

Preface

Huddled deep in my down jacket, grasping my arms around my waist to keep in the heat, I faced into the wind. Beside me stood Fred Lesser, stoically steering the boat through the chilly fog of an early summer morning. I could hardly see the front of the 18 ft whaler, yet he was focused on a distant island, its position marked on the map in his head. "We need an early start," he had said. What in the world was I doing skimming across Barnegat Bay, in the Ocean County Mosquito Commission boat? Fred, an ecologist, was the director of the Commission. He was unusual for his time and place. He had a holistic view of mosquito control, and the importance of maintaining the marsh ecosystem with as little management as possible, while still controlling mosquitos. Coastal ecosystems and mosquito control were important to the New Jersey State economy, even then, in the early 1970s. People living in beach communities, walking the beaches of New Jersey, fishing in the surf, or playing with their children in the sand did not want to be harassed by mosquitos. Mosquito control was big business, but mosquitos were part of a complex estuarine ecosystem that we were studying.

In the early dawn, Fred had picked me up from my hunting hut on Clam Island, where I was studying the social interactions among nesting gulls. We were bound for the Lavallette islands in the north end of the bay. We would census the birds there, check their breeding status, then start south stopping systematically at all the suitable islands to count the number of nesting gulls, terns, and skimmers on each salt marsh island. I had a coastal chart in my pack, but Fred was working off his mental map, honed since he was a youngster. He grew up on the bay, and his love for it was infectious. Channels are for boaters who want to avoid running aground, but we had to reach islands, and Fred knew the way into each, at almost any tide.

The fog burned off before we reached the northern end of the bay. The blue sky peeked through the disappearing clouds, and the sun grew warmer. He cut the engine, and as we drifted noiselessly up to the first island, a few Common Terns flew overhead, hurrying away to plunge-dive for fish and bring back their courtship feeding offering to a waiting mate. When we bumped into the island, a cloud of terns arose from the *Spartina* mats, circling overhead and calling loudly. I sat and watched, and was hooked on the swirling mass of delicate terns, some with a faint blush of pink on their breasts. More practically, Fred hooked the anchor into the marsh.

We walked through the nesting colony that day, counting adults, counting nests, counting the number of eggs in each nest, and recording any eggs washed out of nests or that were cut open by predators. "No tern chicks yet," we noted, "another week at least." We counted the numbers of other species nesting on each of the islands—mainly, Herring Gulls on the islands in the northern part of the bay—they nested earlier and were already feeding their downy chicks, still cute at this stage. In the middle of the bay, down by Barnegat Inlet, some of the islands had small Cherry and Poison Ivy bushes that held the nests of Great and Snowy Egrets, Black-crowned Night-Herons, and other species. This morning we only counted from afar, and tried not to flush the incubating birds. Farther south, the Common Tern colonies were next to Laughing Gull colonies; and still farther south, there were Black Skimmers nesting on sandy patches or on the wrack, the dark brown mats of dead vegetation washed up on the salt marsh islands by winter storms.

It was enchanting to see the subtle differences in habitats on these salt marsh islands, and all the different combinations of colonial nesting birds. I not only got to see the mosaic of different vegetation types, but to map their distribution as part of our research on habitat suitability and availability. Did the terns know something about habitat quality not yet evident to our eyes? Hidden in the *Spartina* grass, there were nests of Salt Marsh and Seaside Sparrows, Red-winged Blackbirds, Marsh Wrens, and the occasional Clapper Rail or Willet. Pairs of Oystercatchers would circle around us calling loudly, a distinctive piping note, luring us away from their nests or chicks. It was amazing to see this avian diversity residing on small salt marsh islands. By the time we passed under the Manahawkin Bridge,

there was a steady stream of beach-bound traffic. In midsummer, the barrier beaches were teeming with thousands of tourists, the roads often crammed with cars unable to move faster than a Diamond-back Terrapin crossing the sand to reach its nesting habitat. I fell in love with the ambiance and have been enthralled for more than 40 years by the birds of Barnegat Bay, the subtle hues of the vegetation that change through the season, and the islands themselves that have changed over the years. I have always felt incredibly privileged to be out on the bay, and that this research was my job as a university professor. "They pay you to do that," my father had once said when I explained my typical week.

Like the gulls, terns, and herons that form dense colonies to breed, people who study these species flock together at professional meetings, seeking out others to compare observations or collaborate. How do the habitats differ? How do the colonies differ? How do the predators differ? and How do people influence the success or failure of these colonies? The nearest Common Tern colonies were on Long Island, which led me to Mike Gochfeld, who had also been studying the terns. Mike's interest in toxicology rubbed off on me, and my interest in behavior rubbed off on him, and we began collaborating.

We visited each other's colonies, and over the years, focused our attention on Barnegat Bay. In part, this shift was due to the abandonment of many of the Long Island colonies because of encroaching predators and people, and in part the shift reflected the protected nature of the Barnegat Bay salt marsh islands. Being surrounded by shallow water, still inhabited by healthy numbers of Salt Marsh Mosquitos and Greenhead flies, and devoid of any sandy beaches, they were inhospitable to boaters. The islands were left alone by people if not by the environment. After a preliminary bay-wide study mapping all of the islands in the mid-1970s, we began to notice that islands had begun to disappear—trimmed around the edges by erosion, washed over by severe winter tides, and broken apart by ice and wind. We soon realized that we were witness to a drama unfolding on a global scale.

As the years went by, Mike, Fred, and I continued to visit the colonies day after day, week after week, and year after year. Every spring, when I heard the first Killdeer call over our Somerset home, I could hear in my mind the calls of the gulls and terns, and we were soon bound for Barnegat Bay and another field season—40 plus at last count. Our studies widened to include the population dynamics and heavy metal levels in the gulls and terns, herons and egrets, and even to the fish they consumed. Although the bird colonies are on islands, they are not isolated from other parts of the ecosystem, and our interests include fish, crabs, Horseshoe Crabs, and Diamond-back Terrapin, as well as the interactions between people and the birds. Although Barnegat Bay was our focus, we also worked in the New York–New Jersey Harbor Estuary and in Delaware Bay.

This book is a result of our more than 40 years of study on the behavior, populations, and heavy metals in the colonial birds nesting in Barnegat Bay and the nearby estuaries and bays in the Northeastern United States. Some data sets are more complete than others; some questions required only a few years of data to answer, and some required collaboration with other colleagues. Many remain unanswered for the new generation of researchers who have studied with us. Just as the flavor of nesting colonies of birds requires understanding the habitat, avian coinhabitants, predators, and competitors, the evolving research approaches and new technologies require many collaborations with a wide range of scientists and disciplines. And it requires integration of our findings with those of others in disciplines including toxicology, geology, and climate change science. We are eternally grateful to the birds and their ecosystems, and to the many people who have been our collaborators and friends over the years.

Joanna Burger

Preface

Even in medical school, I tried never to miss a fall weekend to visit Jones Beach. It is a famous bird watching spot, particularly on fall migration. Exhausted migrants literally fall out of the sky into the short beach vegetation where they are easily seen (or eaten), exhausted after a long night flight. If they overshoot and crash at sea, gulls are only too willing to lift them from their watery doom and swallow them. Migrating Merlins will often pause to make a pass at a flock of sparrows feeding on an open lawn. There, in the loop of the beach access road, I found a number of dead birds—fledgling Common Terns that had not made it. They were banded—with metal rings on one skeletal leg. I dutifully turned in the band numbers, dozens of them. There began my field studies of the colonial waterbirds of the Jones Beach strip, part of the New York–New Jersey Estuary.

The following spring, I found a thousand pairs of Common Terns and a hundred pairs of Black Skimmers, and dozens of Roseate Terns, nesting just inside the bend of the highway. Nearby, Least Terns and Piping Plover nested on the beaches, just waiting to be trapped, banded, and studied. Other banders up and down the coast were doing the same thing, and we would soon learn about migration, death on the wintering ground, and declining populations.

My studies were not very systematic, but when I met Joanna at a party after a Christmas bird count, she was showing around a scrapbook illustrating how she was studying Franklin's Gulls in a prairie marsh in northwestern Minnesota. Our colonies offered stark contrasts—not just beach versus marsh or beautiful tern versus beautiful gull. I could drive right up to my colony; park close to the nesting birds, and walk to a hot dog stand when the need arose. Joanna reached her study area by boat through Moose-infested, seemingly endless and trackless marshes, then wading chest deep in icy water to mark her nests, and sleeping night after night in a wooden blind to make her observations—"collecting data," she called it. I made a mental note to marry her some time.

Several years later, When Joanna was studying the three-dimensional pattern of nesting in heron and egret colonies, she asked me to show her some of the recently formed colonies on Long Island. To reach Seganus Thatch, a small island near Captree, with a bustling heronry, we had to wade. By wade, I mean chest deep over unfamiliar substrate, gear held high overhead, for a hundred yards or so, and then clamber up onto a rather shaky muddy island covered with Bayberry and Poison Ivy. An explosion of Great and Snowy Egrets, Black-crowned Night-Herons, Little Blues, and Glossy Ibis flushed from their nests, offering a spectacular vision as they circled away from the colony. We had chosen a cloudy morning so their eggs would not be overheated in their absence, as Joanna planned to measure nest height and nearest neighbor distance, and then take fish-eye photos upward to assess neighbor visibility. We allotted ourselves an hour. Initially thwarted by the dense tangle of vegetation, Joanna hurled her body physically against the bushes and clambered over the Poison Ivy vines to reach each nest. I followed suit. "Watch the Poison Ivy," I cautioned in vain since it was everywhere. "You don't get Poison Ivy?" I questioned. "Very badly," she answered, as she crashed forward to reach the first nest, a Night-Heron with four pale blue eggs. This was much too interesting.

We both felt Seganus was a great success. Lots of accessible nests and good data. Later in the car, I asked Joanna, almost casually, how she would go about studying the Common Tern nesting ecology. I had been laboriously measuring vegetation around each nest and at matched points one and two meters away. Joanna started, unhesitatingly, to talk about random points and sample size, vegetation characteristics, substrate quality and different habitats, and offered to use her fish eye to see if the Common Terns care as much about the proximity of neighbors as did Franklins Gulls

and egrets. I would later learn that this was her stock in trade, being able to grasp a whole problem at once, recognize its context and visualize it as individual components amenable to collecting, analyzing, and publishing data. This book reflects that approach, integrating disparate disciplines into a meaningful story. It was lunchtime. I bought her a hot dog at the Captree Fishing Station. It was courtship feeding.

Michael Gochfeld

Note: Unless otherwise noted, all photographs are by the authors.