

**Piping Plovers
in the Bras d'Or Lakes:
Traditional Ecological Knowledge
and Distribution Mapping**



Prepared for

Canadian Wildlife Service, Environment Canada

17 Waterfowl Lane Sackville, NB, E4L 1G6

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Introduction

The piping plover (*Charadrius melodus*) is an endangered species found only in North America. The adult is a distinct, small sandy-colored bird with a white underbelly and black ring around the neck. Other distinctive features include a black band across its crown, an orange bill and yellow-orange legs. In the winter months, the black markings become absent (Canadian Wildlife Service, 1989, 1998).

Along the Atlantic coast of North America this species breeds on sandy beaches along the Canadian Maritime Provinces to South Carolina and winters along the Gulf of Mexico to the southern Atlantic coast and in a few of the Caribbean Islands. Piping plovers begin to arrive on the shores of Cape Breton Island, Nova Scotia in late March and start nesting between late April and early August often laying between 2-4 eggs. They tend to nest on sparsely vegetated flat sandy or gravel-like beaches. Both parents incubate the eggs, hatching taking place approximately 27-29 days later in early June (Canadian Wildlife Service, 1989). Shortly after hatching they are able to feed themselves and the young are usually fledged by late July to early August (Environment Canada 2004).

In the early 1900's the piping plover became almost extinct due to hunting. In 1918, the Migratory Bird Act prohibited hunting of this species to allow population numbers to increase. In 1945, however, the Atlantic coast piping plover populations began to drastically decline due to an increase in recreational activities and local pollution which resulted in the destruction of breeding and feeding habitats for this species. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), listed the piping plover as threatened in 1978, and then re-listed the plover as endangered in 1985, and again in 2001 (Environment Canada, 2004). Currently these birds, their eggs and nests are protected by the Federal Migratory Bird Convention Act and the species at Risk Act (SARA).

The Bras d'Or Lakes are situated in the center of Cape Breton Island, Nova Scotia as a large estuarine body of interconnecting bays, barachois ponds, channels and islands. The term "Lakes" refers to two main components, the North Basin and the Bras d'Or Lake connected by a 500 m wide opening (Barra Strait), are known collectively as the Bras d'Or Lakes. The smaller component, the North Basin, branches in two channels that lead to separate and small openings to the Atlantic Ocean. The Bras d'Or Lake connects to the Atlantic Ocean on its southern most portion through a small man-made canal that permits only an occasional exchange of water during vessel movements.



The perimeter of the Bras d'Or Lakes measures approximately 1000 km (Petrie and Raymond 2002) and has a total area of 1080 km² (Strain and Yeats 2002). Average depth is 30 m but varies throughout the lakes. St. Andrew's Channel for example has a maximum depth of 280 m while small bays and coves have average depths of 10 m or less. Tidal range diminishes rapidly from the Great Bras d'Or channel inward with tidal ranges between 16 cm near the entrance to 4 cm at Iona (Gurbutt et al. 1993 and Petrie and Bugden 2002). Salinity and temperature varies by area. Salinity ranges from 30 ppt in the Great Bras d'Or Channel to salinities lower than 18 ppt in semi-enclosed basins (Gurbutt et al. 1993) but averages tend to fall around 22 ppt in most of the open regions. Winter temperatures fall to 0°C (Petrie and Bugden 2002), however in past decades the majority of lakes were frozen. Summer temperatures exceed 16°C in July and surface and sub-surface temperatures are even higher (>20°C) in shallow coves such as Gillis Cove in River Denys Basin. Substrata are primarily silt with smaller proportions of sand, gravel and boulders (Tremblay 2002).

The environmental quality of the lakes is still considered to be very good with sewage inputs from farming operations and inadequate treatment plants and residential on-site disposal systems being the primary sources of pollution. Organic contamination (PCBs, PAHs) and heavy metals (such as Cu, Zn, Pb, Cd for example) in sediments, water and biota are well below the federal sediment and water quality guidelines. The productivity of the Bras d'Or Lakes has been described as low and can only support a relatively low level of natural productivity (Strain and Yeats 2002).

The Bras d'Or Lakes are home to a variety of biota. Warm and cold water fish and invertebrates are residents with several fish species such as mackerel, herring, and salmon migrating to the lakes annually to spawn (Lambert 2002). Other types of fish and invertebrates that are found in the Atlantic Ocean are also found in the Bras d'Or Lakes. With its rare physical and chemical oceanography, distribution range of temperate and arctic biota occurring in less than 10 km of water (Lambert 2002), and diversity of habitats, the Bras d'Or Lakes are truly a unique ecosystem. While the Bras d'Or Lakes are similar physical habitats as the Atlantic Coast for the piping plover, the idea of the Bras d'Or Lakes as piping plover habitat has been over-looked.

Twenty beaches along the Atlantic coast of Cape Breton Island are monitored yearly for piping plovers. As of 2003, only three of these sites are known to be existing piping plover nesting areas and only two are known to be pre-existing nesting areas. Initial reports of traditional knowledge suggests that piping plover populations existed along some of the sandy areas of the Bras d'Or Lakes, especially in Malagawatch. Malagawatch is an area in Cape Breton of which all five First Nation communities in Cape Breton Island have equal access. This area has traditionally been used as a hunting, fishing and gathering area. There were many beaches and shorelines along the Bras d'Or Lakes that were not examined as existing and potential piping plover habitats until 2004.

During the summer of 2004, Unama'ki Institute of Natural Resources completed a study on piping plovers in the Bras d'Or Lakes. Within this study TEK (traditional ecological knowledge) surveys and habitat identification were conducted. One hundred and two (102) beaches were surveyed for piping plover habitat suitability. Sixty two (62) of these beaches appeared to be suitable breeding habitat. Due to the late time of funding approval, these beaches could not be completely examined for the presence of piping plovers. UINR continued this research in 2005 to determine if piping plovers were present in the Bras d'Or Lakes.



Research Objectives

Cape Breton Island (Unama'ki) is home to five of the thirteen Mi'kmaw communities in Nova Scotia. The Bras d'Or Lakes, situated in the centre of Cape Breton Island is relatively free from industrial pollution and land development and provides a unique habitat for many fish and waterfowl. The research questions UINR intends to investigate are:

1. What other traditional information on piping plover sighting can be obtained from the Unama'ki communities (Chapel Island, Wagmatcook, Membertou, We'koqma'q, Eskasoni and year-round residents of Malagawatch)?
2. Based on map shoreline information, are there sites that would make good nesting and feeding areas?
3. Are there any existing piping plover populations in the Bras d'Or Lakes?

Methods

In 2004, twenty-one (21) traditional ecological knowledge (TEK) surveys were conducted in areas around the Bras d'Or Lakes. An additional twenty six (26) TEK surveys were conducted in 2005. Attempts were made to gather this information in a consistent manner from all individuals interviewed but this was not always the case. Some individuals could provide more information than others. A copy of the questionnaire is included as Appendix A.

Using the MapInfo database (habitat and wildlife based maps) at the Eskasoni Fish & Wildlife Commission Inc. (EFWC) of the shoreline surrounding the Bras d'Or Lakes, beaches were chosen based on specific land formations, i.e., beaches with a back beach or on a narrow point were chosen. Selected beaches were visited to further examine the area to determine if it would be suitable habitat for piping plovers. Piping plover searches were conducted on each beach that was visited.

Twenty one (21) surveys (Appendix A) were conducted in areas around the Bras d'Or



Results Traditional Ecological Knowledge

Lakes (Table 1). Of these twenty one (21) people surveyed, thirteen (13) were native and residing in communities surrounding the Bras d'Or Lakes and eight (8) were non-native, either visiting or also residing in communities around the Bras d'Or Lakes. Only eight (8) people surveyed knew what a piping plover looked like and had seen at least one before. Four (4) of these people were members of the Unama'ki First Nations communities, three (3) were non-native Cape Breton residents, and one (1) person was a non-native visitor who owned a cabin around the Bras d'Or Lake. Five (5) of these individuals (four (4) native residents and 1 non-native cabin owner) believe they have seen or may have seen these birds on some of the beaches surrounding the Bras d'Or Lakes, in particular, Amagaudee's Pond, Malagawatch, Militia Point, MacLeod's Point, and Whyocomag Bay.

An additional twenty six (26) TEK surveys were conducted in 2005. Seven (7) of the people surveyed had seen a piping plover before, but only five (5) believe they have seen them around the Bras d'Or Lakes. These areas include Ben Eoin, Amagaudees Pond, Malagawatch (Militia Point), Chapel Island, West Bay, and St. Peter's Inlet. The other 2 people believe to have seen piping plovers on other Cape Breton beaches, such as Inverness Beach, Pondville Beach, and Point Michaud Beach. All of these beaches were visited but no piping plovers were observed.

Examination of Potential Plover Sites

In 2004, one hundred and two (102) beaches were examined to be potential piping plover habitat (Table 3). Sixty two (62) beaches appeared to be suitable piping plover breeding habitat (Fig. 1 – 8). These beaches often had sandy or gravel-like substrate with a front and back beach. Many beaches contained seaweed and driftwood that could house a good source of food for the plovers. On three (3) of the beaches tire tracks from ATV's were visible in the sand, which could pose a threat to any plover chicks if present in these areas. Three (3) beaches contained seagulls and crows, which are known to prey on plover chicks. Cormorants were present on three (3) of the beaches. Terns were also present on three (3) of the beaches, which tend to ward off gulls and crows, thus creating protection from predators for plover chicks (Kejimikujik Seaside Adjunct, 1996). The remaining forty (40) beaches were either too rocky, contained too much vegetation, or were too narrow with not enough exposed shoreline.

Seven (7) of the sixty two (62) beaches, however, that seemed to be suitable piping plover habitat in 2004, no longer seemed suitable in 2005. It was evident during this sampling year that shorelines around the Bras d'Or Lakes are eroding and continually changing. Some of the beaches surveyed which once had sandy wide shoreline in 2004, were thinner and more rocky with sand no longer present in 2005. From these observations, a new table depicting the remaining suitable piping plover habitats was created (Table 4). No piping plovers were found on any of these beaches during 2004 and 2005.



Discussion

In 2004, one hundred and two (102) beaches were examined to be potential piping plover habitat. Sixty two (62) beaches appeared to be suitable piping plover breeding habitat, and forty (40) appeared to be unsuitable sites (Table 3). Some of these results have changed due to the erosion of some of the shorelines. In 2005, seven (7) suitable beaches were reclassified to unsuitable beaches, bringing the total of suitable piping plover nesting beaches around the Bras d'Or Lakes to fifty five (55) (Table 4). According to information collected from the TEK surveys, piping plovers have been seen in areas around the Bras d'Or Lakes (Tables 1 – 2). However, the survey did not determine when the birds were seen. Future surveys should also determine if the birds were seen recently or in the past. During this survey, however, no piping plovers were found. Future examination of these beaches should be periodically conducted to determine if there is a presence of piping plovers, especially on the beaches where people believe to have seen these birds.

Acknowledgements

We would like to thank Anna McCarron (NS Piping Plover Guardian Program), Don Anderson (NS Department of Natural Resources), Diane Amirault, Andrew Boyne, and Julie McKnight (Canadian Wildlife Service) for training and providing valuable information about piping plovers and their behavior. We would also like to thank Charlie Dennis, Bob Denny, Patrick Joe, Lorraine Marshall, Raymond Prosper, John James Gould, Danny Stevens, and Darren Tower (Eskasoni Fish and Wildlife Commission) for assisting in piping plover habitat searches. Additional thanks go to Allison McIsaac, Jason Pierro and Tom Johnson (Eskasoni Fish and Wildlife Commission) for assistance with creating maps using GIS (Geographic Information Software). Funding for this project was made possible from Environment Canada's Canadian Wildlife Service.



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Appendix A: Tables

Table 1. Results from the 2004 TEK surveys.

Area	Comments	Native or Non-Native	Have they ever seen a piping plover	Where?	Have they ever seen a piping plover around the Bras d'Or Lakes	Where?
Baddeck	Resident	Non-Native	Yes	Antigonish	No	N/A
Baddeck	Port Manager	Non-Native	No	N/A	N/A	N/A
Baddeck	Resident	Non-Native	Yes	Lawrencetown	No	N/A
Baddeck	Boater	Non-Native	No	N/A	N/A	N/A
Baddeck	Boater	Non-Native	No	N/A	N/A	N/A
Ben Eoin	Bird Society	Non-Native	Yes	Big Glace Bay Beach	No	N/A
Chapel Island	Resident	Native	No	N/A	N/A	N/A
Chapel Island	Resident	Native	No	N/A	N/A	N/A
Chapel Island	Resident	Native	No	N/A	N/A	N/A
Eskasoni	Resident	Native	Yes	Malagawatch ?	Yes ?	Malagawatch ?
Eskasoni	Biologist	Native	Yes	Amaguadees Pond	Yes	Amaguadees Pond
MacLeod's Point	Cabin Owner	Non-native	Yes	MacLeod's Point	Yes	MacLeod's Point
Malagawatch	Cabin Owner	Native	Yes	Militia Point	Yes	Militia Point
Wagmatcook	Resident	Native	No	N/A	N/A	N/A
Wagmatcook	Resident	Native	No	N/A	N/A	N/A
Wagmatcook	Resident	Native	No	N/A	N/A	N/A
Whycocomagh	Resident	Non-Native	No	N/A	N/A	N/A
Whycocomagh	Resident	Native	No	N/A	N/A	N/A
Whycocomagh	Resident	Native	No	N/A	N/A	N/A
Whycocomagh	Resident	Native	No	N/A	N/A	N/A
Whycocomagh	Resident	Native	Yes	Whycocomagh Bay	Yes	Whycocomagh Bay



Table 2. Results from the 2005 TEK surveys.

Area	Comments	Native or Non-Native	Have they ever seen a piping plover?	Where?	Have they ever seen a piping plover around the Bras d'Or Lakes	Where?
Amaguadees Pond	Visitor / Camper	Non-Native	No	N/A	No	N/A
Ben Eoin	Resident	Non-Native	Yes	Ben Eoin	Yes	Same
Ben Eoin	Visitor / Camper	Non-Native	No	N/A	No	N/A
Chapel Island	UINR natural resource officer	Native	No	N/A	No	N/A
Chapel Island	UINR natural resource officer	Native	Yes	St. Peter's Inlet and near the Chapel Island Wharf	Yes	Same
Chapel Island	Resident and Cabin owner	Native	Yes	Chapel Island	Yes	Same
Eskasoni	UINR natural resource officer	Native	No	N/A	No	N/A
Eskasoni	UINR natural resource officer	Native	No	N/A	N/A	N/A
Eskasoni	UINR natural resource officer	Native	No	N/A	No	N/A
Eskasoni	UINR natural resource officer	Native	No	N/A	N/A	N/A
Eskasoni	Resident and Cabin Owner	Native	Yes	Malagawatch	Yes	Same
Eskasoni	Resident	Native	Yes	Amaguadees Pond	Yes	Same
Inverness	Resident	Non-Native	Yes	Inverness Beach	No	N/A
Isle Madame	Resident	Non-Native	Yes	Pondville and Point Michaud	No	N/A
Malagawatch	Cabin Owner	Native	No	Militia Point	Yes	Same
Malagawatch	Cabin Owner	Native	No	N/A	No	N/A
Malagawatch	Cabin Owner	Native	No	N/A	N/A	N/A
Malagawatch	Cabin Owner	Native	No	N/A	N/A	N/A
Marble Mtn.	Resident	Non-Native	No	N/A	No	N/A
Marble Mtn.	Resident	Non-Native	Yes	West Bay Islands near Marble Mtn.	Yes	Same
Membertou	UINR natural resource officer	Native	No	N/A	No	N/A
Membertou	UINR natural resource officer	Native	No	N/A	N/A	N/A
Wagmatcook	UINR natural resource officer	Native	No	N/A	N/A	N/A
Wagmatcook	UINR natural resource officer	Native	No	N/A	N/A	N/A
Whycocomagh	UINR natural resource officer	Native	No	N/A	N/A	N/A
Whycocomagh	UINR natural resource officer	Native	No	N/A	N/A	N/A



Table 3. List of areas around the Bras d'Or Lakes that were examined to be potential piping plover habitat, 2004. Non-suitable habitat is indicated by X, suitable habitat is indicated by √.

Location	Suitable Habitat	Location	Suitable Habitat	Location	Suitable Habitat
Baddeck Bay		Great Bras d'Or Channel		Evan's Head	X
Baddeck	X	MacFarlane Point	X	French Cove	X
		Ross Ferry Provincial Park	X	Hay Cove	X
Bras d'Or Lake (North)		Upper Kempt Head	√	Johnstown	√
Benacadie Point	√			Little Harbour	√
Ben's Beach	√	Malagawatch		MacKenzie's Pond	X
Campbell Pond	√	Boom Island	√	MacNabs Cove	X
Gillis Beach	√	Johnson Cove	√	MacRaes Point	X
MacInnis Pond	√	Noel Point	√	Murdocks Point	X
McKinnon's Point	√	Malagawatch Point	√	North Pond	√
Piper's Cove	√	Militia Point	√	Red Islands	X
Red Point West	√			Sandy Beach	√
		St. Andrew's Channel		Scotch Point	X
Deny's Basin		Almon's Point	X	Sheep Island	√
Stoney Point	X	Barrachois Harbour	√	Soldier's Cove	X
		Beaver Cove	√		
East Bay		Boisdale	X	West Bay	
Amaguadees Pond	√	Carmichael's Point	X	Cameron Island	√
Christmas Island	√	Christie's Beach	X	Campbells Point	√
Christmas Pond	√	Condor Point	X	Cow Island	√
Cossit Point	√	Groves Point	X	Dundee	√
Crane Cove	√	MacDougalls Point	X	Dunphrys Head	√
Curries Pond	√	Point Clear	X	Indian Beach	√
Dhu Point	√	Shawfield Point	X	Leonards Pond	√
Irish Cove	√	Shunacadie Beach	X	MacIntosh Cove	√
Lochmore Harbour	√			MacKenzie's Cove	X
MacDougall Point	√	St. Patrick's Channel		MacKenzie's Point	X
Marble Point	√	Cow Bay	X	MacLean's Cove	X
McAdam Point	X	Lower Washabuck	X	MacLeods Pt	√
McPhee Island	√	Murphy Point	X	McInnis Point	X
Middle Cape	√	Sheep Point	X	Morrison Head	X
		St. Patrick's Channel	X	Poor Point	X
Great Bras d'Or				Pringle Point	X
Big Beach	√	St. Peter's Inlet		Ranald Island	√
Blacksmith Point	√	Alick's Island	√	Ross Point	X
Christmas Island	√	Battery Provincial Park	X	St. Georges Channel	√
Gillis Point	√	Campbells Cove	√		
Grass Cove	√	Campbells Island	√	Whycocomagh Bay	
Iona Beach	√	Cape George	√	South Side	X
				Whycocomagh Bay	
John Alex Cove	√	Carters Cove	X	North Side	X
				Whycocomagh Bay	
Lochan Dhu	√	Chapel Island (Trap Point)	√		
MacKay Point	√	Damions Cove	X		
Plaster Cove	√	Dock Point	√		

Table 4. List of areas around the Bras d'Or Lakes that were examined to be potential piping plover habitat, 2005. Non-suitable habitat is indicated by X, suitable habitat is indicated by √.

Location	Suitable Habitat	Location	Suitable Habitat	Location	Suitable Habitat
Baddeck Bay		Great Bras d'Or Channel		Evan's Head	X
Baddeck	X	MacFarlane Point	X	French Cove	X
		Ross Ferry Provincial Park	X	Hay Cove	X
Bras d'Or Lake (North)		Upper Kempt Head	√	Johnstown	√
Benacadie Point	√			Little Harbour	√
Ben's Beach	√	Malagawatch		MacKenzie's Pond	X
Campbell Pond	√	Boom Island	√	MacNabs Cove	X
Gillis Beach	√	Johnson Cove	√	MacRaes Point	X
MacInnis Pond	√	Noel Point	√	Murdocks Point	X
McKinnon's Point	X	Malagawatch Point	√	North Pond	√
Piper's Cove	√	Militia Point	√	Red Islands	X
Red Point West	√			Sandy Beach	√
		St. Andrew's Channel		Scotch Point	X
Deny's Basin		Almon's Point	X	Sheep Island	√
Stoney Point	X	Barrachois Harbour	√	Soldier's Cove	X
		Beaver Cove	√		
East Bay		Boisdale	X	West Bay	
Amaguadees Pond	√	Carmichael's Point	X	Cameron Island	√
Christmas Island	X	Christie's Beach	X	Campbells Point	√
Christmas Pond	√	Condor Point	X	Cow Island	√
Cossit Point	√	Groves Point	X	Dundee	√
Crane Cove	X	MacDougalls Point	X	Dunphrys Head	√
Curries Pond	√	Point Clear	X	Indian Beach	√
Dhu Point	√	Shawfield Point	X	Leonards Pond	X
Irish Cove	X	Shunacadie Beach	X	MacIntosh Cove	√
Lochmore Harbour	√			MacKenzie's Cove	X
MacDougall Point	√	St. Patrick's Channel		MacKenzie's Point	X
Marble Point	X	Cow Bay	X	MacLean's Cove	X
McAdam Point	X	Lower Washabuck	X	MacLeods Pt	√
McPhee Island	X	Murphy Point	X	McInnis Point	X
Middle Cape	X	Sheep Point	X	Morrison Head	X
		St. Patrick's Channel	X	Poor Point	X
Great Bras d'Or				Pringle Point	X
Big Beach	√	St. Peter's Inlet		Ranald Island	√
Blacksmith Point	√	Alick's Island	√	Ross Point	X
Christmas Island	√	Battery Provincial Park	X	St. Georges Channel	√
Gillis Point	√	Campbells Cove	√		
Grass Cove	√	Campbells Island	√	Whycocomagh Bay	
Iona Beach	√	Cape George	X	South Side	X
				Whycocomagh Bay	
John Alex Cove	√	Carters Cove	X	North Side	X
				Whycocomagh Bay	
Lochan Dhu	√	Chapel Island (Trap Point)	√		
MacKay Point	√	Damions Cove	X		
Plaster Cove	√	Dock Point	√		

Appendix B: Figures

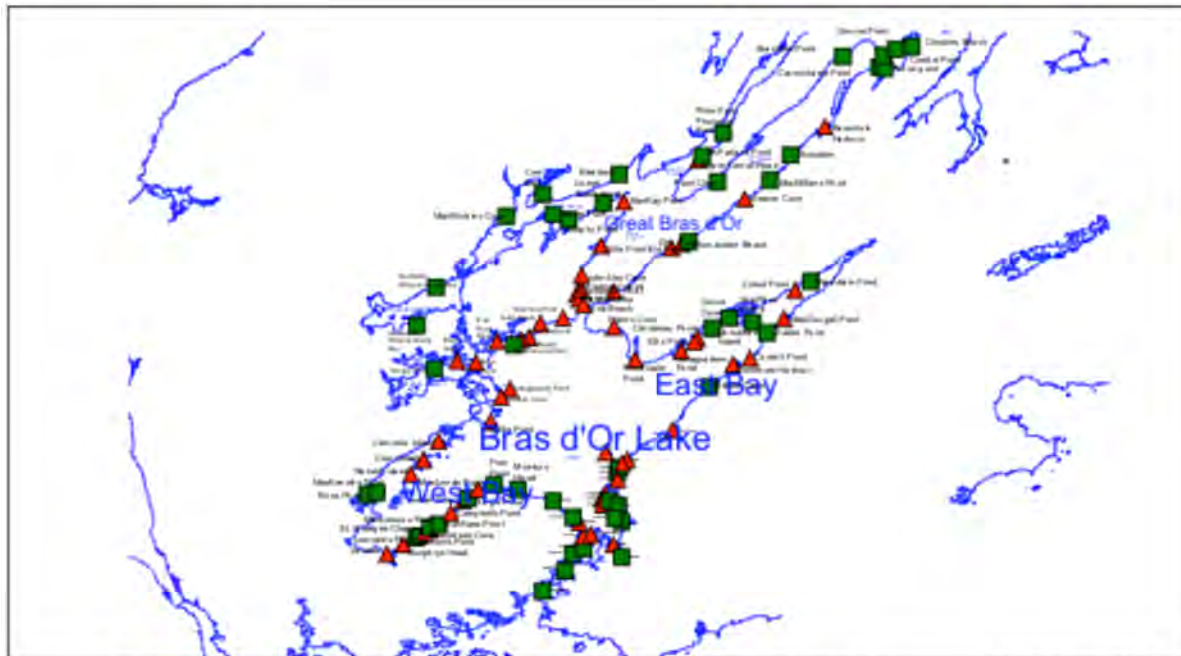


Figure 1. Beaches examined for potential piping plover nesting sites around the Bras d'Or Lakes, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.

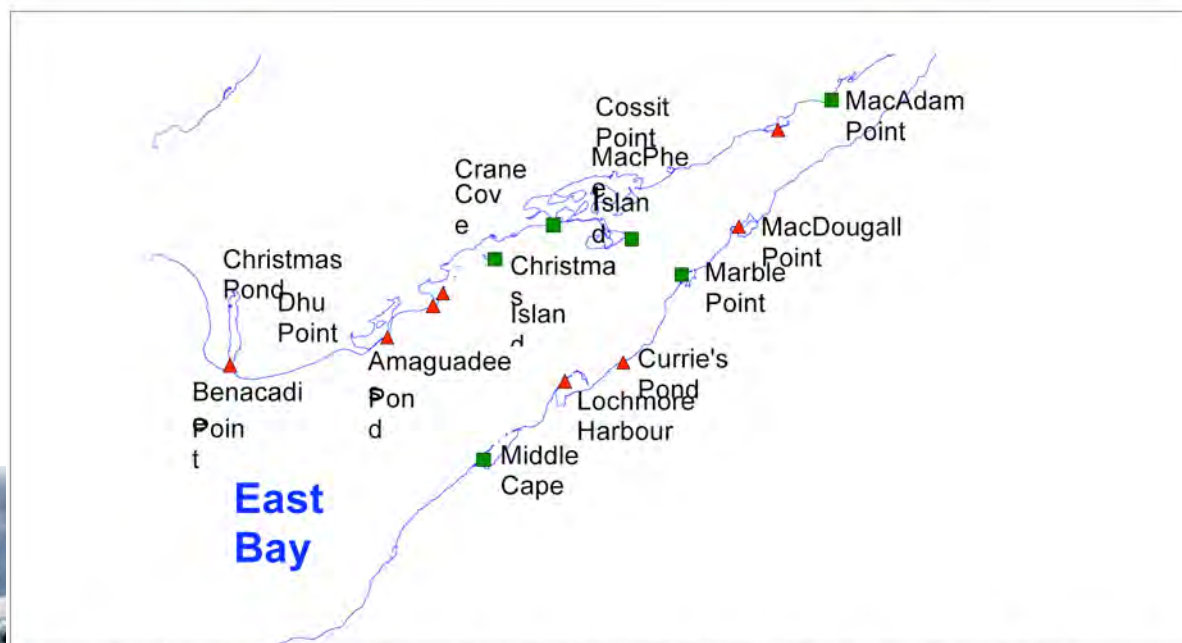


Figure 2. Beaches examined in East Bay for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.

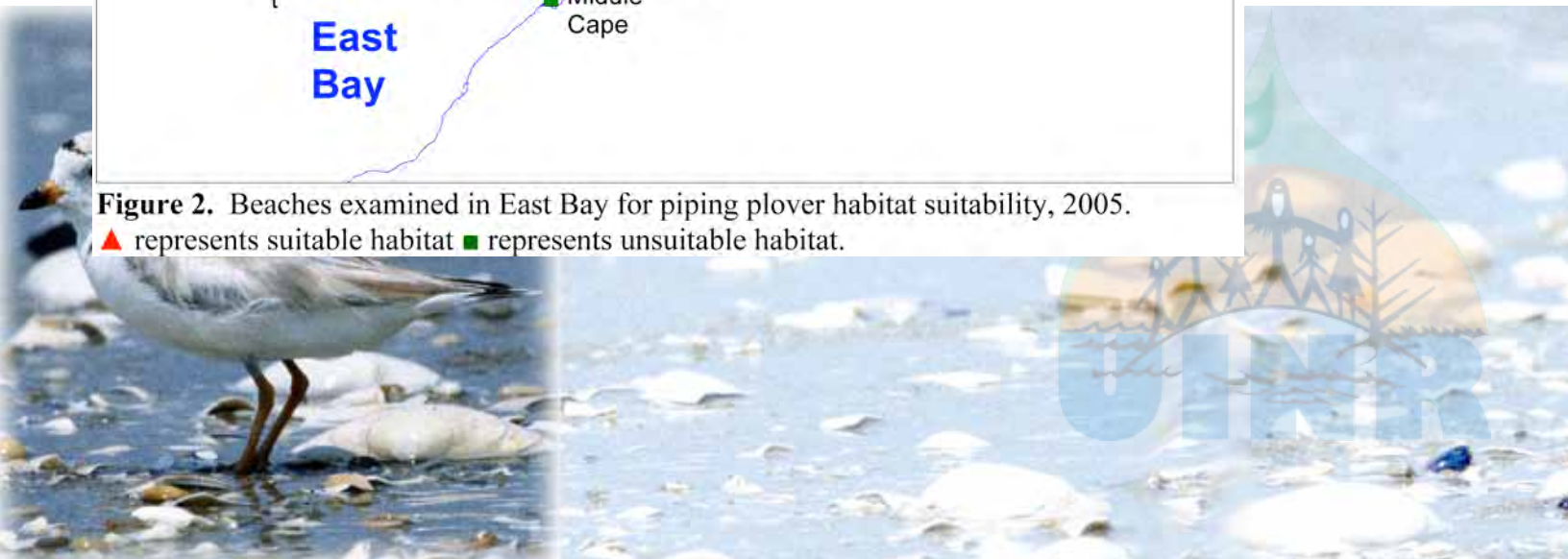




Figure 3. Potential beaches examined in St. Peter's Inlet and surrounding area for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.



Figure 4. Beaches examined in West Bay for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.

4.3 Assessment

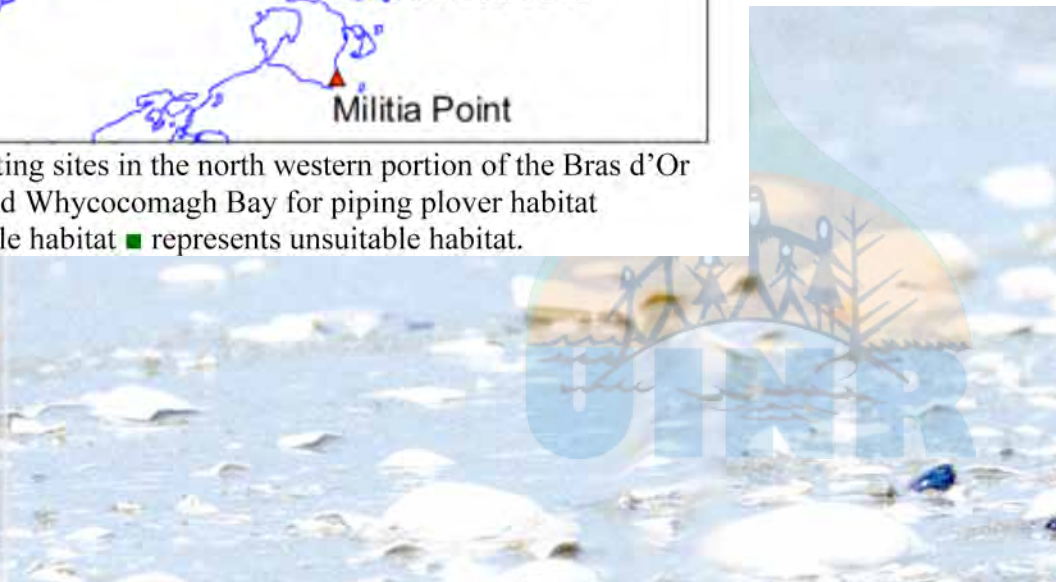
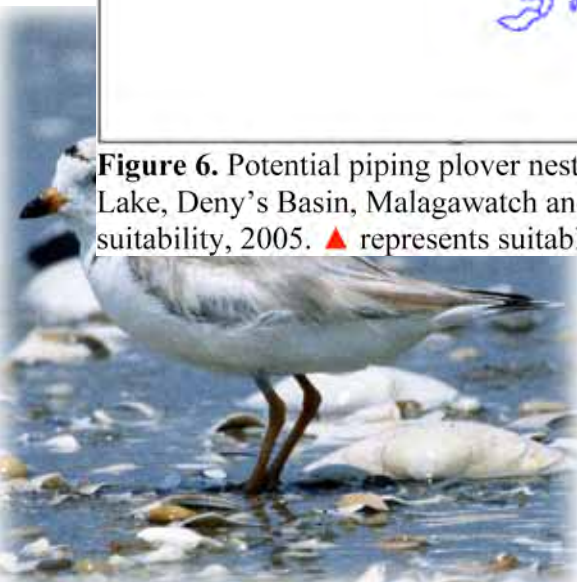




Figure 5. Beaches examined in the south end of the Bras d'Or Lake for piping plover habitat suitability, 2005. ▲ represents suitable habitat. ■ represents unsuitable habitat.



Figure 6. Potential piping plover nesting sites in the north western portion of the Bras d'Or Lake, Denys Basin, Malagawatch and Whycocomagh Bay for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.



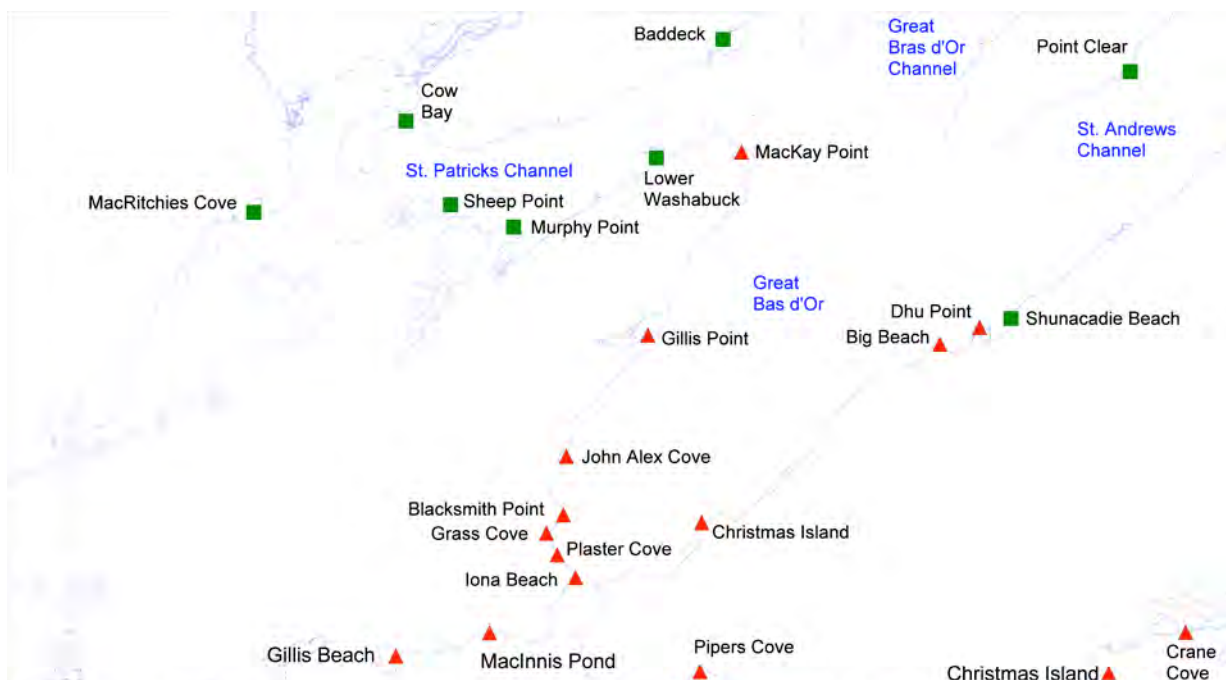


Figure 7. Beaches examined in the Great Bras d'Or Lake and St. Patricks Channel for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.

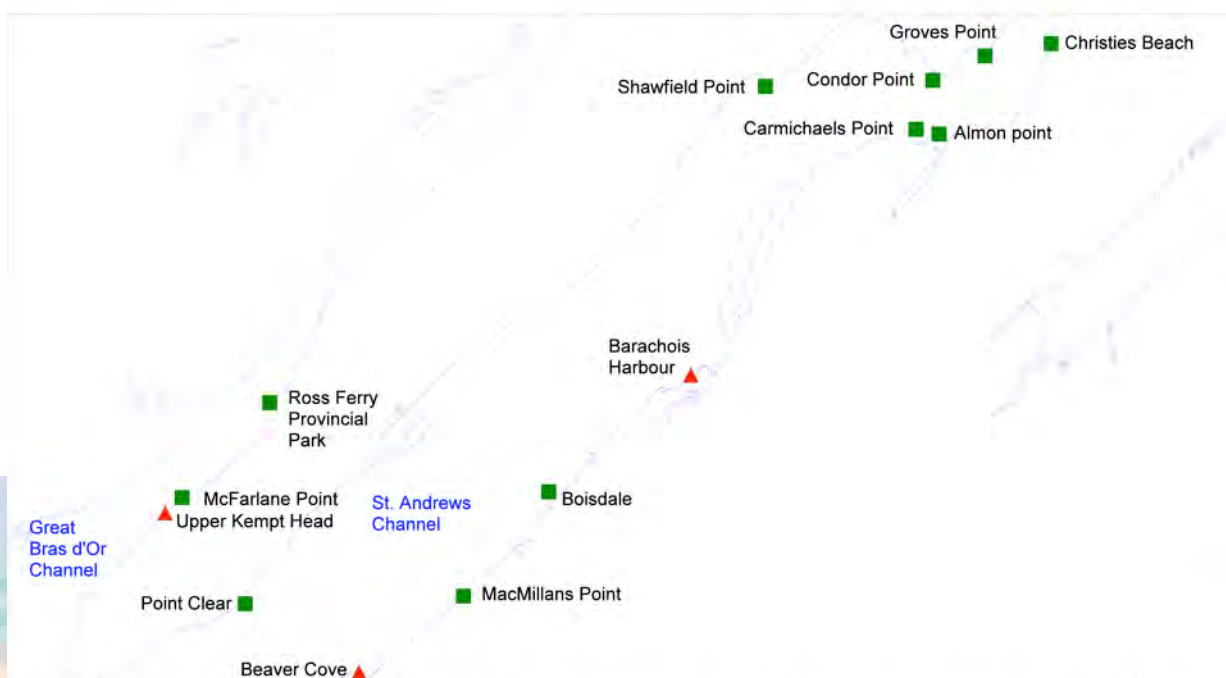


Figure 8. Beaches examined in St. Andrews Channel and the Great Bras d'Or Channel for piping plover habitat suitability, 2005. ▲ represents suitable habitat ■ represents unsuitable habitat.

Appendix C: Piping Plover Survey Template

Have you seen this bird?

Do you know what a piping plover is? Y N

Have you ever seen one? Y N

Where? _____

When? _____

Have you ever seen any around the Bras d'Or lakes? Y N

Where? _____

When? _____

What can you tell me about the plovers you have seen?

Comments:

Native Non native

Resident Cabin Owner Boater Biologist

Tourist Bird Watcher

Other _____



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