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## **Second Census of Terns, Gulls, Kittiwakes and Cormorants Along the Coast of Insular Newfoundland, 2005-2007**

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**Atlantic Region**

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## SUMMARY

In 2005–2007, aerial and ground surveys were conducted along Newfoundland's coastline to estimate the population size and distribution of breeding colonies of Common (*Sterna hirundo*) and Arctic Terns (*S. paradisaea*). Colonies of Herring Gull (*Larus argentatus*), Great Black-backed Gull (*L. marinus*), Ring-billed Gull (*L. delawarensis*), Black-legged Kittiwake (*Rissa tridactyla*) and cormorant species (*Phalacrocorax* spp.) were also identified during these surveys. A total of 22 747 individual terns (Common and Arctic) were counted during the aerial survey at 207 colonies. This total represents a 7% increase in comparison with the previous 2000–2002 survey count of 21 291 individuals, despite more colonies being detected during the previous survey (244). The median colony size in 2005–2007 was 50 terns per colony. Similar to 2000–2002, terns were most abundant along the eastern and northern coasts of insular Newfoundland. Ground counts at colonies were conducted at 68 sites, to confirm breeding, determine tern species ratio and estimate productivity through clutch size. All sites identified by air had breeding terns; however, ground visits revealed an additional 19 active breeding colonies. Arctic Terns made up 30% of all individual terns identified to species during the ground surveys, a slightly lower proportion than what was estimated during the 2000–2002 surveys (0.41). The overall mean clutch size was 2.2 eggs per nest. A subset of 49 matched aerial/ground counts were used to develop a generalized non-linear model, which was then applied to all aerial counts for which ground counts were not available to predict the number of breeding pairs. Combining ground and corrected aerial counts, we estimate the total tern breeding population at  $24\ 200 \pm 2\ 754$  (SD) pairs for the 2005–2007 survey period; this represents an 18% increase from the population size estimated in 2000–2002. Ground surveys also revealed that Newfoundland's only large long-standing Caspian Tern (*Hydroprogne caspia*) colony located on Ladle Island was abandoned by 2005. Furthermore, site fidelity of terns between the two survey periods was investigated and revealed that only 45% of the 248 sites utilized during the 2000–2002 survey were occupied again during the 2005–2007 survey.

The size of other coastal seabird colonies was limited to categorical estimates of number of individuals [small (1–100), medium (101–500), large (501–1 000), and very large (>1 000)]. The distribution of all species was similar to the 2000–2002 survey, with colonies of both Herring and Great Black-backed Gulls being present in high concentrations along all three coasts of insular Newfoundland, Ring-billed Gulls continuing to be primarily concentrated along the Northern Peninsula and northeast coasts, Black-legged Kittiwakes being most prevalent on the eastern and northern coasts, and cormorants sporadically distributed on all three coasts.

Although the overall tern and other seabird populations appear stable since at least the 2000–2002 survey periods, continued complete coastal monitoring of colonial waterbirds at regular intervals along the coast of insular Newfoundland continues to be warranted in light of the high dynamic nature of tern colonies and widespread distribution of important aggregations of all colonial waterbirds. Furthermore, increased ground survey efforts to obtain more robust Arctic Tern proportions and locate breeding Caspian Terns are required to better understand the status of these species in Newfoundland.

## RÉSUMÉ

De 2005 à 2007, des relevés aériens et terrestres ont été effectués le long de la côte de l'île de Terre-Neuve pour estimer la taille de population et l'aire de répartition des colonies reproductrices de Sternes pierregarins (*Sterna hirundo*) et arctiques (*S. paradisaea*). Des colonies de Sternes caspiennes (*Hydroprogne caspia*), de Goélands argentés (*Larus argentatus*), de Goélands marins (*L. marinus*), de Goélands à bec cerclé (*L. delawarensis*), de Mouettes tridactyles (*Rissa tridactyla*) et d'espèces de Cormorans (*Phalacrocorax* spp.) ont également été recensées durant ces relevés. Un total de 22 747 Sternes individuelles (pierregarins et arctiques) ont été dénombrées au cours du relevé aérien auprès de 207 colonies. Ce total représente une hausse de 7 % par rapport au relevé précédent de 2000 à 2002, qui comptait 21 291 individus; en revanche, un plus grand nombre de colonies a été détecté dans le cadre du relevé précédent (244). La taille médiane des colonies de 2005 à 2007 était de 50 Sternes par colonie. À l'instar des résultats de 2000 à 2002, les Sternes étaient plus abondantes le long des côtes est et nord de l'île de Terre-Neuve. Des dénombrements de colonies au sol ont été effectués à 68 sites afin de confirmer le taux de reproduction, de déterminer le ratio d'espèces de Sternes et d'estimer la productivité par la taille de la couvée. Tous les sites ayant fait l'objet d'un relevé aérien comprenaient des Sternes reproductrices; cela dit, les visites au sol ont révélé 19 colonies reproductrices actives supplémentaires. La proportion moyenne de Sternes arctiques selon tous les relevés au sol était de 0,3, ce qui constitue une légère diminution par rapport à la proportion de 2000 à 2002, qui était de 0,41. Dans l'ensemble, la taille de couvée moyenne était de 2,2 œufs par nid. Des dénombrements aériens et au sol appariés ont servi à élaborer un modèle non linéaire généralisé qui a ensuite été appliqué à tous les dénombrements aériens pour lesquels les dénombrements au sol n'étaient pas disponibles pour estimer le nombre de couples reproducteurs. En combinant les dénombrements au sol et les dénombrements aériens corrigés, nous estimons le total de la population reproductrice de Sternes à  $24\ 200 \pm 2\ 754$  (écart-type) couples pour la période de relevé de 2005 à 2007, ce qui représente une augmentation de population de 18 % depuis la période de 2000 à 2002. Les relevés au sol ont également révélé que la seule importante colonie de Sternes caspiennes de vieille date située sur l'île Ladle de Terre-Neuve a été abandonnée avant 2005. Qui plus est, l'étude de la fidélité des Sternes aux sites entre les deux périodes de relevé a révélé que seuls 45 % des 248 sites utilisés durant le relevé de 2000 à 2002 étaient toujours occupés durant le relevé de 2005 à 2007.

La taille des autres colonies d'oiseaux de mer côtiers a été limitée à des estimations catégoriques du nombre d'individus (petite [entre 1 et 100], moyenne [entre 101 et 500], grande [entre 501 et 1 000] et très grande [plus de 1 000]). La répartition de toutes les espèces était semblable à celle du relevé de 2000 à 2002, avec des colonies de Goélands argentés et marins présentant de fortes concentrations le long des trois côtes de l'île de Terre-Neuve, des Goélands à bec cerclé continuant d'être principalement observés le long de la péninsule Northern et de la côte du nord-est, des Mouettes tridactyles plus prévalentes sur les côtes est et nord et des Cormorans sporadiquement répartis dans l'ensemble des trois côtes.

Dans l'ensemble, les populations de Sternes et d'autres oiseaux de mer côtiers semblent stables, du moins depuis les périodes de relevé de 2000 à 2002. Cela dit, une surveillance côtière complète et continue des oiseaux aquatiques nichant en colonie à des intervalles réguliers le long de la côte de l'île de Terre-Neuve est toujours exigée à la lumière de la nature hautement

dynamique des colonies de Sternes, de la vaste aire de répartition de concentrations importantes d'oiseaux aquatiques nichant en colonie de toute sorte et pour satisfaire aux exigences en matière de données propres aux sites, lesquelles sont essentielles aux évaluations environnementales. En outre, un nombre accru de relevés au sol pour obtenir des proportions de Sternes arctiques plus rigoureuses et pour situer les Sternes caspiennes sont nécessaires afin de mieux comprendre l'état de ces espèces à l'échelle de Terre-Neuve.

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## INTRODUCTION

The first complete coastal tern (*Sterna* spp.) survey of insular Newfoundland was conducted by the Canadian Wildlife Service (CWS) in 1973 following concerns regarding tern populations in Atlantic Canada (Lock 1990). A second complete coastal tern survey was conducted in 2000–2002 as part of an Atlantic-wide program initiated in 1999, which revealed that the tern population in insular Newfoundland was similar in size or possibly larger since 1973 (Boyne et al. 2011). Categorical information on other colonial waterbirds exhibiting widespread distribution was also collected in 2000–2002, marking the first complete coastal survey of insular Newfoundland of seabirds exhibiting widespread distribution other than terns (Boyne et al. 2011).

The distribution and population trends of terns and other colonial waterbirds depend on a number of factors, including location, availability and timing of food sources, environmental conditions, and colony disturbance (Monaghan et al. 1992, Brindley et al. 1999, Chaulk et al. 2004, Ratcliffe 2004, Wanless et al. 2009). Range expansions influenced by changing oceanographic regimes also affect colonial waterbird distributions and assemblages (Chaulk et al. 2004), and environmental conditions within a region can exert varying influence on population trends of different species (Chapdelaine 1995, Robertson et al. 2001, Boyne and Hudson 2002, Boyne and Beukens 2004, Chaulk et al. 2004, Boyne et al. 2006, Gaston et al. 2009, Wanless et al. 2009, Cotter et al. 2013). Therefore, it is important to understand the local influences on distributions, populations and demographic trends of all waterbird species within a region and understanding such trends requires repeated and consistent survey effort. This report presents the results of the second complete survey of coastal insular Newfoundland conducted from 2005–2007 collecting information on the size and distribution of terns, gulls (*Larus* spp.), Black-legged Kittiwakes (*Rissa tridactyla*) and cormorants (*Phalacrocorax* spp.).

## METHODS

During the 2000–2002 survey, individual coastal blocks that form insular Newfoundland's coastline, as used in CWS's Coastal Waterbirds Survey (Lock et al. 1996), were grouped into three sections, each to be surveyed in three consecutive years. The 2005–2007 survey followed a comparable breakdown of the coastline (see Table 1), focusing in 2005 on the eastern coast, 2006 on the northern coast and 2007 on the southwestern coast (Fig. 1). Seabird Ecological Reserves of the Witless Bay Islands (N 47.247°, W 52.781°), Cape St. Mary's (N 46.823°, W 54.198°), Funk Island (N 49.750°, W 53.167°) and Baccalieu Island (48.130°N, 52.801°W) were not surveyed by air because of regulations prohibiting overflights and for the safety of the birds and the aircraft in areas with such dense concentrations of birds. Belle Isle (N 47.247°, W 52.782°) was not surveyed because of its distance from the coast while other coastal areas (see Fig. 1) were not surveyed due to insufficient fuel at the end of the survey day. Surveys were conducted between 11 and 27 June 2005, 22 and 25 June 2006 and 11 and 13 June 2007. Unlike the 2000–2002 surveys, the French islands of Saint Pierre et Miquelon were not re-surveyed during the 2005–2007 surveys for logistical reasons.

## Aerial Methods

In each year, colonial waterbird colonies were identified during the aerial component of the survey effort. Colonial waterbirds included in the survey were Arctic Terns (*Sterna paradisaea*) and Common Terns (*S. hirundo*; both tern species were grouped together as they cannot be differentiated during aerial surveys), Caspian Terns (*Hydroprogne caspia*), Black-legged Kittiwake, Herring Gulls (*Larus argentatus*), Great-Black-backed Gulls (*L. marinus*), Ring-billed Gulls (*L. delawarensis*), Double-crested Cormorants (*Phalacrocorax auritus*) and Great Cormorants (*P. carbo*; both species were grouped together due to the difficulties associated with distinguishing between the two during aerial surveys). Other seabird colonies or bird concentrations (alcids, Common Eiders *Somateria mollissima*) were noted but are not reported here.

Observers varied within and between years, but an experienced surveyor was always present for each section of the survey effort. A Cessna 185 on floats with the same pilot was used for the three survey years. The two observers were positioned on the side of the plane closest to the coast. Aerial surveys were flown at approximately 200 m at 80–100 knots. In some cases, the altitude was as low as 15 m to flush terns (terns cannot be counted while on the ground) from their colonies. The location of each colony was marked on 1:250 000 topographic maps (Department of Environment and Lands 1990) or, in areas with high concentrations of islands, on 1:50,000 topographic maps. Colony locations and the flight track of the aircraft were also recorded using Memory Map software loaded onto a laptop and linked to a Global Positioning System that tracked the exact location of the aircraft at any given moment. The rear observer operated the software and flagged colony locations in areas of high colony density and/or of dense concentrations of islands where it was difficult to determine exact location using only the paper topographic map. Aerial count totals represent averages of both observers. Tern colony sizes (counts of individuals) were compared between the 2000–2002 and 2005–2007 survey periods using a Mann-Whitney Rank Sum Test.

Due to time and cost constraints, the size of gull, kittiwake and cormorant colonies were limited to range counts of individuals: small (1–100), medium (101–500), large (501–1 000) and very large (>1 000). Although these categories are too broad to derive accurate information on population size, they are useful to identify areas with high concentrations of breeding seabirds. Such maps were derived by using the median value for each category (small: 50.5; medium: 300.5; large: 750.5). Survey methods did not dictate an upper limit to the “very large” category,<sup>1</sup> thus an arbitrary upper limit of 2 500 was assigned to this category, yielding a median value of 1 750.5. Changes in proportion of size categories between the 2000–2002 and 2005–2007 survey periods were examined using a Fisher’s Exact Test for each species separately; however, no differences were found between the two survey periods.

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<sup>1</sup> Note: In future surveys, actual estimates of “small” and “very large” colonies should be undertaken.

## **Ground Methods and Correction Factor**

Ground surveys were conducted from mid- to late June in all years following the methodologies used in 2000–2002 (Boyne et al. 2011). Briefly, ground surveys were conducted on a subset of aerially detected tern colonies, with preference given to accessible colonies and priority given to larger colonies. Therefore, the selection of colonies for ground surveys cannot be considered random and may not necessarily be representative of the entire population. However, efforts were made to sample a diverse area throughout the survey range. Each ground census was conducted by 2 to 6 biologists walking parallel transects throughout the entire colony and recording the contents of tern nests encountered. Species proportions were obtained by counting a subset of terns flying overhead with an attempt to identify to species 20 individual terns (Boyne et al. 2011).

A correction factor to convert aerial counts for which ground counts were not available was developed by using a generalized non-linear model with the following power equation:

$$N_g = \alpha \cdot N_a^\beta$$

where  $N_g$  and  $N_a$  are ground and air counts, respectively,  $\alpha$  represents the scale of the y-axis and  $\beta$  defines the magnitude of the rate of change. To account for over-dispersion in the count data, the quasi-poisson family was used with the standard log link. This model was applied to overlapping aerial and ground counts. Initially, air counts were compared to ground counts on an annual basis. However, as reported in Boyne et al. (2011), the relationship between air and ground counts was consistent across years and therefore we used model parameters from all six years (2000–2002 and 2005–2007) combined to improve predictions.

Using this model, aerial counts from 2005–2007 were used to predict the number of breeding individuals on the ground. Estimates of the total population were then calculated by adding available ground counts with the predicted values of the colonies that were not included in the ground survey. The error around colony-specific and total population predictions were assessed using a bootstrapping procedure, whereby empirical distributions of predicted values were generated by resampling ground count  $\times$  aerial count data points, with replacement, 1 000 times and selecting predicted values from a new model from each iteration. Confidence intervals (95%) were extracted using these empirical distributions.

## **RESULTS AND DISCUSSION**

### **Aerial Surveys of Tern Colonies**

A mean total of 22 747 individual terns were counted at 207 colonies during the 2005–2007 survey period (Tables 2 and 3). This total represents a 7% increase compared to the previous survey count of 21 291 individuals (2000–2002), despite fewer colonies observed; this shift in fewer but larger colonies was only apparent for the eastern section of the survey (Table 3). Similar to the 2000–2002 survey, terns were more abundant along the eastern and northern coasts of insular Newfoundland (10 385 and 10 359 individuals respectively) with less than 10% of the tern population occupying the southwestern coast of Newfoundland (Table 3, Fig. 2). The

median colony size for the 2005–2007 survey was 50 individuals (mean = 100 individuals) and was not significantly different from the median colony size of 48 individuals for the 2000–2002 survey (Mann-Whitney *U* Statistic = 24 615.5, *T* = 47 213.5, *P* = 0.70; Table 3).

## Ground Surveys of Tern Colonies

A total of 68 ground surveys were completed at 24, 26 and 18 sites in 2005, 2006 and 2007 respectively (Table 4). The average breeding colony size of visited colonies was 103 active nests (range: 1–609) and the average clutch size was 2.2 eggs per nest (Table 4). Ground surveys detected 19 additional colonies that were not observed during aerial surveys (9 in 2005, 6 in 2006 and 4 in 2007; Table 4).

The average proportion of Arctic Terns from all ground surveys was 0.30, slightly lower compared to the 2000–2002 proportion of 0.41 (Boyne et al. 2011). Similar to the previous survey period, Arctic Tern proportions were comparable for both the eastern and northern coasts (both estimated at 0.29, *n* = 25 and *n* = 18 respectively; Table 4) but were considerably lower compared to 2000–2001 (0.50 and 0.51 respectively; Boyne et al. 2011). A higher proportion of Arctic Terns occurred on the southwestern coast in 2007 compared to 2002 (0.35 and 0.06 respectively; Boyne et al. 2011), although the 2007 proportion was based on only 7 sites (Table 4). The overall lower proportion of Arctic Terns between the two survey periods years may represent a decline in the breeding Arctic Tern population, which has also been documented in other parts of Atlantic Canada since the mid-2000s (e.g., Machias Seal Island, Bowser et al. 2009; Gulf of Maine, L. Welch, pers. comm.). However, we examined a subset of colonies (*n* = 18) visited by ground for which information on the proportion Arctic Terns was available for both survey periods (2000–2002 and 2005–2007); this comparison yielded the same proportion of Arctic Terns (0.27) for both survey periods, suggesting that the apparent decline in Arctic Terns may be an artifact of how the ground surveys were sampled, thereby describing a different cross-section of habitat type and hence species composition (Bullock and Gomersall 1981) compared to those selected during the previous survey period. Another potential variable is the reliability of the method used to differentiate between the two species (i.e., based on up to 20 individuals per colony identified to species by observers using distinguishing features such as color of bill-tip while flying overhead), which is challenging (especially in poor light) and can differ between observers. For these reasons, we caution against applying the estimated species proportion to infer province-wide population estimates of Arctic and Common Terns separately.

Paired aerial-ground surveys from 78 sites in 2000–2002 (Boyne et al. 2011) and 49 sites from 2005–2007 were used to develop a generalized non-linear model (see Methods) to correct aerial counts for which ground counts were not available. Using this model to correct the 2005–2007 aerial counts for which ground counts were not available and adding nesting pairs obtained from ground counts only, we estimate that  $24\ 200 \pm 2\ 754$  (SD) pairs of terns were nesting along coastal insular Newfoundland in 2005–2007. This represents an 18% increase from the 2000–2002 population estimate of  $20\ 462 \pm 768$  (SD) pairs (Boyne et al. 2011, Table 5).

Ground surveys revealed that Newfoundland's only large long-standing Caspian Tern colony located on Ladle Island (with a minimum estimate of 75–98 pairs in 2000; Boyne et al. 2011) was abandoned by 2005, although the Herring and Great Black-backed Gull colonies among which the Caspian Terns were nesting remained active (Tables 6 and 7). This site has hosted breeding Caspian Terns since at least 1986, with the population peaking at 75–100 pairs by 1997 (reviewed in Wires and Cuthbert 2000). Such large colonies of Caspian Terns are rare in eastern Canada; rather, their breeding range is described as “disjunct” with single pairs tending to breed near or amongst other colonial waterbirds, including gulls (Cuthbert and Wires 1999, Wires and Cuthbert 2000). Therefore, it is possible that the Caspian Terns formerly breeding on Ladle Island have dispersed to other parts of coastal Newfoundland and Labrador (Chaulk et al. 2004). For example, Caspian Terns have recently begun nesting in 2011 in Gros Morne National Park amongst Ring-billed Gulls (S. Gerrow, Gros Morne National Park, pers. comm.). Caspian Terns are difficult to distinguish from Herring Gulls, Ring-billed Gulls and even Black-legged Kittiwakes during aerial surveys. Because ground surveys focused on islands hosting breeding Arctic and/or Common Terns, it is possible that other Caspian Tern colonies exist along the coast of insular Newfoundland but were not detected because of the low search effort of gull colonies by ground. Increased efforts to locate breeding Caspian Terns through ground surveys among large gull colonies are warranted to obtain insight on the status of this species in insular Newfoundland.

## **Site Fidelity of Tern Colonies**

Tern colonies are known for their dynamic nature, and individuals do not necessarily show high site-fidelity from one year to the next (Bullock and Gomersall 1981, Erwin et al. 1998). We examined the re-use of the 248 sites used by terns in 2000–2002 (Boyne et al. 2011) and found that only 45% of these (111 sites) were occupied again 5 years later in 2005–2007. Such low site-fidelity has been documented in Gull-billed Terns (*Sterna nilotica*) breeding in Virginia, where 64% of colony sites were re-used only once or twice during a 4-year period and only 12% of sites were re-used in all 4 years of the study (Erwin et al. 1998). Although some variability of site-fidelity is apparent between the 3 sections of coastline (eastern coast = 41% (51/123 re-used sites), northern coast = 48% (45/94 re-used sites) southwestern coast = 55% (17/31 re-used sites)), these results suggest that mass shifts away from any particular survey region are not apparent. Rather, it is more likely that this movement reflects changes in the local area or individual islands, such as decreased food availability, altered habitat or frequent flooding (Bullock and Gomersall 1981, Erwin et al. 1998).

## **Other Species**

### *Herring Gulls*

During aerial surveys, 240 Herring Gull colonies were identified (Table 6), representing an 8% decrease compared to 2000–2002 (260 colonies; Boyne et al. 2011). Colonies ranged in size from small to very large, but similar to the previous survey period, the majority of colonies

(64%) were small (Table 6). Just over half of the colonies (53%) were located along the eastern coast in 2005 ( $n = 126$ ), with fewer detected along the northern ( $n = 91$ ) and southwestern ( $n = 23$ ) coasts (Fig. 3).

#### *Great Black-backed Gulls*

A total of 279 Great Black-backed Gull colonies were detected during aerial surveys conducted in 2005–2007 (Table 7), representing an overall higher count of 56% colonies compared to the 2000–2002 observation of 179 colonies (Boyne et al. 2011). Great Black-backed Gulls were most abundant along the eastern and northern coasts of Newfoundland (Fig. 4), with increases in colony counts most notable along these survey sections compared to the previous survey period (eastern coast: 112 versus 37 colonies observed in 2005 and 2000, respectively; northern coast: 111 versus 71 colonies observed in 2006 and 2001, respectively). Fewer colonies were detected along the southwestern coast in 2007 (56 colonies) compared to 2002 (71 colonies). As was observed during the previous survey period, colonies ranged from small to very large, with the majority (91%) being small (Table 7).

#### *Ring-billed Gulls*

A total of 46 Ring-billed Gull colonies were detected in 2005–2007 (Table 8), very close to the 2000–2002 count of 49 colonies for this species (Boyne et al. 2011). Also similar to 2000–2002, most of the colonies (58%) were on the northern coast in 2006 ( $n = 27$ ), with fewer detected on the eastern ( $n = 14$  in 2005) and southwestern coasts ( $n = 5$  in 2007; Fig. 5). Colonies ranged from small to large, the majority of which were medium-sized (Table 8).

#### *Black-legged Kittiwakes*

A total of 84 Black-legged Kittiwake colonies were detected by air in 2005–2007 (Table 9), identical to the total colonies counted in 2000–2002 (Boyne et al. 2011). Most of the colonies were on the eastern ( $n = 44$  in 2005) and northern coasts ( $n = 32$  in 2006), with fewest on the southwestern coast ( $n = 8$  in 2007; Fig. 6). Colonies ranged from small to very large, with the majority being small or medium-sized (Table 9).

#### *Cormorants*

A total of 38 cormorant colonies (Double-crested and Great combined) were detected in 2005–2007 (Table 10), 57% more compared to the 23 colonies counted in 2000–2002 (Boyne et al. 2011). Overall, cormorant colonies were distributed equally around the survey regions (Fig. 7), with increases in colony counts having occurred along all three coasts (eastern coast: 10 versus 14 colonies observed in 2005 and 2000, respectively; northern coast: 5 versus 10 colonies observed in 2006 and 2001, respectively; southwestern coast: 8 versus 12 colonies observed in 2007 and 2002, respectively). Colonies were either small or medium-sized (Table 10).

This survey marks the second complete Newfoundland-wide survey for seabirds other than terns. Comparisons between these two survey periods must be made cautiously due to the categorical nature of the data. Nonetheless, these findings do suggest that the breeding distribution and overall number of colonies have remained similar for some species (e.g., Herring Gulls, Black-legged Kittiwakes and Ring-billed Gulls) or may have expanded/increased (e.g., Great Black-backed Gulls and cormorants) between the 2000–2002 and 2005–2007 survey periods. These results corroborate the findings of localized long-term monitoring studies conducted in the Witless Bay Islands Ecological Reserve (located on the east coast of the Avalon Peninsula) on Black-legged Kittiwakes, which have shown a stable trend since 2000 (Robertson et al. 2004, CWS, unpubl. data) but contradict the population trends of Herring Gulls and Great Black-backed Gulls, which have declined by more than 50% within the Reserve during this same time period (Robertson et al. 2001, CWS, unpubl. data). The results of these Newfoundland-wide aerial surveys suggest that the gull declines observed in Witless Bay are likely linked to local influences and are not reflective of the entire Newfoundland population. Despite the limitations of categorical data collected on these species, this information provides an important broader context on the status of these populations as a whole (Cotter et al. 2013) and is complementary to the information collected on the more accurate but localized monitoring sites.

In summary, the overall tern population in insular Newfoundland appears to have increased since the last survey period of 2000–2002 and it has certainly increased since 1973 (Lock 1990). What is unclear, however, are the status of the Arctic and Caspian Tern populations, which may be showing signs of decline. To get a better sense of how Arctic Terns are faring in insular Newfoundland, it may be necessary to adopt a more random approach when choosing sites at which to conduct ground surveys to obtain species proportion information. Alternatively, future ground surveys can focus on sites that are known to be re-used and monitor species proportion trends within this subset of colonies, assuming that they are representative of the population as a whole. Future surveys should also increase search effort among gull colonies and the northern and eastern coasts to find nesting Caspian Terns. Large gull, kittiwake and cormorant populations continue to be widespread and abundant as shown with the distribution and size of colonies. The categorical information collected on these species is useful to provide a broader context on the overall status of populations in light of what is being found in localized long-term monitoring sites. Given the highly dynamic nature of tern colonies and widespread distribution of important aggregations of all colonial waterbirds around insular Newfoundland (Figs. 8 and 9), complete aerial surveys coupled with ground surveys continue to be warranted on a regular basis to help direct conservation and management decisions and to fulfill the site specific data requirements needed for environmental assessments.

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Table 1. Start and finish locations for the aerial component of the colonial waterbird survey for insular Newfoundland (2005–2007).

<b>Location</b>	<b>Year</b>	<b>Status</b>	<b>Lat</b>	<b>Long</b>
Ladle Island	2005	Start	49.49178	-54.04842
Allan's Island	2005	Finish	46.85165	-55.80006
Gregory Island	2006	Start	49.28432	-58.30122
Ladle Island	2006	Finish	49.49178	-54.04842
Allan's Island	2007	Start	46.85165	-55.80006
<u>Seal Island, Bay of Islands</u>	<u>2007</u>	<u>Finish</u>	<u>49.08189</u>	<u>-58.30232</u>

Table 2. Location of tern colonies and counts of individuals identified during aerial surveys of insular Newfoundland 2005–2007.

Year	Colony Name	Latitude	Longitude	Month	Day	Observer 1	Observer 2
<b>Placentia Bay</b>							
2005	Big Rock	47.6733	-54.1093	6	27	350	220
2005	Burnt Islands, Unnamed Island, S of	47.3779	-54.7037	6	27	120	65
2005	Creve Islands	47.5317	-54.2439	6	27	30	35
2005	Cross Rocks	47.6100	-54.3367	6	27	4	4
2005	George Dock Island, uni s of	47.5069	-54.2806	6	27	40	45
2005	Grandies Rocks, [W] uni	47.5683	-54.2512	6	27	8	4
2005	Green Island, Central Channel	47.5427	-54.1138	6	27	110	110
2005	Gull Islands (south)	47.3545	-54.5454	6	27	20	25
2005	Jude Island, uni off	47.2718	-54.7848	6	27	140	105
2005	Little Pinchgut, Unnamed Island in	47.5814	-53.9018	6	25	50	45
2005	Saddleback Island	47.5078	-54.2618	6	27	25	28
2005	Salls Island	47.6452	-53.9467	6	25	3	2
2005	Shag Rock, Woody Islands	47.7675	-54.2144	6	25	30	35
2005	Shag Rocks, W of Ship Island	47.6733	-54.2950	6	27	30	30
2005	Southeast Arm, uni in	47.2242	-53.9483	6	25	10	10
2005	Trinny Cove Island (1)	47.5033	-53.9369	6	25	90	85
2005	Valen Harbour, uni in (1)	47.4731	-54.3978	6	27	75	65
2005	Valen Harbour, uni in (2)	47.4744	-54.3885	6	27	150	85
2005	Vicuna Island	47.8717	-54.1833	6	25	50	
<b>Burin Peninsula</b>							
2005	Little Green Islands	46.8638	-56.0961	6	27	40	40
2005	Gooseberry Island, Burin Inlet	47.0656	-55.1845	6	27	100	75
2005	Big Salmonier Rock	46.8562	-55.7755	6	27	160	
2007	Frenchmans Cove Barasway, uni small S	47.2026	-55.4039	6	11	75	135
2007	Grand Beach	47.1378	-55.5001	6	11	130	126
<b>St. Mary's Bay</b>							
2005	Newbridge	47.1364	-53.4813	6	25	25	25
2005	Pinchgut Tickle, point in	47.1546	-53.5760	6	25	35	70
2005	O'Donnell's lagoon, small uni in	47.0738	-53.5654	6	25	50	55
2005	Coote Pond	46.9483	-53.5197	6	25	70	110
<b>Trinity Bay</b>							
2005	East Random Head, rocks NE of	48.1030	-53.5647	6	22	10	10
2005	Copper Island, S of Verge Island	48.1138	-53.5295	6	22	10	10
2005	Random Head Harbour, uni in	48.1019	-53.5574	6	22	15	15
2005	Grassy Island N of Verge Island	48.1255	-53.5369	6	22	20	10
2005	Mouse Island	47.7667	-53.7833	6	22	40	35
2005	Harbour Rocks, Shoal Bay	47.8645	-53.7287	6	22	45	52
2005	Inside Chapel Arm	47.5203	-53.6610	6	22	50	55
2005	Dildo Islands, rock SW of	47.5606	-53.5938	6	22	60	90
2005	Rantem Cove, uni in	47.7154	-53.8497	6	22	80	80
2005	Islington, uni off	47.7612	-53.4842	6	25	140	120
2005	Sgeir Island	48.1461	-52.9770	6	25	300	350

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Observer 1</b>	<b>Observer 2</b>
2005	Maiden Islet	48.2733	-53.4333	6	22	2500	4000
<b>Eastern Avalon Peninsula</b>							
2005	Portugal Cove Pond, Unnamed island	46.7161	-53.2648	6	25	10	10
2005	Hare's Ears	47.0150	-52.8533	6	25	20	15
2005	Stones Islands	47.0467	-52.8617	6	25	25	25
2005	Renews Harbour	46.9315	-52.9506	6	25	120	120
2005	O'Donnell's	47.0635	-53.5704	6	25	50	55
<b>Conception Bay</b>							
2005	Spaniards Bay Spit	47.5971	-53.2821	6	25	10	10
2005	Perry's Cove, north of	47.8167	-53.1167	6	25	15	15
2005	Salmon Cove, uni in	47.7835	-53.1557	6	25	90	75
2005	Gull Island, Conception Bay	47.9518	-53.0384	6	25	110	100
<b>Bonavista Bay</b>							
2005	Castle Cove, north uni in	48.6119	-53.4161	6	22	2	2
2005	Bennett's Low Island	49.1220	-53.5609	6	20	10	10
2005	Horse Island, Bonavista Bay	49.0553	-53.5433	6	20	10	5
2005	Shoe Island, uni SE of	48.7403	-53.6929	6	20	15	10
2005	Freshwater Bay, uni in mouth of	48.8300	-54.0581	6	20	20	20
2005	Cottel Island, uni rock sw of	48.8152	-53.7283	6	20	20	15
2005	Clode Sound, The Narrows, uni	48.4086	-54.0826	6	20	25	20
2005	Hail Island, uni 1 km E of	48.7684	-53.7805	6	20	25	15
2005	Little Harbour, uni in	48.5683	-53.7550	6	20	30	40
2005	Deer Shag Islets	48.9176	-53.6656	6	20	30	30
2005	Swale Island, uni s of east point	48.6115	-53.6908	6	20	30	15
2005	Willis Reach, uni in	48.8297	-53.6631	6	20	30	20
2005	Wolf Island, uni N of	48.4804	-53.6396	6	22	40	60
2005	Doctor's Island	48.8003	-54.0911	6	20	40	40
2005	Hare Bay, uni off	48.8598	-53.9918	6	20	50	40
2005	Pouch Island	49.1711	-53.4766	6	20	50	50
2005	Goodwithy Harbour, uni sw os	48.9870	-53.7782	6	20	60	60
2005	Baldric Head, uni N of	48.6875	-53.7280	6	20	70	60
2005	Deer Island, small uni (2) NE of	48.9449	-53.7220	6	20	70	70
2005	Long Reach Island, uni N of	48.7488	-53.8340	6	20	80	75
2005	Locker's Flat Island, small uni W of	48.8783	-53.8781	6	20	100	110
2005	Red Cliff Island	48.5644	-53.4950	6	22	110	120
2005	Greenspond Harbour, uni island in	49.0659	-53.5711	6	20	120	80
2005	Lion's Den, Terra Nova NP unis in	48.5333	-53.7942	6	20	130	120
2005	Southwest Island	48.9783	-53.7278	6	20	160	150
2005	Little Harbour Gull Rock	48.5667	-53.7667	6	20	190	160
2005	Shag Islands, Outer	48.7099	-53.6170	6	20	200	200
2005	Varket Island	48.7559	-53.7177	6	20	230	175
2005	Long Islands, middle uni n of	48.5909	-53.6330	6	20	250	200
2005	Inner Gooseberry Islands, East, uni inside	48.8809	-53.6387	6	20	270	250
2005	Tinker Rocks	49.1614	-53.5344	6	20	700	350
2005	Green Island, Cape Bonavista	48.7022	-53.1070	6	22	800	1500
2005	Mustard Bowl Island	48.5164	-53.6477	6	22	140	60

Year	Colony Name	Latitude	Longitude	Month	Day	Observer 1	Observer 2
<b>Notre Dame Bay</b>							
2005	South Penguin	49.4333	-53.7917	6	20	110	50
2006	Storehouse Island	49.4116	-54.4156	6	25	70	45
2006	Goose Island	49.5022	-54.3456	6	25	90	50
2006	Duck Island, N (near Fogo)	49.5403	-53.9254	6	25		20
2006	Grandfather Island	49.5409	-54.1651	6	25	60	35
2006	Pigeon Island (NDB)	49.5479	-53.8653	6	25	25	30
2006	Coleman Island	49.5570	-53.8172	6	25	100	70
2006	Grassy Island	49.2598	-55.2359	6	22	140	90
2006	Berry Island	49.6706	-54.5807	6	22	30	35
2006	West Grassy Island	49.5695	-55.7519	6	25	180	160
2006	Strong Island, uni NW of	49.4387	-55.3435	6	25	10	10
2006	Jock Island (north)	49.4501	-54.9588	6	22	80	60
2006	Gull Island, Loon Bay	49.3546	-54.8545	6	22	100	130
2006	Green Island	49.3799	-54.7935	6	22	100	85
2006	Main Tickle Island	49.6283	-54.6826	6	22	15	10
2006	Smoker Island	49.6116	-54.4532	6	22	15	20
2006	Steering Island	49.5163	-54.4600	6	25	400	320
2006	Charley Island	49.5097	-54.4823	6	25	100	85
2006	Dog Islands (north)	49.4971	-54.4675	6	25	10	15
2006	Seal Islands	49.4360	-54.4559	6	25	35	32
2006	Noggin Cove Islands	49.4562	-54.3149	6	25	90	70
2006	Hare Island, uni W of	49.6046	-54.3761	6	25	2	
2006	Little Fogo Islands	49.8284	-54.1136	6	25	50	45
2006	Joe Batt's Arm, uni in	49.7255	-54.1628	6	25	150	170
2006	Browns Point, largest island NW of	49.7341	-54.1640	6	25	450	450
2006	Crow Island, uni NW of	49.6609	-55.6590	6	25	10	8
2006	Dog Bay Island, uni west of north tip	49.5512	-54.4324	6	22	4	4
	Duck Island, Bay of Exploits, N Indian						
2006	Arm	49.3915	-54.8975	6	22	30	35
2006	East Hare Island, uni N of	49.3906	-55.2811	6	25	40	40
2006	Goose Islands	49.6852	-54.3948	6	25	3	1
2006	Grassy Islet	49.5847	-55.9359	6	25	1	1
2006	Gull Island, uni 1.75 km SSW of	49.4500	-55.5581	6	25	50	55
2006	Island Harbour Head, largest uni north of	49.6251	-54.3130	6	25	30	32
2006	Jock Island (south)	49.4488	-54.9626	6	22	100	70
2006	Mathew Lane Island, largest uni south of	49.5026	-55.0148	6	22	1	1
2006	Mile Island, uni SE of	49.6554	-54.4609	6	22	50	55
2006	Offer Rock	49.6531	-54.7965	6	22	350	280
2006	Offer Wadham Island	49.5942	-53.7617	6	25	70	55
2006	Pigeon Island, Tilting Harbour	49.7112	-54.0584	6	25	80	165
2006	Puncheon Cove, uni 1.7km SSE of	49.6567	-54.3690	6	25	4	2
2006	Robert's Arm, uni in mouth of	49.4892	-55.7973	6	25	3	3
2006	Rogers Point, Island SW of	49.5702	-54.3344	6	25	150	170
2006	Saltwater Pond Bay, uni on east side	49.5598	-55.9048	6	25	2	2
2006	Thart Island, uni north of	49.3555	-55.1731	6	22	40	35
2006	The Reach, uni in	49.3826	-54.7239	6	22	5	

Year	Colony Name	Latitude	Longitude	Month	Day	Observer 1	Observer 2
2006	Tinker Island	49.5839	-54.1761	6	25	30	25
2006	Duck Island, Bay of Exploits	49.4898	-55.0675	6	22	50	
<b>White Bay / Baie Verte Peninsula</b>							
2006	Grassy Island	50.0062	-56.1171	6	25	15	
2006	Northeast Granby	49.7456	-56.7089	6	25	230	220
2006	Middle Arm uni in mouth of	49.8982	-56.4572	6	25	20	22
2006	Western Island (Horse Islands)	50.2156	-55.8444	6	25	700	650
<b>Northern Peninsula / Gray Islands</b>							
2006	Cailloux Island	51.2012	-55.9921	6	24	20	35
2006	Goelands Island	51.2209	-55.8121	6	24	250	205
2006	Demetre Island	51.2392	-55.9328	6	24	50	45
2006	Goose Tickle Arm, unnamed island	51.2582	-56.0378	6	24	30	30
2006	Vert Island	51.2664	-55.9747	6	24	230	240
2006	Querre Island	50.7202	-57.3344	6	23	600	750
2006	Sheep Island	50.8178	-57.1998	6	23	230	240
2006	Horn Island	50.8003	-57.2215	6	23	400	400
2006	Twin Islands, south	50.8889	-57.2841	6	23	45	55
2006	Bird Islands (St Margaret By), rock SE of	51.0110	-56.9302	6	23	90	80
2006	Cape Island	51.1343	-56.8580	6	23	90	140
2006	Seal Islands	51.2843	-56.7689	6	23	220	230
2006	Herb Island	51.3088	-56.7331	6	24	40	45
2006	Green Island, Green Island Cove	51.4069	-56.5725	6	24	140	
2006	Cow Point	51.6138	-55.8830	6	24	400	360
2006	Long Point, uni off of	51.5914	-55.8685	6	24	140	85
2006	Triangle Point, uni W of	51.5115	-55.8622	6	24	65	95
2006	Brent Islands, uni between	51.2623	-55.9630	6	24	15	
2006	Deaths Head Island	51.2120	-55.7565	6	24	240	240
2006	Chasseurs Island	51.1644	-55.7253	6	24	100	110
2006	Bad Rock	50.7809	-56.1595	6	24	200	240
2006	Black Island, Northern Peninsula	50.9643	-57.0482	6	23	280	290
2006	Boisee Islands, Rock 1km SW of	51.5501	-55.8775	6	24	25	45
2006	Brent Islands, S rock between	51.2610	-55.9655	6	24	20	25
2006	Current Island, Forresters Point	51.1833	-56.8214	6	23	350	340
2006	Double Island, Great Islets Harbour	51.1609	-55.7342	6	24	40	35
2006	Entrance Island, Old Ferrole Harbour	51.0733	-56.9031	6	23	2	3
2006	Fishermans Cove, uni in	51.0482	-56.9625	6	23	80	90
2006	White Cape Harbour, uni in	51.5156	-55.4590	6	24	8	8
2006	Little Pond, uni in	51.1544	-56.0200	6	25	50	55
2006	Micmac Island	51.4992	-55.7197	6	24	100	95
2006	Monk Island	51.1987	-55.7078	6	24	16	14
2006	Moyac Island, uni E of	51.0992	-56.8814	6	23	20	
2006	Onion Island	51.6082	-55.6086	6	24	400	450
2006	Schooner Island, uni south of	51.5913	-55.8481	6	24	150	110
2006	Seal Islands, uni northernmost Island	51.2917	-56.7668	6	23	25	35
2006	Shoal Cove, rock in	51.3596	-56.6549	6	24	40	45
2006	Wooded Island, rock NW of	51.0321	-56.9581	6	23	90	120
2006	Green Islands (east)	51.0257	-56.9582	6	23	30	40

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Observer 1</b>	<b>Observer 2</b>
2006	Seal Islands NE	51.2897	-56.7586	6	23	100	120
<b>West Coast</b>							
2007	Crabbe River estuary, uni 1 in	48.2124	-58.8557	6	13	45	55
2007	St. Georges River, uni in	48.4952	-58.4231	6	13	200	165
2006	Middle Island	49.8406	-57.7769	6	23	400	280
2006	Little Island	49.8533	-57.7871	6	23	200	150
2006	Western Island (St. Pauls Inlet)	49.8275	-57.7863	6	23	50	60
2007	Gravels Pond Island	48.5579	-58.7279	6	13	260	220
2007	Codroy Island	47.8739	-59.4019	6	13	2	2
2007	Stephenville Crossing Lagoon	48.4990	-58.4275	6	13	35	35
2007	Point Au Mal	48.6406	-58.6712	6	13	100	60
2007	Fox Island River	48.6976	-58.6784	6	13	37	0
2006	St. Pauls Bay, Sandbar in	49.8733	-57.7953	6	23	4	3
<b>South Coast</b>							
2007	Southwest Island, uni off	47.5053	-57.4015	6	12	75	65
2007	Round Shag Island	47.5755	-57.6240	6	12	25	
2007	Gull Island	47.6857	-58.0365	6	12	10	9
2007	Goose Island	47.6566	-58.5058	6	12	6	2
2007	Harbour Island	47.5948	-58.8656	6	12		1
2007	Salmon Island	47.5794	-58.9689	6	12	50	35
2007	Smokey Island	47.6565	-58.0031	6	12	12	15
2007	Shag Islands	47.5927	-57.2681	6	12	30	25
2007	Three Islands (north island)	47.6741	-58.1953	6	12	150	160
2007	Tinker Island	47.6471	-58.4936	6	12	25	28
2007	Round Rock	47.5679	-59.0156	6	12	17	18
2007	Flat Islands	47.5687	-59.0585	6	12	100	95
2007	Money Island	47.5838	-59.1293	6	12	140	150
<b>Hermitage Bay / Fortune Bay</b>							
2007	Little Bay De L'Eau, uni S of	47.6146	-54.9255	6	11	70	65
2007	island just off Great Island	47.5171	-55.8694	6	11	80	65
2007	Landing Cove, uni E Side	47.5339	-55.9055	6	11	35	35
2007	Dawson's Cove	47.5297	-55.9423	6	11	7	5
2007	Sloop Rock	47.6875	-55.9705	6	12	12	11
2007	Dawson Point, uni S of	47.6369	-56.1518	6	12	2	2
2007	Hare Harbour, uni SW of	47.5839	-55.1502	6	11	200	125
2007	Barrow Rock	47.5782	-55.3890	6	11	75	65
2007	Black Island	47.4620	-55.8465	6	11	60	55
2007	Beck Bay estuary	47.5021	-56.1688	6	11	30	20

Table 3. Number of tern colonies, mean colony size (individuals) and mean total counts (both observers combined) of individual terns identified during aerial surveys of insular Newfoundland in 2005–2007, compared to the 2000–2002 (Boyne et al. 2013) and 1973 surveys (Lock 1990).

<b>Year</b>	<b>Eastern Newfoundland</b>		<b>Northern Newfoundland</b>		<b>Southwestern Newfoundland</b>		<b>Total</b>		
	<b>2000</b>	<b>2005</b>	<b>2001</b>	<b>2006</b>	<b>2002</b>	<b>2007</b>	<b>1973</b>	<b>2000–2002</b>	<b>2005–2007</b>
Total colonies counted	123	81	91	94	30	32	131	244	207
Mean colony size	75	128	103	110	90	63	124	86	110
Minimum colony size	2	2	3	1	1	1	1	1	1
Maximum colony size	475	3 250	800	675	625	240	3 000	800	3 250
<i>Mean total count</i>	<i>9 244</i>	<i>10 385</i>	<i>9 354</i>	<i>10 359</i>	<i>2 694</i>	<i>2 004</i>	<i>16 201</i>	<i>21 291</i>	<i>22 747</i>

Table 4. Clutch size, number of chicks observed and species proportions for tern colonies visited during ground surveys of insular Newfoundland 2005–2007. Colonies marked with \* were not observed through aerial surveys.

Year	Colony Name	Latitude	Longitude	Day	Month	Nests with # eggs					Total active nests	Total chicks	Species Proportion (ARTE)
						0	1	2	3	4			
2005	Duck Island*	46.8582	-55.7876	18	6	0	39	95	90	0	224		0
2005	Point La Haye*	46.899	-53.6063	21	6	0	1	0	0	1	2		0.5
2005	Renews	46.9323	-52.9511	21	6	8	27	74	24	0	125		0.1
2005	Riverhead*	46.9766	-53.5167	14	6	2	5	6	2	0	13		0.05
2005	O'Donnell's	47.0636	-53.5715	14	6	4	22	17	2	0	41		0.8
2005	O'Donnell's inner west lagoon	47.0739	-53.5692	14	6	0	23	33	53	2	111		0
2005	Grand Beach	47.1399	-55.4944	18	6	0	49	142	77	0	268		0.75
2005	Newbridge	47.3178	-53.4793	14	6	9	15	11	56	0	82		0
2005	Crawley Island*	47.4236	-53.856	16	6	1	0	4	7	0	11		0
2005	uni off Trinny Cove Head*	47.4868	-53.9443	16	6	0	16	35	0	0	51		1
2005	uni in Trinny Cove Islands	47.5022	-53.9315	16	6	0	4	5	0	0	9		0.1
2005	Inside Chapel Arm	47.5203	-53.661	20	6	0	5	3	0	0	8		0.25
2005	Uni Island in Chapel Arm*	47.5305	-53.6536	20	6	2	0	1	0	0	1		0.2
2005	Molly's Island, Brigus*	47.5352	-53.2034	20	6	0	5	3	5	0	13		0.1
2005	Green Island (off Kingwell)	47.5438	-54.1121	16	6	1	29	27	12	0	68		0.75
2005	Dildo Islands (southwest of Big island)	47.5625	-53.5937	20	6	1	1	0	0	0	1		0.25
2005	Gull Pond near St. Philip's*	47.5781	-52.8339	15	6	0	14	5	4	0	23		0.2
2005	Island in Little Pinchgut	47.5815	-53.901	16	6	0	4	0	0	0	4		0.25
2005	Spaniard Bay Spit	47.5979	-53.2877	20	6	0	1	7	6	0	14		0
2005	Big Rock	47.6722	-54.111	16	6	0	68	100	34	0	202		0.5
2005	Biscay Bay*	47.7478	-53.283	21	6	0	0	1	0	0	1		
2005	Copper Island, Off Verge	48.1137	53.5311	24	6	0	2	0	0	0	2		1
2005	Grassy Island, Off Verge	48.1261	-53.5384	24	6	0	5	3	1	0	9		0.5
2005	Gooseberry Island, Smith Sound*	48.1849	-53.6076	25	6	8	1	8	6	0	15		0.05
2005	Green Island, Cape Bonavista	48.6964	-53.1032	23	6	0	135	369	61	0	565		0
2005	Tinker Rocks, Wesleyville	49.162	-53.5355	23	6	2	36	146	293	1	476		0.01
2006	Grassy Island, Point of Bay	49.2603	-55.237	23	6	5	13	44	117	1	175	8	0
2006	Gull Island, Loon Bay	49.3545	-54.8558	23	6	8	49	68	139	0	256	135	0
2006	Storehouse Is	49.4116	-54.4156	25	6	31	24	42	69	2	137		0.01
2006	Seal Islands	49.436	-54.4559	25	6	1	3	5	13	0	21		0.25
2006	Noggin Cove Is	49.4562	-54.3149	25	6	16	25	43	24	0	92		0.15
2006	Muddy Shag Is., near Musgrave Hbr*	49.4917	-53.9448	26	6	0	5	7	0	0	12		1
2006	Goose Island, NE (near Fogo)	49.5076	-54.3462	24	6	17	17	23	20	0	60		0.05

Year	Colony Name	Latitude	Longitude	Day	Month	Nests with # eggs					Total active nests	Total chicks	Species Proportion (ARTE)
						0	1	2	3	4			
2006	Offer Wadham	49.5833	-53.7667	26	6	4	4	18	0	0	22		1
2006	Offer Rock	49.6576	-54.8086	25	6	29	39	155	172	1	367	12	0.25
2006	Joe Batt's Arm Hbr	49.7255	-54.1628	24	6	4	12	40	159	3	214	3	0
2006	Western Island, St. Paul's Inlet	49.8272	-57.7867	23	6		15	24	4	0	43		0.11
2006	Middle Island, St. Paul's Inlet	49.8404	-57.7782	23	6	0	26	104	163	0	293		
2006	Little Island, St. Paul's Inlet	49.8536	-57.7877	23	6	0	68	206	364	4	642		0.63
2006	Stearin Island*	49.9366	57.8283	2	7	0	5	3	1	0	9		
2006	Lobster Island*	51.1629	-56.819	22	6	0	0	2	1	0	3		0.1
2006	East of Beef Is.*	51.164	-56.8103	22	6	4	7	24	22	0	53		0.7
2006	Mutton Is, uni N of *	51.177	-56.814	22	6	5	9	83	71	0	163		0.3
2006	Cailloux Island	51.2007	-55.9945	21	6	2	5	25	31	0	61		
2006	Death's Head Island	51.212	-55.7565	21	6	10	41	115	70	0	226		0.6
2006	Gilliat (Duck) Is.*	51.2233	-55.9515	21	6	1	10	21	7	0	38		
2006	Demetre Island	51.2405	-55.9338	21	6	0	5	5	4	0	14		
2006	Brent Islands, S rock between	51.261	-55.9655	21	6	1	10	10	2	0	22		
2006	Brent Islands, uni between	51.2623	-55.963	21	6	0	3	5	4	0	12		
2006	Vert Island	51.2678	-55.9772	21	6	2	17	45	72	0	134		
2006	White Cape Harbour, uni in	51.5154	-55.4621	20	6	3	3	0	1	0	4		0
2006	Uni off Long Point, Cooks Hbr	51.5914	-55.8685	20	6	10	20	31	11	0	62		0.02
2007	Harbour Breton Black Island	47.462	55.8455	16	6	19	14	10	1	0	25		0.5
2007	Seal Cove/The Bight (island off sand spit)*	47.4935	56.0307	16	6	1	0	2	2	0	4		
2007	Great Island, small island off of	47.5171	55.8692	16	6	0	14	38	16	0	68		
2007	Dawson's Cove	47.5294	-55.9516	16	6	2	0	1	0	0	1		
2007	Round Rock	47.5679	59.0159	14	6	12	9	4	2	0	15		0.5
2007	Flat Islands	47.5694	59.0628	13	6	0	14	66	10	0	90		0.35
2007	Barrow Rock	47.5783	55.3892	16	6	17	9	15	24	0	48		
2007	Salmon Island	47.5792	58.9682	14	6	9	12	14	3	0	29		
2007	Money Island	47.5838	59.1293	14	6	17	27	53	18	0	98		
2007	Stephenville Crossing Tidal Flats near Bridge*	48.4909	58.4215	12	6	45	12	28	30	0	70		0.5
2007	St. Georges River	48.4912	-58.423	12	6	14	6	36	123	0	165	2	
2007	Stephenville Crossing Lagoon	48.4987	58.4307	12	6	4	7	4	30	0	41		0.1
2007	Gravels Pond Island	48.5579	58.7277	13	6	25	12	75	132	1	220		0.4
2007	Point aux Mal	48.6404	58.6708	13	6	40	12	0	2	0	14		
2007	Fox Island River	48.6969	58.6787	13	6	11	8	4	25	0	37		0.1
2007	McIvers*	49.0694	-58.1259	12	6	13	70	387	151	1	609	7	
<b>Total: 68 colonies</b>											<b>7,008</b>	<b>167</b>	<b>0.30</b>

Table 5. Estimated tern population for insular Newfoundland using aerial-ground corrections from 2000–2007 based on a generalized non-linear model (see methods for details).

<b>Year</b>	<b>Total groudn counts</b>	<b>Total aerial counts</b>	<b>Total estimate d terns</b>	<b>SD</b>	<b>Lower confidence limit</b>	<b>Upper confidence limit</b>
2000	31	123	8 775	420	8 081	9 708
2001	32	91	8 654	311.7	8 121	9 341
2002	15	30	3 018	97	2 863	3 246
<i>Total</i>	78	244	20 462	768	18 997	22 000
2005	24	81	10 760	2 481	9 001	16 771
2006	26	96	10 612	564	9 707	11 947
2007	18	33	2 889	71	2 763	3 037
<i>Total</i>	68	210	24 200	2 754	21 696	31 265

Table 6. Herring Gull colonies and counts of individuals identified during aerial surveys of insular Newfoundland in 2005–2007.

Year	Colony Name	Latitude	Longitude	Month	Day	Estimated Size
<b>Bonavista Bay</b>						
2005	Green Island, Cape Bonavista	48.70216	-53.10702	6	22	Large 501-1000 Ind
2005	Pound Island South	49.09989	-53.56667	6	20	Medium 101-500 Ind
2005	Deer Island, small uni NE of	48.94870	-53.70250	6	20	Medium 101-500 Ind
2005	Brown Store Islet	48.71667	-53.73333	6	20	Medium 101-500 Ind
2005	Sailor's Island, uni E of	48.69810	-53.66600	6	20	Medium 101-500 Ind
2005	Red Cliff Island	48.56440	-53.49500	6	22	Medium 101-500 Ind
2005	Castle Cove, north uni in	48.61190	-53.41610	6	22	Medium 101-500 Ind
2005	Castle Cove, south uni in	48.60970	-53.42000	6	22	Medium 101-500 Ind
2005	Gull Island, Cape Freels	49.25000	-53.43333	6	20	Small 1-100 Ind
2005	Cabot Island, North	49.17160	-53.35887	6	20	Small 1-100 Ind
2005	Butterfly Islets	49.12667	-53.49833	6	20	Small 1-100 Ind
2005	Pouch Island	49.17110	-53.47660	6	20	Small 1-100 Ind
2005	Bennett's Low Island	49.12200	-53.56090	6	20	Small 1-100 Ind
2005	North Pound Island	49.09942	-53.54619	6	20	Small 1-100 Ind
2005	Southwest Island	48.97830	-53.72780	6	20	Small 1-100 Ind
2005	Double Shag Island	48.91406	-53.56070	6	20	Small 1-100 Ind
2005	Locker's Flat Island, small uni W of	48.87830	-53.87810	6	20	Small 1-100 Ind
2005	Black Puffin	48.80850	-53.60290	6	20	Small 1-100 Ind
2005	Puffin Island	48.79370	-53.61200	6	20	Small 1-100 Ind
2005	Great Black Island, uni N of & west of Gulch Island	48.83349	-53.62203	6	20	Small 1-100 Ind
2005	Shag Rock	48.77810	-53.64520	6	20	Small 1-100 Ind
2005	Little Denier Island	48.68333	-53.59450	6	20	Small 1-100 Ind
2005	Copper Island	48.57500	-53.71333	6	20	Small 1-100 Ind
2005	Long Island, Middle, Center of Island	48.58370	-53.65720	6	20	Small 1-100 Ind
2005	Wolf Island, uni N of	48.48040	-53.63960	6	22	Small 1-100 Ind
2005	Gull Island, uni N of	48.51899	-53.61824	6	22	Small 1-100 Ind
2005	Lakeman Island	48.51432	-53.58940	6	22	Small 1-100 Ind
2005	Fish Point Gulch, S of	48.58689	-53.32323	6	22	Small 1-100 Ind
2005	Gull Island	48.71108	-53.09272	6	22	Small 1-100 Ind
2005	Cape Island	49.22186	-53.47553	6	20	Small 1-100 Ind
<b>Burin Peninsula</b>						
2005	Barred Island near Cat Island	46.85333	-55.76167	6	27	Medium 101-500 Ind
2005	Morgans Island	46.84870	-55.82124	6	27	Medium 101-500 Ind
2005	Colombier Island (NE)	46.89090	-55.57390	6	27	Small 1-100 Ind
2005	Colombier Island (SW)	46.88870	-55.57780	6	27	Small 1-100 Ind
2005	Ferryland Head	46.87164	-55.38329	6	27	Small 1-100 Ind
2005	Middle Island- Lawn islands	46.86956	-55.61680	6	27	Small 1-100 Ind
2005	Offer Island	46.86667	-55.63333	6	27	Small 1-100 Ind
2005	Ragged Head	46.90082	-55.56622	6	27	Small 1-100 Ind
<b>Conception Bay</b>						
2005	Carbonear Island	47.74110	-53.16830	6	22	Large 501-1000 Ind
2005	Fergus Island	47.60810	-53.21520	6	25	Large 501-1000 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2005	Little Bell Island	47.56667	-52.97384	6	25	Large 501-1000 Ind
2005	Kelly's Island	47.54488	-53.01551	6	25	Small 1-100 Ind
2005	The Bell	47.60749	-53.02600	6	25	Small 1-100 Ind
2005	Harbour Grace Islands	47.70800	-53.14500	6	22	Very large > 1000 ind
<b>Eastern Avalon Peninsula</b>						
2005	Double Island	47.80167	-52.78167	6	25	Medium 101-500 Ind
2005	Ship Island (NF)	47.02655	-52.86885	6	25	Medium 101-500 Ind
2005	Pee Pee Island	47.19167	-52.83833	6	25	Medium 101-500 Ind
2005	Goose Islands	47.03667	-52.86167	6	25	Medium 101-500 Ind
2005	Bois Island	47.02667	-52.86333	6	25	Medium 101-500 Ind
2005	Crow Island	47.01333	-52.88333	6	25	Medium 101-500 Ind
2005	Shoe Cove Island	47.76667	-52.73333	6	25	Small 1-100 Ind
2005	Logy Bay	47.63126	-52.66434	6	25	Small 1-100 Ind
2005	Wrens Island	47.02854	-52.87412	6	25	Small 1-100 Ind
2005	Costellos Island	47.02786	-52.87162	6	25	Small 1-100 Ind
2005	South Head	47.00039	-52.90403	6	25	Small 1-100 Ind
<b>Fortune Bay / Hermitage Bay</b>						
2007	English Harbour Island	47.45042	-55.49857	6	11	Medium 101-500 Ind
2007	Little Fox Island	47.58001	-55.92674	6	11	Medium 101-500 Ind
2007	Bird Island, Uni SW of	47.23979	-55.96398	6	11	Small 1-100 Ind
2007	Bird Island	47.24452	-55.95334	6	11	Small 1-100 Ind
2007	Brunette Island	47.27063	-55.93392	6	11	Small 1-100 Ind
2007	Stearin' Island	47.61364	-55.35292	6	11	Small 1-100 Ind
2007	Shag Rock/Gull Rock	47.45558	-55.65997	6	11	Small 1-100 Ind
2007	Gull Island	47.45763	-55.84100	6	11	Small 1-100 Ind
<b>Great Northern Peninsula</b>						
2006	Whale Island (west)	50.88229	-57.15193	6	23	Medium 101-500 Ind
2006	Fox Islands, east	50.92093	-57.10360	6	23	Medium 101-500 Ind
2006	Gooseberry Island	51.16083	-56.83758	6	23	Medium 101-500 Ind
2006	Green Island, Cooks Harbour	51.61101	-55.82107	6	24	Medium 101-500 Ind
2006	Hostis Island	51.58926	-55.62982	6	24	Medium 101-500 Ind
2006	Warrens Island	51.61146	-55.53875	6	24	Medium 101-500 Ind
2006	Green Island, Sacred Bay	51.61405	-55.52367	6	24	Medium 101-500 Ind
2006	White Islands (north)	51.59191	-55.35642	6	24	Medium 101-500 Ind
2006	White Islands (south)	51.57838	-55.35802	6	24	Medium 101-500 Ind
2006	Notre Dame Island	51.31192	-55.58314	6	24	Medium 101-500 Ind
2006	Spring Island	51.24086	-55.82581	6	24	Medium 101-500 Ind
2006	Stearing Island	49.93657	-57.82831	6	23	Small 1-100 Ind
2006	Savage Island	50.73237	-57.31589	6	23	Small 1-100 Ind
2006	Flat Island	50.82674	-57.31129	6	23	Small 1-100 Ind
2006	Twin Islands, north	50.89962	-57.27683	6	23	Small 1-100 Ind
2006	Twin Islands, south	50.88891	-57.28406	6	23	Small 1-100 Ind
2006	Turr Island west	50.83326	-57.10598	6	23	Small 1-100 Ind
2006	Turr Island east	50.83514	-57.09831	6	23	Small 1-100 Ind
2006	James Island	50.92493	-57.18231	6	23	Small 1-100 Ind
2006	Seal Islands NE	51.28973	-56.75863	6	23	Small 1-100 Ind
2006	Herb Island	51.30883	-56.73308	6	24	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	Green Island, Green Island Cove	51.40222	-56.57749	6	24	Small 1-100 Ind
2006	Triangle Point, uni W of	51.51146	-55.86224	6	24	Small 1-100 Ind
2006	Moyacs Islands #1	51.58913	-55.61905	6	24	Small 1-100 Ind
2006	Wreck Island	51.59765	-55.58121	6	24	Small 1-100 Ind
2006	Northeast Island	51.38631	-55.56990	6	24	Small 1-100 Ind
2006	Bigue Island	51.23357	-55.94228	6	24	Small 1-100 Ind
2006	Direction Island	51.23477	-55.99065	6	24	Small 1-100 Ind
2006	Gilliat Island	51.22333	-55.95145	6	24	Small 1-100 Ind
2006	Starboard Island	51.21416	-55.76903	6	24	Small 1-100 Ind
2006	Port Island (NF)	51.20927	-55.76434	6	24	Small 1-100 Ind
2006	Great Verdon Island	51.20601	-55.67109	6	24	Small 1-100 Ind
2006	Jehenne Point, uni WNW of	51.15382	-55.74690	6	24	Small 1-100 Ind
2006	Double Island, Great Islets Harbour	51.16091	-55.73421	6	24	Small 1-100 Ind
2006	St. Julien Head	51.10857	-55.71413	6	24	Small 1-100 Ind
2006	Groais Island, uni #1 NW of	50.97291	-55.63218	6	24	Small 1-100 Ind
2006	Groais Island, uni #2 NW of	50.98325	-55.64885	6	24	Small 1-100 Ind
2006	Rouge Island	50.89948	-55.76720	6	24	Small 1-100 Ind
2006	Rock Island	50.75652	-56.04975	6	24	Small 1-100 Ind
2006	White Island, Canada Bay	50.73718	-56.13315	6	24	Small 1-100 Ind
2006	Lancy Pigeon	51.62897	-55.42009	6	24	Small 1-100 Ind
2006	Little Verdon Island	51.19879	-55.67190	6	24	Small 1-100 Ind
<b>Notre Dame Bay</b>						
2006	Nippers Islands, eastern Most of	49.78919	-55.82230	6	25	Large 501-1000 Ind
2006	Tarpaulin Island	49.52867	-55.00233	6	22	Medium 101-500 Ind
2006	Mouse Island	49.60162	-54.77774	6	22	Medium 101-500 Ind
2006	Gull Island (NDB)	49.70297	-54.75695	6	22	Medium 101-500 Ind
2006	Duck Islands (south)	49.64855	-55.61699	6	25	Medium 101-500 Ind
2006	Big Triton Island	49.54761	-55.58388	6	25	Medium 101-500 Ind
2006	Gull Island, Thimble Tickles	49.48661	-55.49548	6	25	Medium 101-500 Ind
2006	Sculpin Island	49.54024	-55.40884	6	25	Medium 101-500 Ind
2006	Besom Island	49.48450	-55.34395	6	25	Medium 101-500 Ind
2006	Woody Island	49.54147	-55.29321	6	25	Medium 101-500 Ind
2006	Indian Cove Point	49.53849	-55.22097	6	25	Medium 101-500 Ind
2006	Watch Island, Change Islands	49.59384	-54.34668	6	25	Medium 101-500 Ind
2006	Grandfather Island	49.54091	-54.16507	6	25	Medium 101-500 Ind
2006	Noggin Cove Islands	49.45624	-54.31489	6	25	Medium 101-500 Ind
2005	South Penguin	49.43333	-53.79167	6	20	Medium 101-500 Ind
2005	Southern Cat Island	49.30660	-53.58930	6	20	Medium 101-500 Ind
2005	Middle Bill Island	49.27380	-53.48470	6	20	Medium 101-500 Ind
2006	Pig Island	49.52867	-55.00233	6	22	Small 1-100 Ind
2006	Steering Island	49.31124	-54.90245	6	22	Small 1-100 Ind
2006	Storehouse Island (south)	49.55884	-54.95847	6	22	Small 1-100 Ind
2006	Bridgeport Island	49.55025	-54.90463	6	22	Small 1-100 Ind
2006	Green Island, off Bridgeport	49.54949	-54.90956	6	22	Small 1-100 Ind
2006	Puzzle Harbour Rocks #2	49.53418	-54.88621	6	22	Small 1-100 Ind
2006	Long Point, uni #1 off of	49.69199	-54.80117	6	22	Small 1-100 Ind
2006	Long Point, uni #2 off of	49.69146	-54.80258	6	22	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	Spithers Point, south twillingate island	49.67672	-54.71162	6	22	Small 1-100 Ind
2006	Main Tickle Island	49.62834	-54.68261	6	22	Small 1-100 Ind
2006	Berry Island, Unnamed island east of	49.66838	-54.56486	6	22	Small 1-100 Ind
2006	Indian Garden Island	49.57980	-54.49777	6	22	Small 1-100 Ind
2006	Duck Island, Unnamed island E of	49.47257	-55.64689	6	25	Small 1-100 Ind
2006	East Grassy Island	49.57022	-55.74825	6	25	Small 1-100 Ind
2006	Flint Islands, uni #2 S	49.61531	-55.72353	6	25	Small 1-100 Ind
2006	Indian Island	49.59269	-55.61459	6	25	Small 1-100 Ind
2006	Gull Island, Seal Bay	49.45771	-55.54808	6	25	Small 1-100 Ind
2006	Gull Island	49.54343	-55.22371	6	25	Small 1-100 Ind
2006	Shoal Bay, uni northernmmost in	49.69002	-54.19410	6	25	Small 1-100 Ind
2006	Seal Nest Islets# 3	49.79725	-54.19554	6	25	Small 1-100 Ind
2006	Storehouse Islets (1)	49.81649	-54.18150	6	25	Small 1-100 Ind
2006	Little Fogo Islands	49.82551	-54.09745	6	25	Small 1-100 Ind
2006	Little Grandfather Island	49.54600	-54.16430	6	25	Small 1-100 Ind
2006	Indian Lookout, uni NE of	49.56775	-54.31832	6	25	Small 1-100 Ind
2006	Ladle Island	49.49178	-54.04842	6	25	Small 1-100 Ind
2005	North Penguin	49.44833	-53.81333	6	20	Small 1-100 Ind
2006	Lobster Island	49.35833	-55.15000	6	22	Small 1-100 Ind
2006	Goose Island	49.50221	-54.34557	6	25	Small 1-100 Ind
<b>Placentia Bay</b>						
2005	Harbour Island, Iona Islands	47.42310	-53.97420	6	25	Large 501-1000 Ind
2005	Fox Island	47.35000	-53.98333	6	25	Large 501-1000 Ind
2005	Harbour Island (PB)	47.42547	-53.97378	6	25	Large 501-1000 Ind
2005	Yardie Island	47.27208	-54.87772	6	27	Large 501-1000 Ind
2005	North Green Island	47.43260	-53.97880	6	25	Medium 101-500 Ind
2005	Graves Island	47.42369	-53.96857	6	25	Medium 101-500 Ind
2005	Grassy Island, Trinny Cove Islands	47.50622	-53.94083	6	25	Medium 101-500 Ind
2005	Little Harbour Island	47.61333	-53.96000	6	25	Medium 101-500 Ind
2005	Woody Island, Southern Harbour	47.69000	-53.97333	6	25	Medium 101-500 Ind
2005	Grassy Island [N]	47.69333	-53.97333	6	25	Medium 101-500 Ind
2005	Duck Island, E (PB)	47.72500	-53.98167	6	25	Medium 101-500 Ind
2005	Goose Island, S (PB)	47.74833	-53.99770	6	25	Medium 101-500 Ind
2005	Copper Island	47.24150	-54.95584	6	27	Medium 101-500 Ind
2005	Iron Island [SW]	47.03960	-55.11667	6	27	Medium 101-500 Ind
2005	Marshall Island	47.62500	-54.19833	6	27	Medium 101-500 Ind
2005	Red Island	47.35941	-54.20469	6	27	Medium 101-500 Ind
2005	Shag Rock, Placentia Bay	46.99533	-55.17309	6	27	Medium 101-500 Ind
2005	Hole in the Wall Island	47.39333	-53.98000	6	25	Small 1-100 Ind
2005	Graves Island, uni S of	47.42266	-53.96848	6	25	Small 1-100 Ind
2005	Woody Island, W of	47.45128	-53.95324	6	25	Small 1-100 Ind
2005	West Grassy, Grassy Islands	47.45768	-53.94990	6	25	Small 1-100 Ind
2005	Trinny Cove Island (1)	47.50327	-53.93688	6	25	Small 1-100 Ind
2005	Grassy Island, uni E of	47.69453	-53.97653	6	25	Small 1-100 Ind
2005	Fair Haven Island	47.52539	-53.91925	6	25	Small 1-100 Ind
2005	Corbin Island	46.96438	-55.21048	6	27	Small 1-100 Ind
2005	Eastern Head	47.10300	-55.06881	6	27	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2005	Goat Island, Placentia Bay	47.42572	-54.17769	6	27	Small 1-100 Ind
2005	Gooseberry Island, uni S of [White Islands]	47.59309	-54.27538	6	27	Small 1-100 Ind
2005	Grandmother Rocks	47.52500	-54.35500	6	27	Small 1-100 Ind
2005	Little Seal Island	47.45167	-54.13833	6	27	Small 1-100 Ind
2005	Poor Island	47.00729	-55.17958	6	27	Small 1-100 Ind
2005	Jean de Baie, Unnamed Island,	47.21200	-55.05174	6	27	Small 1-100 Ind
2005	Western Island	47.06990	-55.09630	6	27	Small 1-100 Ind
2005	White Islands, uni	47.59000	-54.27667	6	27	Small 1-100 Ind
2005	East Grassy, Grassy Islands, Brine Islands	47.45646	-53.94596	6	25	Small 1-100 Ind
2005	Salls Island	47.64520	-53.94670	6	25	Small 1-100 Ind
2005	Croney Island	47.10167	-55.06833	6	27	Small 1-100 Ind
2005	Green Islands	47.24290	-54.88024	6	27	Small 1-100 Ind
2005	Gull Islands (south)	47.35450	-54.54540	6	27	Small 1-100 Ind
2005	Valen Harbour, uni in (3)	47.47380	-54.39131	6	27	Small 1-100 Ind
2005	Saddle Back Island	47.21360	-54.79560	6	27	Small 1-100 Ind
2005	Shag Roost	47.57000	-53.90833	6	27	Small 1-100 Ind
2005	Jean de Baie Head, Uni N of	47.17821	-55.01913	6	27	Small 1-100 Ind
2005	West Island, White Islands	47.57750	-54.28339	6	27	Small 1-100 Ind
<b>South Coast</b>						
2007	Three Islands (central island)	47.67150	-58.19412	6	12	Small 1-100 Ind
2007	Green Island	47.64961	-58.28016	6	12	Small 1-100 Ind
2007	Jacques Island	47.65101	-58.33550	6	12	Small 1-100 Ind
2007	Wreck Island	47.62769	-58.54533	6	12	Small 1-100 Ind
2007	Duck Island	47.59936	-58.71811	6	12	Small 1-100 Ind
2007	Garden Islands	47.57024	-59.01687	6	12	Small 1-100 Ind
2007	Vardy's Island	47.57774	-59.13633	6	12	Small 1-100 Ind
2007	Shag Island, Uni N of	47.63767	-58.52201	6	12	Small 1-100 Ind
<b>Trinity Bay</b>						
2005	Perlican Island	48.08390	-53.02820	6	25	Large 501-1000 Ind
2005	North Bird Island	48.63410	-53.01632	6	22	Medium 101-500 Ind
2005	Bird, South	48.62479	-53.01036	6	22	Medium 101-500 Ind
2005	Elliston Point	48.62961	-53.02059	6	22	Medium 101-500 Ind
2005	Green Island, uni inside (off Salvage Head)	48.34310	-53.35690	6	22	Medium 101-500 Ind
2005	Ragged Islands W	48.24200	-53.44860	6	22	Medium 101-500 Ind
2005	Duck Island (TB)	48.16667	-53.48333	6	22	Medium 101-500 Ind
2005	Copper Island, S of Verge Island	48.11380	-53.52950	6	22	Medium 101-500 Ind
2005	Copper Island	47.85245	-53.71969	6	22	Medium 101-500 Ind
2005	Bellevue Beach PP, uni off	47.64000	-53.75400	6	22	Medium 101-500 Ind
2005	Dildo Islands, north	47.57160	-53.59250	6	25	Medium 101-500 Ind
2005	Dildo Islands north, Unnamed Island,	47.57253	-53.59094	6	22	Medium 101-500 Ind
2005	Hopeall Island	47.64890	-53.54720	6	25	Medium 101-500 Ind
2005	Ragged rocks, unnamed island in from	48.48814	-53.05679	6	22	Small 1-100 Ind
2005	Ragged Islands, north	48.48940	-53.05380	6	22	Small 1-100 Ind
2005	Stone Island	48.34667	-53.35333	6	22	Small 1-100 Ind
2005	Green Islands, N of Long Island	48.04649	-53.60445	6	22	Small 1-100 Ind
2005	St. Jones Island	47.92150	-53.67000	6	22	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2005	Sugar Loaf	47.95420	-53.34850	6	25	Small 1-100 Ind
2005	Kings Head, Unnamed Island, off of	47.99246	-53.31705	6	25	Small 1-100 Ind
2005	Hant's Head, Unnamed Island off of	48.01816	-53.28546	6	25	Small 1-100 Ind
2005	Green Island (TB)	48.19989	-53.43217	6	22	Very large > 1000 ind
2005	Verge Island	48.11790	-53.53530	6	22	Very large > 1000 ind
<b>West Coast</b>						
2007	Durands Island	47.57295	-59.19913	6	12	Medium 101-500 Ind
2007	Red Island	48.55926	-59.23770	6	13	Medium 101-500 Ind
2007	Shag Island	48.87074	-58.59297	6	13	Medium 101-500 Ind
2007	Seal Island	49.08191	-58.30306	6	13	Medium 101-500 Ind
2007	Codroy Island	47.87391	-59.40187	6	13	Small 1-100 Ind
2007	Fox Island	48.72528	-58.70523	6	13	Small 1-100 Ind
2007	Fox Island River	48.69756	-58.67841	6	13	Small 1-100 Ind
<b>White Bay / Baie Verte Peninsula</b>						
2006	Steering Island	49.85851	-56.55468	6	25	Medium 101-500 Ind
2006	Gull Rock, White Bay	49.74688	-56.72233	6	25	Small 1-100 Ind
2006	Northeast Granby	49.74555	-56.70886	6	25	Small 1-100 Ind
2006	Fish Point, uni S of	49.89784	-56.49191	6	25	Small 1-100 Ind
2006	Tin Pot Islands (west)	50.05099	-56.08236	6	25	Small 1-100 Ind
2006	Tin Pot Islands (east)	50.05083	-56.07466	6	25	Small 1-100 Ind
2006	Grassy Island	50.00615	-56.11715	6	25	Small 1-100 Ind
2006	Eastern Island, unnamed island at NW tip	50.23379	-55.80216	6	25	Small 1-100 Ind

Table 7. Great Black-backed Gull colonies and counts of individuals identified during aerial surveys of insular Newfoundland in 2005–2007.

Year	Colony Name	Latitude	Longitude	Month	Day	Estimated Size
<b>Bonavista Bay</b>						
2005	Pouch Island	49.17110	-53.47660	6	20	Medium 101-500 Ind
2005	Gull Island, Cape Freels	49.25000	-53.43333	6	20	Small 1-100 Ind
2005	Cabot Island, North	49.17160	-53.35887	6	20	Small 1-100 Ind
2005	Butterfly Islets	49.12667	-53.49833	6	20	Small 1-100 Ind
2005	Green Island, Wesleyville	49.14417	-53.52700	6	20	Small 1-100 Ind
2005	Pound Island South	49.09989	-53.56667	6	20	Small 1-100 Ind
2005	Copper Island	49.05176	-53.55210	6	20	Small 1-100 Ind
2005	Maiden Island	49.05860	-53.57920	6	20	Small 1-100 Ind
2005	Gull Island, Offer Gooseberry	48.91667	-53.55000	6	20	Small 1-100 Ind
2005	Grassy Island, Locker's Reach	48.89819	-53.79884	6	20	Small 1-100 Ind
2005	Traverse Island	48.81775	-54.07983	6	20	Small 1-100 Ind
2005	Great Content Cove, small uni outside	48.84709	-53.86844	6	20	Small 1-100 Ind
2005	Inner Gooseberry Islands, East, uni inside	48.88090	-53.63870	6	20	Small 1-100 Ind
2005	Black Puffin	48.80850	-53.60290	6	20	Small 1-100 Ind
2005	Puffin Island	48.79370	-53.61200	6	20	Small 1-100 Ind
2005	Shag Rock	48.77810	-53.64520	6	20	Small 1-100 Ind
2005	Grassy Gull Islet	48.75809	-53.66873	6	20	Small 1-100 Ind
2005	Brown Store Islet	48.71667	-53.73333	6	20	Small 1-100 Ind
2005	Little Denier Island	48.68333	-53.59450	6	20	Small 1-100 Ind
2005	Sailor's Island, uni E of	48.69810	-53.66600	6	20	Small 1-100 Ind
2005	Copper Island	48.57500	-53.71333	6	20	Small 1-100 Ind
2005	Long Island, Middle, Center of Island	48.58370	-53.65720	6	20	Small 1-100 Ind
2005	Southern Den	48.54250	-53.81000	6	20	Small 1-100 Ind
2005	Chance Head, uni N of	48.54880	-53.62850	6	22	Small 1-100 Ind
2005	Wolf Island, uni N of	48.48040	-53.63960	6	22	Small 1-100 Ind
2005	Gull Island, uni N of	48.51899	-53.61824	6	22	Small 1-100 Ind
2005	Red Cliff Island	48.56440	-53.49500	6	22	Small 1-100 Ind
2005	Castle Cove, north uni in	48.61190	-53.41610	6	22	Small 1-100 Ind
2005	Gull Island, Cape Bonavista	48.71108	-53.09272	6	22	Small 1-100 Ind
2005	Cape Island	49.22186	-53.47553	6	20	Small 1-100 Ind
2005	Honey Pot Island	49.17769	-53.51308	6	20	Small 1-100 Ind
2005	Horse Island, Bonavista Bay	49.05531	-53.54326	6	20	Small 1-100 Ind
2005	Deer Island, small uni NE of	48.94870	-53.70250	6	20	Small 1-100 Ind
2005	Deer Shag Islets	48.91758	-53.66562	6	20	Small 1-100 Ind
2005	Locker's Flat Island, small uni W of	48.87830	-53.87810	6	20	Small 1-100 Ind
2005	Great Black Island, uni N of & west of Gulch Island	48.83349	-53.62203	6	20	Small 1-100 Ind
2005	Lakeman Island, uni S of	48.82010	-53.78210	6	20	Small 1-100 Ind
2005	Long Reach Island, uni N of	48.74880	-53.83400	6	20	Small 1-100 Ind
2005	Ship Island, uni SW of	48.74430	-53.66310	6	20	Small 1-100 Ind
2005	Shag Point, uni island s of	48.51234	-53.76969	6	20	Small 1-100 Ind
2005	Gull Island, Sweet Bay	48.51666	-53.61780	6	22	Small 1-100 Ind
2005	Green Island, Cape Bonavista	48.70216	-53.10702	6	22	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
<b>Burin Peninsula</b>						
2007	Frenchman's Cove Barasway, Uni SW corner	47.20371	-55.41549	6	11	Small 1-100 Ind
2007	Devil Brook Island	47.27467	-55.32238	6	11	Small 1-100 Ind
2005	Offer Island	46.86667	-55.63333	6	27	Small 1-100 Ind
2007	Frenchman's Cove Barasway, uni SW	47.20386	-55.39711	6	11	Small 1-100 Ind
2007	Frenchman's Cove Barasway, Uni NW corner	47.21431	-55.38416	6	11	Small 1-100 Ind
<b>Conception Bay</b>						
2005	Red Head Cove	48.15288	-52.89972	6	25	Small 1-100 Ind
2005	Fergus Island	47.60810	-53.21520	6	25	Small 1-100 Ind
2005	Little Bell Island	47.56667	-52.97384	6	25	Small 1-100 Ind
2005	The Bell	47.60749	-53.02600	6	25	Small 1-100 Ind
2005	Perry's Cove, N of	47.81667	-53.11667	6	25	Small 1-100 Ind
<b>Eastern Avalon Peninsula</b>						
2005	Ship Island (NF)	47.02655	-52.86885	6	25	Small 1-100 Ind
2005	Goose Islands	47.03655	-52.86052	6	25	Small 1-100 Ind
2005	Bois Island	47.02667	-52.86333	6	25	Small 1-100 Ind
2005	Crow Island	47.01333	-52.88333	6	25	Small 1-100 Ind
2005	Wrens Island	47.02854	-52.87412	6	25	Small 1-100 Ind
<b>Hermitage Bay / Fortune Bay</b>						
2007	Little Fox Island	47.58001	-55.92674	6	11	Medium 101-500 Ind
2007	Bird Island	47.24452	-55.95334	6	11	Small 1-100 Ind
2007	Gull Island	47.59020	-55.09749	6	11	Small 1-100 Ind
2007	Stearin' Island	47.61364	-55.35292	6	11	Small 1-100 Ind
2007	Shag Rock/Gull Rock	47.45558	-55.65997	6	11	Small 1-100 Ind
2007	Gull Island	47.45763	-55.84100	6	11	Small 1-100 Ind
2007	Pass Island, Uni S of	47.48165	-56.20057	6	11	Small 1-100 Ind
2007	Puffin Island	47.25054	-55.94114	6	11	Small 1-100 Ind
2007	Brunette Island	47.27063	-55.93392	6	11	Small 1-100 Ind
2007	English Harbour Island	47.45042	-55.49857	6	11	Small 1-100 Ind
2007	Little Sagona Island	47.37782	-55.77533	6	11	Small 1-100 Ind
2007	off Doughball Point	47.54229	-55.83301	6	11	Small 1-100 Ind
2007	off Doughball Point	47.54252	-55.83166	6	11	Small 1-100 Ind
<b>Great Northern Peninsula</b>						
2006	Savage Island	50.73237	-57.31589	6	23	Medium 101-500 Ind
2006	Green Island, Green Island Cove	51.40222	-56.57749	6	24	Medium 101-500 Ind
2006	Moyacs Islands #1	51.58913	-55.61905	6	24	Medium 101-500 Ind
2006	Demetre Island	51.23917	-55.93277	6	24	Medium 101-500 Ind
2006	Great Verdon Island	51.20601	-55.67109	6	24	Medium 101-500 Ind
2006	White Island, Canada Bay	50.73718	-56.13315	6	24	Medium 101-500 Ind
2006	Stearing Island	49.93657	-57.82831	6	23	Small 1-100 Ind
2006	Belldowns Islands	49.93736	-57.78577	6	23	Small 1-100 Ind
2006	Flat Island	50.82674	-57.31129	6	23	Small 1-100 Ind
2006	Twin Islands, north	50.89962	-57.27683	6	23	Small 1-100 Ind
2006	Twin Islands, south	50.88891	-57.28406	6	23	Small 1-100 Ind
2006	Green Island, St. John Bay	50.75458	-57.24271	6	23	Small 1-100 Ind
2006	Whale Island (west)	50.88229	-57.15193	6	23	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	James Island	50.92493	-57.18220	6	23	Small 1-100 Ind
2006	Fox Island (east)	50.92093	-57.11119	66	23	Small 1-100 Ind
2006	Green Islands (west)	51.02899	-56.96616	6	23	Small 1-100 Ind
2006	Gooseberry Island, uni S of	51.15151	-56.83958	6	23	Small 1-100 Ind
2006	Gooseberry Island	51.16083	-56.83758	6	23	Small 1-100 Ind
2006	Lobster Island	51.16165	-56.82431	6	23	Small 1-100 Ind
2006	Herb Island	51.30883	-56.73308	6	24	Small 1-100 Ind
2006	Green Island, Cooks Harbour	51.61101	-55.82107	6	24	Small 1-100 Ind
2006	Boisee Islands, uni n island	51.56404	-55.84936	6	24	Small 1-100 Ind
2006	Triangle Point, uni W of	51.51146	-55.86224	6	24	Small 1-100 Ind
2006	Moyac Islands, east	51.58683	-55.61577	6	24	Small 1-100 Ind
2006	Hostis Island	51.58926	-55.62982	6	24	Small 1-100 Ind
2006	Wreck Island	51.59765	-55.58121	6	24	Small 1-100 Ind
2006	Green Island, Sacred Bay	51.61405	-55.52367	6	24	Small 1-100 Ind
2006	White Islands (north)	51.59191	-55.35642	6	24	Small 1-100 Ind
2006	White Islands (south)	51.57838	-55.35802	6	24	Small 1-100 Ind
2006	Salut Island, unnamed island NW of	51.48997	-55.47658	6	24	Small 1-100 Ind
2006	Northeast Island	51.38631	-55.56990	6	24	Small 1-100 Ind
2006	Notre Dame Island	51.31192	-55.58314	6	24	Small 1-100 Ind
2006	Direction Island	51.23477	-55.99065	6	24	Small 1-100 Ind
2006	Gilliat Island	51.22333	-55.95145	6	24	Small 1-100 Ind
2006	Spring Island	51.24086	-55.82581	6	24	Small 1-100 Ind
2006	Starboard Island	51.21416	-55.76903	6	24	Small 1-100 Ind
2006	Jehenne Point, unnamed island WNW of	51.15382	-55.74690	6	24	Small 1-100 Ind
2006	Double Island, Great Islets Harbour	51.16091	-55.73421	6	24	Small 1-100 Ind
2006	Groais Island, unnamed Island #1 NW of	50.97291	-55.63218	6	24	Small 1-100 Ind
2006	The Sisters Rocks (south)	50.98322	-55.52504	6	24	Small 1-100 Ind
2006	Rouge Island	50.89948	-55.76720	6	24	Small 1-100 Ind
2006	Rock Island	50.75652	-56.04975	6	24	Small 1-100 Ind
2006	Canards Cove, unnamed island in	51.58605	-55.59974	6	24	Small 1-100 Ind
2006	Noddy Bay, uni in S end of bay	51.57614	-55.48710	6	24	Small 1-100 Ind
2006	Lancy Pigeon	51.62897	-55.42009	6	24	Small 1-100 Ind
2006	Salut Island	51.48821	-55.47502	6	24	Small 1-100 Ind
2006	Little Brehat Bay, unnamed island N of	51.45211	-55.46778	6	24	Small 1-100 Ind
2006	Needles Rocks (north)	51.43994	-55.46650	6	24	Small 1-100 Ind
2006	Port Island	51.20927	-55.76434	6	24	Small 1-100 Ind
2006	Little Cormorandier Island	51.22329	-55.67393	6	24	Small 1-100 Ind
2006	Great Cormorandier Island	51.21659	-55.66551	6	24	Small 1-100 Ind
2006	Pigeon Island, Hare Bay	51.21452	-55.66314	6	24	Small 1-100 Ind
2006	Little Verdon Island	51.19879	-55.67190	6	24	Small 1-100 Ind
2006	Chasseurs Island	51.16445	-55.72532	6	24	Small 1-100 Ind
2006	St. Julien Head	51.10857	-55.71413	6	24	Small 1-100 Ind
2006	Twin Islands, unnamed island NE of	51.59321	-55.58776	6	24	Small 1-100 Ind
<b>Notre Dame Bay</b>						
2006	Duck Islands (south)	49.64855	-55.61699	6	25	Large 501-1000 Ind
2006	Steering Island	49.31124	-54.90245	6	22	Medium 101-500 Ind
2006	Sculpin Island	49.54024	-55.40884	6	25	Medium 101-500 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	Woody Island	49.54147	-55.29321	6	25	Medium 101-500 Ind
2006	Grandfather Island	49.54091	-54.16507	6	25	Medium 101-500 Ind
2005	Southern Cat Island	49.30660	-53.58930	6	20	Medium 101-500 Ind
2006	Tarpaulin Island	49.52867	-55.00233	6	22	Small 1-100 Ind
2006	Pig Island	49.52867	-55.00233	6	22	Small 1-100 Ind
2006	Lobster Island	49.35833	-55.15000	6	22	Small 1-100 Ind
2006	Bridgeport Island	49.55025	-54.90463	6	22	Small 1-100 Ind
2006	Green Island, off Bridgeport	49.54949	-54.90956	6	22	Small 1-100 Ind
2006	Puzzle Harbour Rocks #2	49.53418	-54.88621	6	22	Small 1-100 Ind
2006	Long Point, uni #1 off	49.69199	-54.80117	6	22	Small 1-100 Ind
2006	Long Point, uni #2 off	49.69146	-54.80258	6	22	Small 1-100 Ind
2006	Main Tickle Island	49.62834	-54.68261	6	22	Small 1-100 Ind
2006	Berry Island, Unnamed island east of	49.66838	-54.56486	6	22	Small 1-100 Ind
2006	Jack's Island, Cobbs Arm	49.62915	-54.52476	6	22	Small 1-100 Ind
2006	Indian Garden Island	49.57980	-54.49777	6	22	Small 1-100 Ind
2006	East Garden	49.59090	-54.47394	6	22	Small 1-100 Ind
2006	Nippers Islands, eastern Most of	49.78919	-55.82230	6	25	Small 1-100 Ind
2006	Duck Island, Unnamed island E of	49.47257	-55.64689	6	25	Small 1-100 Ind
2006	East Grassy Island	49.57022	-55.74825	6	25	Small 1-100 Ind
2006	Lewis Island	49.59850	-55.72581	6	25	Small 1-100 Ind
2006	Flint Islands, unnamed island #2 S	49.61531	-55.72353	6	25	Small 1-100 Ind
2006	Gull Island	49.45889	-55.54731	6	25	Small 1-100 Ind
2006	Gull Island, Thimble Tickles	49.48661	-55.49548	6	25	Small 1-100 Ind
2006	Besom Island	49.48450	-55.34395	6	25	Small 1-100 Ind
2006	Steering Island, Little Fogos	49.78821	-54.19884	6	25	Small 1-100 Ind
2006	Seal Nest Islets# 3	49.79725	-54.19554	6	25	Small 1-100 Ind
2006	Seal Nest Islets #2	49.79990	-54.19989	6	25	Small 1-100 Ind
2006	Seal Nest Islets	49.79721	-54.20225	6	25	Small 1-100 Ind
2006	Storehouse Islets (1)	49.81649	-54.18150	6	25	Small 1-100 Ind
2006	Storehouse Islets (3)	49.81869	-54.18088	6	25	Small 1-100 Ind
2006	Little Fogo Islands	49.81652	-54.13954	6	25	Small 1-100 Ind
2006	Little Fogo Islands	49.81920	-54.13161	6	25	Small 1-100 Ind
2006	Little Fogo Islands	49.82551	-54.09745	6	25	Small 1-100 Ind
2006	Small Island, Wadham Is	49.58079	-53.78162	6	25	Small 1-100 Ind
2006	Coleman Island	49.55701	-53.81717	6	25	Small 1-100 Ind
2006	Indian Lookout, uni NE of	49.56775	-54.31832	6	25	Small 1-100 Ind
2006	Goose Island, uni N of	49.50678	-54.34599	6	25	Small 1-100 Ind
2006	Goose Island	49.50221	-54.34557	6	25	Small 1-100 Ind
2006	Ladle Island	49.49178	-54.04842	6	25	Small 1-100 Ind
2005	North Penguin	49.44833	-53.81333	6	20	Small 1-100 Ind
2005	South Penguin	49.43333	-53.79167	6	20	Small 1-100 Ind
2006	Duck Island, Nippers Islands	49.78185	-55.83332	6	25	Small 1-100 Ind
2006	Riding Island	49.78444	-55.83518	6	25	Small 1-100 Ind
2006	Burnt Island	49.74211	-55.94429	6	25	Small 1-100 Ind
2006	Flint Islands, unnamed island #1 S	49.61403	-55.72519	6	25	Small 1-100 Ind
2006	Hare Island, uni W of	49.60464	-54.37614	6	25	Small 1-100 Ind
2005	Middle Bill Island	49.27380	-53.48470	6	20	Small 1-100 Ind

Year	Colony Name	Latitude	Longitude	Month	Day	Estimated Size
<b>Placentia Bay</b>						
2005	North Green Island	47.43260	-53.97880	6	25	Medium 101-500 Ind
2005	East Green Island	47.43322	-53.96554	6	25	Medium 101-500 Ind
2005	Hole in the Wall Island	47.39333	-53.98000	6	25	Small 1-100 Ind
2005	Graves Island, uni S of	47.42266	-53.96848	6	25	Small 1-100 Ind
2005	Woody Island, W of	47.45128	-53.95324	6	25	Small 1-100 Ind
2005	Little Harbour Island	47.61333	-53.96000	6	25	Small 1-100 Ind
2005	Woody Island, Southern Harbour	47.69000	-53.97333	6	25	Small 1-100 Ind
2005	Duck Island, E (PB)	47.72500	-53.98167	6	25	Small 1-100 Ind
2005	Goose Island, S (PB)	47.74833	-53.99770	6	25	Small 1-100 Ind
2005	Vicuna Island	47.87167	-54.18333	6	25	Small 1-100 Ind
2005	Bald Island, Flat Islands	47.24510	-54.93916	6	27	Small 1-100 Ind
2005	Copper Island	47.24150	-54.95584	6	27	Small 1-100 Ind
2005	Grandmother Rocks	47.52500	-54.35500	6	27	Small 1-100 Ind
2005	Green Islands	47.24290	-54.88024	6	27	Small 1-100 Ind
2005	Green Islands, south	47.49459	-54.30488	6	27	Small 1-100 Ind
2005	Gull Islands (south)	47.35450	-54.54540	6	27	Small 1-100 Ind
2005	Iron Island [SW]	47.03960	-55.11667	6	27	Small 1-100 Ind
2005	Middle Island [E]	47.24167	-54.77333	6	27	Small 1-100 Ind
2005	Saddle Back Island	47.21360	-54.79560	6	27	Small 1-100 Ind
2005	Jean de Baie, Unnamed Island,	47.21200	-55.05174	6	27	Small 1-100 Ind
2005	West Grassy, Grassy Islands	47.45768	-53.94990	6	25	Small 1-100 Ind
2005	East Grassy, Grassy Islands, Brine Islands	47.45646	-53.94990	6	25	Small 1-100 Ind
2005	Trinny Cove Island (1)	47.50327	-53.93688	6	25	Small 1-100 Ind
2005	Grassy Island, Trinny Cove Islands	47.50622	-53.94083	6	25	Small 1-100 Ind
2005	Grassy Island, uni E of	47.69453	-53.97653	6	25	Small 1-100 Ind
2005	Fair Haven Island	47.52539	-53.91925	6	25	Small 1-100 Ind
2005	Salls Island	47.64520	-53.94670	6	25	Small 1-100 Ind
2005	Ball Island	47.14190	-55.07473	6	27	Small 1-100 Ind
2005	Croney Island	47.10167	-55.06833	6	27	Small 1-100 Ind
2005	Fish Islands, small uni 1 km N of	47.56167	-54.25833	6	27	Small 1-100 Ind
2005	Gooseberry Island, uni S of [White Islands]	47.59309	-54.27538	6	27	Small 1-100 Ind
2005	Green Island, W of Jude Island	47.32333	-54.75000	6	27	Small 1-100 Ind
2005	Rock Harbour, uni in	47.17073	-55.04476	6	27	Small 1-100 Ind
2005	Marticott Island, uni s of	47.32620	-54.58233	6	27	Small 1-100 Ind
2005	Marshall Island	47.62500	-54.19833	6	27	Small 1-100 Ind
2005	North Tilt Island	47.63256	-54.17552	6	27	Small 1-100 Ind
2005	Poor Island	47.00729	-55.17958	6	27	Small 1-100 Ind
2005	Shag Rock, Placentia Bay	46.99533	-55.17309	6	27	Small 1-100 Ind
<b>South Coast</b>						
2007	Green Island	47.63352	-57.83315	6	12	Medium 101-500 Ind
2007	Gulch Cove Islands W	47.56885	-57.00998	6	12	Small 1-100 Ind
2007	Ramea Colombier	47.50644	-57.43513	6	12	Small 1-100 Ind
2007	Green Island	47.56895	-57.68098	6	12	Small 1-100 Ind
2007	somewhere in Miffel Island area	47.56309	-57.65707	6	12	Small 1-100 Ind
2007	Baring Island	47.64184	-57.85314	6	12	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2007	Three Islands (central island)	47.67150	-58.19412	6	12	Small 1-100 Ind
2007	Three Islands (south island)	47.67020	-58.19078	6	12	Small 1-100 Ind
2007	Green Island	47.64961	-58.28016	6	12	Small 1-100 Ind
2007	Wreck Island	47.62769	-58.54533	6	12	Small 1-100 Ind
2007	Duck Island	47.59936	-58.71811	6	12	Small 1-100 Ind
2007	Shag Rocks	47.59559	-58.72287	6	12	Small 1-100 Ind
2007	Green Island	47.60073	-58.75128	6	12	Small 1-100 Ind
2007	Garden Islands	47.57024	-59.01687	6	12	Small 1-100 Ind
2007	Turr Island, Uni SW of	47.51349	-57.35537	6	12	Small 1-100 Ind
2007	Turnip Island	47.51343	-57.37397	6	12	Small 1-100 Ind
2007	Richards Head, Uni S of	47.61828	-57.59802	6	12	Small 1-100 Ind
2007	Green Island Rocks, Uni	47.57352	-57.68103	6	12	Small 1-100 Ind
2007	Pigeon Island, Uni SW	47.66151	-58.22442	6	12	Small 1-100 Ind
2007	Ireland Island	47.63352	-58.36957	6	12	Small 1-100 Ind
2007	Shag Island, Uni N of	47.63767	-58.52201	6	12	Small 1-100 Ind
2007	Pigeon Island	47.59383	-58.80950	6	12	Small 1-100 Ind
2007	Grandy Sound, Uni in	47.60446	-58.84142	6	12	Small 1-100 Ind
2007	Isle Aux Morts	47.58050	-58.97394	6	12	Small 1-100 Ind
2007	Vardy's Island	47.57774	-59.13633	6	12	Small 1-100 Ind
2007	Mouse Island	47.56512	-59.15709	6	12	Small 1-100 Ind
<b>Trinity Bay</b>						
2005	Ragged Islands W	48.24120	-53.45050	6	22	Medium 101-500 Ind
2005	Green Islands, N of Long Island	48.04649	-53.60445	6	22	Medium 101-500 Ind
2005	Bellevue Beach PP, uni off	47.64000	-53.75400	6	22	Medium 101-500 Ind
2005	Ragged rocks, unnamed island in from	48.48814	-53.05679	6	22	Small 1-100 Ind
2005	Ragged Islands, north	48.48940	-53.05380	6	22	Small 1-100 Ind
2005	Ragged Islands, South	48.48170	-53.06170	6	22	Small 1-100 Ind
2005	Green Island, uni inside (off Salvage Head)	48.34310	-53.35690	6	22	Small 1-100 Ind
2005	Green Island (TB)	48.19989	-53.43217	6	22	Small 1-100 Ind
2005	Verge Island	48.11790	-53.53530	6	22	Small 1-100 Ind
2005	Dildo Islands, north	47.57160	-53.59250	6	25	Small 1-100 Ind
2005	Hopeall Island	47.64890	-53.54720	6	25	Small 1-100 Ind
2005	Perlican Island	48.08390	-53.02820	6	25	Small 1-100 Ind
2005	Bird, South	48.62479	-53.01036	6	22	Small 1-100 Ind
2005	Stone Island	48.34667	-53.35333	6	22	Small 1-100 Ind
2005	Duck Island (TB)	48.16667	-53.48333	6	22	Small 1-100 Ind
2005	Copper Island, S of Verge Island	48.11380	-53.52950	6	22	Small 1-100 Ind
2005	Copper Island	47.85245	-53.71969	6	22	Small 1-100 Ind
<b>West Coast</b>						
2007	Duck Island	47.56360	-59.19367	6	12	Medium 101-500 Ind
2007	Durands Island	47.57295	-59.19913	6	12	Medium 101-500 Ind
2007	Ship Island	48.50757	-58.96996	6	13	Medium 101-500 Ind
2007	Red Island	48.55926	-59.23770	6	13	Medium 101-500 Ind
2007	Bard Island	47.57897	-59.22741	6	12	Small 1-100 Ind
2007	Shag Island	47.59088	-59.24400	6	12	Small 1-100 Ind
2007	Green Island	47.56165	-59.18486	6	12	Small 1-100 Ind
2007	Codroy Island	47.87391	-59.40187	6	13	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2007	Crabbe River estuary, Uni 2 in	48.20883	-58.85626	6	13	Small 1-100 Ind
2007	Shag Island	48.87074	-58.59297	6	13	Small 1-100 Ind
2007	Seal Island	49.08191	-58.30306	6	13	Small 1-100 Ind
2007	Bay behind Shoal Point, v	47.75071	-59.30210	6	13	Small 1-100 Ind
2007	rock inside of White Rocks	49.01937	-58.47280	6	13	Small 1-100 Ind
<b>White Bay / Baie Verte Peninsula</b>						
2006	Tin Pot Islands (east)	50.05083	-56.07466	6	25	Medium 101-500 Ind
2006	Grassy Island	50.00615	-56.11715	6	25	Medium 101-500 Ind
2006	Northeast Granby	49.74555	-56.70886	6	25	Small 1-100 Ind
2006	Steering Island	49.85851	-56.55468	6	25	Small 1-100 Ind
2006	Tin Pot Islands (west)	50.05099	-56.08236	6	25	Small 1-100 Ind
2006	Ming's Islands (south)	50.03593	-56.00420	6	25	Small 1-100 Ind
2006	Little Pigeon Island	49.85621	-56.56387	6	25	Small 1-100 Ind
2006	Pines Islet	50.02600	-55.98505	6	25	Small 1-100 Ind
2006	Bois Island (north)	50.02610	-55.88661	6	25	Small 1-100 Ind

Table 8. Ring-billed Gull colonies and counts of individuals identified during aerial surveys of insular Newfoundland in 2005–2007.

Year	Colony Name	Latitude	Longitude	Month	Day	Estimated Size
<b>Bonavista Bay</b>						
2005	Tinker Rocks	49.16135	-53.53436	6	20	Medium 101-500 Ind
2005	Bennett's Low Island	49.12200	-53.56090	6	20	Medium 101-500 Ind
2005	Doctor's Island	48.80030	-54.09110	6	20	Medium 101-500 Ind
2005	Willis Reach, uni in	48.82966	-53.66306	6	20	Medium 101-500 Ind
2005	Green Island, Cape Bonavista	48.70216	-53.10702	6	22	Medium 101-500 Ind
2005	Pouch Island	49.17110	-53.47660	6	20	Small 1-100 Ind
2005	Air Island, unnamed island n of	48.80537	-54.14173	6	20	Small 1-100 Ind
2005	Mustard Bowl Island	48.51638	-53.64771	6	22	Small 1-100 Ind
<b>Burin Peninsula</b>						
2005	Little Green Islands	46.86380	-56.09610	6	27	Large 501-1000 Ind
2005	Big Salmonier Rock	46.85621	-55.77550	6	27	Medium 101-500 Ind
<b>Eastern Avalon Peninsula</b>						
2005	Biscay Bay Pond	46.75250	-53.28080	6	25	Small 1-100 Ind
<b>Hermitage Bay / Fortune Bay</b>						
2007	Island E Side of The Bight	47.49399	-56.02976	6	11	Small 1-100 Ind
2007	Beck Bay estuary	47.50208	-56.16879	6	11	Small 1-100 Ind
<b>Great Northern Peninsula</b>						
2006	Beak Point, uni off	51.60502	-55.53039	6	24	Large 501-1000 Ind
2006	Querre Island	50.72018	-57.33435	6	23	Medium 101-500 Ind
2006	Savage Island	50.73237	-57.31589	6	23	Medium 101-500 Ind
2006	Moyac Island, unnamed island E of	51.09922	-56.88140	6	23	Medium 101-500 Ind
2006	Cape Island	51.13425	-56.85802	6	23	Medium 101-500 Ind
2006	Slab Island	51.30883	-56.73781	6	24	Medium 101-500 Ind
2006	Pistolet Bay, unnamed island #1 in	51.52609	-55.87130	6	24	Medium 101-500 Ind
2006	Wild Bight, uni NE of	51.31067	-56.05886	6	24	Medium 101-500 Ind
2006	Cailloux Island	51.20115	-55.99214	6	24	Medium 101-500 Ind
2006	Little Island, St. Paul's Inlet	49.85369	-57.78668	6	23	Small 1-100 Ind
2006	Green Island, Green Island Cove	51.40693	-56.57247	6	24	Small 1-100 Ind
2006	Double Island, Great Islets Harbour	51.16091	-55.73421	6	24	Small 1-100 Ind
2006	Bad Rock	50.78087	-56.15948	6	24	Small 1-100 Ind
<b>Notre Dame Bay</b>						
2006	Puzzle Harbour Rocks #1	49.53525	-54.88632	6	22	Large 501-1000 Ind
2006	Lewis Island	49.59850	-55.72581	6	25	Large 501-1000 Ind
2006	Passage Rocks (north)	49.36540	-55.38848	6	25	Large 501-1000 Ind
2006	Storehouse Island	49.41158	-54.41564	6	25	Large 501-1000 Ind
2006	Lewisporte Harbour, unnamed island in	49.22598	-55.04404	6	22	Medium 101-500 Ind
2006	East Grassy Island	49.57022	-55.74825	6	25	Medium 101-500 Ind
2006	Dog Islands (west)	49.48899	-54.47272	6	25	Medium 101-500 Ind
2006	Browns Point, largest island NW of	49.73412	-54.16400	6	25	Medium 101-500 Ind
2006	Coleman Island	49.55701	-53.81717	6	25	Medium 101-500 Ind
2006	Duck Island, Bay of Exploits	49.48978	-55.06752	6	22	Small 1-100 Ind
2006	Gull Island, Loon Bay	49.35462	-54.85454	6	22	Small 1-100 Ind
2006	Rogers Point, Island SW of	49.57019	-54.33436	6	25	Small 1-100 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
<b>Placentia Bay</b>						
2005	The Neck at Isaac Heads	47.32550	-53.92340	6	25	Medium 101-500 Ind
2005	Goose Island, S (PB)	47.74833	-53.99770	6	25	Small 1-100 Ind
2005	Vicuna Island	47.87167	-54.18333	6	25	Small 1-100 Ind
<b>South Coast</b>						
2007	Smokey Island	47.65646	-58.00305	6	12	Medium 101-500 Ind
<b>West Coast</b>						
2007	Fox Island River	48.69756	-58.67841	6	13	Small 1-100 Ind
2007	Durands Island	47.57295	-59.19913	6	12	Medium 101-500 Ind
2007	Crabbe River estuary, Uni 2 in	48.20883	-58.85626	6	13	Medium 101-500 Ind
2007	St. Goerges River, Uni in	48.49517	-58.42307	6	13	Medium 101-500 Ind
<b>White Bay / Baie Verte Peninsula</b>						
2006	Northeast Granby	49.74555	-56.70886	6	25	Small 1-100 Ind
2006	Western Island (Horse Islands)	50.21562	-55.84440	6	25	Small 1-100 Ind

Table 9. Black-legged Kittiwake colonies and counts of individuals identified during aerial surveys of insular Newfoundland in 2005–2007.

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
<b>Bonavista Bay</b>						
2005	Gull Island, Offer Gooseberry	48.91667	-53.55000	6	20	Large 501-1000 Ind
2005	Gull Island, Cape Freels	49.25000	-53.43333	6	20	Medium 101-500 Ind
2005	Little Denier Island	48.68333	-53.59450	6	20	Medium 101-500 Ind
2005	Black Head	48.62690	-53.17140	6	22	Medium 101-500 Ind
2005	Stone Island	48.70125	-53.15759	6	22	Medium 101-500 Ind
2005	Double Shag Island	48.91406	-53.56070	6	20	Small 1-100 Ind
2005	Gull Island, Cape Bonavista	48.71108	-53.09272	6	22	Very large > 1000 ind
<b>Burin Peninsula</b>						
2005	Colombier Island (NE)	46.89090	-55.57390	6	27	Small 1-100 Ind
2005	Colombier Island (SW)	46.88870	-55.57780	6	27	Small 1-100 Ind
2005	Ferryland Head	46.87164	-55.38329	6	27	Small 1-100 Ind
<b>Conception Bay</b>						
2005	Carbonear Island	47.74110	-53.16830	6	22	Medium 101-500 Ind
2005	Brigus Lookout, Unnamed Cliff,	47.55764	-53.18313	6	25	Medium 101-500 Ind
2005	Red Head Cove	48.15288	-52.89972	6	25	Small 1-100 Ind
2005	Perry's Cove, N of	47.81667	-53.11667	6	25	Small 1-100 Ind
2005	Bradley's Cove, Unnamed Island, in	47.87335	-53.06420	6	25	Very large > 1000 ind
2005	Harbour Grace Islands	47.70800	-53.14500	6	22	Very large > 1000 ind
<b>Eastern Avalon Peninsula</b>						
2005	Blow Me Down	47.54024	-52.67424	6	25	Large 501-1000 Ind
2005	Blackhead	47.53140	-52.63730	6	22	Medium 101-500 Ind
2005	Goose Islands	47.03655	-52.86052	6	25	Small 1-100 Ind
2005	Cape Ballard	46.78321	-52.96390	6	25	Small 1-100 Ind
2005	Church Cove	47.68880	-52.70600	6	22	Very large > 1000 ind
2005	Miner's Point	47.36690	-52.71780	6	22	Very large > 1000 ind
2005	The Rookery (mainland cliffs)	46.65190	-53.22470	6	25	Very large > 1000 ind
<b>Hermitage Bay / Fortune Bay</b>						
2007	Bird Island, Uni SW of	47.23979	-55.96398	6	11	Small 1-100 Ind
2007	Wolf Rocks, Uni 1 East of	47.48106	-56.21701	6	11	Small 1-100 Ind
2007	Pass Island	47.49223	-56.20001	6	11	Small 1-100 Ind
2007	Wolf Rocks, Uni 2 East of	47.48038	-56.21633	6	11	Small 1-100 Ind
<b>Great Northern Peninsula</b>						
2006	Groais Island, unnamed Island #2 NW of	50.98325	-55.64885	6	24	Large 501-1000 Ind
2006	The Sisters Rocks (south)	50.98322	-55.52504	6	24	Large 501-1000 Ind
2006	Conche Peninsula, cliff #1 on SE side	50.86586	-55.88616	6	24	Large 501-1000 Ind
2006	White Islands (north)	51.59191	-55.35642	6	24	Medium 101-500 Ind
2006	Notre Dame Island	51.31192	-55.58314	6	24	Medium 101-500 Ind
2006	Groais Island, unnamed Island #1 NW of	50.97291	-55.63218	6	24	Medium 101-500 Ind
2006	Conche Peninsula, cliff #2 on SE side	50.86328	-55.88750	6	24	Medium 101-500 Ind
2006	Quirpon Island, Deep Gutch	51.63321	-55.43828	6	24	Small 1-100 Ind
2006	Little Looping Harbour, Cliff at head of	50.57545	-56.22753	6	25	Small 1-100 Ind
<b>Notre Dame Bay</b>						
2006	Flint Islands, unnamed island #2 S	49.61531	-55.72353	6	25	Medium 101-500 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	Besom Island	49.48450	-55.34395	6	25	Medium 101-500 Ind
2006	Little Fogo Islands	49.82844	-54.11356	6	25	Medium 101-500 Ind
2006	Little Fogo Islands	49.81652	-54.13954	6	25	Medium 101-500 Ind
2006	Little Fogo Islands	49.82551	-54.09745	6	25	Medium 101-500 Ind
2006	Nippers Islands, eastern Most of	49.78919	-55.82230	6	25	Small 1-100 Ind
2006	Green Bay Island	49.72306	-55.88223	6	25	Small 1-100 Ind
2006	Gull Rock (GB)	49.68250	-55.69467	6	25	Small 1-100 Ind
2006	Big Triton Island	49.54761	-55.58388	6	25	Small 1-100 Ind
2006	Sculpin Island	49.54024	-55.40884	6	25	Small 1-100 Ind
<b>Placentia Bay</b>						
2005	Goose Island, S (PB)	47.74833	-54.00000	6	25	Medium 101-500 Ind
2005	Red Island	47.35941	-54.20469	6	27	Small 1-100 Ind
<b>South Coast</b>						
2007	Ramea Colombier	47.50644	-57.43513	6	12	Small 1-100 Ind
<b>Trinity Bay</b>						
2005	Spillar's Point	48.66667	-53.05000	6	22	Large 501-1000 Ind
2005	St. Jones Island	47.92150	-53.67000	6	22	Large 501-1000 Ind
2005	Ragged rocks, unnamed island in from	48.48814	-53.05679	6	22	Medium 101-500 Ind
2005	Ragged Islands, north	48.48940	-53.05380	6	22	Medium 101-500 Ind
2005	Green Island, uni inside (off Salvage Head)	48.34310	-53.35690	6	22	Medium 101-500 Ind
2005	Maiden Islet	48.27333	-53.43333	6	22	Medium 101-500 Ind
2005	Green Island (TB)	48.19989	-53.43217	6	22	Medium 101-500 Ind
2005	Copper Island, S of Verge Island	48.11310	-53.52870	6	22	Medium 101-500 Ind
2005	Copper Island	47.85245	-53.71969	6	22	Medium 101-500 Ind
2005	Shag Islands, uni rock SW of	47.75820	-53.84920	6	22	Medium 101-500 Ind
2005	Shag Islands, Bull Arm	47.75900	-53.84850	6	22	Medium 101-500 Ind
2005	Rantem Cove, uni in	47.71535	-53.84970	6	22	Medium 101-500 Ind
2005	Red Rocks	47.70050	-53.51680	6	25	Medium 101-500 Ind
2005	North Bird Island	48.63410	-53.01632	6	22	Small 1-100 Ind
2005	Bird, South	48.62479	-53.01036	6	22	Small 1-100 Ind
2005	Ragged Islands, Middle	48.48450	-53.05820	6	22	Small 1-100 Ind
2005	Stone Island	48.34667	-53.35333	6	22	Small 1-100 Ind
2005	Green Islands, N of Long Island	48.04649	-53.60445	6	22	Small 1-100 Ind
2005	Hopeall Island	47.64890	-53.54720	6	25	Small 1-100 Ind
<b>West Coast</b>						
2007	Cliff N of Cape St. George	48.47561	-59.26167	6	13	Large 501-1000 Ind
2007	Shag Island	48.87074	-58.59297	6	13	Small 1-100 Ind
2007	Cliff S. edge of Big Cove	48.49334	-59.24884	6	13	Very large > 1000 ind
<b>White Bay / Baie Verte Peninsula</b>						
2006	Tin Pot Islands (west)	50.05099	-56.08236	6	25	Large 501-1000 Ind
2006	Tin Pot Islands (east)	50.05083	-56.07466	6	25	Large 501-1000 Ind
2006	Seal Island Bight, Cliff in	49.99529	-55.51109	6	25	Large 501-1000 Ind
2006	Gull Rock, White Bay	49.74688	-56.72233	6	25	Medium 101-500 Ind
2006	Gull Rocks	49.78002	-56.65281	6	25	Medium 101-500 Ind
2006	Grassy Island	50.00615	-56.11715	6	25	Medium 101-500 Ind
2006	Ming's Islands (south)	50.03593	-56.00420	6	25	Medium 101-500 Ind
2006	Western Island (Horse Islands), Nervous Rocks	50.21562	-55.84440	6	25	Medium 101-500 Ind

<b>Year</b>	<b>Colony Name</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Month</b>	<b>Day</b>	<b>Estimated Size</b>
2006	Brent's Cove, cliff north of	49.94406	-55.70904	6	25	Medium 101-500 Ind
2006	North Bill, Baie Vert Peninsula	50.00266	-55.50850	6	25	Medium 101-500 Ind
2006	Western Island, East of Hit or Miss Point	50.20139	-55.88956	6	25	Small 1-100 Ind
2006	Western Island, Hit or Miss Point	50.20234	-55.87553	6	25	Small 1-100 Ind
2006	Eastern Island, unnamed island at NW tip	50.23379	-55.80216	6	25	Small 1-100 Ind

Table 10. Cormorant colonies and counts of individuals identified during aerial surveys of insular Newfoundland in 2005–2007.

Year	Colony Name	Latitude	Longitude	Month	Day	Estimated Size
<b>Bonavista Bay</b>						
2005	Pound Island South	49.09989	-53.56667	6	20	Small 1-100 Ind
2005	Traverse Island	48.81775	-54.07983	6	20	Medium 101-500 Ind
2005	Brown Store Islet	48.71667	-53.73333	6	20	Medium 101-500 Ind
2005	Gull Island, Cape Bonavista	48.71108	-53.09272	6	22	Small 1-100 Ind
2005	North Pound Island	49.09942	-53.54619	6	20	Small 1-100 Ind
<b>Conception Bay</b>						
2005	Harbour Grace Islands	47.70800	-53.14500	6	22	Small 1-100 Ind
<b>Eastern Avalon Peninsula</b>						
2005	Renews Island	46.89269	-52.92053	6	25	Small 1-100 Ind
<b>Hermitage Bay / Fortune Bay</b>						
2007	Bird Island, Uni SW of	47.23979	-55.96398	6	11	Medium 101-500 Ind
2007	Shag Rock/Gull Rock	47.45558	-55.65997	6	11	Small 1-100 Ind
<b>Great Northern Peninsula</b>						
2006	Spring Island	51.24086	-55.82581	6	24	Small 1-100 Ind
2006	Rouge Island	50.89948	-55.76720	6	24	Small 1-100 Ind
<b>Notre Dame Bay</b>						
2005	South Penguin	49.43333	-53.79167	6	20	Small 1-100 Ind
2006	Duck Islands (south)	49.64855	-55.61699	6	25	Medium 101-500 Ind
2006	Duck Islands (north)	49.65207	-55.62012	6	25	Medium 101-500 Ind
2006	Sculpin Island	49.54024	-55.40884	6	25	Medium 101-500 Ind
2006	Little Grandfather Island	49.54600	-54.16430	6	25	Medium 101-500 Ind
2006	Turr Islets	49.82673	-54.15319	6	25	Small 1-100 Ind
2006	Little Fogo Islands	49.81652	-54.13954	6	25	Small 1-100 Ind
<b>Placentia Bay</b>						
2005	Angels Cove, cliffs n of	47.01306	-54.14763	6	25	Medium 101-500 Ind
2005	Black Point	47.19587	-54.04303	6	25	Medium 101-500 Ind
2005	Cuslet Cove, cliffs north of	46.97602	-54.16757	6	25	Small 1-100 Ind
2005	North of Great Barasway	47.14379	-54.06571	6	25	Small 1-100 Ind
2005	Bald Island, Flat Islands	47.24510	-54.93916	6	27	Small 1-100 Ind
2005	Green Islands	47.24290	-54.88024	6	27	Small 1-100 Ind
<b>South Coast</b>						
2007	Green Island	47.56895	-57.68098	6	12	Medium 101-500 Ind
2007	Black Rock	47.65447	-57.99562	6	12	Medium 101-500 Ind
2007	Flat Island	47.66042	-58.11345	6	12	Medium 101-500 Ind
2007	Gulch Cove Islands W	47.56885	-57.00998	6	12	Small 1-100 Ind
<b>West Coast</b>						
2007	Shag Island	47.59088	-59.24400	6	12	Medium 101-500 Ind
2007	Cape Cormorant	48.54209	-59.22138	6	13	Medium 101-500 Ind
2007	Shag Island	48.87074	-58.59297	6	13	Medium 101-500 Ind
2007	Grebes Head	47.92464	-59.38559	6	13	Small 1-100 Ind
2007	Wreck Cove	48.05578	-59.16628	6	13	Small 1-100 Ind
2007	Ship Cove, Uni in	48.14059	-58.98188	6	13	Small 1-100 Ind
<b>White Bay / Baie Verte Peninsula</b>						
2006	Gull Rock, White Bay	49.74688	-56.72233	6	25	Small 1-100 Ind
2006	Ming's Islands (south)	50.03593	-56.00420	6	25	Small 1-100 Ind

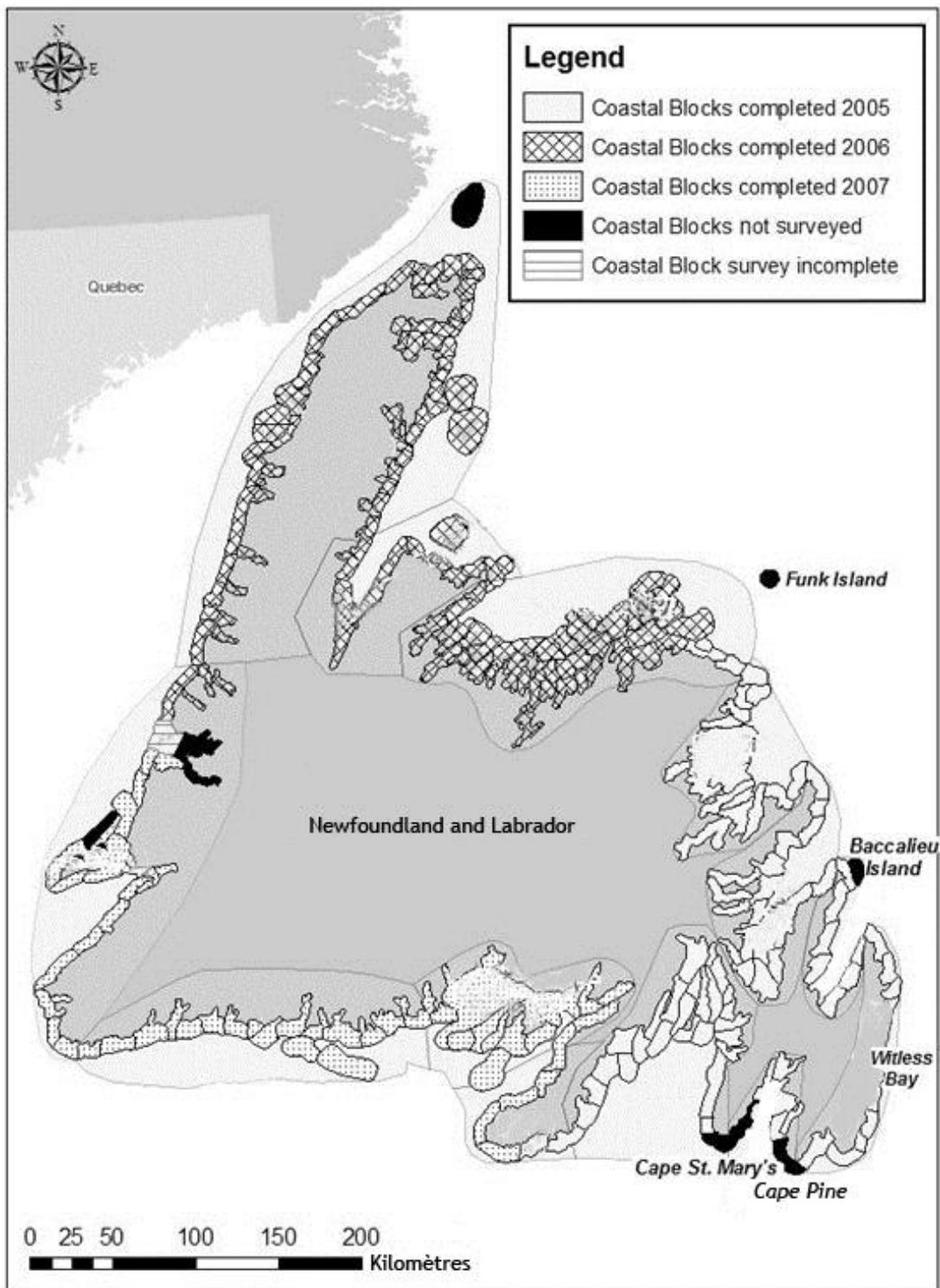


Figure 1. Coastal blocks surveyed for seabird colonies in insular Newfoundland in 2005 (white blocks) 2006 (gray blocks) and 2007 (hatched blocks)

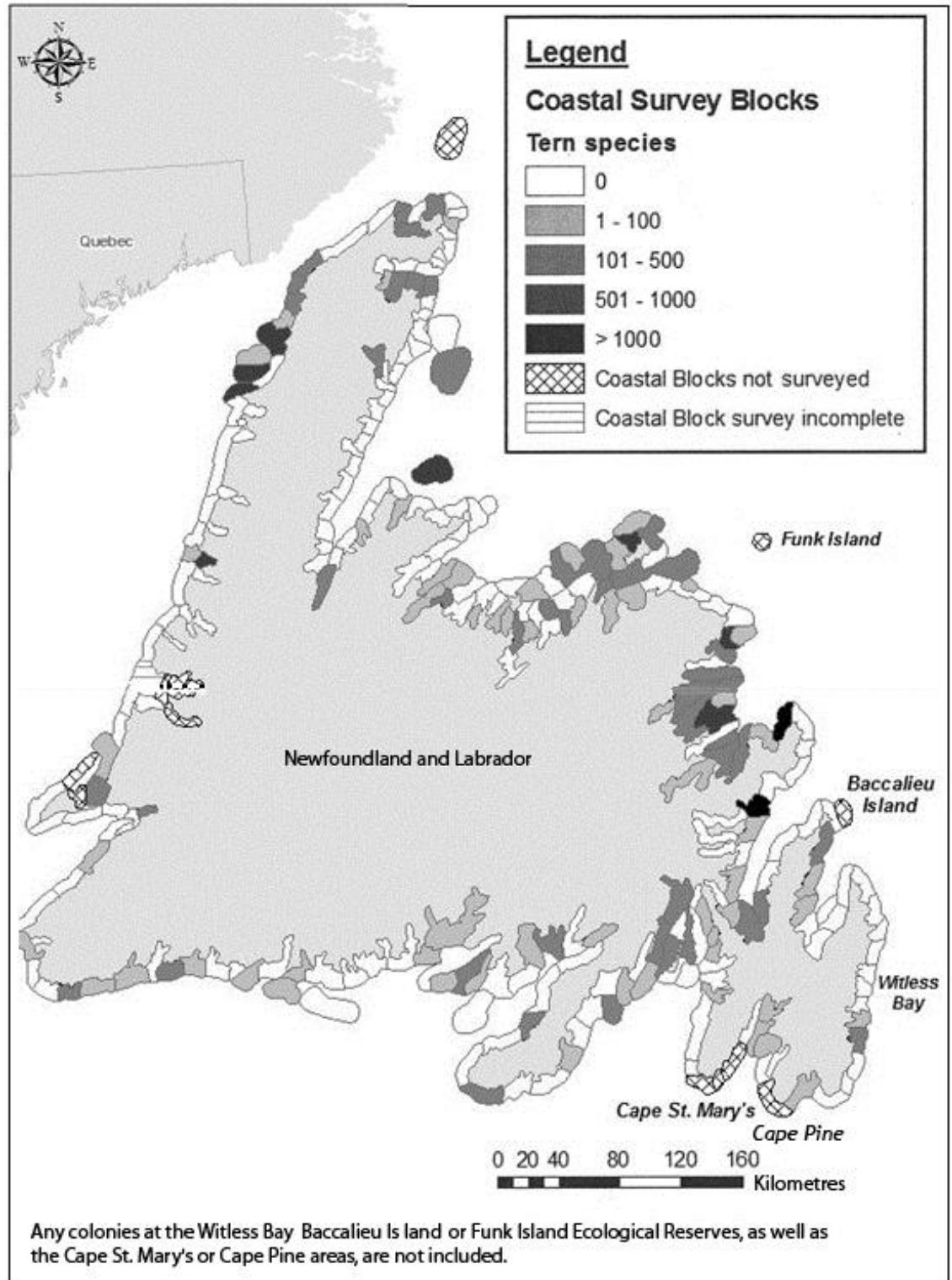


Figure 2. Total count of individual terns identified during aerial survey for each coastal block in Newfoundland, 2005–2007.

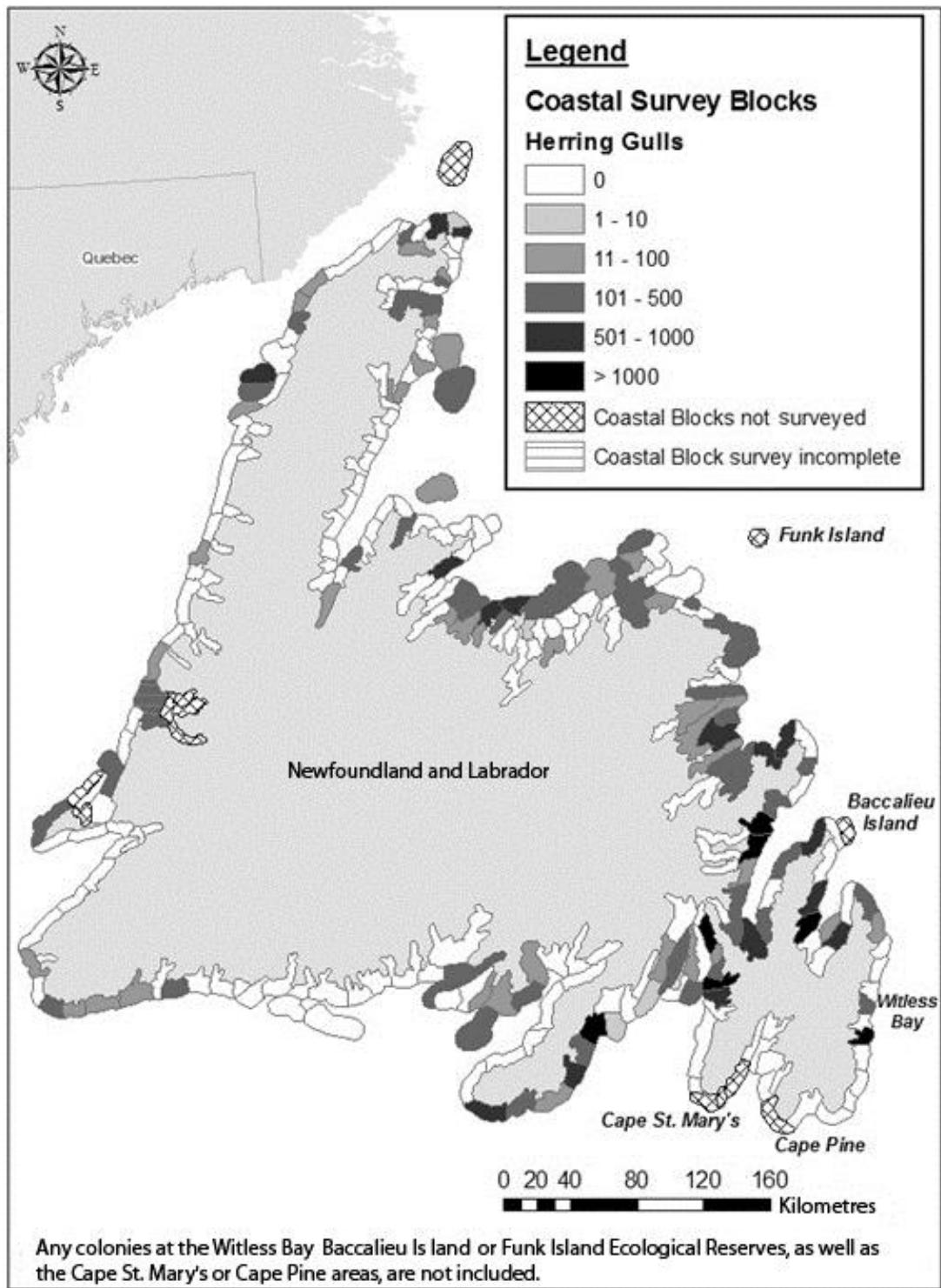


Figure 3. Sum of median counts for Herring Gulls identified during aerial surveys, percoastal survey block in Newfoundland, 2000–2002. Medians were estimated from quantitative categories of colony size (see methods): small (1–100 individuals), medium (101–500 individuals) large (501–1 000 individuals) and very large (>1 000 individuals).

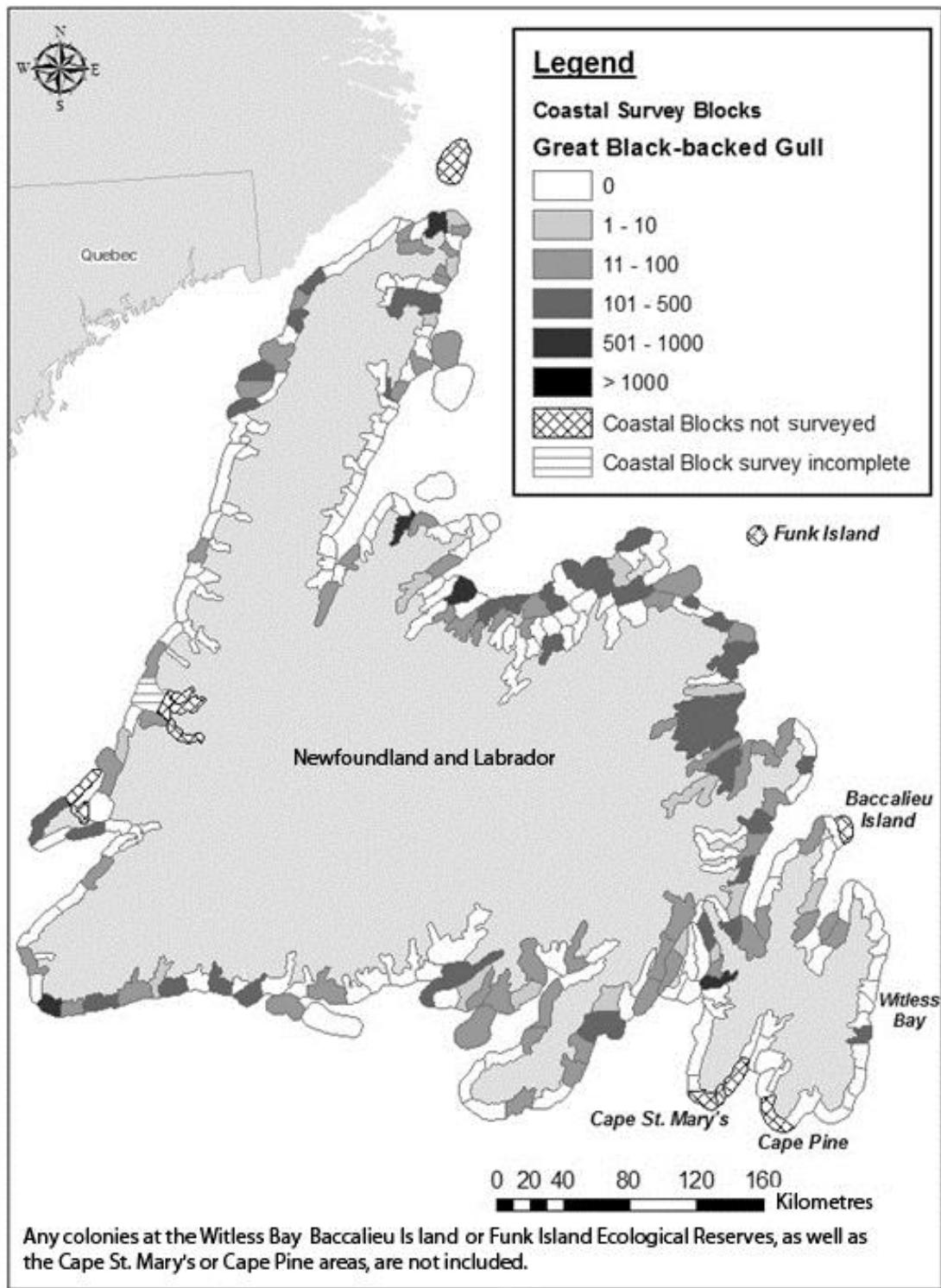


Figure 4. Sum of median counts for Great Black-backed Gulls identified during aerial surveys, per coastal survey block in Newfoundland, 2000–2002. Medians were estimated from quantitative categories of colony size (see methods): small (1–100 individuals), medium (101–500 individuals) large (501–1 000 individuals) and very large (>1 000 individuals).

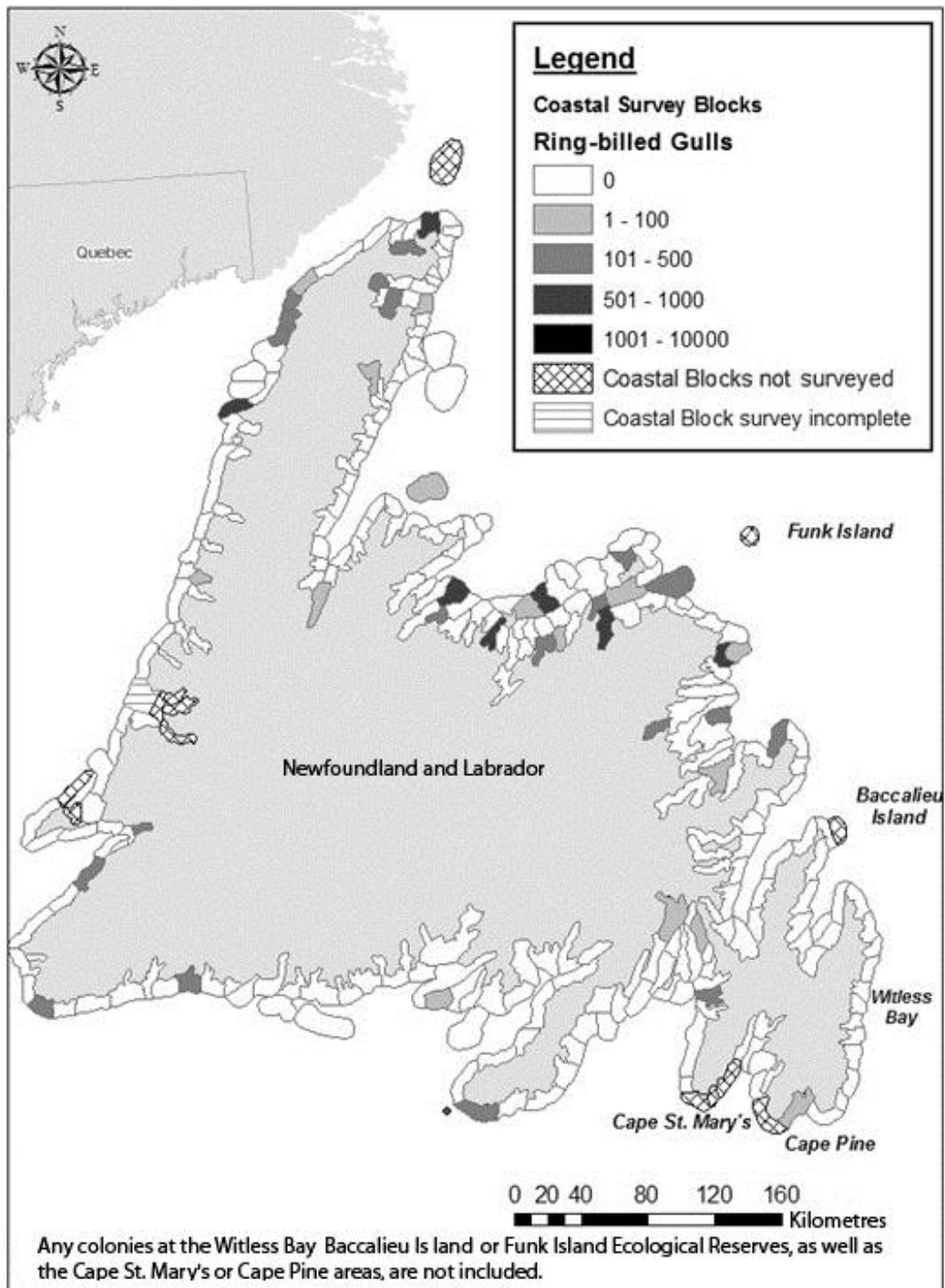


Figure 5. Sum of median counts for Ring-billed Gulls identified during aerial surveys, per coastal survey block in Newfoundland, 2000–2002. Medians were estimated from quantitative categories of colony size (see methods): small (1–100 individuals), medium (101–500 individuals), large (501–1 000 individuals) and very large (>1 000 individuals).

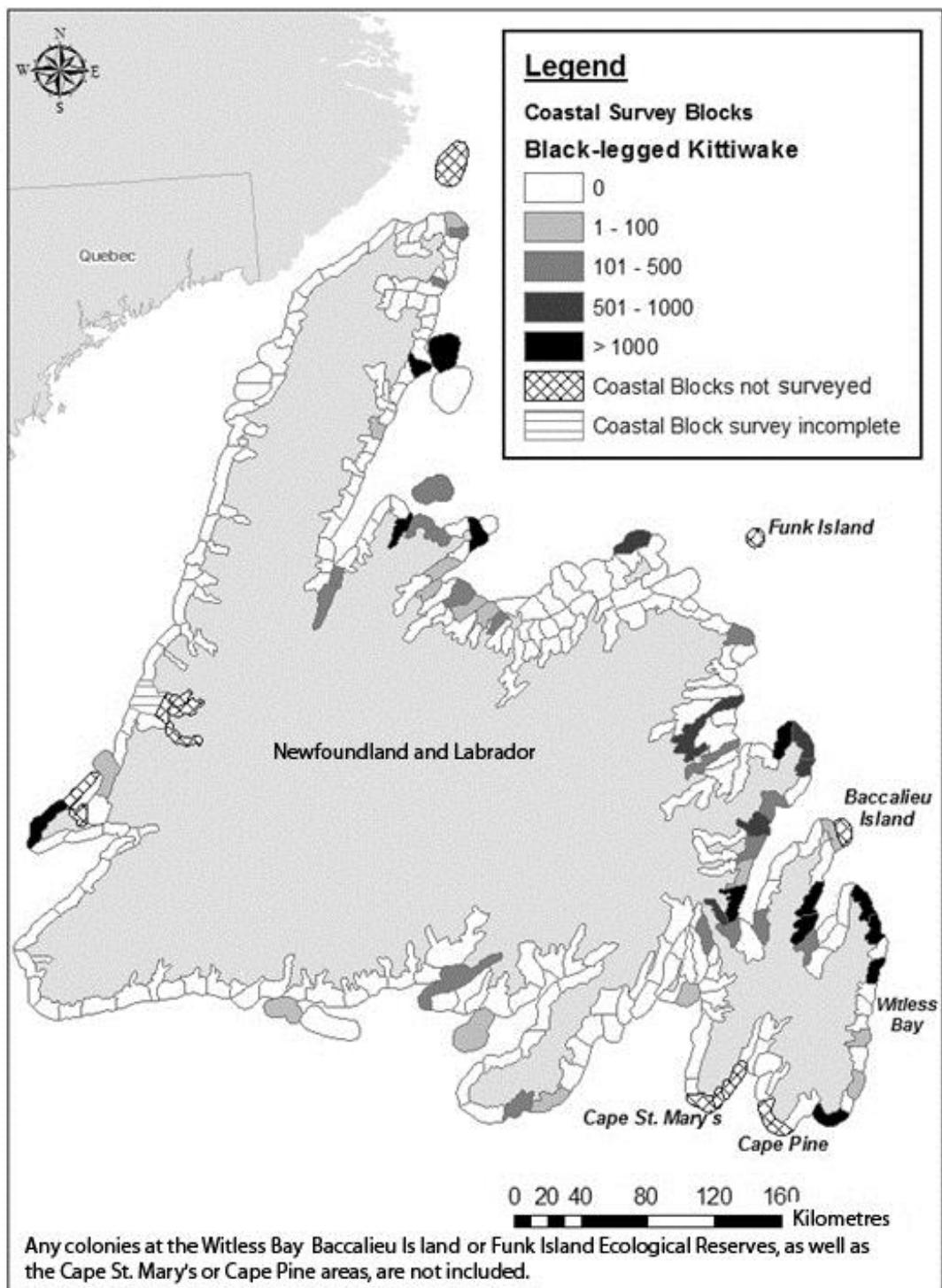


Figure 6. Sum of median counts for Black-legged Kittiwakes identified during aerial surveys, per coastal survey block in Newfoundland, 2000–2002. Medians were estimated from quantitative categories of colony size (see methods): small (1–100 individuals), medium (101–500 individuals), large (501–1 000 individuals) and very large (> 1 000 individuals).

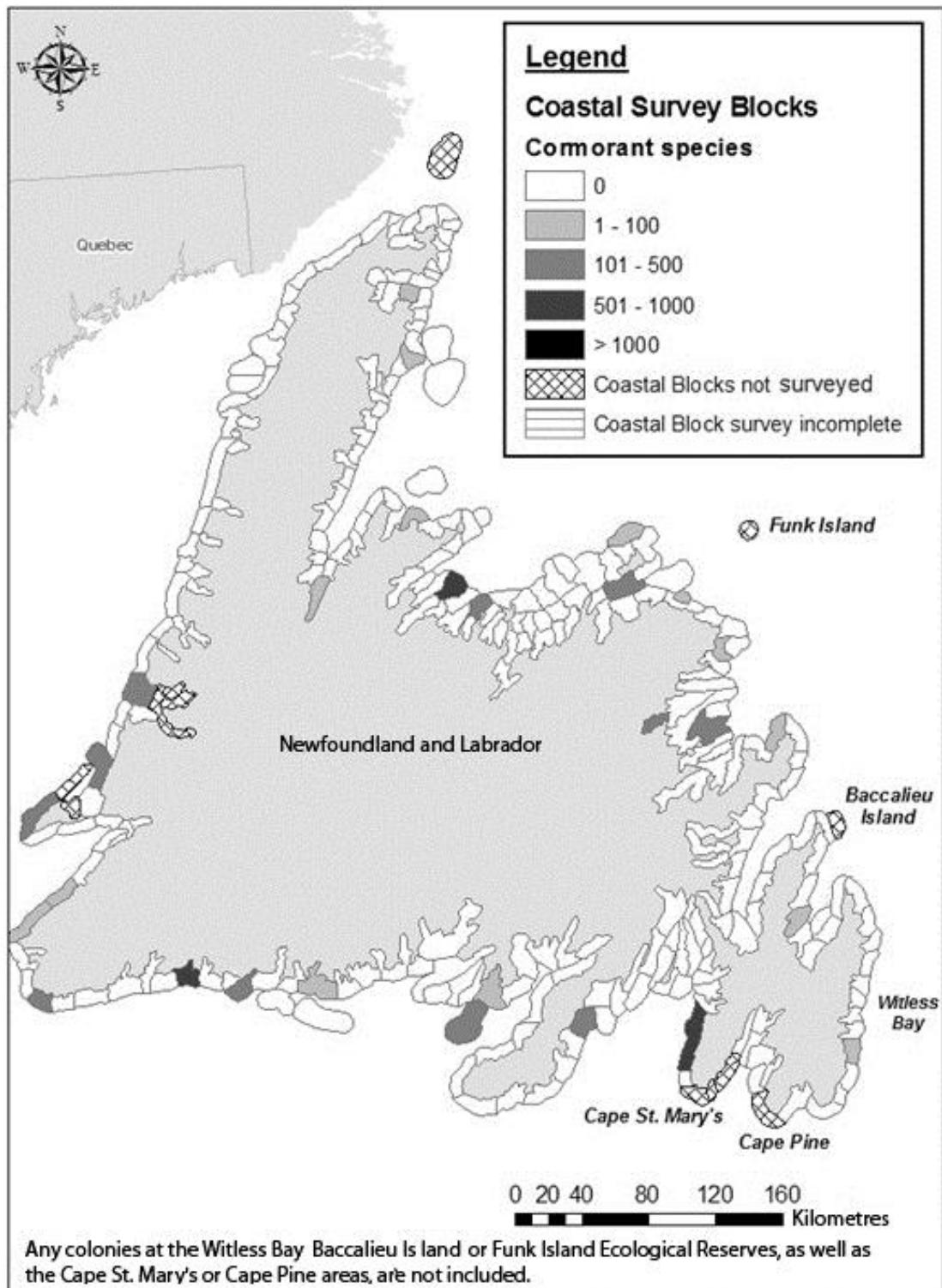


Figure 7. Sum of median counts for cormorant species identified during aerial surveys, per coastal survey block in Newfoundland, 2000–2002. Medians were estimated from quantitative categories of colony size (see methods): small (1–100 individuals), medium (101–500 individuals), large (501–1 000 individuals) and very large (>1 000 individuals).

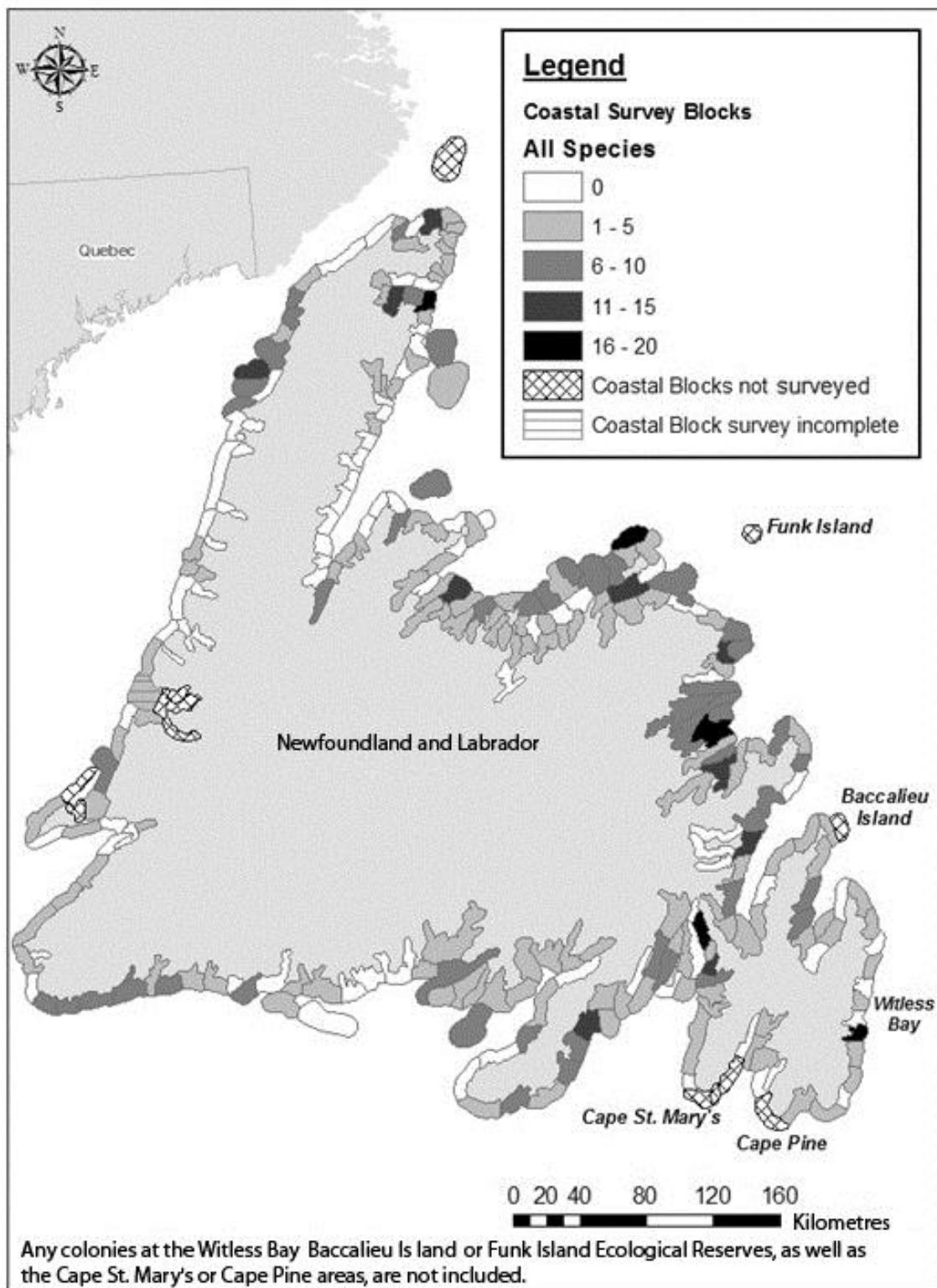


Figure 8. Total colonies identified from aerial surveys for all species combined, indicating coastal “colony hotspots.”

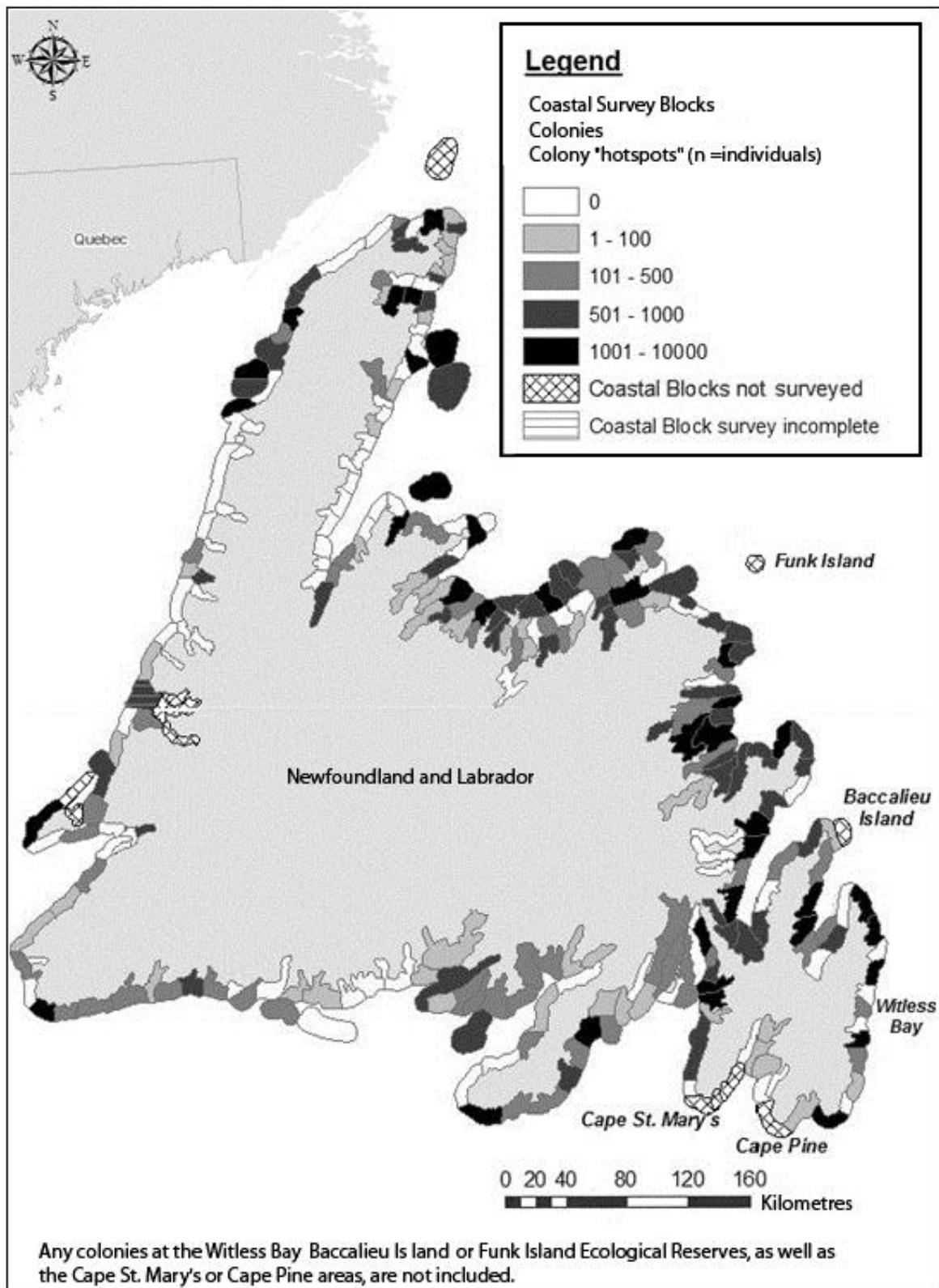


Figure 9. Total individuals counted from aerial surveys for all species combined, indicating overall "hotspots" of bird abundance.

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