

MAHONE BAY ROSEATE TERN RECOVERY PROJECT

FIELD REPORT

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ABSTRACT

The Bluenose Coastal Action Foundation (BCAF) initiated the Roseate Tern Recovery Project (RTRP) in 2003 after Roseate terns had disappeared from the Mahone Bay area. Efforts to re-establish a secure nesting site for Roseate terns began on Quaker Island in 2004; however, efforts were abandoned on this island in 2007 after experiencing little success. The project was then scaled back and bay-wide surveys were conducted to determine tern and predator activity within Mahone Bay. As a result of these surveys, it was determined that efforts would be refocused on Grassy Island, a historical Roseate tern nesting island, and a stewardship program was initiated in 2010. Nesting boxes, tern decoys, and a mixed tern colony sound system were placed on Grassy Island for the purposes of attracting terns. As gulls are a common predator to terns, a permit was issued to deter gulls from nesting on Grassy Island. The stewardship program was continued in 2011 and again in 2012. However, Grassy Island was unsuccessful in hosting a tern colony in 2012 and has not produced fledglings during any years of the stewardship program. Westhaver Island held the largest colony (188 nests) and produced the only fledglings (37). Along with monitoring the seabirds, education and outreach activities occurred through the delivery of presentations, attending local festivals, and surveying boaters in the area to inform more people about the importance of conserving this species at risk.

ADKNOWLEGEMENTS

The Roseate Tern Recovery Project team would like to extend their gratitude and appreciation to those who have contributed to the successful completion of the 2012 field season. The following groups and/or individuals have played a critical role in supporting the RTRP:

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- Bridgewater Growing Green Sustainability Festival
- Mahone Bay Regatta and Pirate Festival
- Lunenburg Farmer's Market
- Bridgewater Farmer's Market
- Mahone Bay Farmer's Market
- Bluenose Academy
- Chester Race Week

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- Habitat Stewardship Program for Species at Risk
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INTRODUCTION

BLUENOSE COASTAL ACTION FOUNDATION

Established in 1993, the Bluenose Coastal Action Foundation (BCAF) is a non-profit charitable community-based organization that addresses the environmental concerns within Lunenburg County, NS. BCAF's goal is to promote the restoration, enhancement, and conservation of our ecosystem through research, education, and action. As part of the Atlantic Coastal Action Program (ACAP), BCAF was originally conceived to respond to the urgent need to restore human-impacted coastal environments so that they could continue to sustain coastal communities. The watershed boundaries in which BCAF conducts its work include the coastline from Sandy Point to Cherry Hill and inland to include the following watersheds: Petite Riviere, LaHave, Mushamush, Gold, and East Rivers. The towns or communities of Lunenburg, Mahone Bay, Chester, Bridgewater, and New Germany fall within BCAF's watershed boundaries.

Over the past 18 years, BCAF has successfully completed a number of projects within Lunenburg County. Currently BCAF is involved in several projects which include, but are not limited to, the Atlantic Whitefish Recovery Project (AWRP), American Eel Habitat Assessment, Elver Abundance Study, Bridgewater Active Transportation, Environmental Home Assessment Program, Gold River Restoration and Salmon Research Project, LaHave River Watershed Project, and Mahone Bay Roseate Tern Recovery Project (RTRP).

ROSEATE TERN

There is a total world population of near 50,000 pairs of Roseate terns, and although they are not globally endangered, their populations have been suffering in all parts of the world (Hinterland Who's Who 2012). In Canada, the Roseate tern (*Sterna dougallii*) is assessed as an endangered species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In Nova Scotia, it is protected under the *Migratory Birds Convention Act*, *Species at Risk Act* (SARA), and the *Nova Scotia Endangered Species Act*. Populations in the northeast region of the United States are also considered endangered by the United States Fish and Wildlife Service (USFWS). The USFWS has also listed the Caribbean breeding population of the Roseate tern as threatened due to a decline in its numbers (COSEWIC 2009).

There is only one population of Roseate terns that breed on the Atlantic coast of Canada, and it is estimated that there are less than 140 breeding pairs in Canada. Their range runs from the Magdalen Islands in the Gulf of St. Lawrence east to New Brunswick and Nova Scotia (Hinterland Who's Who 2012). There are three main colonies in Nova Scotia where Roseate terns are currently nesting; Country Island, North Brother, and Sable Island (COSEWIC 2009; Nova Scotia Species at Risk 2010). Roseate terns nest almost entirely on small islands that are sparsely vegetated with beach grass and other herbaceous plants. They nest under cover, usually in the form of dense vegetation, or under and among boards, driftwood, and artificial structures like boxes and tires (COSEWIC 2009). In the North Atlantic, Roseate terns forage for small fish which include small herring, pollock, butterfish, and sand lance (Environment Canada 2010).

In Canada, Roseate terns nest in large mixed colonies of Common terns (*Sterna hirundo*) and Arctic terns (*Sterna paradisaea*). By doing so, greater protection from predators is provided as they benefit from the aggressive behaviours of these other terns. Terns that breed in Mahone Bay, NS arrive in early May and typically depart in late July to mid-August to travel to staging areas prior to their migration. Roseate terns are known to utilize staging areas located in Saco Bay, ME and on Cape Cod. While there is little data available on habitat used during the winter months, Roseate terns are known to over winter in South America from Colombia to eastern Brazil (COSEWIC 2009).

Roseate terns typically breed first at three years of age, with the average age of breeding adults in the northeastern population being 7.8 years. They are ground nesters who typically lay a clutch of 1-2 speckled eggs which are easily camouflaged against beach-like substrates (COSEWIC 2009). The parents take turns incubating the eggs for 23 to 24 days. Chicks hatch in June and typically leave the nest several days later to find other hiding places. They fledge after 25 to 28 days and depart for staging areas with their parents in mid August (Hinterland Who's Who 2012). Roseate terns can be confused with Common and Arctic terns as they are similar in appearance – they are a medium-sized, pale seabird, that are closely related to gulls; however, the Roseate tern has a long and deeply forked tail. In addition, during breeding, adults are mostly white with a black cap, have black at the tip of their wings, and also a white breast suffused with pale pink. The bill of the Roseate tern is black with red appearing at the base later in the breeding season (COSEWIC 2009).

BIOLOGICALLY LIMITING FACTORS

The Roseate tern (ROST) has an annual adult survival rate of 83%, which is low for a seabird. In addition, they lay one small clutch per year (mean clutch size = 1.7 eggs/pair), and usually do not breed until their third year. Colony sites can be limited by their need for specific foraging sites (Environment Canada 2010; COSEWIC 2009).

THREATS TO ROSEATE TERNS

Threats to the reproductive success of terns (Common, Arctic, and Roseate) in Canada include predation at breeding colonies by Herring (*Larus argentatus*) and Great Black-backed Gulls (*Larus marinus*), American Crows (*Corvus brachyrhynchos*), raptors, and American mink (*Neovison vison*). Gulls not only prey on terns and their eggs, but also take up valuable tern nesting habitat. It is this predation and displacement by gulls that is thought to be the primary factor limiting distribution of the Roseate tern in Canada (Environment Canada 2010).

Predation, human disturbance, extreme weather events, habitat loss from development, rising sea levels, and pollution has threatened the recovery of the Roseate tern within Mahone Bay and other breeding sites in Atlantic Canada. In South America, a major threat to terns is trapping, as terns roost on beaches at night making them an easy target for trappers (Hinterland Who's Who 2012).

HISTORY OF ROSEATE TERNS IN MAHONE BAY

The islands within Mahone Bay lay midway between Atlantic Canada's two "managed" Roseate tern colonies; Country Island (Guysborough County) and North Brother Island (Yarmouth County). Grassy Island, located in Mahone Bay, historically supported one third of the breeding Roseate tern population in Canada. Beginning in the mid-1990's, the terns abandoned Grassy Island after being displaced by a colony of Herring Gulls and Great Black-backed Gulls, which establish their nests three to four weeks before terns.

SITE DESCRIPTION

Mahone Bay (44°30'N, 64°15'W) is located in Lunenburg County, Nova Scotia, Canada. The islands in Mahone Bay are a popular destination for recreational and commercial (lobster fishery) boaters.

The Mahone Bay islands, ranging in size from 200 to 2400 m², provide a variety of habitats including rocky shores, cobble and sand beaches, dune complexes, tidal flats, wetlands, and mature forests. These coastal habitats have led to support a diverse population of wildlife, both marine and terrestrial. Distinct seabird and shorebird populations occupy these islands such as osprey, eagles, puffins, leach's storm petrels, razorbills, shearwaters, northern gannets, black guillemots, cormorants, and terns (Mahone Islands Conservation Association 2012).

BACKGROUND

The Roseate Tern Recovery Project (RTRP) was initiated in April 2003 by BCAF. The primary goal of the project is to re-establish a secure nesting site for endangered Roseate tern on an island in Mahone Bay, Nova Scotia. This goal would fulfill the third objective of the "Recovery Strategy for the Roseate Tern in Canada", which hopes to restore a broader distribution of Roseate terns by establishing at least one more managed colony.

During the first year of the project, the Bluenose Coastal Action Foundation determined that the most appropriate stewardship site for Roseate terns in Mahone Bay was Quaker Island. From 2004 to 2007, BCAF facilitated research on the island to establish a Roseate tern colony by using tern decoys, sound systems, nesting boxes, predator deterrence, and predator control measures. Unfortunately, successful stewardship on Quaker Island was not accomplished due to mink predation, severe storm events, and potentially anthropogenic disturbances. The lack of tern breeding success on Quaker Island led BCAF to refocus their efforts in 2008 and 2009. During the next two field seasons, bay-wide surveys, at a maximum of three times per week, were conducted to document tern distribution, abundance, productivity, and reproductive success.

Beginning in April 2010, the RTRP initiated a tern stewardship program on Grassy Island due to its historical suitability as habitat for breeding terns, and also as it once held one third of the Roseate tern population in Canada. The island is located offshore, which limits anthropogenic disturbances, but is close enough to be regularly monitored. Grassy Island is a Wildlife Management Area owned by Nova Scotia Department of Natural Resources (NS DNR). Therefore, gull deterrence and management efforts were first approved by the NS DNR and the Canadian Wildlife Service (CWS).

A Public Education and Outreach Program and a Tern Colony Signage Program are also implemented by the Bluenose Coastal Action Foundation. The outreach program aims to inform recreational users of Mahone Bay's islands, students, and local community groups in Lunenburg County of the presence, conservation status, and recovery actions required for endangered Roseate terns, as well as provide information on tern colonies in general. The Tern Colony Signage Program was created to enhance public recognition of and respect for tern colonies. Ultimately, it is hoped that this will decrease human disturbance to tern colonies, leading to healthier Common and Arctic tern colonies in Mahone Bay. The decrease in human disturbance events in the bay may attract and shelter Roseate terns, allowing reproduction and recovery of this endangered species.

MATERIALS AND METHODS

To monitor seabird populations, a 20' Boston Whaler loaned to the project by Rick and Barb Welsford and was used to travel throughout the bay. The boat was equipped with safety gear including a radio, GPS, flares, first aid kit, etc. RTRP staff were required to obtain their Small Craft Operators License and participate in a boat safety course as well as be in receipt of current first aid training. While in the field a cellular telephone was carried at all times.

BAY-WIDE SURVEYS

Beginning in May, bay-wide surveys were conducted up to three times a week until August. The Boston Whaler was used to travel to islands in Mahone Bay that could potentially hold tern colonies. Information including the date, weather, temperature, time, persons present, predators, any bird species and their action, was recorded.

TERN DISTRIBUTION AND ABUNDANCE

Once tern colonies were established at various islands in Mahone Bay, those islands were monitored regularly to a maximum of three times a week. Abundance was recorded during each visit by flushing the terns from the island and estimating the number of terns in flight. Through flushing the terns, a more accurate estimate was possible, as terns are not easily observed along the ground. Distribution and abundance was monitored regularly throughout the season, as terns tend to relocate often.

NEST, EGG, AND FLEDGLING COUNTS

Reproductive success was monitored June through August by conducting nest, egg, and fledgling counts. Nest and egg counts were conducted by having field staff walk in a straight line, one meter apart, while marking the line walked with flags. Nests and number of eggs were recorded on the inside of the flags, as flags were placed down and picked up in continuous lines across the nesting area. To eliminate recounting nests, popsicle stick pieces were laid in the nests as they were recorded. Counts were completed as quickly and efficiently as possible in order to minimize stress to adult terns and unprotected eggs. Islands were revisited several times in order to keep track of the number of eggs and chicks that did not hatch or were predated on, as well as chick mortality.

Fledgling counts were conducted by walking the island and monitoring the number of chicks. Fledglings were distinguished from younger chicks by their ability to fly as they were approached. They were then monitored with binoculars from the boat. Juvenile terns are easily distinguished from adults by their white forehead, mottled brown plumage, and weak carpal bars.

GRASSY ISLAND STEWARDSHIP

The stewardship program on Grassy Island began in 2010 and was continued in 2011 and 2012. Decoys, nesting boxes, and a sound system were placed on the island to attract terns to their historical nesting grounds. Seabird nesting signs were also posted once terns were observed to discourage human disturbance events on the island.

54 fibreglass tern decoys were filled with sand and placed around the nesting area of the island to simulate an actual nesting colony and attract terns to the island. Should Roseates be among the terns attracted to the island, 17 nesting boxes were placed above the high tide line on the NE side of the island facing SW, so as to provide shelter from the elements for terns and a view of the inside of the boxes from the boat (See Figure 1). Seaweed and other materials such as shells, sticks, etc., were placed around the nesting boxes to create a more natural appearance and to provide nesting materials. A large rock was placed on each nesting box to hold it in place.



Figure 1. Photo of nesting boxes and decoys set up on Grassy Island in 2012.

A sound system playing mixed tern colony sounds was placed above the high water line on the rocks, outside the suitable tern nesting habitat so as not to take up valuable space. MotoMaster Nautilus marine batteries ranging from 625 to 1000 marine cranking amps were used to power the sound system. Batteries were changed about once per week as the used battery was brought back to the office to charge. The battery and sound box were covered with plastic garbage bags and placed in a crevice to avoid damage from the elements.

The speakers were surrounded with small rocks so as to stay in place. Once an adequate number of terns were colonizing on the island, or it became too late in the season for a colony to establish, the sound system was removed.

PERMITS

Grassy Island and Pearl Island are both Wildlife Management Areas owned by the Nova Scotia Department of Natural Resources (NS DNR) and permits were required to monitor seabird populations up to three times a week from the boat. BCAF staff were permitted to land on Grassy Island as required throughout the field season. On Pearl Island, project staff were allowed to land on the island up to three visits during the breeding season to assess the productivity and reproductive success of the terns, with the accompaniment of Andrew Boyne of the Canadian Wildlife Service (CWS) or his nominee.

GULL DETERRENCE

In addition to the aforementioned permit, another permit was granted from CWS regarding the removal and destruction of gull eggs on Westhaver and Grassy Islands. The permit allows nominees to destroy up to 250 Herring Gull (HERG) eggs and 30 nests, as well as 75 Great Black-backed Gull (GBBG) eggs and 30 nests on Grassy Island, and up to 20 GBBG eggs and five nests on Westhaver Island.

OUTREACH AND EDUCATION

The Education and Outreach Program was established by the RTRP in April 2008. The program was continued in 2012, as many events, wharves and/or marinas, schools, and festivals were attended in order to reach a maximum number of individuals within various interest and age groups. The program was created to inform users of Mahone Bay's islands and local groups in Lunenburg County of the presence, conservation status, and recovery actions required for the endangered Roseate tern. By educating local residents and boaters, the RTRP team hopes to increase involvement in, and support of, recovery activities. To accomplish the objectives, various educational materials (brochures, postcards, etc.) were developed and distributed along with presentations at local events and schools.

TERN COLONY SIGNAGE PROGRAM

Permanent interpretive signs were posted at wharves and yacht clubs (Figure 2a). Seabird Nesting signs were placed on islands with active tern colonies (Figure 2b). Two signs were placed on either side of islands with tern populations to make visible to boaters on either side. Signs were mounted on a post and placed in a holding box filled with large rocks (taken from the island on which the sign was posted) to provide greater stability. Signs were placed a safe distance above the high tide line to prevent them from being dislodged during storm events. In the case that a colony was abandoned, the signs were removed from that island so local residents and boaters would not question the credibility of the signs (and hence, reduce their effectiveness at active colonies). A sign was also posted for the breeding season on Westhaver Beach and removed in the fall to avoid damage or loss over the winter. Boater surveys were conducted throughout the

2012 field season in order to monitor the effectiveness of the seabird nesting signs. The RTRP team visited local wharves and marinas and asked a series of five questions to participants.

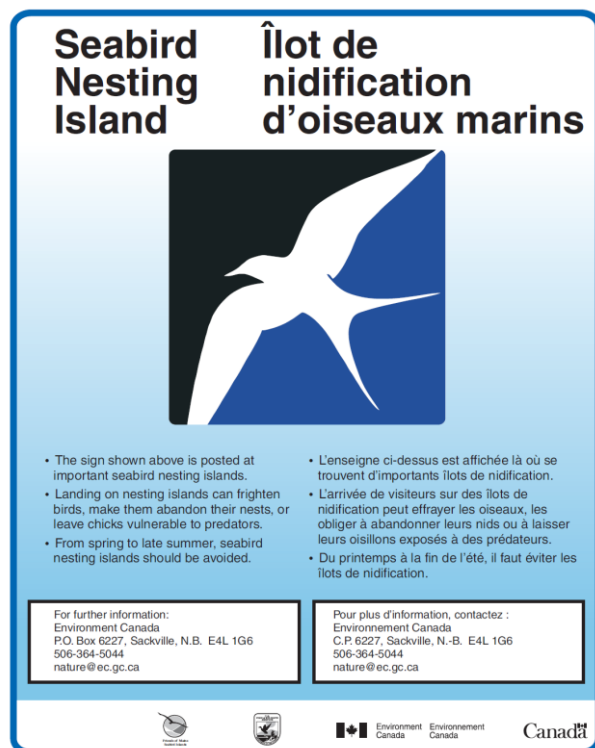


Figure 2a. Interpretive signs placed at local wharves and marinas.



Figure 2b. Seabird nesting signs placed on islands that held active tern colonies.

RESULTS

DISTRIBUTION AND ABUNDANCE

Terns were widely distributed throughout Mahone Bay; however, only nested on a select few islands. Tern abundance per island fluctuated throughout the season as terns relocated. Westhaver Island produced the only fledglings in 2012, although nests were found on other islands as well. Terns were observed nesting on several other islands including Quaker (one nest), Grassy (three nests), Saddle (33 nests), and Mash (12 nests); but none of these other colonies were successful in producing fledglings. Chicks were observed on Mash Island but none survived to fledging. Tern fledglings were only observed on Westhaver Island. Figure 3 denotes where terns were observed.

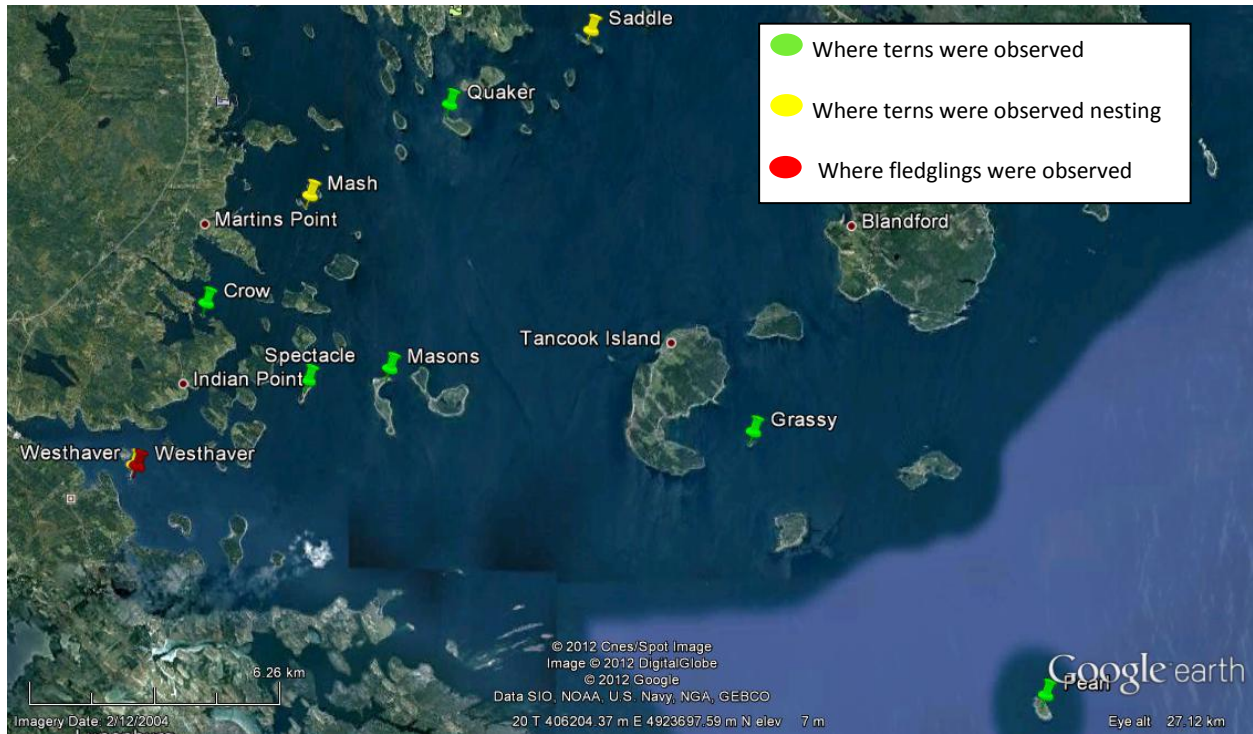


Figure 3. Tern distribution in Mahone Bay, NS in 2012.

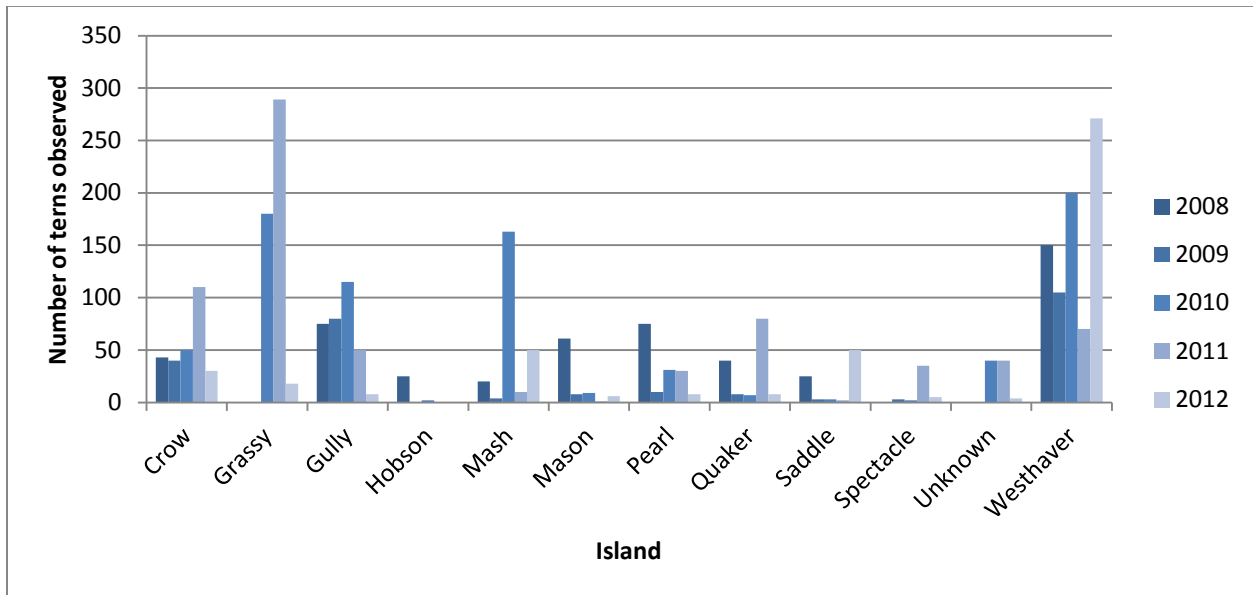


Figure 4. Tern abundance on islands in Mahone Bay 2008-2012.

REPRODUCTIVE SUCCESS

Nest counts were conducted on islands where terns were thought to be nesting; i.e., where terns were observed often throughout the season. Counts were conducted once a fairly consistent number of terns had been on the island for a few weeks. Numbers of terns on each island varied each year (Figure 4). Note that

nest counts include all tern species observed in the area (Common, Arctic and Roseate – although there have been no nesting Roseates since the mid-1990s.).

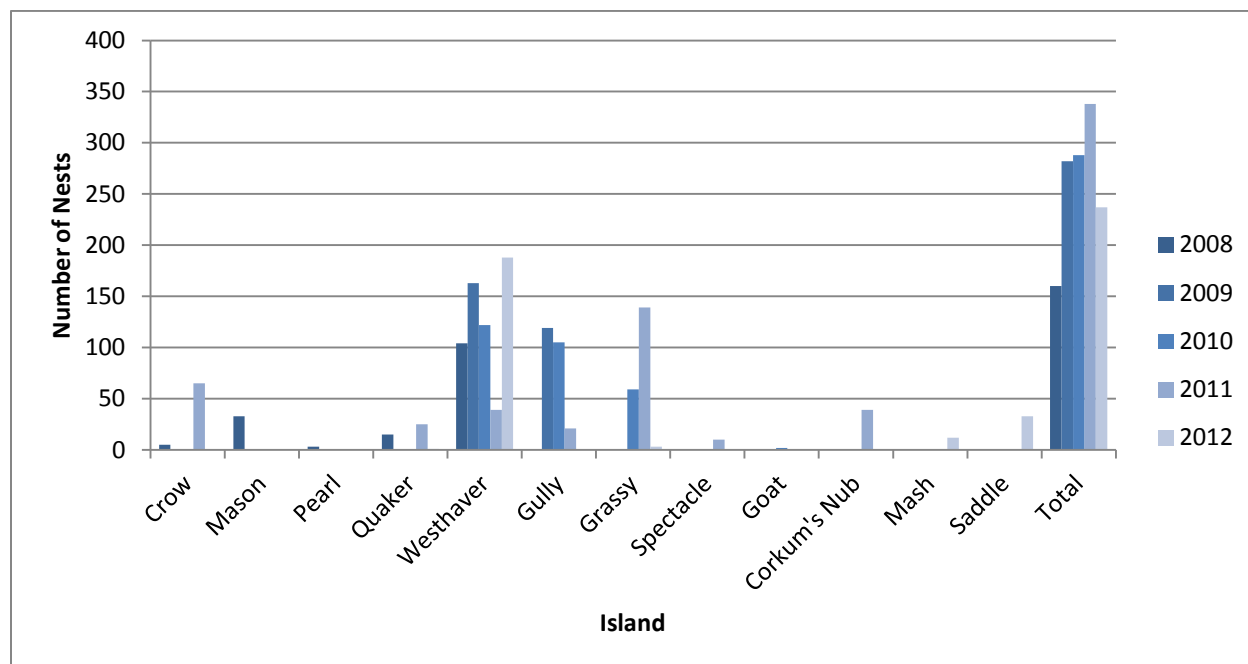


Figure 5. Nest counts on islands in Mahone Bay 2008-2012.

The total number of nests from all islands decreased from 2011 where there were 338 nests, to 237 nests in 2012. Nest counts in 2012 were the lowest over the last three years. In comparison to nest numbers on North Brother Island, North Brother has had more consistent numbers of nests over the last four years (Figure 6).

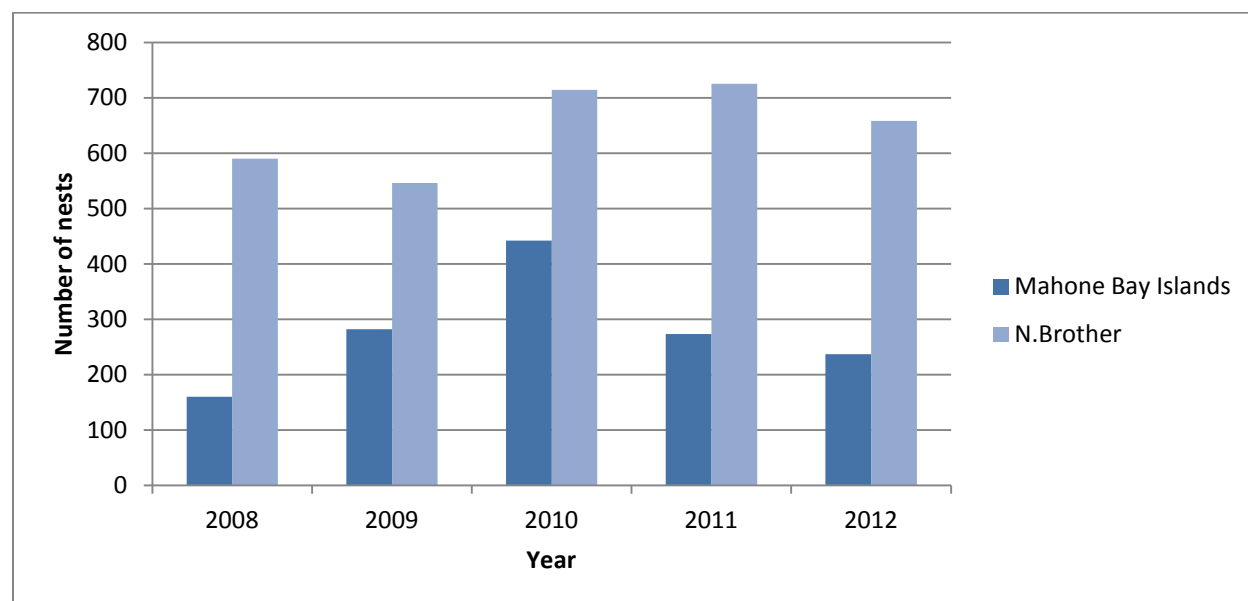


Figure 6. Tern nest counts comparison between Mahone Bay Islands and North Brother Island, 2008-2012.

GULL DETERRENCE

Gull deterrence was successful on both Grassy and Westhaver Islands. The pair of gulls nesting on Westhaver Island in 2011 did not return in 2012; therefore, no eggs were destroyed on Westhaver Island. Fewer gulls nested on Grassy Island in 2012 compared to 2011 (four nests with eggs compared to 12); however, gulls were commonly observed roosting in small numbers throughout the season and many gull pellets containing fur and shell pieces were observed in August.

GRASSY ISLAND

Grassy Island was visited a total of 18 times beginning May 3rd to August 29th, 2012, when the field gear was removed from the island. A total of four nests and 18 terns (16 Common, two Arctic) were observed; however, all had disappeared by early July. Five Common eider (*Somateria mollissima*) nests were observed, but all ten eggs observed had been depredated. Other birds commonly observed on the island included Herring and Great Black-backed gulls, Common eiders (two dead), as well as Cormorants (*Phalacrocorax auritus*), which were seen roosting during every trip to the island. Ruddy turnstones (*Arenaria interpres*) were also observed during one visit. Northern gannets were often seen flying around the waters of Mahone Bay, foraging during late July to mid-August.

WESTHAVER ISLAND

Westhaver Island was visited frequently from the boat and observed from the shore on Westhaver Beach. It held the largest tern colony in Mahone Bay in 2012, with a colony of 188 nests. No gulls nested on Westhaver in 2012, and were very seldomly seen roosting. Double crested cormorants were observed roosting along the rocky bar extending from the Northwest side of the island during every trip to the island. Westhaver Island produced the only fledglings in Mahone Bay this year, with 40 being observed, all of which were thought to be Common terns.

PEARL ISLAND

Pearl Island was visited once during the field season in July. Two BCAF staff members and two volunteers were present. Observations were made from the boat as the boat circled the island twice. Along with five Common terns, many other bird species were observed including: Razorbills (*Alca torda*), Atlantic puffins (*Fratercula arctica*), Double-crested cormorants (*Phalacrocorax auritus*), Common eiders (*Somateria mollissima*), Black-legged kittiwakes (*Rissa tridactyla*), Black guillemots (*Cepphus grylle*), as well as a number of Herring and Great Black-backed gulls.

OUTREACH AND EDUCATION

The Education and Outreach Program was established by the RTRP in April 2008, and was continued again this year. In 2012, many events, wharves, marinas, schools and festivals were attended so as to reach as many people as possible. The program was created to inform users of Mahone Bay's islands and local groups in

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Lunenburg County of the presence, conservation status, and recovery actions required for the endangered Roseate tern. By educating local residents and boaters, the RTRP team hopes to increase involvement in, and support of, recovery activities. Materials were developed in order to reach the communications objectives and were distributed at local events and presentations. Boater surveys were conducted to determine awareness of the RTRP and have suggestions on how to improve awareness of the project (Table 1). Materials created and distributed include Roseate Tern Boater Cards, Island Watchers cards, Summer and Fall Newsletters, as well as brochures. Stickers were also designed but have not yet been printed (Appendix A). The RTRP also had an article in the Bird Studies Canada (BSC) weekly newsletter in April and an article and video in the Chronicle Herald newspaper and website during June. Table 2 outlines all outreach activities and approximate number of people reached.

Table 1. Boater survey questions and results 2012.

QUESTION	% YES	%NO	SUGGESTIONS
Are you aware of the endangered Roseate tern?	69	31	<ul style="list-style-type: none">• Continue to talk to people.• Continue to post signs.• Advertise on marina and yacht club websites and expand outreach to other yacht clubs.• Throw information packages into cockpits of moored boats.• Sell merchandise - could print on iron on paper and give them to kids to put on their own clothing.• Radio.
Are you aware of BCAF's RTRP?	62	38	
Do you know what the seabird nesting sign looks like?	62	38	
Do you know the precautions to take when you come across a seabird nesting sign?	69	31	
Total number of boaters = 16			

Table 2. Events attended in 2012 and approximate number of people reached.

EVENT	NUMBER OF PEOPLE PRESENT
NSCC Natural Resources & Environmental Technology Program presentation	25
Bird Studies Canada Newsletter	56,000
South Shore Sustainability Expo	150
South Shore Young Naturalists Presentation/Field Trip	15
Mahone Bay Farmers Market	35
Lunenburg Farmers Market	60
Bridgewater Farmers Market	10
Petite Riviere Girl Guides	20
Bluenose Academy Presentation	100

Chronicle Herald	World Wide (Internet) Newspaper all of NS
Mushamush Camp Presentation	40
Tern Festival Presentation	25
Rissers Beach Provincial Park	30
Ellenwood Lakes Provincial Park	10
Chester Yacht Club Youth Sailing Presentation	60
YMCA Day Camp	22
Hubbards Sailing Club Presentation	33
Mahone Bay Regatta and Pirate Festival	50
Chester Yacht Club / Race Week	10
Bridgewater Growing Green Festival	10
(Big) Tancook Island	25
Total	56,730 +

DISCUSSION

DISTRIBUTION AND ABUNDANCE

Terns are colonial birds and the presence of other terns (Common or Arctic) is highly important to Roseate terns, as they preferentially nest in large colonies of other terns (>100 pairs) (Gochfeld et al. 1998, Environment Canada 2010). During the 2012 breeding season, Common and Arctic terns nested on several islands, with Westhaver Island having the largest colony at 188 nests (188 pairs, approximately 376 individuals); however, no Roseate terns were observed.

Gully Island was where terns were first observed in the season, but was abandoned for unknown reasons early in the season. Crow Island had a colony of about 30 terns, but was abandoned on June 3rd, when a storm caused the island to flood (as reported by a local resident and volunteer). Mash and Saddle Islands both held nesting colonies, but were both abandoned late in the season for unknown reasons.

GULL DETERRENCE

The gull population on Grassy Island was smaller than during the 2010 and 2011 field seasons. Gull deterrence began in early May and continued frequently (2-3 times per week), resulting in successful deterrence of gulls from the island. The pair of Great Black-backed gulls that nest annually on Westhaver Island did not return to nest there in 2012, proving the deterrence efforts had been successful.

Overall, gulls were successfully deterred from nesting on active tern colonies, and in carrying on with this work should not prove to be a problem in providing safe, managed nesting grounds for terns in terms of predators.

GRASSY ISLAND

Although gull deterrence was successful, the stewardship program on Grassy Island was unfortunately not this season. In spite of the social attraction attempts (sound system, decoys, and nest boxes), a maximum of 18 terns (16 Common, two Arctic) were observed on the island, which was later abandoned. The lack of terns on Grassy Island in 2012 could be due to the fact that out of all 132 nests on the island in 2011, none produced fledglings. The lack of success the year before could have caused the terns to relocate where they have had better success.

The fact that there have been no fledglings on Grassy in the three years in which the stewardship program has been in place on the island may mean that efforts will need to be refocused. On a trip to Tancook Island (adjacent to Grassy Island), islanders informed BCAF staff that Grassy Island gets washed over regularly, even in fairly gentle weather. This could account for an incident earlier in the field season, when on a trip to change the battery for the sound system, rocks that had been placed over it to secure it were thrown several feet, no other explanation other than wave action has been determined. If the island is frequently washed over, it may not be suitable to continue the stewardship program on Grassy.

Islanders also informed BCAF staff that there are river otters (*Lontra Canadensis*) inhabiting Tancook Island. Since Grassy is not far from Tancook, it is possible that the otters could swim to Grassy and disturb the terns; however, there has been no evidence of otters on Grassy.

WESTHAVER ISLAND

Similar to 2011, Westhaver Island produced the only fledglings in the 2012 breeding season. However, there was a large increase in the amount of fledglings from three in 2011 to 40 in 2012. This could be due to the fact that more terns nested on the island in 2012, and the weather was much improved this year with less rainfall and warmer temperatures. It is possible that chicks successfully fledged here due to the protection provided them from the base of the lighthouse which contains a rim where chicks were observed during the first and subsequent visits. RTRP staff contend that this lighthouse base provides a safe and sheltered area for terns to nest.

Although Westhaver Island is in a high boating traffic area and there is evidence of human presence on the island, the terns do not appear to be bothered and continue to nest there annually. During both the 2011 and 2012 field seasons, all tern colonies in the Mahone Bay area appeared to have begun to migrate by mid-August; however, a tern colony still remained on Westhaver until late August. Once the terns appeared to have left Westhaver Island, many of the fledglings were observed foraging throughout Lunenburg Back Harbour in sheltered areas.

OUTREACH AND EDUCATION

Many schools, events, and festivals were attended throughout the duration of the 2012 field season reaching a variety of people and ages. Events attended ranged from Lunenburg County to Yarmouth County, essentially

reaching many people along the entire South Shore. Articles in the BSC newsletter and Chronicle Herald allowed information to be spread throughout Nova Scotia and the world, via the internet. Activities and crafts were used to engage younger children, while teachers and parents were provided with brochures and postcards. Information was enthusiastically received by students at local sailing clubs, as many youth were aware of and concerned about the health of tern colonies in the area. Local sailing clubs should be targeted again in the future.

Boater surveys were conducted during July and August at local wharves and marinas. RTRP staff were able to interact and discuss the project one on one with local residents and summer visitors, who seemed genuinely interested and offered helpful suggestions.

RECOMMENDATIONS

Since 2003, the RTRP staff have worked towards establishing a secure and managed Roseate tern colony in Mahone Bay. Throughout the years, various methods have been employed including a stewardship program on Quaker Island (4 years), tern attractants and predator deterrence, and bay-wide surveys. In April 2010, a stewardship program was initiated on Grassy Island which incorporated gull deterrence. Although the gull deterrence activities have proven successful, and there were a large number of terns on Grassy Island in 2011, there have been no fledglings recorded to date. Therefore, there may be other reasons for the lack of reproductive success in the bay and it may be necessary to refocus efforts. Recommendations towards project continuation are as follows:

- Refocus efforts away from Grassy Island. The island is small and eroding fairly quickly. It is also prone to poor weather conditions which could affect the terns. Although human traffic and nesting gulls are minimal, something has kept the terns from fledging young at this location.
- If habitat is found to be a limiting factor in Mahone Bay, a protective wall (similar to the base of the lighthouse on Westhaver) could be constructed on a suitable island. It is a known fact that terns like manmade objects, and the base of the lighthouse on Westhaver offers protection from the elements and predators. It also provides high nesting ground; should there be a flood, the nests would have a better chance of surviving.
- A remote video camera monitoring system should be set up to observe tern colonies, as it could be vital in determining tern colony abandonment.
- Employees at the Mahone Bay Civic Marina are supportive of the RTRP and allowed RTRP staff to hand out boater cards around the wharf, as well as sit in the tender boat to speak with boat owners as they were picked up. If possible it would be great to team up with this organization in the future and, perhaps, establish a program where if a boater buys a mooring they can receive an educational package about the RTRP. As suggested by a boater while participating in a survey, informational packages are thrown into the cockpits of moored boats during festivals and the same could be done with BCAF's tern information handouts.
- The positive response from presentations at sailing clubs suggests continuing these presentations.
- Boater surveys should be a main focus of outreach efforts as they have the most impact on islands. The questions on the boater surveys may be changed to be more open ended so as to gauge the level of knowledge rather than simple 'yes' or 'no' answers.

CONCLUSION

Recovery efforts are taking place throughout Nova Scotia in hopes of reversing the declining population of Roseate terns in Canada. BCAF has been making an effort to establish another managed Roseate tern colony since 2003, refocusing efforts from Quaker Island (2004-2007) to Grassy Island (2010-2012). As severe weather, anthropogenic disturbance, as well as unknown disturbances, efforts may need to be refocused once again, as reproductive success has been virtually invisible on the island. With increased education and outreach, more members of the community will recognize the value in conserving our local species at risk which will hopefully minimize human disturbance.

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APPENDIX A

Education and outreach materials created and/or distributed during the 2012 RTRP.


Roseate Tern Sticker



RTRP Boater Postcard




RTRP Summer 2012 Newsletter



Roseate Tern Recovery Project

Summer 2012

Grassy Island





Grassy Island, off the coast of Chester, Nova Scotia, once supported 1/3 of Canada's breeding colony although there have been no Roseate terns nesting on the island since the early 1990's. 2012 is the third year BCAF has focused their efforts on re-establishing a breeding colony of Roseate terns on Grassy Island. As of May, the nesting boxes, sound system, and decoys were set up on the island. The gull population on Grassy has decreased, as only four nests with eggs were destroyed. Several Common eider nests were observed, but failed due to predation. A maximum of 18 terns (16 Common, 2 Arctic) were observed on the island, along with three tern nests; however, the nests and terns had disappeared by late June. Although gull deterrence had been successful, it is still a disappointing year for Grassy Island. However, the island will continue to be monitored for the remainder of the field season.

Roseate Tern

The Roseate tern is a medium sized, migratory seabird that is designated as an endangered species by the Nova Scotia Endangered Species Act as well as the Canadian Species at Risk Act. There are currently less than 100 pairs of Roseate terns nesting in Canada.


The Bluenose Coastal Action Foundation (BCAF) has been monitoring tern populations in Mahone Bay since 2003 and have established effective methods of stewardship to encourage tern inhabitation and breeding. A few of the methods currently in use are the placement of nesting boxes, decoys, and a sound system that plays tern calls continuously. As terns are colonial birds, BCAF is working to enhance nesting areas, not only for Roseate terns, but also Common and Arctic terns as well. This will hopefully increase the chance of attracting a Roseate tern breeding population.





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Roseate Tern Recovery Project

Summer 2012

Terns Colonies 2012

Westhaver: 188 nests June 13
Saddle: 33 nests June 18
Mash: 12 nests June 18
Quaker: 1 nest June 18



As of July 4, there were at least 37 fledglings (mostly Common and some Arctic species) on Westhaver Island, along with many younger chicks! A large increase from the three fledglings in 2011!

Public Outreach

This year BCAF will be going door to door in Lunenburg County to educate the public about the island watchers program and hopefully recruit some new tern fans! Informational postcards and an island watchers package containing a tern survey report along with information on how to conduct tern surveys of nearby islands will be given to those interested in helping. So keep an eye out—BCAF may be knocking on your door! Along with presentations and project displays at various public events, a variety of new outreach material is being created including stickers, brochures, and informational signs.


Terns Made the News!

On May 24, Lois Legge with the Chronicle Herald came out to document BCAF efforts with the Roseate Tern Recovery Project. A photographer came along as well and filmed the day's events. Both the article and the video can be found online at the following link: <http://thechronicleherald.ca/artslife/105318-video-rescuing-roseate-terns>


2012 Field Season Events

- Habitat enhancement on Grassy Island
- Tern surveys on coastal islands
- School presentations
- Placement of tern colony signs
- 8th Annual Pubnico Tern Festival June 22-24
- Mahone Bay Regatta and Pirate Festival
- Chester Race Week
- Bridgewater Growing Green Sustainability
- Bayview Camp Day June 21
- Young Naturalists Field Trip to Westhaver beach

Check the website for more events!




Some of the education and public outreach materials about the Roseate tern.



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Roseate Tern Recovery Project


Summer 2012

2012 Field Season




Left: The RTRP team had a chance to visit North Brother Island with Ted D'Eon in July to look for Roseate tern chicks. A great shot from Ted D'Eon of a Roseate tern flying on North Brother Island! Check out Ted's work with the terns at teddeon.com


Right: Volunteer Sarah Holden (left) and Project Coordinator Danielle Pernette placing seabird nesting signs on Quaker Island.



Below: Field Tech Tracy Pagenhardt placing decoys on Grassy Island




Left: Rick Welsford loading the boat full of field gear for Grassy Island




The Bluenose Coastal Action Foundation (BCAF) is a non-profit community-based charitable organization with a mandate to address environmental issues within Lunenburg County, NS.

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Thank you to our 2012 RTRP Funders:




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RTRP Fall 2012 Newsletter



Roseate Tern Recovery Project

Autumn 2012

Farewell Terns!



It's that time of year again! Time to pack up the field gear and say bon voyage to the terns. The majority of terns began their journey back down south to their wintering grounds in early August, therefore, field gear has been removed from the islands and information collected during the summer field season is being compiled into a report. Without the raucous squawking of terns, Mahone Bay is not unlike a bar after hours...void of its rowdy yet welcoming patrons.

Grassy Island

The success of attracting a tern colony of 300 individuals in 2011 provided encouragement for having nesting Roseate terns in 2012. However, Grassy Island was not as successful in 2012 as hoped. Although four nests were found earlier in the field season, there were few pairs of terns floating around Grassy this year, and they unfortunately failed to establish a secure colony

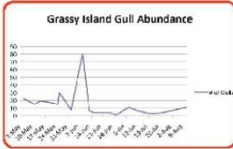



Figure 1: Grassy Island gull abundance. Gulls decrease over the field season from an average of 20 down to an average of 11 gulls observed roosting on the island (observed per visit May-August 2012).

on the island. The lack of nesting success on Grassy Island last year may have deterred the terns from establishing a colony there again this year. The only fledglings observed in 2011 were three on Westhaver Island, which in 2012 held a tern colony of 188 nests and 34 fledglings. However, the gull deterrence efforts on Grassy appear to be working effectively. As seen on the graph (Figure 1) the abundance of gulls decrease over the field season from an average of 20 down to an average of 11 gulls observed roosting on the island. In June there was a day where a sharp increase of gulls occurred randomly, although the majority of these gulls were juveniles. Although there were no Roseate terns observed in Mahone Bay this year, fledgling success of Common and Arctic terns was much higher.

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Westhaver Island



Although efforts to re-establish a tern colony on Grassy Island were unsuccessful, Westhaver Island held a successful colony of Common and Arctic terns.


The island hosted a mixed colony of 188 nests, and successfully produced at least 34 fledglings. The fledglings had left the island as of the beginning of August, but were later observed in the sheltered cove of Lunenburg Back Harbour on August 18th. It is likely that the adults have begun their migration south and these younger birds are filling up on fish and enjoying the hot weather experienced locally before taking their parents lead and flying to their wintering grounds in the south.

2012 Outreach Activities

Many festivals and events were attended during the 2012 field season where presentations were delivered or informational booths set up. New outreach material was developed, including a brochure and postcard, and handed out at events. Events attended include:

- Chester and Hubbards sailing clubs
- Bluenose Academy presentation
- 8th Annual Pubnico Tern Festival June 22-24
- Mahone Bay Regatta and Pirate Festival
- Chester Race Week
- Bridgewater Growing Green Sustainability Festival
- Bayview Camp Day June 21
- Young Naturalists Field Trip to Westhaver Beach
- Ellenwood Lake Provincial Park
- Rissers Beach Provincial Park

Boater surveys were conducted at local marinas and yacht clubs, and Tanook Island was visited to increase awareness and gain insight as to why Grassy Island has not been successful in supporting a tern colony.



Above: Tern fledgling. Right: Observing Westhaver Island.

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2012 Field Season

Right: Tracy reading off the leg band on a Roseate tern chick on North Brother Island, July 5th.

Below: Fledgling counts at Westhaver Island



Right: Fledgling counts at Westhaver Island.

Above: Counting Roseate tern chicks on North Brother Island with Ted D'Eon (Nancy Covington, Ronnie D'Entremont, Tracy Pagenhardt, and Danielle Pernette) on July 5th.

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Thank you to our 2012 RTRP Funders:




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RTRP Brochure


You Can Help

The Bluenose Coastal Action Foundation is currently overseeing a volunteer monitoring program called Island Watchers that is comprised of volunteers who monitor and record any tern sightings in the Mahone Bay island area.


Monitors include island owners, outdoor enthusiasts, birders, and recreational boaters. There are currently 30 monitors and BCAF welcomes more to join the program. The more people involved, the more area that can be covered. Contact us if you would like to take part:



BCAF's Roseate Tern Recovery Project - you can get involved!



Roseate tern (photo: Ted O'Son)



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Roseate Tern Recovery Project





Photo: Ted O'Son



Bluenose Coastal Action Foundation

Roseate Tern

The Roseate tern (*Sterna dougalli*) is a medium sized seabird that is designated as an endangered species by both the Nova Scotia Endangered Species Act and the Canadian Species at Risk Act. It is also listed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). There are estimated to be less than 100 breeding pairs currently located on Sable, Country, and North Brother Islands off the coast of Nova Scotia.



Roseate tern and chick (photo: Ted O'Son)

Mahone Bay

Grassy Island, located in Mahone Bay, Nova Scotia, once hosted 1/3 of Canada's breeding colonies of Roseate terns; however, there are presently no breeding pairs recorded within the bay. Human disturbance, rising sea levels, and extreme weather are thought to have contributed to the disappearance of Roseate terns from Grassy Island, as well as other islands within the bay.

What We Do

The Bluenose Coastal Action Foundation (BCAF) has been monitoring tern populations since 2003 and has established effective methods of stewardship to encourage tern inhabitation and breeding. BCAF is currently attempting to re-establish a breeding colony on an island within Mahone Bay by using habitat enhancement techniques, including: the placement of tern nesting boxes, Roseate tern decoys, and a sound system that plays attractive tern calls.



Grassy Island with Nesting Seabird sign

Through the prevention of human disturbance during peak breeding times (May to August), the use of habitat enhancement methods (such as nesting boxes), and the cooperation from people like you BCAF hopes the Roseate Tern Recovery Project will be successful in re-establishing a breeding colony within Mahone Bay.



Roseate tern with nesting boxes

Signage Program

BCAF initiated the tern colony signage program in 2008 in the hopes of increasing public knowledge and respect of tern colony avoidance signs. Any island displaying the "Seabird Nesting Area - Please Do Not Disturb the Birds" sign should be avoided from early spring to late summer. Informational signs are also posted at boat access points and government wharves. The signs explain how human disturbance can cause terns to abandon their eggs/young; furthermore, the signs encourage humans to please obey the seabird nesting island signs.

Voluntary boater surveys are also used to gather information on the success of the signs in terms of increasing public knowledge and compliance. Contact us to find out more information on how you can become an Island Watcher for the Roseate Tern Recovery Project.



Seabird Nesting Island
Ilot de nidification d'oiseaux marins
Please Do Not Disturb the Birds
Veuillez ne pas déranger les oiseaux

Watch for this sign indicating nesting seabirds