THE CURRENT BREEDING STATUS OF THE COMMON TERN IN THE INTERNATIONAL SECTOR OF THE ST. LAWRENCE RIVER, EASTERN LAKE ONTARIO AND ONEIDA LAKE

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Common Tern *(Sterna hirundo)* colonies from Long Island to Cape Cod have been studied for many years (Austin 1949, 1951, 1953; Buckley *et al.* 1980; Gochfeld 1974a, 1974b, 1976; Nisbet 1973, 1978). These studies provide information on the breeding biology and population dynamics of this species in North America.

In contrast, Common Tern breeding populations in upstate New York and the adjacent waters of the St. Lawrence River in Ontario have rarely been investigated. Only since the mid-1970s have investigators begun to survey these populations. These efforts have been stimulated by evidence of a severe decline in these populations in the last twenty-five years.

The purposes of this paper are to review the local historical status of the species, present evidence of decline, provide the results of the first region-wide population survey ever conducted, consider factors contributing to reproductive failure elsewhere and their applicability to the local situation, and suggest protection, research and management options that should be undertaken in the immediate future.

HISTORICAL STATUS

Little information is available on breeding Common Terns in this region prior to 1915. Eaton (1910) indicated the species was rare in upstate New York although he suggested breeding had occurred on Lake Erie in the past. It is reasonable to assume a breeding population existed in this area in the latter part of the 19th century. Eaton's assessment of the species' status is based primarily on information from the period 1875-1910. During this period the species was at a low ebb, caused by the slaughter for the millinery trade (Brewster 1879; Nisbet 1973, 78). Given the great reduction in populations and the small number of ornithologists, the remaining breeding colonies could easily have been overlooked.

The first confirmed reports of tern colonies in this region date from between 1915-1930 (Merwin 1918; Stoner 1932). During this period large colonies were reported in the upper St. Lawrence River and the species became established on the islands of Oneida Lake. These records coincide with the rapid recovery of Atlantic coast populations, which resulted in peak numbers for this century during the early 1900s (Drury 1973-74; Nisbet 1978). Information for the next two decades locally is limited to scattered reports primarily from the colonies on Oneida Lake (Burtch 1936, 1941).

From the late 1940s to the early 1960s several observers documented the existence of large colonies in this region. Very large colonies were noted at Little Galloo Island and Sandy Pond in eastern Lake Ontario (Belknap 1968; Bull 1974; F. G. Scheider, pers. comm.). Colonies were also present in the western St. Lawrence River (Quilliam 1973) and undoubtedly substantial numbers bred elsewhere. Scattered visits to the Oneida Lake colonies by several observers indicated they were stable with good populations. Although these data are incomplete, they indicate that a large breeding population existed in this region during the 1950s and early 1960s. Data from recent surveys compared to these data indicate a substantial decline has occurred since then.

EVIDENCE OF DECLINE

Evidence of decline is provided by comparing recent findings with information provided by Bull (1974). He recorded 14 colonies in the Finger Lakes, Onondaga Lake, Lake Ontario, Oneida Lake and the St. Lawrence River. In addition, scattered information is available from regional reports in *The Kingbird* for various years. These data suggest a minimum estimate of 2,000 pairs breeding in these waters. It is reasonable to assume that a minimum of 500 pairs was present in the unsurveyed waters of the St. Lawrence River. Therefore, we suggest that a minimum of 2,500 pairs was present in this region in the recent past. It is likely that these figures are conservative.

Quilliam (1973) also supports the idea of a decline in the Common Tern population nesting in Canadian waters of the western St. Lawrence River. In addition the complete disappearance of all large colonies from this region further supports the idea of decline.

Evidence of decline in this area is consistent with trends observed in breeding populations in other parts of the species' North American range. Investigators on the four western Great Lakes have reported poor reproductive success and population declines (Harris and Matteson 1975; Morris and Hunter 1976a, 1976b; Scharf 1981; Shugart and Scharf 1981). Similar difficulties have been reported on the Atlantic coast, notably in the massive colonies of the Cape Cod region (Nisbet 1978). The only major exception to this pattern of decline in the northeast and north-central regions are the colonies of the Long Island region (Gochfeld 1974a, 1974b, 1976).

The reasons for this widespread decline are complex, varied and often unclear. Reproductive failure is assumed to be the primary cause of decline in many areas. Nisbet (1978) indicates that he does not believe the declines in Cape Cod colonies are due primarily to reproductive problems. The effects of factors at work during migration and on the wintering grounds are unknown, but their impact may be substantial. Although the reasons for decline in many regions remain obscure, it is clear a serious decline is occurring in Common Tern populations in much of this species' North American breeding range.

RECENT POPULATION SURVEYS

Common Tern colonies in this region are grouped in five sectors. Areas between these are generally devoid of colonies and observations indicate that feeding and resting terns are much less frequent than in regions with colonies. The five colony sectors are: 1) the western section of Oneida Lake near Constantia, Oswego County; 2) the North Pond region of northern Oswego County at the east end of Lake Ontario; 3) the western St. Lawrence River region around Grindstone Island from just east of Clayton, New York, to Gananoque, Ontario; 4) the central St. Lawrence River between Chippewa Bay and Morristown, New York, on the south and Mallorytown Landing and Brockville, Ontario, on the north; 5) the eastern St. Lawrence River between Waddington, New York, and Cornwall, Ontario.

Concern over the local population decline of the Common Tern has stimulated survey and research efforts since the mid-1970s. The first systematic survey of Common Terns breeding in this region was conducted in Canadian waters of Lake Ontario and the St. Lawrence River in 1976 by Blokpoel (1977). Beginning in 1977 the authors conducted surveys along the international section of the river during the next three summers. In 1978 survey efforts were most intense and studies of basic breeding biology of Common Terns were conducted at two colonies in Ontario waters (Maxwell and Smith 1983a, 1983b). From the mid-1970s through the present Johannes Van Riet of Massena, New York, has regularly visited several colonies between Waddington, New York, and Cornwall, Ontario, in the eastern section of the St. Lawrence River. From the late 1970s to the present, Bud Andress, Don Ross and Tom Hince of the St. Lawrence Islands National Park, Ontario, have collected data from colonies in Canadian waters of the St. Lawrence River between Gananoque and Brockville, Ontario.

The colonies at Oneida Lake have been studied intensively in recent years by Lucia Severinghaus, Russ Charif, Laurie Miller and John Confer (see Miller and Confer 1982). All of these efforts have greatly increased the data base on Common Tern local colonies. Still a systematic region-wide one-year survey was lacking. The current effort was developed to fill this void and to update available data.

The 1982 survey visited all known Common Tern breeding colonies in this region. In addition, a search for unknown colonies was conducted along the upper St. Lawrence River where it was deemed most likely that undetected colonies might exist. All colonies were visited 3 to 5 times at 10 to 14-day intervals from late May to late July. During most visits counts of adults, numbers of nests, eggs per nest, numbers of chicks and fledged immatures were recorded. Occasionally counts were not made, to minimize disturbance in the colonies. At these times counts of flying adults, immatures, chicks, and general observations were made.

These data in combination with population estimates provided by Russ Charif (pers. comm.) for the Oneida Lake colonies give a fairly complete picture of breeding populations in 1982 in eastern Lake Ontario, the St. Lawrence River, and Oneida Lake. The maximum total of 591 nests recorded in U.S. waters of eastern Lake Ontario and the St. Lawrence River plus the approximatey 400 nests on Oneida Lake indicate a population of no more than 1,000 pairs. This figure is approximately 40% of the minimal population estimate of a quarter of a century ago. Clearly there has been a substantial decline in breeding populations in this region.

Of the 14 regional colonies listed by Bull (1974), three are present at the same or nearby sites. The fate of two others on Cayuga Lake is unknown, and the remainder have been abandoned. Only the Oneida Lake colonies remain at their sites at population levels similar to those of past years. This is particularly disturbing as these colonies are stressed by a gull invasion and other difficulties. The colonies listed by Bull that have been abandoned are: Lonesome Bay in Black Lake, St. Lawrence County; island in Eel Bay and Featherbed Shoals, both in the St. Lawrence River, Jefferson County; Point Peninsula, Gull Island, and Little Galloo Island, all in Lake Ontario, Jefferson County; and Onondaga Lake, Onondaga County. Two colonies listed by Bull, in addition to the colony on Oneida Lake, are still occupied. The colony at Eaglewing Rocks (herein Eaglewing Islands) in the St. Lawrence River, Jefferson County, still exists. The colony at North Pond-Sandy Pond, Oswego County, is much reduced and now occupies a small island in the pond rather than the sand spit location of earlier years.

Recent surveys have recorded colonies on the St. Lawrence River not recorded by Bull (1974). These are on Gull and Tidd Islands in Jefferson County. The St. Lawrence County colony sites are on the following islands: Bogardus, Northeast Long Sault, Big and Little Murphy, Old Man, Whaleback, and Brockville Rocks. Colonies were also located on navigation marker platforms, platform east of #57, 57, old 58, 73, 75, 79, 91 and 154. Some of these sites have been active during all surveys while others have been used only irregularly for nesting. Robert Long (pers. comm.) indicates that Common Terns bred on small islets in Morristown Bay, New York, at various times between 1950 and 1975. He also quotes Joe McDonald, a resident of Morristown, New York, as stating that he observed Common Terns nesting on Old Man Island near Morristown prior to the establishment of a summer cottage there in 1950. Apparently recent abandonment of this structure has permitted reestablishment of a colony there. John Brown (pers. comm.) of Rochester, New York, recalls that a Common Tern colony was present on Tidd Island, Jefferson County, during the 1960s. This colony may have been overlooked by us during early surveys and was not discovered until 1982. Our survey found the following colonies

present on the following Ontario islands: Bass, Bass Rock, Black Ant, Channel, Ice, Murray, Scorpions, East Sheek, West Sheek, and on shoals south of Stovin Island and east of Sheaffle Island.

The locations of all Common Tern colonies located between 1975 and 1982, and their annual breeding status are presented in Table 1. Data on the 1982 population status of the 20 active colonies are provided in Table 2. These data indicate that the mean number of active nests per colony was 29.55. The mean number of observed adults per colony was 45.95. The mean number of chicks per colony was 14.84 and the mean number of fledged young per colony was 8.5. The total population produced an average of .48 chicks and .29 fledged immature per active nest. These data indicate that Common Terns did not have a good reproductive season in this region in 1982.

All colonies in the region are located on small islands, except for eight colonies located on support platforms for navigation marker lights. This type of site has not previously been recorded in the literature and may be unique to this region. These sites are 7-meter square concrete platforms 3 meters above the surface of the water. They are covered with varying amounts of gravel and/or soil and vegetation. These sites have been increasing in importance to nesting terns in eastern sectors of the river in recent years.

FACTORS AFFECTING REPRODUCTIVE SUCCESS

Factors affecting reproductive success include competition with gulls for nest sites (Courtney and Blokpoel 1980), human disturbance, vegetational succession, and predation (Morris and Hunter 1976a, 1976b; Erwin 1980). In this region and throughout the Great Lakes, breeding populations are being adversely affected by a massive population explosion of Ring-billed Gulls. The most serious impact of gulls on terns is nest-site competition. The gulls have an advantage in this struggle due to their larger size and 4- to 6-week earlier arrival on the breeding grounds. This competition is being intensified due to the destruction of nesting sites by exploding human populations.

During the past 25 years several local tern colonies have been eliminated by gull encroachment. These include the largest colony in this region, formerly located at Little Galloo Island. In the past four years several colonies in the St. Lawrence River have been overrun. Several colonies, including the only remaining colony in U.S. waters of Lake Ontario, are being invaded by gulls and could be eliminated in the near future.

Tern colonies throughout much of North America are being adversely affected by human activities. These include urbanization and recreational development (Gochfeld 1974a, 1974b), intentional disruption (Gochfeld 1976), toxic chemical pollution, and fluctuations in "regulated" water levels.

In this region several human activities are adversely affecting tern colonies. One of the most serious of these is the encroachment of human recreational activities at colony sites. The second largest colony in the region, at Sandy Pond (Bull, 1974), was eliminated by recreational pressures including four-wheel drive vehicles, airplanes landing, and excessive pedestrian traffic (F. G. Scheider, pers. comm.). A long-occupied colony at Black Ant Island, Ontario (Quilliam 1973), was recently abandoned when cottagers moved onto the island. On several occasions we have observed disruption of colonies by fish frys, beer parties and overnight camping expeditions. These activities cause losses of eggs and chicks by exposure and predation.

Sportfishing activities cause problems at colonies. Fishing from or near the colonies contributes to stress in colonies already exposed to other disturbance. Another adverse effect related to sportfishing is direct mortality due to entanglement in lost lures and lines. Nickel (1964) noted the loss of 6 adults and 4 chicks to lost lures and lines at a colony on Lake Erie. We have seen entanglement losses of adult terns in local colonies on several occasions. The recent large increase in sportfishing in the region gives cause for concern over the potential increasing impact of this problem.

Toxic chemicals may be of importance, considering the contaminants present in Lake Ontario and the St. Lawrence River. Descriptive information on the presence of some chemicals in terns is available (Gilbertson and Reynolds 1972) but data on effects of these pollutants are lacking.

The quality of tern colony sites has been shown to effect overall reproductive success (Erwin 1980). In many areas terns are being eliminated from preferred nesting areas, such as sand dune and beach, by human and gull pressures. Terns being forced to nest at more marginal and often untenable sites, such as salt marsh islands, often regularly experience reproductive failure (Erwin 1980). Some of these sites are clearly unsuitable from the standpoint of reproductive success but apparently are the best the birds can find. An example of a very marginal site is Whaleback Island, New York. This barren rock island has been occupied for the duration of our surveys. The terns nest in lichen-fringed hollows in solid rock. Because these hollows lack soil and vegetation and are poorly drained, they flood during moderate rainstorms. Losses of eggs and chicks because of exposure and immersion are consistently high. Yet a slowly declining colony still persists here.

There is evidence that large tern colonies experience better reproductive success than small colonies. Several authors (Austin 1951, Gochfeld 1974a, 1974b) suggest that where conditions permit terns tend to consolidate into larger colonies rather than remain in small colonies. It has been suggested that increased colony stability and reproductive success result from consolidation into larger colonies.

The elimination of most of the large Common Tern colonies in this region has resulted in dispersal of the remaining population into small colonies. This dispersal may be contributing to reproductive failure and population decline through reduced social stimulation and increased vulnerability to gull encroachment and predation. The effects of this dispersal on local populations are not clear, and small colonies do experience good reproductive success on occasion. The small colony at Channel Island, Ontario, has experienced good success often during our surveys, while the much larger colony at nearby Ice Island was having poor success.

Conditions of vegetation at colony sites appear to be of great importance to Common Terns. Excessive vegetation at colony sites increases vulnerability to some predators, increases chick mortality and may cause colony abandonment. (Austin 1948, Switzer *et al.* 1971, Blokpoel 1976 and Scharf 1981). Some vegetation at colony sites is important (Blokpoel 1976) and apparently has value in providing shelter from the elements and predators for chicks. As a consequence of being forced to nest at more marginal sites in this region, terns are experiencing problems due to vegetation succession. Under natural fluctuating water levels, periodic cycles of high water would have washed over islands and retarded or reversed vegetation succession. These forces would have provided a variety of sites at the correct successional stage for tern nesting in many parts of the region. Control of water levels by man and the forcing of terns to nest in marginal sites results in terns nesting in areas where vegetation succesion is more rapid. Succession can render sites unsuitable, further limiting the already scarce resource of available nest sites. The Murphy Islands near Coles Creek, New York, have lost their tern colonies probably due to vegetational changes. On Carl Island, increasing vegetation density is causing problems for adults and chicks, including mortality of the latter due to entanglement.

The unique nature of colony sites on navigation markers in the St. Lawrence River has also created some unique problems for terns nesting there. The most serious problem is loss of large chicks and nearly fledged immatures caused by premature abandonment due to human disturbance. At critical times in the nesting cycle human visits to these sites cause young terns to jump into the river from the platform. Since the colony site is several feet above the surface of the water these birds cannot return to the platform without human help. Failure of visitors to replace chicks on the platform results in large losses of young.

Predation at tern colonies causes losses of adults, chicks and eggs and causes severe disruption of reproductive behavior. Activities of nocturnal predators, notably the Great Horned Owl, can cause "night desertion" (Marshall 1942, Morris and Hunter 1976a). This phenomenon is characterized by the nocturnal abandonment of a colony by adults in contrast to the normal close nocturnal incubation and brooding

behavior of the species. Night desertion leaves eggs and chicks vulnerable to exposure and increased predation, and may result in reproductive failure. There is evidence that Great Horned Owls are causing serious problems at tern colonies in several areas, notably in the western St. Lawrence River. Edward Waltz (pers. comm.) noted, during his studies on the Eaglewing Islands in the late 1970s, that predation by Great Horned Owls caused mass chick mortality and night desertion. Our observations in 1982 suggest that this important colony is still being raided by owls. At several other colonies in this sector we noted the presence of owl feathers and decapitated adult terns—suggestive evidence of owl predation.

RESEARCH AND MANAGEMENT NEEDS

There is little doubt that Common Tern breeding populations in this region are suffering a severe, long-term decline. In our opinion, unless efforts are made to arrest and reverse this decline the species may disappear as a breeder in the region during the 1990s. A cooperative effort between government agencies, private organizations, and individuals is needed. These efforts should include endeavors in surveying, research, management and public education.

The survey efforts of recent years are an initial step in this process. The regional survey begun in 1982 should be continued annually for the foreseeable future. This baseline population monitoring survey can provide a needed assessment of the breeding status of the species in the region and develop information on threats to colonies. Continuation of these surveys must be of primary concern.

During recent years other initial steps have been taken to help preserve the Common Tern in this region. The listing of the species as officially threatened in New York State by the Department of Environmental Conservation will focus increased attention on its problems. In 1982 the senior author, under the auspices of the Onondaga Audubon Society, called a meeting of persons interested in terns in this region. This meeting, held at St. Lawrence Islands National Park, Ontario, on 22 September, was attended by participants from various agencies and organizations in the U.S. and Canada. At the meeting the Upper St. Lawrence Tern Working Group was formed. This group will serve as a cooperative coordination and advisory body on matters related to terns in this region. Primary thrusts of the group's efforts will be continuing documentation of breeding status, coordination and advisement on survey and research efforts to minimize investigator-caused disruptions, identification of problems facing breeding terns and seek solutions, and facilitation of cooperative endeavors between all interested in terns in the area of concern.

These are important first steps but there is a critical need for more and immediate action on a number of problems. While long-term monitoring and research is continued, management activities should

be instituted. In the short term (one to six years) we suggest a coordinated program of surveys, research designed to assess specific problems and develop solutions and experimental management. We believe such an approach would relieve some of the pressure on local breeding populations, increase reproductive success and buy additional time to reverse the decline and institute long-term management planning efforts.

We suggest several priority efforts:

1) Continuation of the baseline population monitoring survey for at least ten years.

2) Development of a list of owners of all current and recently occupied colony sites. These persons should be contacted and appraised of the important wildlife value of their land. Efforts should be made to seek their cooperation and participation in protection and management efforts in order to develop increased interest among owners in the stewardship of these colonies.

3) Legal protection for major colony sites. This could be done through purchase or gift to a conservation organization or agency. If this is not possible attempts should be made to obtain a conservation easement or other legal protection for these sites.

4) A widespread survey of potential manageable colony sites along the St. Lawrence River should be conducted and the results compiled for future action.

5) Efforts to increase the number of suitable nesting sites, clearly a limiting factor to breeding success efforts. Experimental management efforts such as vegetation control should be attempted at currently abandoned sites and other suitable sites near existing colonies. Tern decoys may induce terns to nest at these sites.

6) Studies of the feasibility of Ring-billed Gull control at critical sites. Although gull control is undesirable there may be a need for this in some circumstances.

7) A thorough study of all aspects of Great Horned Owl-Common Tern interactions at breeding colonies, with consideration of live trapping and deportation of raiding owls.

8) Attempts at vegetation management at a limited number of extant sites where information suggests a critical need exists, such as Whaleback Island.

9) Initiation of widespread public education programs in regions with colonies, particularly along the St. Lawrence River, to increase the public's awareness of an appreciation for terns.

We believe this effort can have positive effects on increasing the possibilities of long-term survival of Common Tern breeding populations in this region at limited cost. At present that survival is very much in doubt. All persons interested in these birds must make an effort to help assure their survival in our region.

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TABLE 1

Common Tern Colony Sites in the International Section of the St. Lawrence River, U.S. Waters of Lake Ontario and Oneida Lake 1975-1982

Site Name	Latitude (nearest 15")	Longitude (nearest 15")	Location(a)	Active(b)
Bass Island, Ont.	44-17-15	76-09-30	SLR	76,78
Bass Island Rock, Ont.	44-17-15	76-07-30	SLR	76
Black Ant Island, Ont.	44-15-30	76-11-15	SLR	78,79
Bogardus Island, NY	44-35-30	75-39-30	SLR	77,78,79,80
Brockville Rock, NY	44-35-45	75-40-45	SLR	76,77
Carl Island, NY	43-40-00	76-11-00	LO	75,76,77,78,79,80, 81,82
Channel Island, Ont.	44-26-30	75-52-00	SLR	76,77,78,79,80, 81,82
Eaglewing Islands, NY	44-15-00	76-06-00	SLR	76,77,78,79,80, 81,82
Gull Island, NY	44-15-45	76-04-15	SLR	82
Ice Island, Ont.	44-27-30	75-50-00	SLR	76,77,78,79,80, 81,82
Little Corn Island, Ont.	44-27-00	75-49-30	SLR	78
Northeast Long Sault Island, NY	44-49-15	74-54-00	SLR	76,77
Big Murphy Island, NY	44-53-30	75-10-00	SLR	77,78,79,80,81
Little Murphy Island, NY	44-53-30	75-09-45	SLR	77,78,79,80,81
Murray Island, Ont.	44-35-45	75-39-45	SLR	76,77,78,79
Nav. Light E. of Light 57, NY	44-57-15	74-59-30	SLR	82
Nav. Light 57, NY	44-57-15	74-59-45	SLR	77,81,82
Old Nav. Light 58, NY	44-57-00	75-00-30	SLR	76,77,78,79,80, 81,82
Nav. Light 73, NY	44-55-30	75-05-15	SLR	80,81,82
Nav. Light 75, NY	44-15-15	75-07-00	SLR	81,82
Nav. Light 79, NY	44-55-00	75-08-00	SLR	80,81,82
Nav. Light 91, NY	44-52-45	75-11-45	SLR	81,82
Nav. Light 56, NY	44-30-30	75-46-15	SLR	79,80?,81?,82
Old Man Island, NY	44-34-30	75-40-30	SLR	82
Oneida Lake Islands, NY	43-15-00	76-00-00	OL	75,76,77,78,79, 80,81,82
Scorpion Islands, Ont.	44-19-00	76-06-30	SLR	78,79,80,81
Shoal S. of Stovin Island, Ont.	44-33-15	75-42-45	SLR	76,82
Shoal E. of Sheaffle Island, Ont.	44-32-45	75-43-00	SLR	82
Shoal W. of Indian Chief Islands, NY	44-28-00	75-48-15	SLR	79
East Sheek Island, Ont.	45-01-15	74-50-15	SLR	76,77,78,79,80, 81,82
West Sheek Island, Ont.	45-00-30	74-52-15	SLR	77,79,80,81,82
Tidd Island, NY	44-16-30	76-02-30	SLR	82
Whaleback Island, NY	44-30-30	74-45-45	SLR	77,78,79,80?, 81?,82

Key: a: SLR = St. Lawrence River; LO = Lake Ontario; OL = Oneida Lake.
b: 76,78 = colony active in 1976 and 1978, etc.

TABLE 2

Summary of Status of Common Tern Colonies in U.S. Waters of Lake Ontario, the International Sector of the St. Lawrence River and Oneida Lake in 1982

Colony	Nests/Date[a]	Ads/Date[a]	Chicks/Date[a]	Imm./Date
Carl Island	100/3 June	120/3 June	23/17 June	16/15 July
Channel Island	19/9 June	30/Several dates	23/28 June	24/13 July
Eaglewing Island	54/14 June	75/14 June	2/Several dates	0
Gull Island	21/28 June	26/13 July	1/28 June-13 July	0
Ice Island	83/9 June	150/14 June	14/14 June	3/28 June
Nav. Lt. E. of Lt. 57	1/30 May	1/30 May	0	0
Nav. Lt. 57	6/30 May	14/30 May	11/15 June	2[b]
Old Nav. Lt. 58	88/30 May	100/25 May-15 June	119/15 June	24[b]/13 July
Nav. Lt. 73	27/31 May	50/31 May	18/15 June	10[b]/13 July
Nav. Lt. 75	20/25 May	40/25 May	25/15 June	11[b]/13 July
Nav. Lt. 79	4/13 July	16/13 July	4/13 July	0
Nav. Lt. 91	1/31 May	2/31 May	0	0
Nav. Lt. 156	37/25 May	72/25 May	21/15 June	20/28 June
Old Man Island	25/15 June	30/Several dates	8/15 June	0
Oneida Lake	400/season[c]	---	---	---
Shoal S. of Stovin Island	7/15 June	14/15 June	0	0
Shoal E. of Sheaffle Island	2/29 June	4/29 June	0	0
East Sheek Island	10/25 May-15 June	20/Several dates	12/15 June	0[b]
West Sheek Island	56/30 May	100/Several dates	d	60/23 July
Tidd Island	23/28 June	30/28 June	1/13 July	0
Whaleback Island	7/15 June	25/25 May	0	0
Total Maximum	591	909	282	170[b]

Key

a = all seasonal maximum
b = these figures may be low due to lack of a late June visit to the eastern sector of the river
c = approximate figure
d = chick counts not obtained due to the extremely hazardous nature of landing on this island.