

# NEST SITE COMPETITION AND POPULATION ESTIMATES OF ISLAND NESTING COMMON TERNS, RING-BILLED GULLS AND HERRING GULLS IN THE ST. LAWRENCE RIVER

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Interest in colonial waterbirds along the St. Lawrence River has increased in recent years due to proposed winter navigation in the St. Lawrence Seaway and to the increased pollutant load in the river system. The Common Tern (*Sterna hirundo*) and Ring-billed Gull (*Larus delawarensis*) are the most common colonial nesters in low, uninhabited islands in the St. Lawrence River along the New York border. A number of studies have increased our knowledge of the Common Tern (Austin 1949, 1951, 1956; Blokpoel 1977; Haymes and Blokpoel 1978a; Morris and Hunter 1976) and of Ring-billed Gull biology (Ryder *et al.* 1977; Southern 1974; Vermeer 1970). Most of these studies were concerned with marine or freshwater lake colonies. Less information is available on river colonies.

## METHODS

From 5 May to 1 August 1978 visits were made to Ice and Murray Islands, Leeds Co., Ontario, between Chippewa Bay and Morristown, N.Y., to gain data on nest site selection. The 0.17-hectare (56 m x 30 m) Ice Island supported 123 Ring-billed Gull and 126 Common Tern nests. Murray Island, an 0.24-hectare (50 m x 48 m) island supported 43 Common Tern nests. Maximum elevation above the mean river level during the study period at Ice Island was 1.5 m and at Murray Island was 5.4 m. All nests on Ice and Murray Islands were marked by numbered golf tees placed in the ground next to each nest. Visits to river islands from Cape Vincent to Massena, N.Y., were made between 23 May and 22 June to determine the size of the nesting populations of Common Terns, Ring-billed Gulls and Herring Gulls.

## RESULTS AND DISCUSSION

Nest placement on the islands was governed by the intensity of interspecific competition for nest sites. The Common Terns on Murray Island, which were free of competition from gulls, placed their nests increasingly farther from shore as the season progressed. The nests placed in the earliest week of the season were averaged 10.67 m from shore, while those built in the latter part of the season averaged 16.67 m from shore (see Table 1). However, the Common Terns on Ice Island, which had to compete with Ring-billed Gulls, showed an erratic pattern of placement from the edge to the center of the

colony. The early nests were 9.59 m from shore while the latest nests were 4.28 m from shore with erratic mean distances recorded during the total egg laying period. The terns' mean distance from shore for the season was 7.84 m. The gulls, on the other hand, with a mean of 8.87 m from shore, were closer than the terns to the more desirable vegetated portion of the island. Their nests showed a consistent pattern of increasing distance from edge to center while in competition with the terns for those nest sites. We believe that the ability of the gulls to maintain a consistent increase in distance from edge to center in nest siting, in spite of competition from the terns, while the terns could not, indicates a superior competitive advantage for the Ring-billed Gulls over the Common Terns in nest-site selection.

Measurements of the distance between nests were made throughout the nesting season on both islands. Both gulls and terns showed a compression of the nests in the colony as the season progressed and the islands became more crowded. The competition and greater density of gulls and terns on Ice Island caused severe compression of the nests. The mean distance between tern nests was 0.61 m, while the gull nests showed a mean separation of 0.78 m. On Murray Island, where no gulls nested, the tern nests averaged 3.73 m apart (see Table 1). The density of the tern nests on Ice Island was 647 nests per hectare, while the density on Murray Island was 138 nests per hectare. Vermeer (1970) found that Ring-billed Gulls in competition with California Gulls for nest sites on Island A in Miquelon Lake, Alberta, placed the majority of their nests less than one m apart. He believed the more highly competitive California Gulls forced the Ring-billed Gulls closer together.

Visits to 19 islands in Ontario and to 12 islands in New York waters indicate that the Ring-billed Gull was the most common nester on the St. Lawrence River islands in 1978. Strachen Island, Ontario, was the site of 6000 nests, with 316 nesting on 10 other islands (see Table 2). The Common Tern was the next most common breeder, with 513 nests located on 19 islands. Ice Island, Ontario, had 126 of those nests. A small island east of Sheek Island, Ontario, had the next highest concentration of nests, with 88. The Herring Gull had only 68 nests scattered on 17 islands. The largest colony, of 19 nests, was found on Black Ant Island, Ontario.

The number of young being produced on Ice and Murray Islands by the Common Tern and Ring-billed Gull was in the range reported by Haymes and Blokpoel (1978b). The Herring Gulls on Black Ant Island produced no young from 19 nests with eggs. The egg shells seemed fragile and were seen crushed in the nests. Young gulls were

noted in convulsions or were lethargic when approached. On a small island just west of Crossover Island, N.Y., only 7 young fledged from 14 nests and on Griswald and Gull Islands, Ontario, and only 8 young fledged from the 16 nests located on these islands.

Continued censusing of these islands is critical so that changes in the status of the nesting colonial water birds can be assessed. The Herring Gull is in danger from chemical contamination of its food source, the Common Tern from competition with the more aggressive Ring-billed Gull, and all island-nesting species from water-level fluctuations. During periods of high water, ice damage to the island vegetation, which is required by the terns and gulls for nest construction and protection, is a critical concern on the St. Lawrence River. Current ice damage could be exacerbated by winter shipping as proposed by the U.S. Army Corps of Engineers winter navigation season extension. Further studies are needed to understand the requirements for the continued existence of nesting birds on the St. Lawrence River.

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#### LITERATURE CITED

- Austin, O. L. 1949. Site tenacity: A behavior trait of the Common Tern. *Bird-Banding* 20: 1-139.
- Austin, O. L. 1951. Group adherence in the Common Tern. *Bird-Banding* 22: 1-15.
- Austin, O. L. and O. L. Austin, Jr. 1956. Some demographic aspects of the Cape Cod populations of Common Terns. *Bird-Banding* 27: 56-66.
- Blokpoel, H. 1977. Gulls and Terns nesting in northern Lake Ontario and the upper St. Lawrence River. *Canadian Wildlife Service Progress Note* 75: 1-12.
- Haymes, G. T. and H. Blokpoel. 1978a. Seasonal distribution and site tenacity of the Great Lakes Common Tern. *Bird-Banding* 49: 142.

- Haymes, G. T. and H. Blokpoel. 1978b. Reproductive success of larids nesting on the eastern Headland of the Toronto Outer Harbour in 1977. *Ontario Field Biologist* 32: 1-17.
- Morris, R. D. and R. A. Hunter. 1976a. Factors influencing desertion of colony sites by Common Tern. *Canadian Field Naturalist* 90: 137-143.
- Ryder, J. P., D. E. Orr and G. H. Saedi. 1977. Egg quality in relation to nest location in Ring-billed Gulls. *Wilson Bull.* 89: 473-475.
- Southern, W. E. 1974. Seasonal distribution of Great Lakes region Ring-billed Gulls. *Jack-Pine Warbler* 52: 154-179.
- Vermeer, K. 1970. Breeding biology of California and Ring-billed Gulls: a study of ecological adaptations to the inland habitat. *Canadian Wildlife Service Report Series* 12: 1-52.

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TABLE 1

Nest Placement of Gull and Tern Nests on Ice and Murray Islands, Ontario, During 1978.

| Species                        | Clutch Completion Period | N   | Distance from Shoreline (m)<br>Mean $\pm$ SE (range) | Distance between Adjacent Nests<br>Mean $\pm$ SE (range) |
|--------------------------------|--------------------------|-----|------------------------------------------------------|----------------------------------------------------------|
| Ring-billed Gull<br>Ice Island | 5 May - 12 May           | 20  | 7.02 $\pm$ 0.79 ( 2.8-14.9)                          | 0.84 $\pm$ 0.05 (0.40-1.20)                              |
|                                | 13 May - 20 May          | 26  | 9.22 $\pm$ 0.75 ( 3.0-17.0)                          | 0.80 $\pm$ 0.05 (0.30-1.85)                              |
|                                | 21 May - 28 May          | 40  | 9.63 $\pm$ 0.73 ( 2.8-18.0)                          | 0.76 $\pm$ 0.04 (0.40-1.30)                              |
|                                | 29 May - 6 June          | 13  | 8.65 $\pm$ 0.72 ( 5.0-14.0)                          | 0.72 $\pm$ 0.07 (0.50-1.30)                              |
|                                | For Year                 | 99  | 3.77 $\pm$ 0.44 ( 2.8-18.0)                          | 0.78 $\pm$ 0.03 (0.30-1.85)                              |
| Common Tern<br>Ice Island      | 11 May - 17 May          | 29  | 9.59 $\pm$ 0.60 ( 4.0-14.5)                          | 0.65 $\pm$ 0.05 (0.35-1.40)                              |
|                                | 18 May - 24 May          | 52  | 7.56 $\pm$ 0.52 ( 1.4-14.0)                          | 0.58 $\pm$ 0.03 (0.30-1.40)                              |
|                                | 25 May - 31 May          | 7   | 8.90 $\pm$ 1.65 ( 2.3-13.1)                          | 0.57 $\pm$ 0.05 (0.40-0.75)                              |
|                                | 1 June - 7 June          | 10  | 4.80 $\pm$ 0.81 ( 2.2- 8.0)                          | 0.74 $\pm$ 0.08 (0.50-1.20)                              |
|                                | 8 June - 21 June         | 2   | 11.80 $\pm$ 3.11 ( 9.6-14.0)                         | 0.53 $\pm$ 0.11 (0.45-0.60)                              |
|                                | 22 June - 5 July         | 6   | 6.63 $\pm$ 0.71 ( 3.8- 8.1)                          | 0.58 $\pm$ 0.10 (0.40-1.00)                              |
|                                | 6 July - 26 July         | 4   | 4.28 $\pm$ 0.96 ( 2.1- 6.0)                          | 0.48 $\pm$ 0.03 (0.40-0.50)                              |
|                                | For Year                 | 110 | 7.74 $\pm$ 0.35 ( 1.4-14.5)                          | 0.61 $\pm$ 0.02 (0.30-1.40)                              |
| Common Tern<br>Murray Island   | 14 May - 18 May          | 10  | 10.67 $\pm$ 1.27 ( 7.0-19.0)                         | 3.99 $\pm$ 0.56 (2.20-7.30)                              |
|                                | 19 May - 23 May          | 9   | 10.93 $\pm$ 1.57 ( 5.2-17.0)                         | 4.37 $\pm$ 0.36 (2.65-5.50)                              |
|                                | 24 May - 2 June          | 5   | 11.20 $\pm$ 3.05 ( 5.0-19.0)                         | 3.52 $\pm$ 0.90 (1.60-5.50)                              |
|                                | 3 June - 12 June         | 6   | 13.83 $\pm$ 2.05 ( 9.0-22.0)                         | 3.07 $\pm$ 0.73 (1.60-5.50)                              |
|                                | 13 June - 27 June        | 3   | 16.67 $\pm$ 2.48 (13.0-20.0)                         | 2.87 $\pm$ 0.10 (2.70-2.95)                              |
|                                | For Year                 | 33  | 11.94 $\pm$ 0.82 ( 5.0-22.0)                         | 3.75 $\pm$ 0.26 (1.60-7.30)                              |

TABLE 2

Active colonial waterbird nests along the St. Lawrence River from Cape Vincent to Massena during 1978<sup>a</sup>.

| Dates              | Area                           | UTM Coordinates <sup>b</sup> | Herring Gull | Ring-billed Gull | Common Tern     |
|--------------------|--------------------------------|------------------------------|--------------|------------------|-----------------|
| 26 May; 7, 16 June | Black Ant Isl., Ont.           | 4054, 49010                  | 19           | 131              | 12              |
| 26 May; 7, 16 June | Bass Isl., Ont. (Seven Pines)  | 4075, 49041                  | 0            | 0                | 2               |
| 26 May; 7, 16 June | Rock S. of Bass Isl. (Ont.)    | 4075, 49040                  | 1            | 0                | 0               |
| 26 May; 7, 16 June | Scorpion Isl., Ont.            | 4115, 49078                  | 1            | 1                | 1               |
| 26 May; 7, 16 June | Rock W. of Scorpion Isl., Ont. | 4114, 49078                  | 1            | 0                | 9               |
| 26 May; 7, 16 June | Rock S. of Scorpion Isl., Ont. | 4117, 49077                  | 1            | 2                | 18              |
| -                  | Eagle Wing Group, NY           | 4119, 49004                  | 0            | 0                | 75 <sup>c</sup> |
| 26 May; 1, 9 June  | Gull Island, NY                | 4146, 49015                  | 1            | 0                | 0               |
| 26 May; 1, 9 June  | Hickey Isl., Ont.              | 4147, 49102                  | 0            | 0                | 1               |
| 25 May; 4, 16 June | Channel Isl., Ont.             | 4311, 49210                  | 0            | 0                | 8               |
| 23, 30 May; 9 June | Lone Brother Isl., NY          | 4323, 49172                  | 2            | 0                | 0               |
| May, June, July    | Ice Isl., Ont.                 | 4335, 49229                  | 1            | 123              | 126             |
| 23, 30 May; 9 June | Little Corn Isl., Ont.         | 4343, 49220                  | 1            | 0                | 0               |
| 23, 31 May; 4 June | Griswold Isl., Ont.            | 4347, 49237                  | 8            | 0                | 0               |
| 23, 31 May; 4 June | Gull Isl., Ont.                | 4348, 49229                  | 8            | 0                | 0               |
| 23, 31 May; 9 June | Renny Isl., Ont.               | 4359, 49251                  | 1            | 0                | 0               |
| 23, 30 May; 4 June | W. Crossover Isl., NY          | 4379, 49268                  | 14           | 0                | 0               |
| 1, 9, 16 June      | Navigation Light 156, NY       | 4385, 49282                  | 1            | 0                | 0               |
| 1, 9, 16 June      | Whaleback Isl., NY             | 4391, 49281                  | 1            | 0                | 28              |
| 23 May; 1, 9 June  | E. Whaleback Isl., NY          | 4394, 49281                  | 2            | 0                | 0               |

| Dates                | Area                              | UTM Coordinates <sup>b</sup> | Herring Gull | Ring-billed Gull | Common Tern |
|----------------------|-----------------------------------|------------------------------|--------------|------------------|-------------|
| May, June, July      | Murray Isl., Ont.                 | 4474, 49378                  | 0            | 1                | 43          |
| 1, 9, 16 June        | Bogardus Isl., NY                 | 4477, 49377                  | 0            | 0                | 3           |
| 24 May; 9, 21 June   | Big Murphy Isl., NY               | 4868, 49705                  | 0            | 0                | 17          |
| 24 May; 9, 21 June   | Little Murphy Isl., NY            | 4873, 49706                  | 0            | 4                | 4           |
| 24 May; 9, 21 June   | Navigation Light 58, NY           | 4995, 49773                  | 0            | 0                | 75          |
| 24 May; 10, 22 June  | Long Sault Isl., NY               | 5078, 49817                  | 0            | 5                | 0           |
| 24 May ; 10, 22 June | Small isl. w. of Sheek Isl., Ont. | 5110, 49843                  | 0            | 0                | 1           |
| 24 May; 10, 22 June  | W. Bergin Isl., Ont.              | 5112, 49847                  | 0            | 40               | 1           |
| 24 May; 10, 22 June  | Bergin Isl., Ont.                 | 5113, 49849                  | 0            | 2                | 1           |
| 24 May; 10, 22 June  | Small isl. e. of Sheek Isl., Ont. | 5128, 49848                  | 0            | 7                | 88          |
| 24 May; 10, 22 June  | Strachen Isl., Ont.               | 5149, 49851                  | 5            | 6000             | 0           |

a — Nest counts made on the ground during site visits.

b — Refer to U.S. Geological Survey 7.5 minute topographical maps.

c — Personal correspondence with Edward Waltz.