

# Terns Nesting in Boston Harbor: The Importance of Artificial Sites

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Terns are familiar coastal birds in Massachusetts, nesting widely, but they are most numerous from Plymouth southwards. Their numbers have fluctuated over the years, and the history of the four principal species was compiled by Nisbet (1973 and in press). Two of these have nested in Boston Harbor: the Common Tern (*Sterna hirundo*) and the Least Tern (*S. albifrons*). In the late nineteenth century, the numbers of all terns declined profoundly throughout the Northeast because of intensive shooting of adults for the millinery trade (Doughty 1975), reaching their nadir in the 1890s (Nisbet 1973). Subsequently, numbers rebounded and reached a peak in the 1930s, declined again to the mid-1970s, then increased into the 1990s under vigilant protection (Blodget and Livingston 1996).

In contrast, the first terns to nest in Boston Harbor in the twentieth century were not reported until 1968, and there are no records from the 1930s, when the numbers peaked statewide. For much of their subsequent existence the Common Terns have depended upon a sequence of artificial sites. This unusual history is the subject of this article. For successful breeding, terns require both an abundant food supply and nesting sites safe from predators. Islands in estuaries can be ideal in both respects, and it is likely that terns were numerous in Boston Harbor in early times. There is no direct evidence for — or against — this surmise, but one of the former islands now lying beneath Logan Airport was called Bird Island (Fig. 1) and, like others similarly named, may well have been the site of a tern colony in colonial times. This island was shown on seventeenth- and eighteenth-century maps.

This long absence of nesting terns from Boston is attributable to rats, which are notorious predators on eggs and chicks of small seabirds worldwide. Norway rats (*Rattus norvegicus*) have been widespread on the Boston Harbor Islands, and they caused terns to abandon Snake Island in 1974 (see below). In addition, some islands have been occupied by Herring Gulls (*Larus argentatus*) and Great Black-backed Gulls (*L. marinus*), so that no nesting sites reliably free of predators have been available until the recent appearance of artificial islands in the form of abandoned and derelict wooden docks that have lost their connection to the land. Such sites provide safety from rats and other ground predators, but are ill-suited for chicks which generally fall to their deaths in the water.

The information reported here is a compilation of observations gathered by the author and assistants, or records obtained from the State Ornithologist, Massachusetts Division of Fisheries and Wildlife. Numbers of nesting pairs were generally derived from nest counts shortly before the first eggs hatched, or from estimates of flying adults at sites that were inaccessible for nest counts.

## Common Terns

The annual totals for nesting Common Terns have fluctuated substantially. In the 1970s most reports were of fewer than 200 pairs (although 360 were reported in 1974). From 1985 to 1994 there were over 300 pairs each year, with a maximum of 630 in 1991. In the late 1990s there were fewer than 200 pairs, but the number increased to 330 in 1999, and 245 in 2000. Some fluctuations are caused by incomplete censuses, as when a new site is occupied late in the season and perhaps is unrecognized for several years, but most of these were probably the result of movements between colonies over a wider range.

## Colony sites

The sites used repeatedly by Common Terns for nesting in Boston Harbor include one island, four derelict wooden docks, and one nesting platform constructed

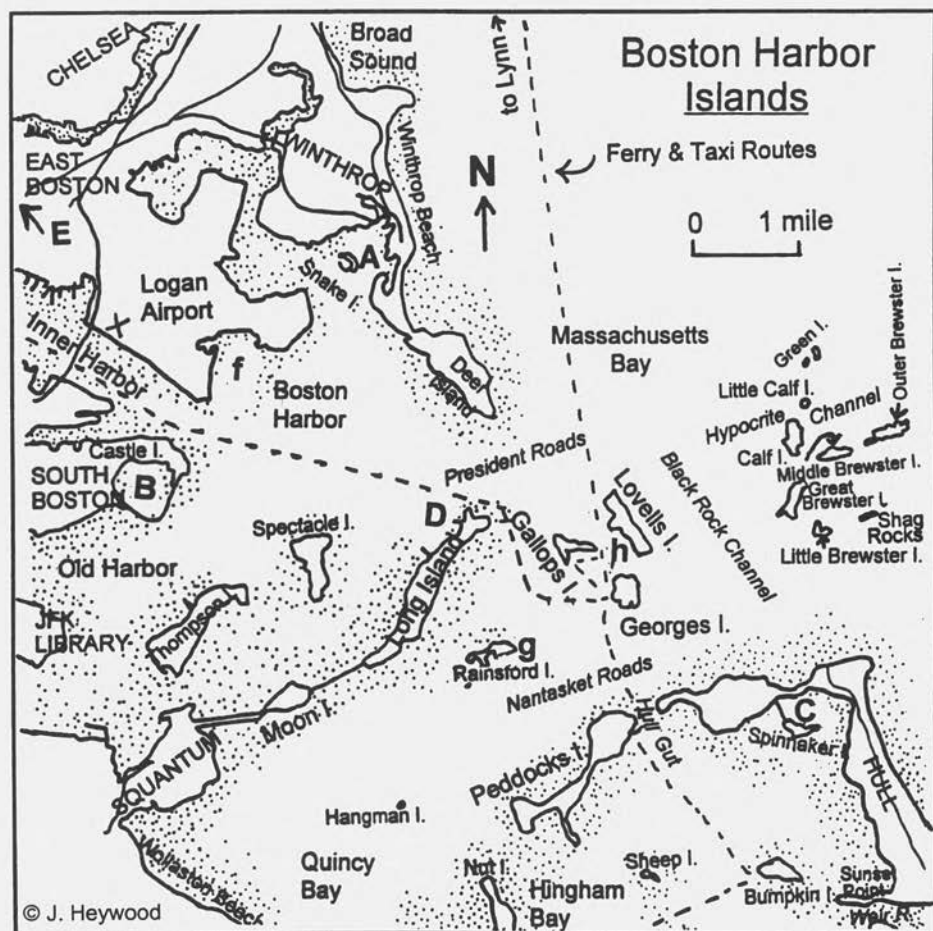


Figure 1. Map of Boston Harbor, Massachusetts, to show tern nesting sites. A-E = Common Terns (see Table 1); f-h = Least Terns (see text); X = location of former Bird Island.

specifically for terns (Table 1; Fig. 1, A-E). In addition, at last two minor sites have been used. This record may be incomplete, and additional records would be welcomed by the author.

**A. Snake Island, Winthrop.** This low, horseshoe-shaped island, located between Winthrop and Logan Airport, was the principal site for nesting Common Terns in 1972, but rats were present in 1974 and caused most of the terns to abandon the site that year. Removal of debris in 1975, by volunteers led by Deborah Howard of Massachusetts Audubon Society, improved matters only briefly. Subsequently, the island was used for deposition of dredge-spoil and there has been extensive growth of both terrestrial and saltmarsh vegetation. The open areas attractive to terns are now reduced, and the most recent year with more than 100 pairs nesting was 1993.

**B. Pleasure Bay, South Boston.** From about 1974 (possibly earlier) until 1977 terns nested on a dilapidated wooden structure (original purpose unclear) in the middle of what is now an enclosed sailing arena. The structure was removed before the 1978 breeding season. Although some young fledged from this site, others fell off the structure. We did not measure productivity at this site.

**C. Hog/Spinnaker Island, Hull.** Terns nested from c. 1977 to 1983 on a derelict dock that had formerly served Hog Island when it was occupied by the military. The peak number of nesting pairs was 190 in 1982. This structure was too dilapidated for any study of the terns or for restoration of the nesting area; it was removed early in 1984 and replaced by a platform specifically designed for nesting terns.

Starting in 1983, Hog Island was developed as a residential community and renamed Spinnaker Island. The site of the old dock is now occupied by a marina. In 1984, a new nesting site for terns was constructed north of the island, about 130 m from the old dock. The 9.2 meter-square platform is supported by eleven wooden pilings about 2 m above highwater, and covered by 7 cm of coarse sand (Fig. 2). Ninety-seven pairs nested that year. The number of nesting pairs peaked at 262 in 1991. In that year the nests were exceptionally crowded, with an average density of 3.1 nests per square meter. In recent years the numbers have been lower, possibly as a result of predation by Black-crowned Night-Herons (*Nycticorax nycticorax*).

**D. Long Island Head.** The remnants of the dock for former Fort Strong, located 200 m southwest of the lighthouse, were used by nesting terns from 1983 to 1994 (Fig. 3a). To enhance the structure as a nesting site, some holes in the deck were covered with plywood, and sections were surrounded by low wooden walls to prevent chicks from falling off. Fine gravel from the nearby shore was spread on the deck (Fig. 3b). The structure was removed before the 1995 breeding season.

The number of nesting terns fluctuated between 130 and 295 pairs through 1991, then fell to 12, 1, and 61 pairs in the last three years. There is no certain explanation for this marked decline, but the site is very close to a wooded hillside, which could have harbored Great Horned Owls (*Bubo virginianus*). These predators are known to visit tern colonies and to cause abandonment.

**E. Donald McKay Docks, East Boston.** Terns at this site have been monitored by Soheil Zendeh. Terns were first reported in 1997 (by Joe Pike). In 2000 the structure was disintegrating, but about 140 pairs attempted to nest.

**Minor sites.** The minor sites in Boston Harbor referred to above include Logan Airport, where Common Terns were reported nesting in 1968, the first record for Boston. There are no subsequent records of this species, but they may have nested there occasionally, unreported. A single pair nested at Belle Isle Marsh in 1990. Additional sites in nearby communities include the General Edwards Bridge, Saugus/Revere, where terns have mostly nested on wooden bridge abutments since 1981 or earlier (maximum 64 pairs in 1996); and in Amelia Earhart cove of the Mystic River, Everett, where they have nested on rotted pilings.

### Studies of breeding biology and dispersal

Common Terns nested on the old wooden docks in a great variety of places. Some terns built rather substantial nests from fragments of rotten wood, debris from meals left by gulls in the winter, and pieces of vegetation; others chose small hollows where the decking had begun to rot; while others laid on bare boards without any nesting material at all. Clutches laid on the bare boards were commonly dispersed (possibly by high winds), and eggs were sometimes added to neighboring clutches. Some nests were on long ledges, only 9 cm wide, overlooking the water below. One pair laid eggs in the deeply-hollowed top of an isolated rotten piling only 28 cm in diameter. This unusual nest site was about 1 m away from the dock and 1.3 m above it. Although the tern chicks were safe from ground predators, mortality was high because many chicks of all ages fell from the nesting area on the deck to the water below. Common Tern chicks more than two days old usually respond to a predator by running and hiding under vegetation or other objects. On the unimproved sites the chicks showed negligible hesitation at the edge of a hole in the dock, and chicks hatched at exposed sites rarely survived beyond one or two days of age. This hazard precluded any close study at unimproved



*Figure 2. Nesting platform for Common Terns at Spinnaker Island, Hull. Photograph by the author.*

sites once hatching had begun. Nests within fenced areas at the Long Island site were followed until the oldest chicks were nearly ready to fly. At this point visits to the site ceased because of the risk that newly flying young would end up in the water. Estimated productivity (following the methods of Nisbet and Drury 1972) was more than one fledged young per nest for each year 1983-1988. In 1972, productivity at Snake Island was more than two chicks per pair (Nisbet pers. comm.).

Over 2000 young terns were banded, 1973-1987, at Snake, Long, and Spinnaker islands. Of these, 22 were subsequently encountered at ages 2 months to 11 years.



**Figure 3:** (a, left) Derelict dock at Long Island, Boston Harbor; nesting site for Common Terns. (b, below) Closer view of improved nesting areas on the Long Island dock. Photographs by the author.



Four were encountered during their first migration in New York or the Caribbean; the others were trapped and released alive by biologists, or their bands were read without handling. Two were found wintering in Brazil. The remainder were found during the breeding season at colonies in Maine (3), Massachusetts (8), and New York (4). These locations extend from Petit Manan Island, Maine, to Great Gull Island, NY (east of Long Island). In addition, one individual was trapped twice, aged 4 and 6 years, on Oneida Lake, near Ithaca, NY. This bird is particularly interesting because there are few reports of movements between the coastal and inland populations.

In 1987 and 1988, twelve previously-banded adults were trapped on nests at Long Island during studies of parental behavior. One had been banded as a wintering adult

**TABLE 1.** Principal nesting locations for Common Terns in Boston Harbor, MA

Loc <sup>1</sup>	Name	Type <sup>2</sup>	Dates <sup>3</sup>	Max No. Pr.	Notes
A.	Snake I., Winthrop	I	1970-74; 91-93	275	
B.	Pleasure Bay, S. Boston	D	1974-77	175	Removed
C.	Hog I., Hull	D	1977-83	190	Removed
C.	Spinnaker I., Hull	P	1984-present	262	
D.	Long I. Head	D	1983-94	295	Removed
E.	McKay Docks, E. Boston	D	1997-present	140	

<sup>1</sup> see Fig. 1 for locations

<sup>2</sup> I = natural island + dredge-spoil; D = derelict dock; P = purpose-built platform

<sup>3</sup> years of major occupation; first nesting may have been earlier, but unreported, except at Spinnaker Island (see text)

in Brazil (at the same site as the two retraps, see above); the others had been banded as hatching-year young birds at five sites, four of them in Massachusetts: Snake Island, Winthrop (5); Bird Island, Marion (1); Monomoy, Chatham (2); Long Beach, Plymouth (2); and one in New York, at Great Gull Island (1).

### **Least Tern**

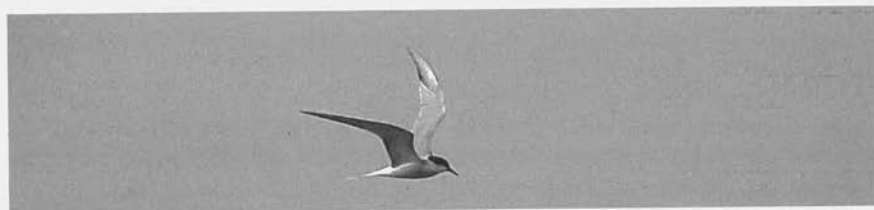
This species was first recorded nesting in Boston Harbor in 1974, on Snake Island, and it has been present in at least thirteen years from 1980 to 1997. All recorded nesting has been on the ground, at semi-natural sites at Logan Airport (f), Rainsford Island (g) and Lovell's Island (h). Numbers reached a high of 63 pairs in 1996. There have been no attempts to measure productivity, but a few fledged young have been seen.


### **Discussion**

The fluctuating numbers of nesting terns, and the observations of diverse origins and wide dispersal of individuals indicate that the terns of Boston Harbor are part of a much larger, relatively fluid, population. The extent of this dynamic interchange is not well known.

The terns' brief presence on Snake Island and continued success on the dilapidated docks indicate that the lack of safe nesting sites may indeed explain their long absence from Boston Harbor. The old docks, however, are unsatisfactory long-term sites, not only for the tern-related reasons mentioned earlier, but also because the structures are short-lived. The docks are perceived as eyesores, and they are subject to removal in the course of redevelopment. In some cases they are determined to be sources of potentially hazardous floatable debris in the harbor. It is notable that the terns have moved from one dilapidated dock to another as they have been successively cleared away, and it is likely that this population of terns has developed a tradition for sites of this kind. The history of the old docks is not well documented; the dates at which each became an island, safe from ground predators, might shed light on this tradition.

Nesting on diverse artificial sites has been reported from other areas where safe, natural sites are not available. These sites include not only dredge-spoil islands and derelict docks or barges, but also breakwaters, navigation cells, and gravel roofs of buildings. Structures designed for nesting terns also include floating rafts. Thus, there are chances for mitigation where natural sites have been preempted by human development or made unsafe by predators, especially those such as rats and gulls that benefit from human actions. However, since no site can be perfectly safe every year,



and terns have evolved a propensity to shift nesting sites (especially in response to predators), modern managers must provide several alternative sites for nesting terns. The readiness with which Common Terns occupy man-made sites means that this appealing species can be encouraged to nest within easy viewing-range of multitudes of people. Such structures would provide a valuable additional dimension to the avian diversity within the Boston Harbor Islands Park Area and would be an important accompaniment to the eradication of rats from the islands. 

## References

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