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# Census of terns and gulls in Prince Edward Island - 2009

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Manon Dubé<sup>1</sup>, Julie McKnight<sup>2</sup>, and Andrew W. Boyne<sup>2</sup>

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Atlantic Region

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Canadian Wildlife Service  
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# **CENSUS OF TERNS AND GULLS IN PRINCE EDWARD ISLAND - 2009**

**Manon Dubé<sup>1</sup>, Julie McKnight<sup>2</sup>, and Andrew W. Boyne<sup>2</sup>**

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## SUMMARY

The coast of Prince Edward Island was surveyed for colonial nesting gulls and terns in May and June 2009. The coastline was flown by fixed-wing aircraft and aerial visual-estimates and photo estimates were made of gull colonies. Subsequently, each gull and tern colony was visited on the ground. Aerial surveys identified 9 Great Black-backed and Herring Gull colonies, 2 Ring-billed Gull colonies and 7 tern colonies. It was estimated from aerial surveys that 840 pairs of Great Black-backed Gulls, 690 pairs of Herring Gulls, and 150 pairs of Ring-billed Gulls nested in Prince Edward Island in 2009. Furthermore, ground surveys estimated 612 pairs of Common Terns on the island. Great Black-backed and Herring Gull populations continue to decline, while Ring-billed Gulls have seen their first decrease since they appeared in the province. Tern populations continue to exist at levels substantially lower than their peak in the early 1980's.

## RÉSUMÉ

Un dénombrement des populations de goélands et de sternes qui nichent en colonie le long de la côte de L'Île-du-Prince-Édouard a été effectué en mai et en juin 2009. Des estimations visuelles aériennes ainsi que des estimations photographiques des colonies de goélands ont été faites à l'aide d'un aéronef à voilure fixe. Par la suite, chaque colonie de goélands et de sternes a été visitée à terre. Les estimations aériennes ont permis de recenser neuf colonies de goélands marins et de goélands argentés, deux colonies de goéland à bec cerclé et sept colonies de sternes. Nous avons déterminé à partir de l'estimation visuelle aérienne que 840 paires de goélands marins, 690 paires de goélands argentés et 150 paires de goélands à bec cerclé nichaient sur L'Île-du-Prince-Édouard en 2009. De plus, les estimations sur le terrain ont aussi déterminées que 612 paires de sternes pierregarins étaient présentes. Les populations de goélands marins et de goélands argentés continuent leur déclin, tandis que les populations de goélands à bec cerclé en sont à leur premier déclin depuis qu'ils ont été recensés dans la province. On dénombre encore quelques populations de sternes, mais leur nombre est sensiblement moins élevé que celui recensé lors du sommet démographique atteint au début des années 1980.

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## INTRODUCTION

In 1999, the Canadian Wildlife Service (CWS) initiated a program to census tern colonies in Atlantic Canada. The CWS census program was started to increase knowledge of Common Tern population trends in Canada. Terns face threats from human disturbance and coastal development (Kress et al. 1983, Molina and Erwin 2006, Schippers et al. 2009) as well as displacement (Kress et al. 1983) and predation by gulls (Donehower et al. 2007). Thus, trends in gull populations are also important to better understand the status of tern populations in Canada. In Atlantic Canada, each province is surveyed every 4-5 years in rotation. Prince Edward Island (PEI) was first surveyed under this program in 1999 (Boyne et al. 2001) and then again in 2004 (Boyne and McKnight 2005). Several previous efforts to survey seabird colonies in PEI have occurred over the last 40 years (Vass 1965; Pigot 1967; MacDougall 1985; Lock 1987; Northcott and Creamer 1987; Lock 1988).

This report outlines the results for Great Black-backed Gull (*Larus marinus*), Herring Gull (*L. argentatus*), Ring-billed Gull (*L. delawarensis*), as well as Tern (*Sterna spp.*) colonies surveyed by CWS on Prince Edward Island in 2009.

## METHODS

We performed two types of surveys, aerial and ground. Aerial surveys included a visual estimate of species type and abundance from the air, and aerial photographs of the colonies. Ground surveys consisted of nest counts by foot.

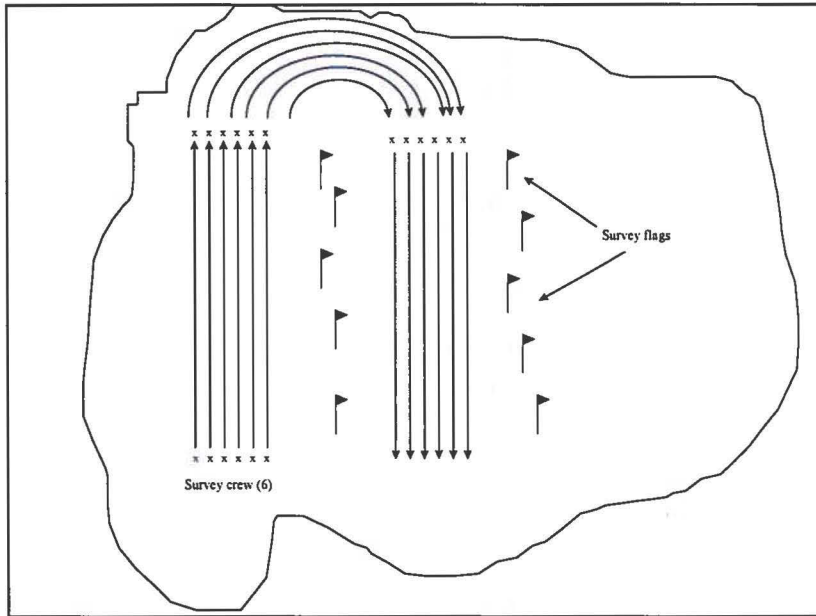
**Aerial survey** – The coast of Prince Edward Island was surveyed by a fixed-wing aircraft on May 28, 2009 (Cessna 172; Tartan Air, Murray Harbour; pilot: Mark Coffin). The aerial survey was timed to occur during the third week of incubation for Great black-backed Gulls. Terns were not nesting but were present at colony sites at this point and we expected to observe them during aerial surveys.

The aerial survey was conducted 50 m offshore at an altitude of approximately 150 m with two observers, A. W. Boyne and J. Stewart. Observer 1 (AWB) sat in the front left-hand seat and Observer 2 (JS) in the rear left-hand seat. The coastline of PEI was flown counter-clockwise starting and finishing in Murray Harbour (N 46.030°, W 62.528°). The total flight time was 5.4 hours and the total survey time was 5.0 hours. More specifically, the survey occurred from 09:55 and 15:40. A 30-minute refuelling stop was made in Alberton Harbour (N 46.795°, W 64.059°).

Tern and gull colonies were identified from the air and their locations were marked on 1:50,000 topographic maps. For tern colonies, no visual estimates were performed and only locations were recorded because the survey was too early for an accurate count. For gulls, each observer made a visual estimate of the number of individuals on territories at each colony. On islands with small gull colonies, total counts of individual gulls on territories were performed, but at larger colonies, birds were counted in clusters of 5, 10



or 25. The two observers jointly estimated the species ratio for colonies with both Great Black-backed Gulls and Herring Gulls. Birds that were obviously loafing, on the edge of the colony, or in the intertidal zone were not counted. However, the location and number of gulls in roosting flocks away from colonies was recorded by CWS Coastal Survey Block (Lock et al. 1996; Figure 2).



Box 1. Pattern of ground surveys for gulls and terns in PEI, 2009

In addition to visual estimates, aerial photographs of gull colonies were taken from the open window by Observer 1. Photos were taken using a Nikon D300 digital camera with a Nikon 18-200 mm zoom. Aerial photographs of gull colonies were interpreted digitally (Chardine 2000) and analysed using Adobe Photoshop® 5.5. Multiple overlapping photos were taken for islands too large to be captured on one photograph. The overlapping sections of photographs were marked and only the image that best represented the overlapped area was counted. In Photoshop, a layer was added for each species and a square, with a known number of pixels and a given colour associated with that species, was placed using the paintbrush tool on each apparently occupied territory by gulls. Individual gulls or pairs on the interior of the colony that were spaced regularly were assumed to be on territories. Gulls that were obviously loafing, on the edge of the colony, or in the intertidal zone were not included in the count. The number of apparently occupied territories was determined using the HISTOGRAM function in Photoshop. This tool produced a histogram with the number of pixels of each colour on a layer. To determine the total number of squares or apparently occupied territories for each species, the total number of pixels was divided by the number of pixels per square. Apparently occupied territories were deemed to be equivalent to nesting pairs.

**Ground Survey** – We conducted ground surveys on 3-5 June for gulls and 17-19 June for terns with 3-4 researchers walking parallel transects about arms' length apart. The

ground survey for terns was timed to coincide with the last week of incubation for early nesters. We marked the outside line of each transect with forestry survey flags, which we picked up on the following transect (see Box 1). For gulls, we recorded the number of eggs and chicks for each nest. The species attending each nest was determined by a combination of egg size, nest location, direct observation of incubating birds, and hatching chronology. For terns, we noted the number of nests and eggs as with gulls although no chicks were present at this time. We also actively searched for Arctic Terns amidst the abundant Common Terns. For both gulls and terns, we kept count of predated eggs, which we used, together with other elements such as the number of empty nests and birds in the colony, to make assumptions regarding the colony's fate. Data gathered in this survey are archived in the Atlantic Region Seabird Colony Database, Canadian Wildlife Service, Sackville, New Brunswick.

**Analyses** – We calculated mean clutch size ( $\pm$  SD) for all species at each colony. For terns, we tested for differences in clutch size among the last 3 surveys using an ANOVA. We also obtained total and per colony hatching percentages for gull species. We calculated ratios of gull nests to roosting gulls for 2004 and 2009 from the aerial estimates of Great Black-backed and Herring Gulls by Observer 1, who was present in both surveys. Aerial rather than ground estimates were used because some gull colonies were not surveyed on the ground in 2009. We developed correction factors for aerial visual-estimates and photo estimates using ground estimates as the true counts. To do so, we divided Observer 1, Observer 2, and photo estimates by the ground estimates.

To determine the rate of population growth between 2004-2009 for all species, we calculated a Compound Annual Growth Rate (CAGR) using the following formula (e.g. Cotter and Rail 2002):

$$CAGR = ((N(t)/N(0))^{1/n}) - 1$$

where  $N(t)$  = population size from aerial surveys at time  $t$ ,  $N(0)$  = population size from aerial surveys at time 0 and  $n$  = number of years between the two surveys. Analyses were performed using Microsoft Excel 2003 and R (R Development Core Team 2009).

## RESULTS

**Terns** – Surveys confirmed nesting terns at 7 sites in PEI: Bernards Island, Eglington Cove, Maximeville, Poverty Beach, Pownal Bay, St. Nicholas/Muddy Creek and Covehead Harbour in PEI National Park (Table 1; Figure 5). A total of 612 nests were observed at these sites. Access to the nesting site in PEI National Park was restricted but we observed two nests from a distance. At every site, we attributed all nests to Common Terns because no Arctic Terns were seen flying in the colonies. A total of 34 predated eggs were found at visited sites. Of these, 24 were on Poverty Beach and 7 on Bernards Island. The mean clutch size for the colonies, with the exception of the one in PEI National Park where we could not count the eggs, was 2.31 (SD = 0.80) (Table 2).



Clutch size among 1999, 2004 and 2009 colonies did not vary significantly ( $F_{2,12} = 0.354$ ,  $P=0.709$ ). The CAGR between 2004 and 2009 was -3.68%.

**Great Black-backed and Herring Gulls** – Aerial surveys identified 9 Great Black-backed and Herring Gull colonies in PEI (Table 3; Figure 3). The total number of Great Black-backed and Herring Gulls obtained from aerial visual estimates was 1530 (Observer 1) and 1594 (Observer 2; Table 3), and the species ratio was estimated at 38-45% Herring Gull to 55-62% Great Black-backed Gull (Table 3). Multiple aerial photographs were taken of the 9 colonies ( $n = 2-18$ ). From photographs we estimated 3437 nesting pairs of gulls (1279 Great Black-backed Gulls and 2158 Herring Gulls) at these sites. However, due to poor picture quality, it was difficult to differentiate between Great Black-backed and Herring Gulls resulting potentially in an erroneous ratio. Based on visual estimates from Observer 1, the CAGR between 2004 and 2009 was -11.99%.

Ground counts are assumed to be the most reliable estimate of colony size (Kress and Hall 2004). Due to inclement tides and weather, only 5 of the 9 known gull colonies were censused on the ground. Ground surveys estimated 766 pairs of gulls at the 5 colonies in PEI in 2009. Of these, 141 were Great Black-backed Gulls and 625 were Herring Gulls. Aerial estimates from Observer 1 will be used for comparisons. At these same sites, 620 individuals on territories were recorded in aerial estimates. Of these, 214 were Great Black-backed Gulls and 406 were Herring Gulls. Photograph estimates revealed 368 Great Black-backed Gulls and 915 Herring Gulls' territories at those five sites. While on the ground, we found a gull colony that has not been identified during the aerial survey. Ram Island (N 46.780°, W 64.087°) near Alberton Harbour supported 111 Great Black-backed Gulls and 44 Herring Gulls' nests.

Great Black-backed Gulls nested at all of the six sites surveyed on the ground and Herring Gulls nested at only half of them. All of these islands suffered from predation although we could not differentiate between species for predated eggs. We found a total of 98 predated eggs, which included 45 eggs on Bernards Island, 25 on Ram Island and 17 on Wagners Island. Mean clutch size for Great Black-backed Gulls and Herring Gulls at these sites was 2.21 (SD = 0.83) and 2.42 (SD = 0.71) eggs per nest respectively. Percent hatch at these sites varied from 0-25% for Great Black-backed Gulls and 0-3% for Herring Gulls (Table 4, 5).

In 2009, over 3731 roosting gulls were observed away from colonies during the aerial survey (Table 6). This is a small increase since 2004 where 3481 gulls were observed roosting. It is, however, a large decrease from 1986 where 12718 gulls roosted outside colonies.

To calculate the correction factors for aerial and photographic surveys, we only included the 6 colonies that were both surveyed from the air and on the ground. The aerial visual estimates of both observers were lower than the photo estimates ( $6.15_{[obs\ 1]}$  and  $7.85_{[obs\ 2]}$  individuals on territories  $_{[visual]}/nest_{[ground]}$  compared to  $11.99_{[photo]}/nest_{[ground]}$ ) although the standard deviation was high (Table 3) and the three values are not

significantly different ( $F_{2,12} = 1.17$ ,  $P = 0.344$ ). The standard deviation also indicated that the precision of the visual estimates was greater than for photo estimates.

**Ring-billed Gulls** – Ring-billed Gulls were observed nesting at two sites on PEI in 2009 (Table 7; Figure 4). Aerial visual-estimates were only recorded for Poverty Beach where 150 individuals on territories were seen. For this site, photo estimates were of 94 Ring-billed Gull territories. We visited only one of the two sites, Ram Island, during the ground survey where we found 154 nests. These nests amounted to 374 eggs with a mean clutch size of 2.83 ( $SD = 0.76$ ) and no chicks, thus a percent hatch of 0% (Table 8). We could calculate only one correction factor (i.e.  $\text{photo/nests}_{[\text{ground}]}$ ), which equalled 1.30 (Table 7). The CAGR between 2004 and 2009 for this species was -28.00%.

## DISCUSSION

This is the third survey of Prince Edward Island conducted by the Canadian Wildlife Service since 1999 when it implemented a program to survey terns and associated coastal colonial waterbirds in Atlantic Canada. The results from this survey provide insight into recent trends in the abundance and distribution of terns and gulls in PEI.

**Terns** – The tern population in PEI has sustained a decline since their historical high in 1984 when they reached over 3300 pairs. This decline persists despite population declines in two of their predators, Great Black-backed and Herring Gulls (see below). Since the last tern survey in 2004, the number of nesting pairs in PEI declined from 738 to 612 although the number of colonies increased from 6 to 7 (Figure 7). Predation pressure, through colony fragmentation, may have caused the observed increase in nesting sites (Molina and Erwin 2006). Three sites were consistently occupied by nesting terns in 1999, 2001, and 2004 (Boyne and McKnight 2005). Of these sites, only one – Covehead Harbour in PEI National Park – still supported nesting terns in 2009 and only two nests were observed there. Poverty Beach, however, has supported a large colony of terns since 2001, and this year, Alberton Harbour Islands support a colony for the first time since 1986.

Since 1966, the number of tern colonies has declined. After a sharp decline in 1986, nest number fluctuated until 2001 when numbers slowly declined. Clutch size remained stable during the past three surveys. After the 2004 survey, Boyne and McKnight (2005) indicated that terns were under pressure in PEI due to a decline in numbers and nesting sites, the low number of sites supporting terns on an annual basis, and research suggesting a very poor productivity in terns (McLellan 2005). The suggestion that predation and habitat loss are the main factors limiting the tern population in PEI (McLellan 2005) is still valid in 2009 now that only one of the three long-term colonies remains. Sea-level rise could also negatively impact tern populations in PEI. Worldwide, sea levels are predicted to increase by 180 – 590 mm over the next century (Bates et al. 2008). As sea levels increase, islands will likely face flooding and increased erosion (Titus et al. 1991), which could contribute to a further decrease of tern nesting habitat.



In 2004, there was an interest by local groups to install artificial nesting rafts to compensate for piers collapsing at the Hillsborough Bridge. Nesting rafts, which were initially installed by the PEI Wildlife Federation, are unable to sustain large tern colonies due to their small sizes (R. Curley, PEI Department of Fish and Wildlife) personal communication). Installation of larger rafts in deeper water conflicts with Transport Canada regulations on navigational hazards and have not been installed. Successful efforts have also lead firework celebrations surrounding July first to be held further from the bridge piers (R. Curley, PEI Department of Fish and Wildlife, personal communication). Although a significant effort to protect tern colonies has been underway since 2004, more combined efforts and commitment between local groups and the government as well as adequate land-use practises along the PEI coast are still needed to protect tern populations in this region.

**Great Black-backed and Herring Gulls** – Our results from the 2009 surveys are consistent with those obtained in 1999 (Boyne et al. 2001) and 2004 (Boyne and McKnight 2005), which clearly showed a decrease in nesting Great Black-backed and Herring Gull abundance compared to 1986 levels (Lock 1987; Table 9; Figure 6). Trends between the last three surveys are more difficult to quantify due to inconsistencies in the methods. In 1999, the survey was timed specifically for terns, thus aerial estimates of gull colonies occurred after the mean hatch date for both species and no ground surveys were conducted. This may have resulted in underestimates of nesting gulls in 1999. In 2009, inclement weather and tides resulted in only a portion of the sites being surveyed on the ground, which lead us to use aerial estimates for comparisons. Moreover, in both years, aerial photographs were of poor quality and it was not possible to differentiate between Great Black-backed Gulls and Herring Gulls. The poor photo clarity could explain discrepancies in the proportion of Herring Gulls as compared to aerial estimates in the 2009 results.

While comparing aerial visual-estimates, however, we found a decrease between the 2004 and 2009 nesting gull abundance. This decline is consistent with trends observed elsewhere in Eastern Canada (New Brunswick – Boyne and Hudson 2002, Nova Scotia – Boyne and Beukens 2004; Quebec – Chapdelaine 1995, Cotter and Rail 2007). These declines have been attributed to a decrease in food availability from artificial sources such as dumps and landfills, and discards from the fishing industry (Pierotti and Good 1994). The gull colonies we visited in 2009 also suffered from predation.

The timing of the 2004 and 2009 surveys are similar and offer a good base for comparison between the ratios of roosting gulls to gull nests. Our results show proportionally more gulls roosting than nesting in 2009 compared to 2004. Cairns (1987) proposed that a greater proportion of non-breeders exist when breeding conditions are suboptimal, and that this is followed by a general decline in population numbers. If this is occurring in the large gull populations of PEI, we would expect lower abundance of these gulls in years to come.



Although the observed long-term decrease in the abundance of large gulls could benefit the tern population, we also observed an increase between 2004 and 2009 in the total number of gulls roosting away from the colonies. If this trend continues, it could lead to higher predation on tern nests as demonstrated by the positive correlation between the number of roosting gulls and Least Tern nests predation in Southwestern Indiana (Devault et al. 2005).

**Ring-billed Gulls** – Since Ring-billed Gulls were first detected nesting in PEI in 1974 (Lock 1988), their numbers have increased 46.8% per year through the mid-1980's and continued to increase steadily at a lower rate since (see Boyne and McKnight 2005 for more details). Results from our 2009 survey show the first decline in Ring-billed Gull abundance since they were first seen in PEI (Table 9; Figure 6). This decrease may be overestimated because only one of the two nesting colonies observed during the aerial survey was visited on the ground. This second colony, however, would have had to contain over 530 nests to equal 2004 numbers. This is very unlikely because the aerial survey estimated 150 individuals on territories at this site.

Factors contributing to this decline are not clear. Interestingly, no Ring-billed Gulls nested at Indian Point Sandhills in 2009 when, in the past 20 years, it supported the largest colony in PEI. On the other hand, Ram Island supported a 154 nests Ring-billed Gull colony for the first time this year.

**Correction factors** – We repeated the efforts made in 1999 and 2004 and whenever possible, produced visual aerial estimates, photo estimates, and ground counts for each gull colony in PEI. It was performed to determine the necessity for aerial photography. Even though costs were reduced from 2004 because photographs were taken digitally, the extra time required during flights and the photo analyses are still costly.

For comparison purposes we assumed that ground counts produced the most accurate estimate. Thus, aerial visual estimates and aerial photo estimates were compared in relation to ground counts. Based on our results, the aerial visual estimates for Great Black-backed and Herring Gulls were more accurate and precise than the aerial photo estimates. This may have occurred because the estimates were indeed more accurate and precise or because having only one individual performing the photo estimates, and thus no replication, lead to erroneous counts. It is likely the former because results from 2004 also show a greater accuracy and precision for aerial visual estimates when compared to photo estimates. In either case, the mean and standard deviation obtained from these estimates were much greater than expected from other research (Kadlec and Drury 1968, Boyne and Beukens 2004, Boyne and McKnight 2005). The main outlier in our data was the colony on Wagners Island where very few nests were recorded on the ground compared to aerial and photo estimates. Daily flooding is believed to occur at that location and gulls might have abandoned the colony between the time the aerial survey and the ground survey were conducted.

Consistent with findings from 2004 (Boyne and McKnight 2005), these results suggest that aerial photographs are not worth the extra costs when compared to aerial estimates made by trained observers. Photograph estimates consistently overestimated ground counts (Kadlec and Drury 1968, Boyne and McKnight 2005), but aerial estimates only overestimated ground counts in some instances (Kadlec and Drury 1968, Boyne and McKnight 2005) but not in others (Boyne and Beukens 2004).

In summary, this report adds to the existing documentation on the decline on Great Black-backed Gulls, Herring Gulls, and Common Terns in Atlantic Canada. This report shows for the first time a halt in the increase of Ring-billed Gulls in PEI. We also noted no significant change in clutch sizes of Common Terns over the last 3 surveys. Finally, similarly to the 2004 report, aerial estimates were preferred to photo estimates.

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Table 1. Surveys of tern nests in Prince Edward Island, 1966-2009. A '-' indicates a colony was not surveyed, and a blank cell indicates that it was not possible to determine whether an island was surveyed.

| Colony                         | 1966 <sup>1</sup> | 1975 <sup>2</sup> | 1984 <sup>3</sup> | 1986 <sup>4</sup> | 1987 <sup>5</sup> | 1999 <sup>6</sup> | 2001 <sup>7</sup> | 2004 | 2009 |
|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|------|
| Alberton Harbour Islands       | 410               | 100               | 474               | 18                | 0                 | 0                 |                   | 0    | 107  |
| Boughton Island                |                   |                   | -                 | 0                 | 12                | 0                 |                   | 0    | -    |
| Cascumpec Sandhills            |                   | 100               | 983               | 136               | 155               | 0                 | 2                 | 0    | -    |
| Charlottetown Harbour          | 80                |                   | -                 | 0                 | -                 | 0                 |                   | 0    | -    |
| Conway Sandhills               |                   | 0                 | 1189              | 0                 | 57                | 0                 |                   | 0    | -    |
| Darnley Island                 |                   | 50                | -                 | 0                 | -                 | 0                 |                   | 0    | -    |
| Duck Creek Point               |                   |                   |                   |                   |                   |                   | 2                 | -    | -    |
| Eglington Cove                 |                   |                   | -                 | 0                 | -                 | 15                | 3                 | 0    | 136  |
| Gascoigne Cove                 |                   |                   |                   |                   |                   |                   | 4                 | 0    | -    |
| Hillsborough Bridge            | 80                | 125               | -                 | 234               | 231               | 17                | 69                | 66   | 0    |
| Indian Point Sandhills         |                   |                   | 355               | 0                 | 178               | 54                | 61                | 254  | 0    |
| Little Courtin Island          | 541               | 70                | 0                 | 0                 | -                 | 0                 |                   | 0    | -    |
| Malpeque Sandhills, Hog Island |                   |                   | 161               | 0                 | 33                | 0                 | 7                 | 0    | -    |
| Maximeville                    |                   |                   |                   |                   |                   |                   |                   |      | 73   |
| Mossy Point                    |                   |                   | 3                 | 0                 | -                 | 0                 |                   | 0    | -    |
| Murray Harbour Islands         | 90                | 200               | -                 | 0                 | 0                 | 0                 |                   | 0    | -    |
| PEINP, Blooming Point          |                   |                   | 0                 | 0                 | -                 | 1                 |                   | 3    | -    |
| PEINP, Cavendish Sandspit      |                   | 12                | 161               | 0                 | -                 | 68                | 2                 | 0    | -    |
| PEINP, Covehead Harbour        |                   | 56                | 5                 | 0                 | -                 | 12                | 8                 | 19   | 2**  |
| PEINP, Rustico Causeway        |                   |                   | 62                | 0                 | -                 | 0                 | 2                 | 0    | -    |
| PEINP, Rustico Island Sandspit | 1                 |                   | 5                 | 0                 | -                 | 1                 | 60                | 1    | -    |
| Pownal Bay                     | 98                | 35                | -                 | 21                | 81                | 113               |                   | 0    | 32   |
| Poverty Beach                  |                   | 50                | -                 | 21                | 81                | 0                 | 611               | 395  | 259  |
| Savage Harbour                 | 1                 |                   | -                 | 0                 | 1                 | 0                 |                   | 0    | -    |
| South Lake                     |                   |                   | -                 | 0                 | 2                 | 6                 |                   | 0    | -    |
| St. Nicholas/Muddy Creek       |                   |                   |                   |                   |                   |                   |                   |      | 5    |
| St. Peter's Bay                |                   |                   | -                 | 2                 | 0                 | 0                 |                   | 0    | -    |



| Colony                     | 1966 <sup>1</sup> | 1975 <sup>2</sup> | 1984 <sup>3</sup> | 1986 <sup>4</sup> | 1987 <sup>5</sup> | 1999 <sup>6</sup> | 2001 <sup>7</sup> | 2004 | 2009 |
|----------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|------|
| St. Peter's Lake           | 24                |                   | -                 | 0                 | -                 | 0                 |                   | 0    | -    |
| Tracadie Sandbar           |                   |                   |                   |                   |                   |                   |                   |      | 0    |
| Wood Island                | 1                 | 75                | -                 | 4                 | 61                | 0                 |                   | 0    | -    |
| <i>Additional colonies</i> | 40*               |                   |                   |                   |                   |                   |                   |      |      |
| Total                      | 1326              | 873               | 3398              | 436               | 892               | 287               | 831               | 738  | 612  |
| Number of Colonies         | 29                | 11                | 10                | 7                 | 11                | 9                 | 12                | 6    | 7    |

<sup>1</sup>B.C. Pigot, Maritimes Nest Record Scheme, Canadian Wildlife Service, Sackville, NB; <sup>2</sup>G. Hogan, PEI Fish and Wildlife Division, MNRS; <sup>3</sup>MacDougall 1985; <sup>4</sup>Lock 1987; <sup>5</sup>Northcott and Creamer 1987; <sup>6</sup>Boyne et al. 2001; <sup>7</sup>R. Curley, unpublished data and L. Thomas unpublished data

\* 40 nests observed at 19 additional sites

\*\* not observed during aerial survey

Table 2. Clutch size and nest counts of Common Terns at colonies visited in Prince Edward Island, 2009.

| Location                 | Latitude | Longitude | Date    | Clutch size |     |     |   | Nests | Eggs | Clutch size |      |
|--------------------------|----------|-----------|---------|-------------|-----|-----|---|-------|------|-------------|------|
|                          |          |           |         | 1           | 2   | 3   | 4 |       |      | Mean        | SD   |
| Bernards Island          | 46.815   | -64.039   | 18 June | 43          | 56  | 8   | 0 | 107   | 179  | 1.67        | 0.61 |
| Eglinton Cove            | 46.316   | -62.355   | 18 June | 21          | 42  | 72  | 1 | 136   | 325  | 2.39        | 0.75 |
| Hillsborough Bridge      | 46.237   | -63.108   | 18 June | 0           | 0   | 0   | 0 | 0     | 0    | -           | -    |
| Indian Point Sandhills   | 46.626   | -64.287   | 17 June | 0           | 0   | 0   | 0 | 0     | 0    | -           | -    |
| Maximeville              | 46.447   | -64.119   | 17 June | 12          | 19  | 42  | 0 | 73    | 176  | 2.41        | 0.76 |
| Poverty Beach            | 46.037   | -62.482   | 19 June | 48          | 55  | 152 | 4 | 259   | 630  | 2.43        | 0.81 |
| Pownal Bay               | 46.174   | -62.948   | 19 June | 0           | 5   | 27  | 0 | 32    | 91   | 2.84        | 0.37 |
| St. Nicholas/Muddy Creek | 46.412   | -63.940   | 17 June | 0           | 0   | 5   | 0 | 5     | 15   | 3.00        | 0.00 |
| Tracadie Sandbar         | 46.406   | -63.033   | 18 June | 0           | 0   | 0   | 0 | 0     | 0    | -           | -    |
| Totals                   |          |           |         | 124         | 172 | 274 | 5 | 612   | 1416 | 2.31        | 0.80 |

Table 3. Aerial visual (individuals), aerial photo (territories), and ground (nests) estimates of Great Black-backed and Herring Gulls at colonies in Prince Edward Island, 2009.

| Location                        | Latitude | Longitude |             | Aerial visual |        | Photo<br>(territories) | Ground<br>(nests) | Correction factors |              |              |
|---------------------------------|----------|-----------|-------------|---------------|--------|------------------------|-------------------|--------------------|--------------|--------------|
|                                 |          |           |             | Obs. 1        | Obs. 2 |                        |                   | Obs 1<br>/GC       | Obs 2/<br>GC | Photo/<br>GC |
| Bernards Island                 | 46.815   | -64.039   | Total Gulls | 90            | 30     | 199                    | 62                | 1.45               | 0.48         | 3.21         |
|                                 |          |           | % HERG      | 90%           | 90%    | 17%                    | 5%                |                    |              |              |
|                                 |          |           | GBBG        | 9             | 3      | 165                    | 59                |                    |              |              |
|                                 |          |           | HERG        | 81            | 27     | 34                     | 3                 |                    |              |              |
| Gillis Island                   | 46.809   | -64.038   | Total Gulls | 50            | 60     | 60                     | 7                 | 7.14               | 8.57         | 8.57         |
|                                 |          |           | % HERG      | 10%           | 10%    | 17%                    | 0%                |                    |              |              |
|                                 |          |           | GBBG        | 45            | 54     | 50                     | 7                 |                    |              |              |
|                                 |          |           | HERG        | 5             | 6      | 10                     | 0                 |                    |              |              |
| Little Courtin Island           | 46.509   | -63.760   | Total Gulls | 320           | 400    | 464                    | -                 | -                  | -            | -            |
|                                 |          |           | % HERG      | 15%           | 17%    | 47%                    | -                 |                    |              |              |
|                                 |          |           | GBBG        | 272           | 332    | 245                    | -                 |                    |              |              |
|                                 |          |           | HERG        | 48            | 68     | 219                    | -                 |                    |              |              |
| Indian Point Sand<br>Hills West | 46.626   | -64.287   | Total Gulls | 0             | 164    | 368                    | -                 | -                  | -            | 1.69         |
|                                 |          |           | % HERG      | 0%            | 62%    | 67%                    | -                 |                    |              |              |
|                                 |          |           | GBBG        | 0             | 101    | 122                    | -                 |                    |              |              |
|                                 |          |           | HERG        | 0             | 63     | 246                    | -                 |                    |              |              |
| Poverty Beach                   | 46.037   | -62.482   | Total Gulls | 590           | 550    | 1322                   | -                 | -                  | -            | -            |
|                                 |          |           | % HERG      | 40%           | 40%    | 59%                    | -                 |                    |              |              |
|                                 |          |           | GBBG        | 354           | 330    | 544                    | -                 |                    |              |              |
|                                 |          |           | HERG        | 236           | 220    | 778                    | -                 |                    |              |              |
| Ram Island                      | 46.536   | -63.753   | Total Gulls | 320           | 220    | 694                    | 642               | 0.50               | 0.34         | 1.08         |
|                                 |          |           | % HERG      | 95%           | 95%    | 98%                    | 97%               |                    |              |              |
|                                 |          |           | GBBG        | 16            | 11     | 16                     | 20                |                    |              |              |
|                                 |          |           | HERG        | 304           | 209    | 678                    | 622               |                    |              |              |

| Location                              | Latitude | Longitude |             | Aerial visual |        | Photo<br>(territories) | Ground<br>(nests) | Correction factors |              |              |
|---------------------------------------|----------|-----------|-------------|---------------|--------|------------------------|-------------------|--------------------|--------------|--------------|
|                                       |          |           |             | Obs. 1        | Obs. 2 |                        |                   | Obs 1<br>/GC       | Obs 2/<br>GC | Photo/<br>GC |
| Ram Island (near<br>Alberton Harbour) | 46.780   | 64.087    | Total Gulls | -             | -      | -                      | 155               | -                  | -            | -            |
|                                       |          |           | % HERG      | -             | -      | -                      | 28%               |                    |              |              |
|                                       |          |           | GBBG        | -             | -      | -                      | 111               |                    |              |              |
|                                       |          |           | HERG        | -             | -      | -                      | 44                |                    |              |              |
| Tern Island                           | 46.807   | -64.043   | Total Gulls | 80            | 55     | 110                    | 51                | 1.57               | 1.08         | 2.16         |
|                                       |          |           | % HERG      | 10%           | 10%    | 15%                    | 0%                |                    |              |              |
|                                       |          |           | GBBG        | 72            | 50     | 94                     | 51                |                    |              |              |
|                                       |          |           | HERG        | 8             | 6      | 16                     | 0                 |                    |              |              |
| Wagners Island                        | 46.813   | -64.037   | Total Gulls | 80            | 115    | 220                    | 4                 | 20.00              | 28.75        | 55.00        |
|                                       |          |           | % HERG      | 10%           | 10%    | 80%                    | 0%                |                    |              |              |
|                                       |          |           | GBBG        | 72            | 104    | 43                     | 4                 |                    |              |              |
|                                       |          |           | HERG        | 8             | 12     | 177                    | 0                 |                    |              |              |
|                                       |          |           | Total gulls | 1530          | 1594   | 3437                   | 921               |                    |              |              |
|                                       |          |           | GBBG        | 840           | 984    | 1279                   | 252               |                    |              |              |
|                                       |          |           | HERG        | 690           | 610    | 2158                   | 669               |                    |              |              |
|                                       |          |           | % HERG      | 45%           | 38%    | 63%                    | 73%               |                    |              |              |
|                                       |          |           |             |               |        |                        | Mean              | 6.13               | 7.85         | 11.95        |
|                                       |          |           |             |               |        |                        | SD                | 8.18               | 12.18        | 21.26        |

Table 4. Clutch size and nest counts of Great Black-backed Gulls at colonies visited on the ground in Prince Edward Island, 2009.

| Location                           | Latitude | Longitude | Date   | Clutch size |    |    |   |   | Nests | Eggs | Chicks | Total chicks and eggs | Percent hatch | Clutch size |      |
|------------------------------------|----------|-----------|--------|-------------|----|----|---|---|-------|------|--------|-----------------------|---------------|-------------|------|
|                                    |          |           |        | 1           | 2  | 3  | 4 | 5 |       |      |        |                       |               | Mean        | SD   |
| Bernards Island                    | 46.815   | -64.039   | 3 June | 20          | 20 | 19 | 0 | 0 | 59    | 117  | 0      | 117                   | 0%            | 1.98        | 0.82 |
| Gillis Island                      | 46.809   | -64.038   | 3 June | 5           | 2  | 0  | 0 | 0 | 7     | 9    | 0      | 9                     | 0%            | 1.29        | 0.49 |
| Ram Island                         | 46.536   | -63.753   | 5 June | 4           | 10 | 6  | 0 | 0 | 20    | 42   | 4      | 46                    | 9%            | 2.10        | 0.72 |
| Ram Island (near Alberton Harbour) | 46.780   | 64.087    | 3 June | 21          | 36 | 52 | 1 | 1 | 111   | 253  | 83     | 336                   | 25%           | 2.32        | 0.82 |
| Tern Island                        | 46.807   | -64.043   | 3 June | 8           | 13 | 29 | 1 | 0 | 51    | 121  | 14     | 135                   | 10%           | 2.45        | 0.78 |
| Wagners Island                     | 46.813   | -64.037   | 3 June | 3           | 1  | 0  | 0 | 0 | 4     | 5    | 0      | 5                     | 0%            | 1.25        | 0.50 |
| Totals                             |          |           |        | 50          | 68 | 77 | 1 | 1 | 252   | 421  | 101    | 508                   | 20%           | 2.21        | 0.83 |



Table 5. Clutch size and nest counts of Herring Gulls at colonies visited on the ground in Prince Edward Island, 2009.

| Location                           | Latitude | Longitude | Date   | Clutch size |     |     |   | Nests | Eggs | Chicks | Total chicks and eggs | Percent hatch | Clutch size |      |
|------------------------------------|----------|-----------|--------|-------------|-----|-----|---|-------|------|--------|-----------------------|---------------|-------------|------|
|                                    |          |           |        | 1           | 2   | 3   | 4 |       |      |        |                       |               | Mean        | SD   |
| Bernards Island                    | 46.815   | -64.039   | 3 June | 1           | 1   | 1   | 0 | 3     | 6    | 0      | 6                     | 0%            | 2.00        | 1.00 |
| Gillis Island                      | 46.809   | -64.038   | 3 June | 0           | 0   | 0   | 0 | 0     | 0    | 0      | 0                     | -             | -           | -    |
| Ram Island                         | 46.536   | -63.753   | 5 June | 81          | 198 | 341 | 2 | 622   | 1508 | 54     | 1562                  | 3%            | 2.42        | 0.72 |
| Ram Island (near Alberton Harbour) | 46.780   | 64.087    | 3 June | 4           | 19  | 21  | 0 | 44    | 105  | 0      | 105                   | 0%            | 2.39        | 0.65 |
| Tern Island                        | 46.807   | -64.043   | 3 June | 0           | 0   | 0   | 0 | 0     | 0    | 0      | 0                     | -             | -           | -    |
| Wagners Island                     | 46.813   | -64.037   | 3 June | 0           | 0   | 0   | 0 | 0     | 0    | 0      | 0                     | -             | -           | -    |
| Totals                             |          |           |        | 86          | 218 | 363 | 2 | 669   | 1619 | 54     | 1673                  | 3%            | 2.42        | 0.71 |

Table 6. Roosting gulls surveyed in Prince Edward Island away from colonies, recorded by Canadian Wildlife Service Coastal Survey Blocks, 1986-2009

| Block | 1986 |      |      |      |       | 1999 |      |      |     |      |       | 2004 |      |     |      |       | 2009 |       |     |       |       |
|-------|------|------|------|------|-------|------|------|------|-----|------|-------|------|------|-----|------|-------|------|-------|-----|-------|-------|
|       | GBBG | HERG | RBGU | Imm  | Total | GBBG | HERG | BOGU | Imm | Unk  | Total | GBBG | HERG | Imm | Unk  | Total | GBBG | HERG* | Imm | Unk   | Total |
| 381   | 301  | 1271 |      | 235  | 1807  |      |      |      |     | 360  | 360   | 25   | 30   | 25  | 275  | 355   |      |       |     | 460   | 460   |
| 382   | 327  | 935  |      | 227  | 1489  |      |      |      |     | 365  | 365   |      | 10   | 90  | 202  | 302   | 2    | 248   |     |       | 250   |
| 383   |      |      |      |      | ns    |      |      |      |     | 75   | 75    | 25   | 99   | 49  | 282  | 455   |      |       |     | 250   | 250   |
| 384   |      |      |      |      | ns    |      |      |      |     | 0    | 0     | 8    | 12   | 10  | 20   | 50    |      |       |     | 50    | 50    |
| 385   | 59   | 699  |      | 26   | 784   |      |      |      |     | 0    | 0     | 5    | 30   | 35  | 70   | 70    |      |       |     | 50    | 50    |
| 386   | 42   | 691  |      | 800  | 1533  |      |      |      |     | 550  | 550   | 45   | 130  | 100 | 190  | 465   |      |       |     | 30    | 30    |
| 387   | 55   | 611  |      | 1095 | 1761  |      |      |      |     | 521  | 521   | 15   | 45   | 30  | 90   | 90    |      |       |     | 100   | 100   |
| 388   | 110  | 319  |      | 375  | 804   |      |      |      |     | 45   | 45    | 8    | 17   |     | 25   | 25    |      |       |     | 0     | 0     |
| 389   | 12   | 13   |      | 25   | 50    |      | +    |      |     |      | +     |      |      |     | 0    | 0     |      |       |     | 0     | 0     |
| 390   | 30   | 180  |      | 199  | 409   |      | 350  |      |     |      | 350   | 5    | 20   |     | 25   | 25    |      |       |     | 0     | 0     |
| 393   | 74   | 281  | 20   | 125  | 500   | 18   | 84   |      | 30  |      | 132   | 2    | 8    | 3   | 12   | 25    | 16   | 249   | 200 | 80    | 545   |
| 394   | 7    | 90   | 10   | 60   | 167   |      |      |      | 55  | 323  | 378   | 9    | 58   | 36  |      | 103   |      | 100   |     |       | 100   |
| 395   | 7    | 11   | 3    | 2    | 23    | 38   | 2    |      |     |      | 40    |      |      |     | 0    | 0     |      |       |     |       | 0     |
| 396   | 16   | 57   |      | 44   | 117   |      |      |      |     |      | 0     |      |      |     | 0    | 0     |      |       |     | 10    | 10    |
| 397   |      | 77   |      | 55   | 132   |      |      |      | 55  | 100  | 155   | 1    | 40   | 24  |      | 65    |      |       |     | 5     | 5     |
| 398   |      | 64   |      | 22   | 86    | 2    | 363  | 100  | 44  | 140  | 649   |      | 62   | 10  |      | 72    | 39   | 181   |     | 30    | 250   |
| 402   | 93   | 100  |      | 55   | 248   |      | 80   |      | 40  | 135  | 255   | 17   | 63   | 87  |      | 167   |      |       |     |       | 0     |
| 403   | 36   | 80   |      | 31   | 147   | 2    | 28   |      | 42  |      | 72    | 27   | 95   | 50  |      | 172   |      |       |     | 240   | 240   |
| 404   | 56   | 46   |      | 3    | 105   | 6    | 54   |      |     |      | 60    |      | 42   |     |      | 42    |      |       |     | 40    | 40    |
| 405   |      | 5    |      | 5    | 5     |      |      |      | 22  |      | 22    |      |      |     |      | 0     |      |       |     |       | 0     |
| 406   |      | 34   |      | 34   | 34    | 4    | 95   |      | 40  |      | 139   | 5    | 70   |     | 40   | 115   |      | 70    |     |       | 70    |
| 407   | 2    | 32   |      |      | 34    |      | 35   |      |     |      | 35    | 10   | 15   |     | 142  | 167   |      |       |     |       | 0     |
| 408   |      |      |      |      | 0     | 10   | 90   |      |     |      | 100   |      |      |     |      | 0     | 12   |       |     |       | 12    |
| 409   | 6    |      |      |      | 6     |      |      |      |     |      | ns    |      |      |     |      | 0     |      |       |     |       | 0     |
| 411   | 5    | 413  |      | 7    | 425   |      |      |      | 70  |      | 70    | 1    |      |     | 205  | 206   |      |       |     | 172   | 172   |
| 412   | 66   | 165  |      | 78   | 309   |      |      |      | 50  |      | 50    | 3    | 2    |     | 45   | 50    |      |       |     | 12    | 12    |
| 413   |      | 109  |      | 4    | 113   | 3    | 79   |      | 12  | 55   | 149   |      |      |     | 30   | 30    |      | 30    |     |       | 30    |
| 414   | 145  | 159  |      | 61   | 365   |      | 230  |      |     | 2    | 232   | 5    | 5    |     | 295  | 305   |      |       |     | 20    | 20    |
| 415   | 7    | 37   |      | 16   | 60    |      | 90   |      |     | 28   | 118   |      |      |     |      | 0     |      |       |     | 35    | 35    |
| 416   | 49   | 155  |      |      | 204   |      |      |      |     | 12   | 12    | 3    |      |     | 22   | 25    |      |       |     |       | 0     |
| 417   | 24   | 85   |      | 2    | 111   |      |      |      |     |      | 0     |      |      |     |      | 0     |      |       |     |       | 0     |
| 418   | 116  | 747  |      | 27   | 890   |      |      |      |     | 550  | 550   | 10   | 18   | 12  | 60   | 100   |      |       |     | 1000  | 1000  |
|       |      |      |      |      |       |      |      |      |     |      |       |      |      |     |      |       |      |       |     | +     | +     |
| Total | 1645 | 7466 | 33   | 3574 | 12718 | 83   | 1580 | 100  | 460 | 3261 | 5484  | 229  | 871  | 561 | 1820 | 3481  | 69   | 878   | 200 | 2584+ | 3731+ |

Headings are GBBG = Great Black-backed Gull, HERG = Herring Gull, RBGU = Ring-billed Gull, BOGU = Bonaparte's Gull, Imm = immature gull, and UNK = unknown gull species

+ present, but not counted

ns: not surveyed

\*Likely includes some Ring-billed Gulls

Table 7. Aerial visual (individuals on territories), aerial photo (territories), and ground (nests) estimates of Ring-billed Gulls at colonies in Prince Edward Island, 2009.

| Location      | Latitude | Longitude | Aerial visual (individuals on territories) |        | Photo (territories) | Ground (nests) | Correction factors |           |           |
|---------------|----------|-----------|--|--------|---------------------|----------------|--------------------|-----------|-----------|
|               |          |           | Obs. 1                                     | Obs. 2 |                     |                | Obs 1 /GC          | Obs 2/ GC | Photo/ GC |
| Poverty Beach | 46.037   | -62.482   | 150  | 0      | 94                  | -              | -                  | -         | -         |
| Ram Island    | 46.536   | -63.753   | 0  | 0      | 200                 | 154            | 0.00               | 0.00      | 1.30      |
| Totals        |          |           | 150  | 0      | 294                 | 154            |                    |           |           |



Table 8. Clutch size and nest counts of Ring-billed Gulls at colonies visited on the ground in Prince Edward Island, 2009.

| Location   | Latitude | Longitude | Date   | Clutch size |    |    |   |   | Nests | Eggs | Chicks | Total chicks and eggs | Percent hatch | Clutch size |      |
|------------|----------|-----------|--------|-------------|----|----|---|---|-------|------|--------|-----------------------|---------------|-------------|------|
|            |          |           |        | 1           | 2  | 3  | 4 | 5 |       |      |        |                       |               | Mean        | SD   |
| Ram Island | 46.536   | -63.753   | 5 June | 19          | 55 | 76 | 3 | 1 | 154   | 374  | 0      | 374                   | 0%            | 2.43        | 0.76 |

Table 9. Numbers of Great Black-backed Gull, Herring Gull and Ring-billed Gull nests surveyed at colonies in Prince Edward Island, 1975-2009.

| Colony                             | Great Black-backed Gull |      |      |      |       |      | Herring Gull |       |      |      |       |      | Ring-billed Gulls |      |      |      |      |      |
|------------------------------------|-------------------------|------|------|------|-------|------|--------------|-------|------|------|-------|------|-------------------|------|------|------|------|------|
|                                    | 1975                    | 1984 | 1986 | 1999 | 2004  | 2009 | 1975         | 1984  | 1986 | 1999 | 2004  | 2009 | 1975              | 1984 | 1986 | 1999 | 2004 | 2009 |
| Alberton Harbour Islands           | 50                      |      |      |      |       |      |              |       |      |      |       |      |                   |      |      |      |      |      |
| Bernards Island                    |                         | 136  | 149  |      | 114   | 59   |              |       |      | 44   | 4     | 3    |                   |      |      |      |      |      |
| Gillis Island                      |                         | 1    |      |      | 29    | 7    |              |       |      |      | 0     | 0    |                   |      |      |      |      |      |
| Gull Island (Sandy Is.)            |                         | 111  | 90   |      | 0     |      |              |       |      |      |       |      |                   |      |      |      |      |      |
| Tern Islands                       |                         | 2    | 11   |      | 75    | 51   |              |       |      | 30   | 0     | 0    |                   |      |      |      |      |      |
| Wagners Island                     |                         | 35   | 30   |      | 61    | 4    |              |       |      | 53   | 4     | 0    |                   |      |      |      |      |      |
| Bird Island                        |                         |      | 6    |      | 4     |      |              | 17*   |      |      | 118   |      |                   |      |      |      | 69   |      |
| Cascumpec Sand Hills               |                         |      | 157  |      | 0     |      |              | 1341* | 1412 | 384  | 93    |      |                   | 159  |      |      | 0    |      |
| Conway Sand Hills                  |                         |      | 2    |      | 0     |      |              | 108*  | 46   |      | 0     |      |                   |      |      |      |      |      |
| Hillsborough Bridge                |                         |      | 2    | 2    | 0     |      |              |       |      |      |       |      |                   |      |      |      |      |      |
| Indian Point Sandhills             |                         | 617  | 146  |      | 186** |      |              | 616   | 1263 | 605  | 669** |      |                   | 75   | 116  | 405  | 522  |      |
| Malpeque Bay                       |                         |      |      |      |       |      |              |       |      |      |       |      |                   |      |      |      |      |      |
| Little Courtin Island              | 200                     |      | 571  |      | 168   |      | 300          | 200*  | 1430 | 128  | 296   |      |                   |      |      |      |      |      |
| Ram Island                         | 100                     |      | 300  |      | 0     | 20   | 200          | 325*  | 25   | 115  | 0     | 622  |                   |      |      |      | 154  |      |
| Murray Harbour                     |                         |      |      |      |       |      |              |       |      |      |       |      |                   |      |      |      |      |      |
| Cherry Island                      | 40                      |      | 327  |      | 19    |      | 70           |       | 766  | 63   | 177   |      |                   |      |      |      |      |      |
| Gordons Island                     |                         |      |      |      |       |      |              |       | 2    |      | 0     |      |                   |      |      |      |      |      |
| Poverty Beach                      |                         |      | 531  |      | 435   |      |              |       | 2200 | 455  | 339   |      |                   |      | 114  | 92   | 100  |      |
| Sable Point Island                 | 200                     |      |      |      | 0     |      | 250          |       |      |      | 0     |      | 5                 |      |      |      | 0    |      |
| Nail Pond                          |                         |      | 1    |      | 0     |      |              |       |      |      | 0     |      |                   |      |      |      |      |      |
| Pownal Bay                         | 20                      |      | 1    |      | 0     |      |              |       |      |      | 0     |      |                   |      |      |      |      |      |
| Ram Island (near Alberton Harbour) |                         |      |      |      |       | 111  |              |       |      |      |       | 44   |                   |      |      |      |      |      |
| Totals                             | 610                     | 902  | 2324 | 2    | 1091  | 252  | 820          | 4408  | 7144 | 1877 | 1700  | 669  | 5                 | 234  | 230  | 497  | 691  | 154  |

\*\* partially estimated

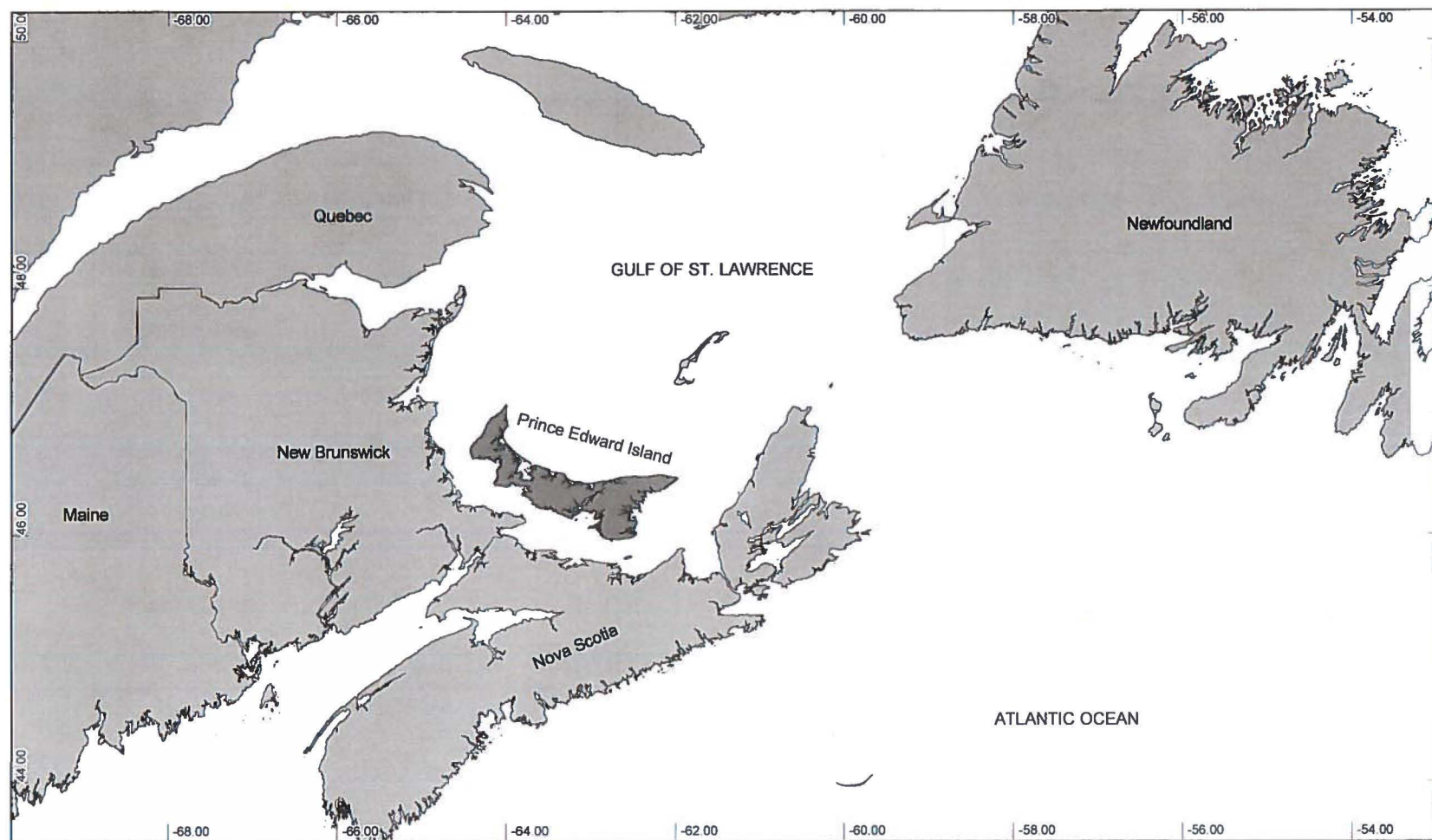


Figure 1. Location of Prince Edward Island, Canada.



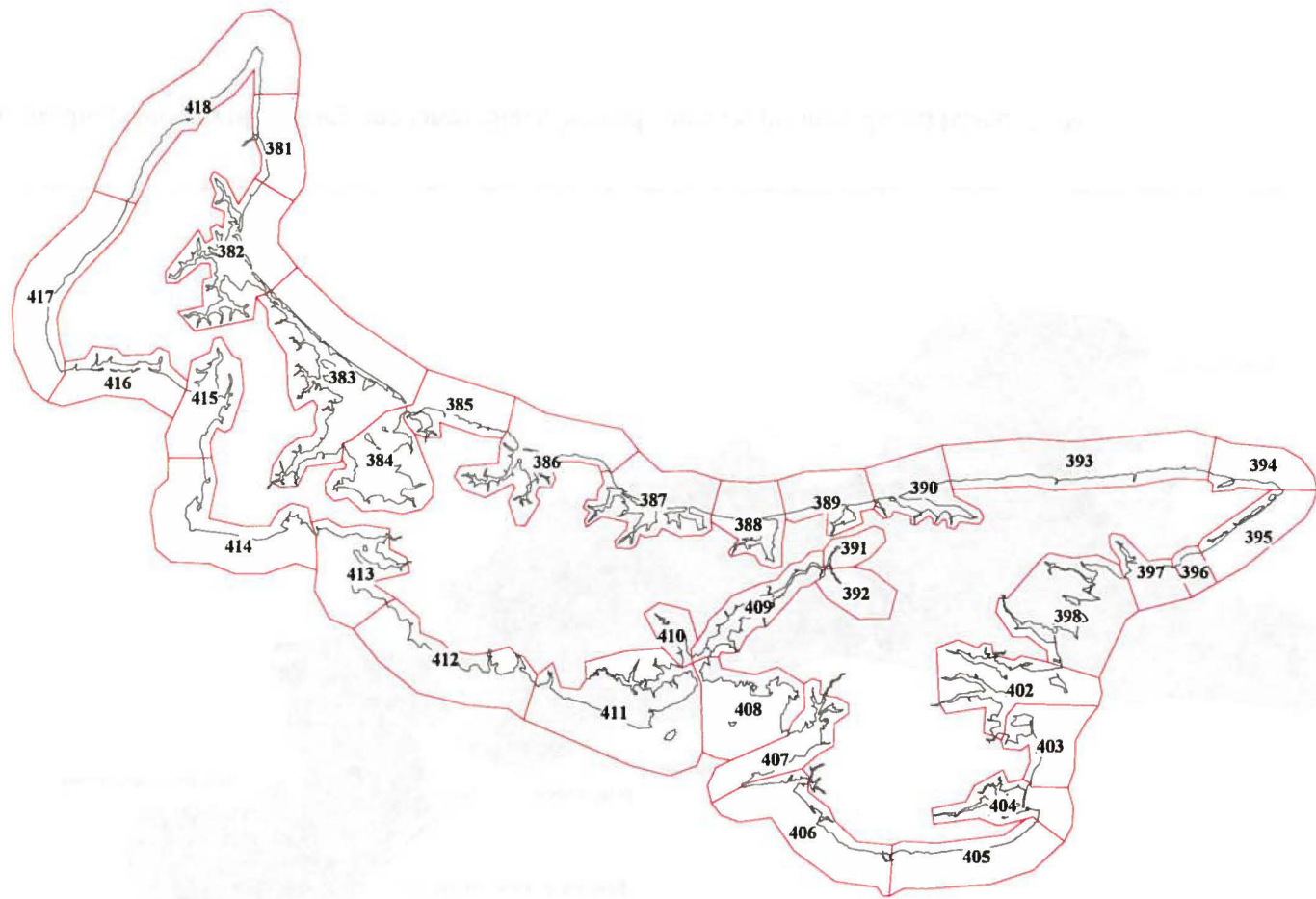


Figure 2. Location of Canadian Wildlife Service Coastal Survey Blocks in Prince Edward Island (from Lock et al. 1996).

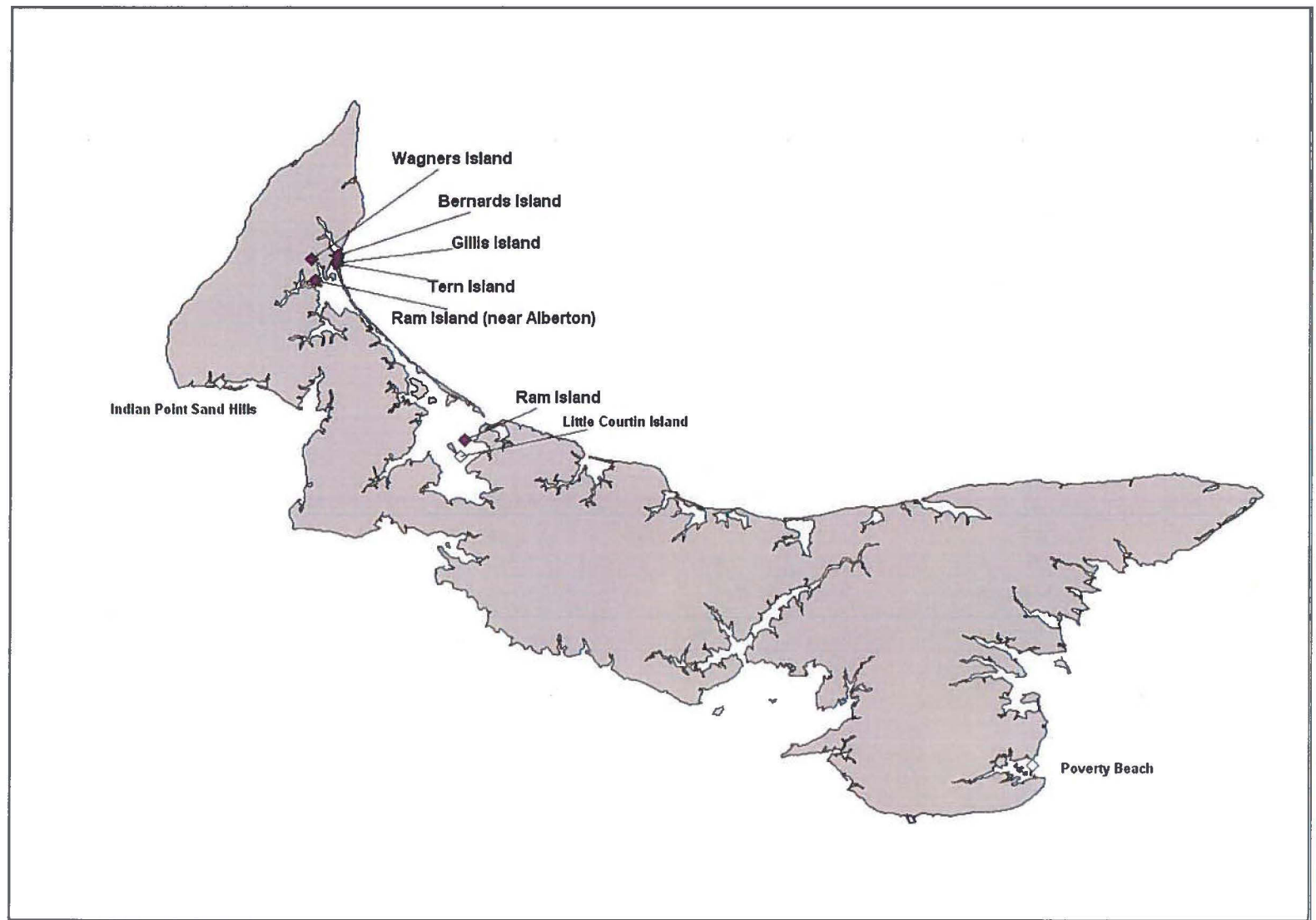


Figure 3. Location of breeding colonies of Herring and Great Black-backed Gulls on Prince Edward Island, 2004.

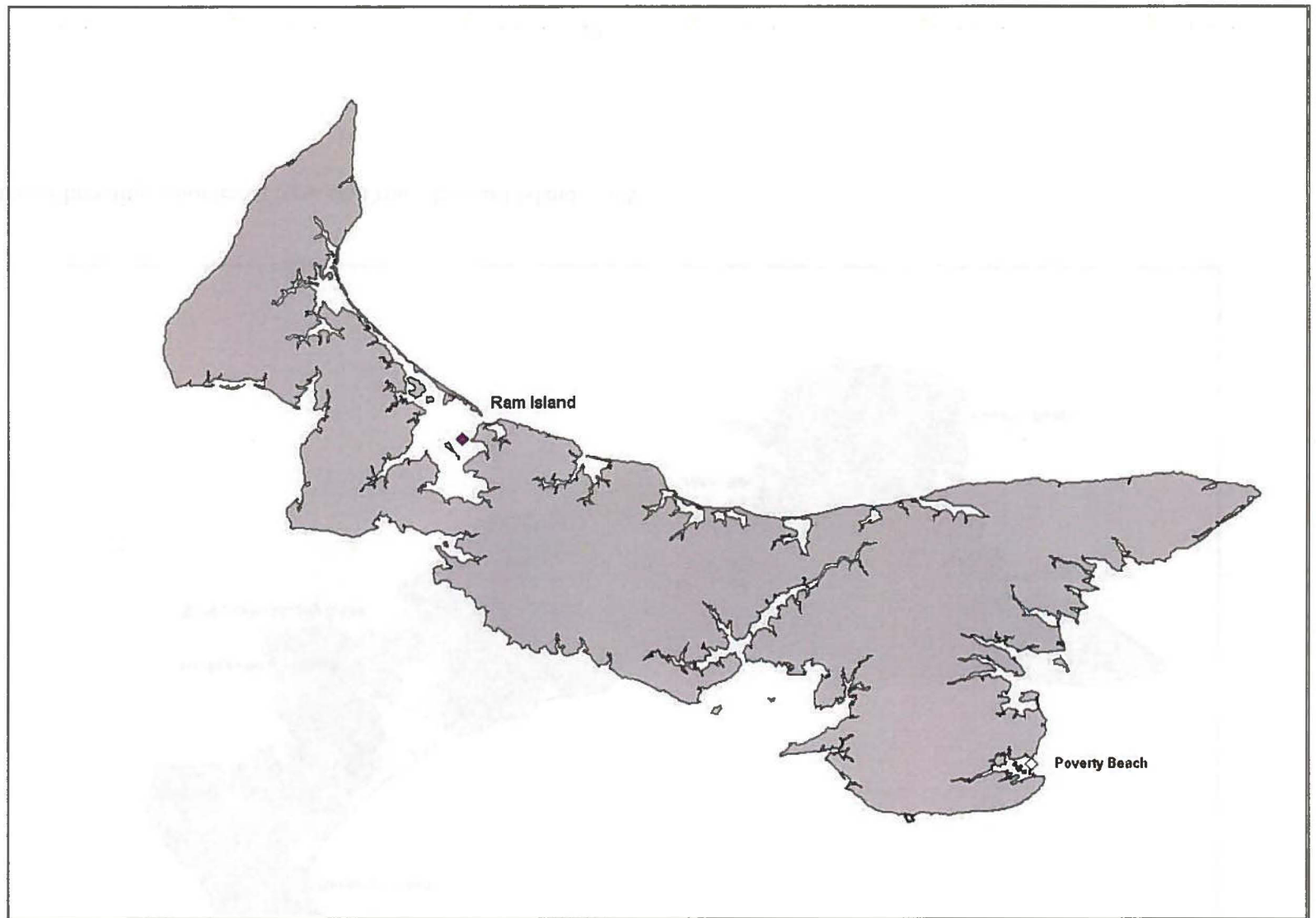


Figure 4. Location of breeding colonies of Ring-billed Gulls on Prince Edward Island, 2009.

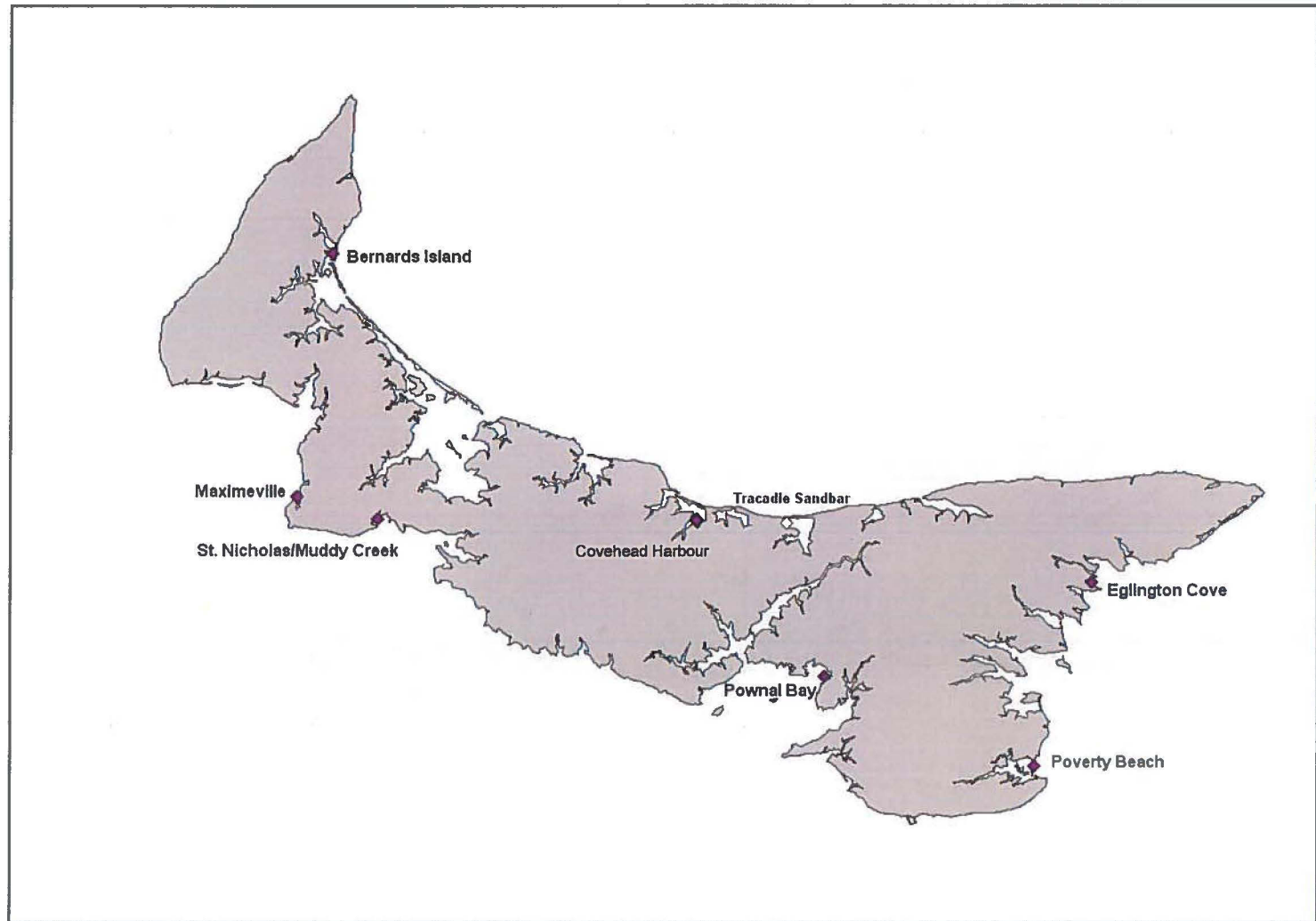


Figure 5. Location of breeding colonies of terns on Prince Edward Island, 2009.



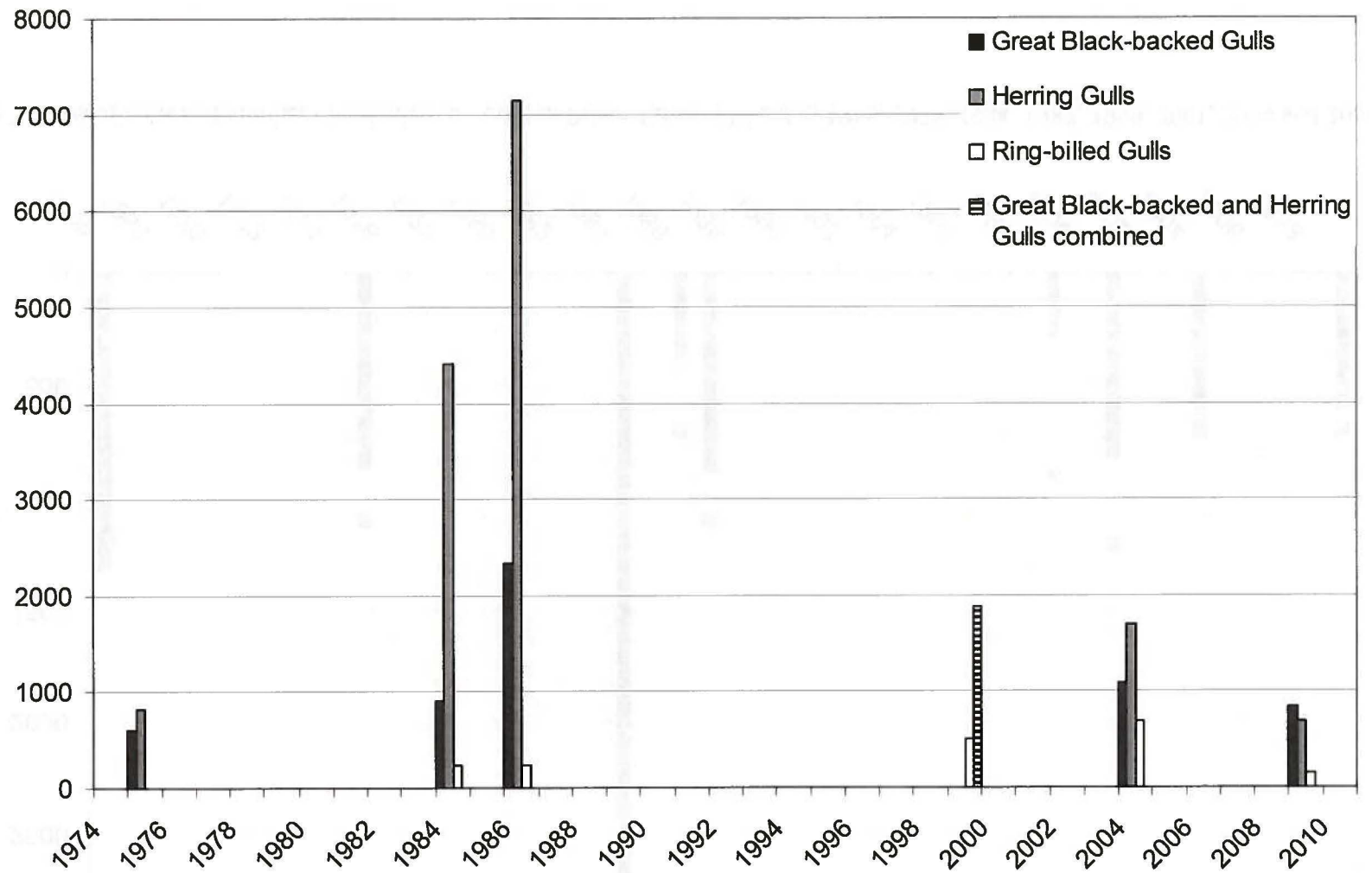


Figure 6. Pairs of Great Black-backed Gulls, Herring Gulls and Ring-billed Gulls surveyed in Prince Edward Island in 1975, 1984, 1986, 1999, 2004 and 2009. Great Black-backed and Herring Gulls were not differentiated in 1999.

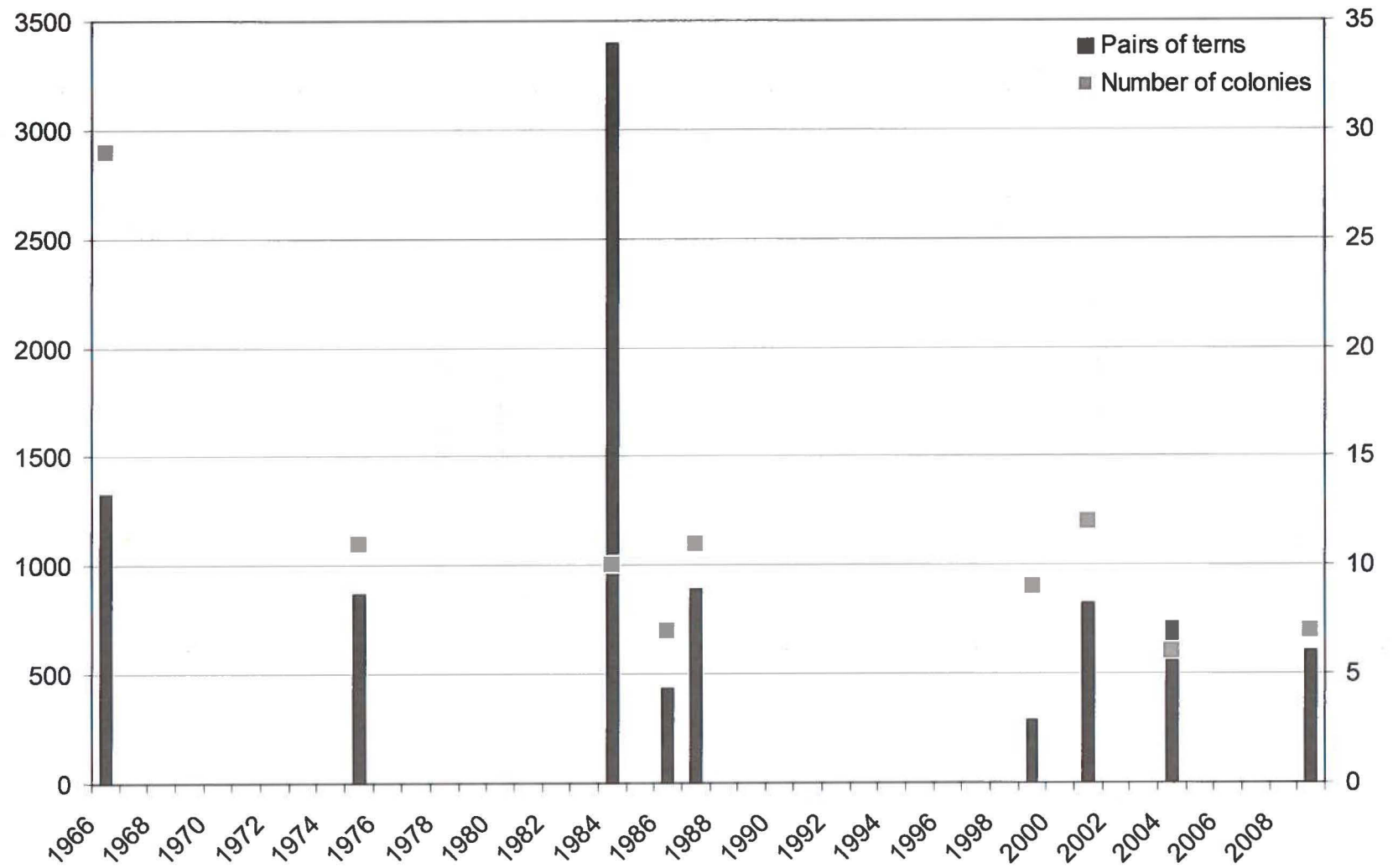


Figure 7. Pairs of terns and number of colonies surveyed in Prince Edward Island in 1966, 1975, 1984, 1987, 1999, 2001, 2004 and 2009.

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