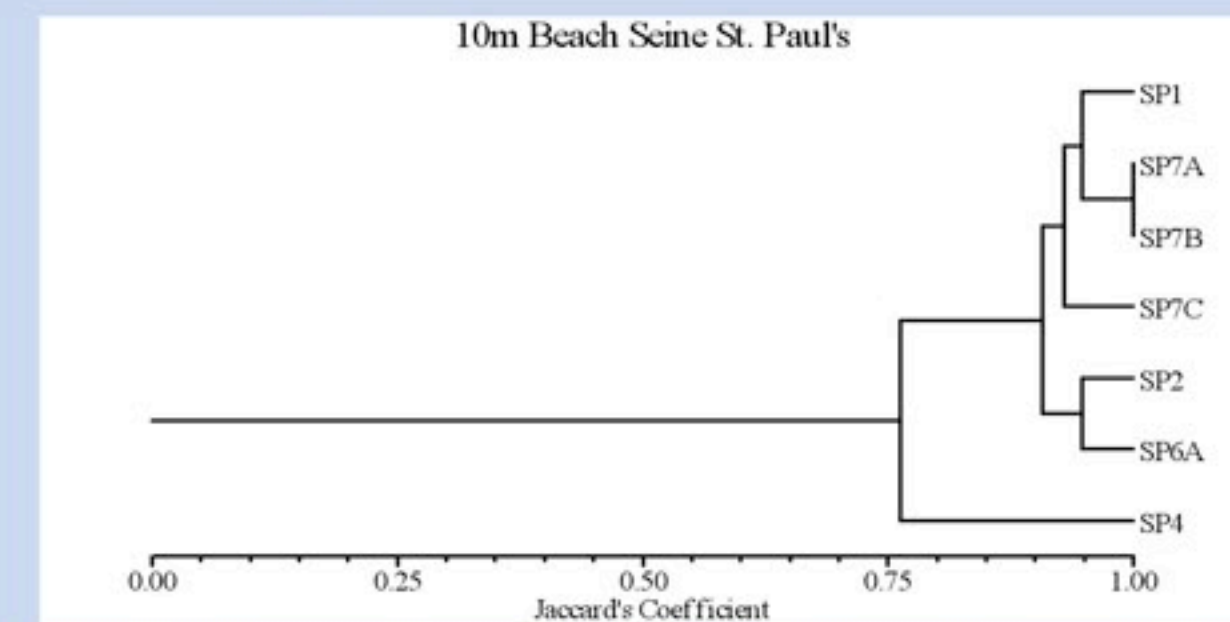


Figure 3. Dendrogram of Jaccard's similarity coefficient values calculated for fish sampled with the 10 m beach seine in St. Paul's Inlet.

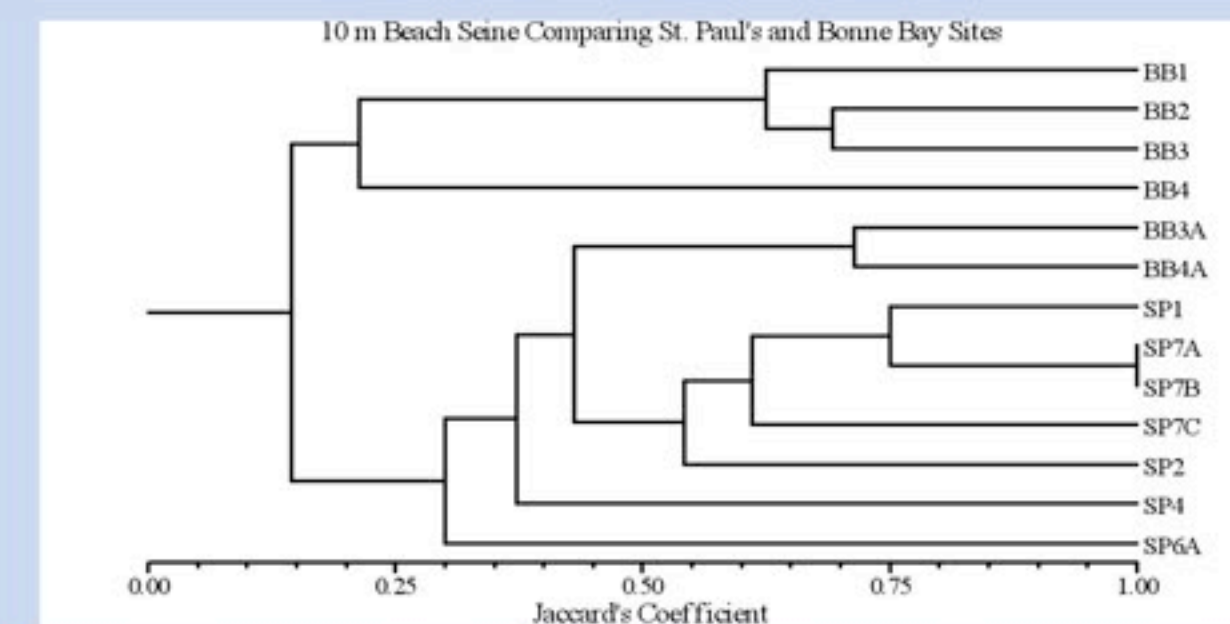


Figure 4. Dendrogram of Jaccard's similarity coefficient values calculated for fish sampled with the 10 m seine for Bonne Bay and St. Paul's Inlet.