AN ARTIFICIAL NEST STRUCTURE FOR BLACK TERNS *(Chlidonias niger)*: DESIGN AND USE

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Abstract—A simple, affordable Black Tern artificial nest platform was designed and tested during the spring of 2002. Goals were (1) to test the basic efficacy of the platform design; (2) to supplement nest sites at an historic breeding area experiencing drastic population declines in recent years; (3) to attract terns into a recently re-flooded marsh, where natural nesting sites would ordinarily be absent; and (4) to test whether birds would select artificial structures over natural substrates at a site where both breeding birds and natural substrates were numerous. Five of 48 platforms were used by Black Terns to some degree, and the basic platform design appeared to work well. None of the platforms deployed at the historic site (Braddock Bay) were used, and this site appears to have been abandoned by breeding Black Terns. In contrast, nesting terns were attracted to four platforms at a recently drawn-down site in Tonawanda Wildlife Management Area. This success suggests that artificial platforms might offer a significant benefit in areas, like New York State, where breeding areas are both limited and intensively managed. Finally, Black Terns were attracted to and nested successfully on a platform at a site (Ruddy Marsh, TWMA) where many ideal natural nest sites were available.

Introduction

Breeding Bird Surveys have demonstrated a declining trend since 1967 in the number of Black Terns (*Chlidonias niger*) breeding in the state (Novak 1998). The New York State Department of Environmental Conservation conducted its first statewide survey for Black Terns in 1989 and estimated 235 pairs (Novak 1990). Numerous surveys since, some using more detailed methods of actual nest counts as opposed to scan surveys, have concluded that the population is relatively stable, but drastically below historical numbers (Mazzocchi and Muller 1995). However, in 2001, breeding pairs were estimated at 155 statewide, the lowest since the NYSDEC surveys began. Several factors are involved in the decline of the species. These include habitat loss, human disturbance, predation, weather, and habitat degradation caused by purple loosestrife, *Lythra salicaria* (Mazzocchi and Muller 1995). The present study tested several potential benefits of artificial structures for Black Terns breeding in New York State.

Platforms were placed in several different settings. For instance, Braddock Bay Wildlife Management Area, along Lake Ontario in the town of Greece was historically an important breeding site for Black Terns, but breeding has been severely reduced there in recent years. Artificial structures were placed here with the hope of reversing this trend. Another site (the North Feeder Marsh of Tonawanda Wildlife Management Area (TWMA), in the township of Alabama) was selected to test whether Black Terns could be attracted to a marsh the first

season following a marsh draw-down. Normally marshes do not offer suitable nesting substrates until the second or third year following a draw-down (Seyler 1991, 1993, Hickey 1997), and successful deployment of artificial structures in this setting would be a great boon to wildlife managers. Platforms were also deployed at a site (Ruddy Marsh, TWMA) featuring abundant natural nest sites. The goal in this instance was to determine if the terns might prefer artificial platforms over some natural sites. Thus, structures were placed in and around cattail areas that also contained decayed and flattened muskrat houses and areas of accumulated dead cattail stalks.

In 1992 artificial Black Tern nest structures designed by D. Seyler were used during a nesting study by J. Hickey (Hickey 1992). Although some were utilized by the birds, the styrofoam design was far less durable and attracted muskrats, that eventually chewed up several of the structures. The author also deployed about half a dozen structures in Ruddy Marsh and Paddy II (TWMA) in 2001. Again, these earlier structures differed in various respects from the ones described in the present paper.

Platform Design and Placement

The artificial structures used in 1992 consisted of one-inch thick polystyrene sheets cut into 16.5-inch squares. All edges were taped with duct tape to prevent crumbling. An anchor was attached to the center with twine to keep the structures in place. During that study, it was observed that chicks were sometimes unable to climb back onto platforms. The polystyrene floated completely on top of the water effectively creating an inch high wall to a small chick trying to make its way back to the nest. This problem was remedied in the present study by draping long strands of vegetation over the sides of the structure.

Polystyrene was not used on the structures deployed in 2002. Rather, these platforms were constructed using half-inch hardware cloth cut into 14-inch squares. This was attached to a twelve-inch wooden frame roughly made of 1 inch x 1 1/2 inch pine (Fig. 1). The hardware cloth was centered on the wood frame so that a two-inch lip extended beyond the frame on all sides. The lip was bent downward about thirty degrees, effectively creating a ramp into the water once the platform was floated. This was designed so that young terns could easily climb back onto the platform should they leave for any reason. Empty plastic beverage bottles provided floatation. Two bottles from twelve to twenty ounces were evenly spaced on the underside of the platform inside the wooden frame. Some were attached to the hardware cloth with thin copper wire, but a better means was large plastic cable ties. Cable ties were cheap, fast, strong and would not corrode.

Completed platforms required an anchor to prevent wind or other forces from moving them. Anchors were tied to the center of the underside of the platforms. Anything could be used for the weight. We used pieces of 1-inch pipe cut into six-inch lengths. Two small holes were drilled into the pipe and a cable tie was passed through and closed forming a loop. Twine was tied to this loop, which prevented sharp edges of the pipe from wearing on the twine and eventually cutting it. Two pieces of pipe were necessary for sufficient weight. Enough twine was used to allow for water level fluctuations. In the past clay drainage tiles were used as

weights (Hickey 1992). Wooden stakes ten feet long and roughly 3/4 inch square were placed adjacent to the platforms for ease of locating. Pink plastic flagging was tied to the top of the stakes. Platforms could also be anchored to the stakes as opposed to using weights.

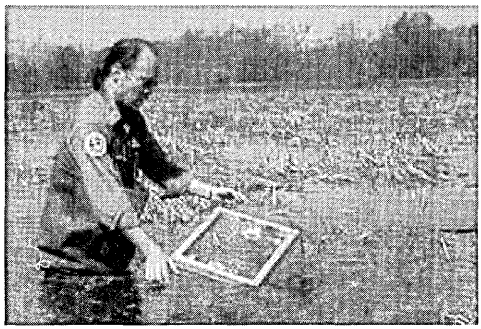

Figure 1
An artificial nest platform for Black Terns.

Figure 2
Final placement of an artificial nest platform for Black Terns.

Once anchored in place, platforms were covered with vegetation (Fig. 2). Partially decayed emergent vegetation is the best material. In early May, the remains of the previous season's vegetation is usually readily available floating within the standing dead stalks. Otherwise a garden rake can be used to pull up material from the bottom. Wet, heavy material works best and the platform can instantly look like a natural nesting site. The structures need to be checked a day or so after placement to confirm that they are not floating too high. Sometimes the material placed on the structure dries and changes how the platform sits in the water. Six days after deployment, the platforms at North Feeder looked good, except that the vegetation originally placed on them appeared insufficient. Only one was completely barren of material. It was on the windward side of a cattail clump toward the edge of the marsh and thus took the brunt of the winds. All structures were refreshed with brown, semi-decayed cattail brought in from an adjacent marsh. Twine was used to lace down the new material on most of the structures. The vegetation used was long enough to drape across the structure and so two simple lashings at opposite ends were adequate to hold the material in place.

- Twenty platforms were placed at Braddock Bay Wildlife Management Area on 1 May.
- Twenty platforms were placed in North Feeder Marsh (TWMA) on 1 May.
- Five structures were placed in Ruddy Marsh on 8 May.
- Three structures were placed in Paddy II on 15 May.

Platform Use

The structures at Braddock Bay were not revisited after the initial placement. Birdwatchers had reported that only a tern or two had passed through the area, and that the site was not being used for nesting. Fifteen of the twenty structures were retrieved 23 July. All were floating and all lacked vegetation (F. Knowlton per com).

Terns were first observed using platforms at TWMA on 7 May when terns were seen to land on two of the structures in North Feeder. Prior to alighting on the structures, the four terns were observed attacking a coot that was close to the platform. They were very agitated and vocal and repeatedly dove at the coot until it retreated, an indication of their attachment to the site. Examination of the platforms found no evidence of nest construction.

May 2002 was a month of very unusual weather. It was very windy and unseasonably cold. Friday 10 May brought tremendously strong winds. Observations from the dike revealed that flagged stakes had been blown down in both North Feeder marsh and Ruddy Marsh. Inspection of the platforms Monday 13 May in North Feeder revealed that the ones on which vegetation had been tied down held up very well. Black terns were now utilizing four structures.

Strong winds again plagued the area on 14 May combined with rain and temperatures 20° below normal. Winds were so strong and persistent that the open water areas had turned brown from turnover. At least four dead grebe chicks were found from two different nests and an adult Black Tern was also found dead in the water. Paddy II, TWMA the site of a very active colony site in 2001 was inspected on 14 May, but the area was devoid of natural nest sites. A single nest was located on an artificial platform that had been placed the year before and left out all winter. The nest was very poor and contained a single egg. Very little material had been brought to the structure. Four terns were repeatedly sweeping the narrow area and immediate plans were made to place more structures. Three platforms were placed in Paddy II on 15 May, but the nest located the day before was now gone and even the structure could not be found. High winds again swept the area 16 May, but the temperature was a much improved 70 degrees. In summary, a total of five nesting attempts were made on the artificial platforms: four in North Feeder and one in Ruddy (the only successful nest on an artificial platform). In addition, a nest in Paddy II was built on a platform of a different design deployed in 2001.

Discussion

The design of the structures and their durability appears sufficient for a single season, although floating platforms might be vulnerable to exceptional winds. None of the platforms deployed in 2002 were found to float too low, and those that floated too high could be adjusted by partially filling the plastic bottles with water. The stability of the platforms is generally good. Muskrats were able to repeatedly climb on and off without toppling or sinking the units. On the other hand, two structures deployed in 2001 were found upside down, floating against a very dense stand of cattail. One bottle had developed a very small hole where it was in contact with the steel wire used to lash it to the hardware cloth. The corrosion of the wire appears to be what caused the hole. Both had broken loose from their anchors.

Although Black Terns historically nested at Braddock Bay, in recent years they appear to have abandoned the area. The artificial platforms deployed there in 2002 did not succeed in reversing this trend.

Of the six nesting attempts observed on platforms at the other sites, it is likely that one failure was a result of muskrat activity. The other four failures were attributed to weather. Winds were excessive in May. Wind speeds exceeded 20 mph on 19 of 31 days and exceeded 30 mph on 6 days (U.S. Fish and Wildlife Service, Iroquois National Wildlife Refuge weather station). The strongest winds were recorded 10 May when speeds exceeded 30 mph for 8 hours and peaked at 41.8 mph at 10 am. Black Terns had been landing on the structures for several days by then, but it is highly unlikely that a nest was already established. The worst weather coincided with the very early stages of nest site selection and nest construction, and I believe that it effectively put a brief hold on nesting activity. In the same manner that birds will move from a site after an unsuccessful nesting, I believe that the terns moved to other sites because of the weather. Even so, the simple fact that nesting terns were attracted to artificial platforms at North Feeder, where natural nest sites were completely absent, is an important result.

Hatching was observed in the successful Ruddy Marsh nest on 28 June. At this time, the structure was so well concealed that it was impossible to tell that it was an artificial platform. Nest height was perfect and duckweed and other aquatic vegetation had grown around the nest and completely obliterated any sign that it was manmade. The success of this platform nest is especially significant because Ruddy Marsh features perfect Black Tern nesting habitat. Interspersion of vegetation to open water was ideal. Decayed muskrat structures were everywhere. Large flat mats, some about two meters across, were very abundant. These mats were decomposed remains of old muskrat lodges. Natural structures from old lodges to feeding sites to areas where cattail stalks from winter feeding muskrats had blown into mini stalk jams were everywhere. The use of an artificial platform among many natural sites is particularly encouraging.

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