

THE CLARK'S ISLAND HERONRY

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Massachusetts' largest mixed-species heronry and one of the most productive Ardeid colonies on the east coast is located on Clark's Island, perched off the west end of Saguish Point in Duxbury Bay. The 80-acre island was visited by the Pilgrims on their way from Provincetown to Plymouth and has served as an Indian prison camp and leper colony. Today, a dozen or so cottages offer a unique summer retreat to island residents. Farmed for more than a century, the island is now largely covered with second-growth cedars and thickets. In spring and summer, the north end supports a sizable gull colony in addition to over 500 nesting pairs of waders.

The herony was discovered in 1974 as a result of some fine ornithological sleuthing by Wayne Petersen. For years local residents in the Duxbury area had noticed an increase in the number of egrets, herons, and Glossy Ibises, but it was not until 1973 that Petersen brought his suspicions to the attention of the Manomet Bird Observatory. In the spring and summer of 1973 he observed evening flights of herons, ibis, and egrets over Dwyer Farm in Marshfield. He systematically tracked the birds south until, from near the Myles Standish Monument, he watched egrets disappear among the gulls on Clark's Island. From studying flight lines and topographic maps and from the careful counting of bird numbers, it seemed very probable that Clark's Island was the location of a major herony. Petersen suggested this to Kathleen Anderson and on July 13, 1974, Petersen, Anderson, and Brian Harrington embarked on an early morning field trip to Clark's Island. In less than two hours and with the aid of island resident, Clinton Watson, the group located an estimated 5 pairs of Little Blue Herons, 2 pairs of Great Egrets, 30+ pairs of Snowy Egrets, 4 to 6 pairs of Glossy Ibis, and over 100 Black-crowned Night Heron pairs. Nests and young of each species were located, confirming the first breeding record for Glossy Ibis in Massachusetts. Watson reported that Snowy Egrets had been on the island since 1970, establishing the origin of the herony no later than the late 1960s. The study of the Clark's Island herony was underway.

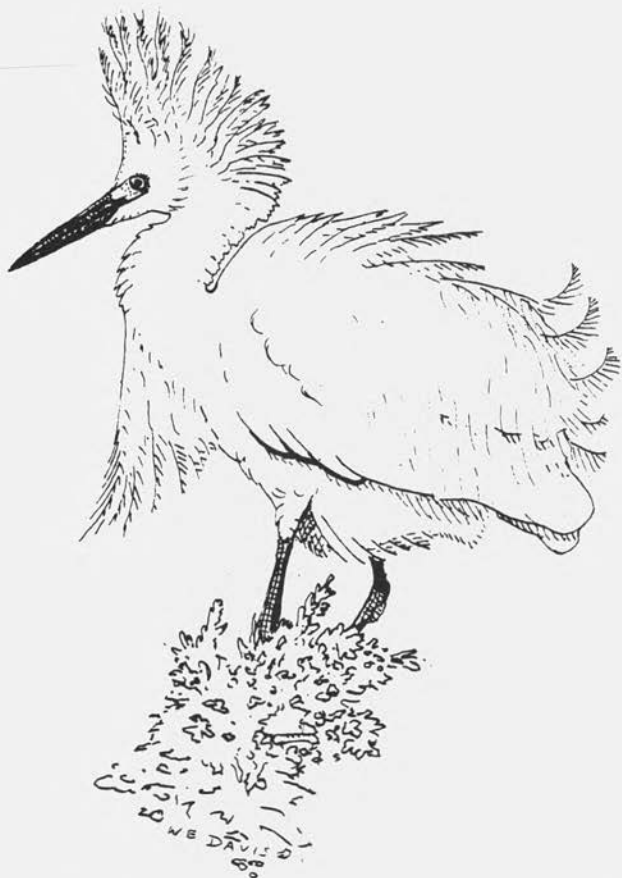
Hérons are good subjects for ecological research because they are colonial breeders, making it relatively easy to observe large populations from which to measure productivity. In addition, fish-eating Ardeids occupy a top position in the food chain and have proved to be sensitive indicators of estuarine quality. Hence, Clark's Island has received much attention from researchers at government agencies as well as from staff and interns at the Manomet Bird Observatory (MBO).

In 1975 Brian Harrington and Kerry Elkin, working under a U.S.

Fish and Wildlife Service contract, began the arduous tasks of climbing cedar and cherry trees, tagging nests, and marking, measuring, and weighing eggs. Each nest was labeled with a numbered tape and each egg lettered with a permanent marker. Young were checked usually through the tenth day, after which most heron chicks are able to scramble from the nest and climb to the top of the tree when approached. At this point, the upper canopy of the heronry is dotted with small herons waiting to deposit half-digested fish on a tree-climbing biologist. MBO personnel and other investigators have continued to collect nesting data, making this one of the most extensive and long-term heronry studies to date. In addition, the heronry at Clark's Island is the northernmost colony on the Atlantic coast to undergo such detailed investigation.

Several investigators have published results from studies conducted at Clark's Island. Organochlorine poisoning has been assessed in Black-crowned Night Herons (Ohlendorf 1977), and several authors have included census data from Clark's Island in regional atlases of breeding bird colonies (Osborn and Custer 1978, Erwin 1979). Other studies of Clark's Island birds include ecological investigations of nest-site and colony-site selection (Erwin 1977, Beaver *et al.*, 1980), a study of heron vocalizations (Davis 1979), and an analysis of gull hatching success (Parsons 1981).

Many investigations are still in progress. Early morning and late afternoon flight lines are being mapped to help identify areas within the Plymouth-Duxbury estuary that are heavily used by herons as food resources. In 1980, William E. (Ted) Davis began an experimental study of wader nesting patterns in red cedars. Old nests that had survived the winter were removed from a sample of nest-trees. A similar number of control nest-trees were selected in which old nests were not disturbed. Nest building and occupancy by Snowy Egrets, Black-crowned Night Herons, and Glossy Ibis were monitored weekly. This data is being analyzed to determine if the presence of old nests affects nest-site selection by Clark's Island waders. Kathy Parsons, a former MBO intern, has been studying the effects of weather on Black-crowned Night Herons and Snowy Egrets as part of her doctoral research. Wader productivity in most southern heronries is limited by biological factors such as predators, parasites, and competitors. Preliminary evidence from Clark's Island suggests that herons nesting in the north might be limited by their physical environment. The diversity of projects completed and in progress is evidence of the wealth of research opportunities available in a large, mixed-species colony.



Although the large size of the colony prevents marking and following each heron nest, the entire colony has been censused during the first two weeks of June on five occasions, four of which have been previously reported (Harrington, 1975; Davis *et al.*, 1979; Davis, 1980). Census data from 1981 and previous counts are presented in Table 1.

The principal nesters at Clark's Island are Black-crowned Night Herons and Snowy Egrets; their numbers have remained greater than any of the other nesting species since 1975. Glossy Ibis were first found nesting in Massachusetts on Clark's Island in 1974. Since then, their numbers have fluctuated considerably with the fewest pairs nesting in 1981. Great Egrets and Little Blue Herons nest in small and somewhat variable numbers on Clark's Island. The Cattle Egret is known to have nested there in 1977 (Harrington and K. Parsons, personal communication), and possibly 1978, but its colonization of the area seems tenuous at best.

The large and stable numbers of Black-crowned Night Herons and Snowy Egrets form the bulk of the heronry at Clark's Island. The number of Snowy Egrets has consistently increased relative to black-crowns from the first census in 1975 through 1980. The decrease in Snowy Egret pairs this past year reflects a recent reduction in snowy numbers in many Massachusetts' heronries (R. Forster, personal communication).

Table 1. Active Wader Nests at Clark's Island

	BNHE	SNEG	GREG	CAEG	LBHE	GLIB	TOTAL
1975	350	150	5	0	5	40	550
1976	245	244	5	0	3	60	557
1978	200	231	10	1?	1	20	463
1979	254	264	10	0	2	31	561
1981	226	222	2	0	4	15	469

BNHE - Black-crowned Night Heron CAEG - Cattle Egret
 SNEG - Snowy Egret LBHE - Little Blue Heron
 GREG - Great Egret GLIB - Glossy Ibis

Although the size of the colony appears to have stabilized near 550 pairs of waders, nest-tree preferences among the herons have shifted dramatically over the last several years. Glossy Ibis nested exclusively in deciduous bushes in 1975 (Harrington, 1975). By 1978, all but one ibis nest were located in Eastern Red Cedar (Davis *et al.*, 1979). This year's 14 ibis nests in cedar trees, and one nest in a Pitch Pine represent a total shift of nest-site preferences from deciduous bushes to evergreen trees. Similarly, over the study period Great Egrets have moved their nests from the tops of High-bush Blueberry bushes to the tops of Pitch and White Pine trees.

Table 2. Nest Tree Preference (Percentage)

	1975	1976	1977*	1978	1979	1981
BNHE						
Cedar	48	33	82	72	59	58
Cherry	10	12	8	15	19	24
Other	42	55	10	13	22	18
SNEG						
Cedar	27	52	81	82	84	95
Cherry	6	2	6	8	6	2
Other	67	46	13	10	10	3

*data from a sampled area of heronry

A closer examination of nest-tree preference among the more abundant Black-crowned Night Herons and Snowy Egrets is possible (Table 2). The early-arriving black-crowns might be expected to have an undisputed first choice of nest-trees. Since 1975 they have nested primarily in cedars. However, a recent, secondary preference for Black Cherry trees has emerged. In contrast, Snowy Egrets have shown a strong, developing preference for cedars as nest-trees since 1975.

Some of the changes might be explained in part by the fact that since 1975 the area of concentrated nesting has shifted from the center of the island, where High Bush Blueberry is abundant, to the north end of the island, where blueberry is less dense. The number of nests per tree is higher for black-crowns and snowys, and the first nests are nearly two weeks earlier in the north end of the heronry than in the older nesting area in the center of the island. In the old area, several Red Cedars were not occupied at all.

The herons of Clark's Island have enjoyed relatively high levels of nesting success when compared to other east coast heronries. Preliminary analysis shows that two to three nestlings per black-crown or snowy nest survive at least ten days. A low abundance of predators at Clark's Island accounts for part of this success. In addition, parasites on young herons have been observed infrequently at Clark's Island. From time to time, avian predators, probably Great Horned Owls, reduce heron numbers at the colony, but this has not been a problem of great significance.



Although we plan to continue collecting nesting data, the major thrust of future studies will probably take the form of limited experimental procedures aimed at answering specific questions. For example, although the collection of tape-recorded vocalizations of nesters will continue, more sophisticated record and playback techniques are planned. Goals include determining whether or not Snowy Egrets use vocalizations for individual recognition and, if so, what features of the vocalization structure (frequency patterns or amplitude patterns) are used to implement individual recognition. Other studies planned include an investigation of the interactions between Black-crowned Night Herons and Snowy Egrets, with reference to their nocturnal versus diurnal foraging behavior, and an analysis of feeding strategies.

Acknowledgments

Brian Harrington of the Manomet Bird Observatory initiated and has consistently provided the sustaining effort behind the Clark's Island study. Without his dedication, interest, and sense of humor, few assistants or interns would have seen beyond the guano, regurgitated fish, and poison ivy. We are especially grateful to him and to the logistical support of MBO which has made this long-term investigation possible.

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