UNIVERSITY OF NORTH CAROLINA

SEA GRANT COLLEGE NEWSLETTER

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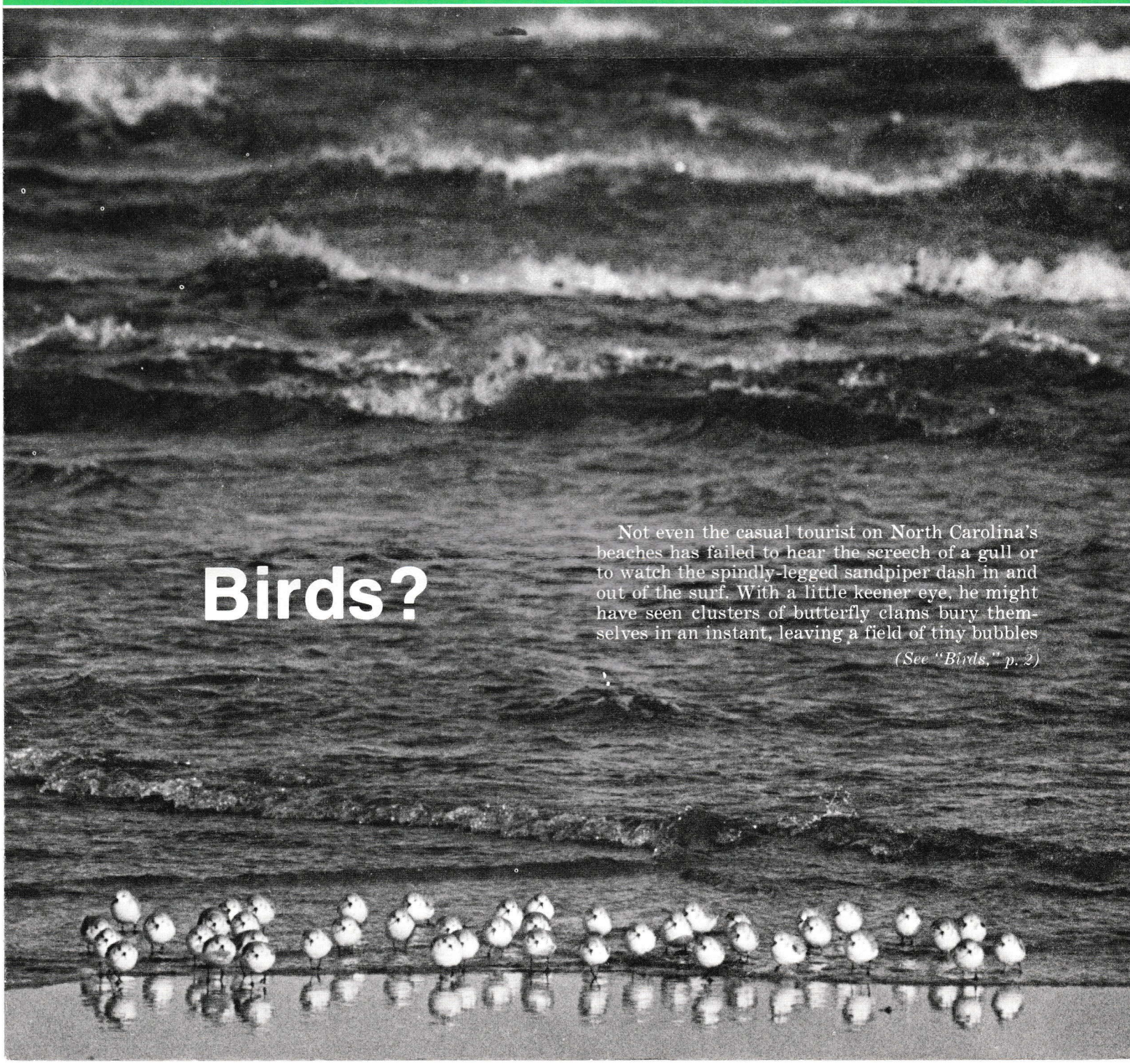


Birds?

Not even the casual tourist on North Carolina's beaches has failed to hear the screech of a gull or to watch the spindly-legged sandpiper dash in and out of the surf. With a little keener eye, he might have seen clusters of butterfly clams bury themselves in an instant, leaving a field of tiny bubbles

(See "Birds," p. 2)

Coastal Birds: Enviornmental Barometers

(Continued from p. 1)

in the wet sand at the water's edge. And if he has strolled the beach at night, he has probably watched ghost crabs scamper across the sand in their nightly feeding rituals.

For the beach lover, these creatures of the sea and sand are an integral part of the coastal magic. To the naturalist, they mean something more. They are environmental barometers—indicating just how man and his development are affecting the delicate balance of nature in the coastal region.

Birds are among the best environmental barometers. Because they are easily affected by any kind of contaminants, they quickly reflect environmental problems. And they are relatively easy to observe.

"Birds are probably the most visible animals we have. If changes are occurring in a bird population, even an amateur ornithologist might notice it." That's the contention of Dr. Robert Soots, an ecologist with Campbell College.

Taking the census

Along with Dr. James Parnell of UNC at Wilmington, Soots has spent the past four summers carefully noticing North Carolina's coastal birds. Until they began to take a census of the state's coastal birds last summer, population figures had been little more than educated guesses. When Parnell and Soots finish their Sea Grant-supported work this summer, they will have established a count which can serve as a baseline for future reference.

Late this month, many species of colonial birds (those that nest in groups) will begin nesting. In May, Parnell and Soots and eight or 10 graduate students will take to the field and begin the laborious task of counting. They will use aerial photography to count some species, such as Royal Terns and Black Skimmers. For other species, the task calls for crawling through brush and climbing trees.

In the smaller colonies, of no more than 2000 birds, the census is taken by actually counting each nest. Because the birds nest in pairs, the researchers double the number of nests to get the total number of adults in the colony. A counting crew visits each colony twice between the period of maximum laying and hatching for that particular species. Birds that habitually nest together—such as the Sandwich Tern and the Royal Tern—cause added difficulties for the census takers. Their laying seasons may be radically different.

In larger colonies, Parnell and Soots may use the strip census. All the nests within a certain diameter strip are counted. Soots adapted another technique used widely by foresters to measure volumes of timber. Called the point center technique, it seems to work if the nests in a colony are randomly scattered throughout the site.

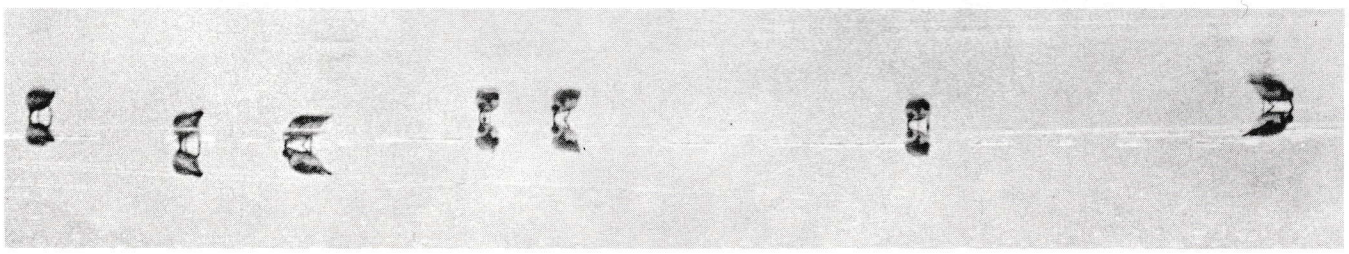
'Heronries are a fit'

But it is not always easy going. They have found no suitable method for estimating the heron population. "The heronries are a fit," said Parnell. "They are absolute chaos. You might have nine different species in two dimensions. You have to climb trees and crawl on your hands and knees."

To make matters worse, young herons will regergitate on anyone who disturbs them. And there are two or three types of herons sometimes nesting together whose eggs are too similar to distinguish under field conditions. The counting process is compounded by the problem that if the adult birds are frightened away from their nests for long periods of time, the eggs may become overheated from exposure to the sun. So the counting in colonies where adult birds are likely to leave their nests must be done within an hour. That group includes most of the birds who nest on the ground.

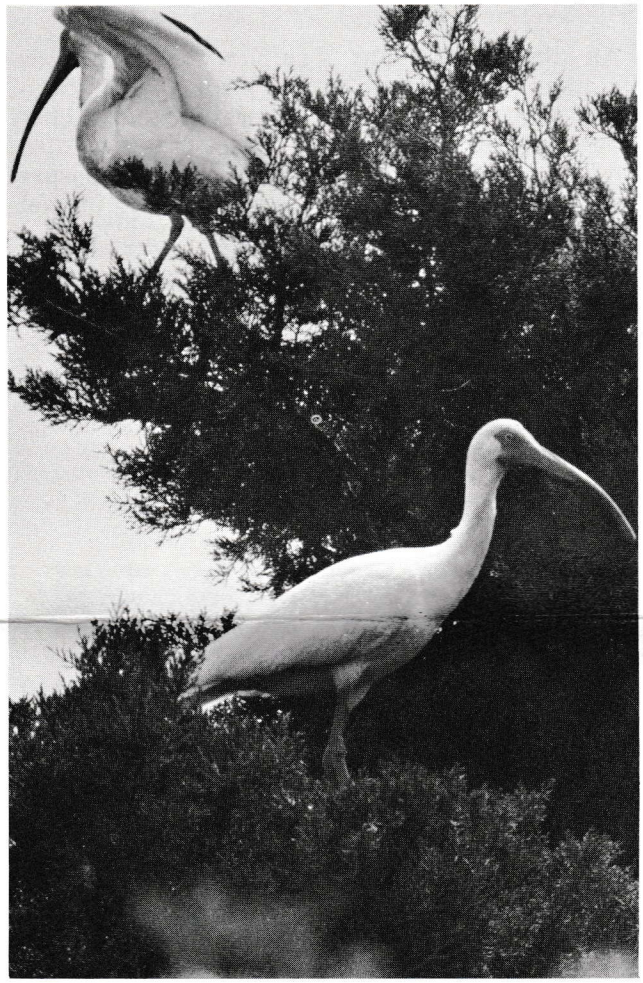
Last summer Parnell and Soots counted 11 species of long-legged waders—the herons, egrets and ibises. The most common bird in this group was the White Ibis, which had about 3000 nests. The Louisiana Heron and the Cattle Egret weren't far behind, with about 2700 and 2400 nests respectively. About 90 percent of the total of 27,000 birds in this category nested in man-modified sites, mainly on dredge islands.

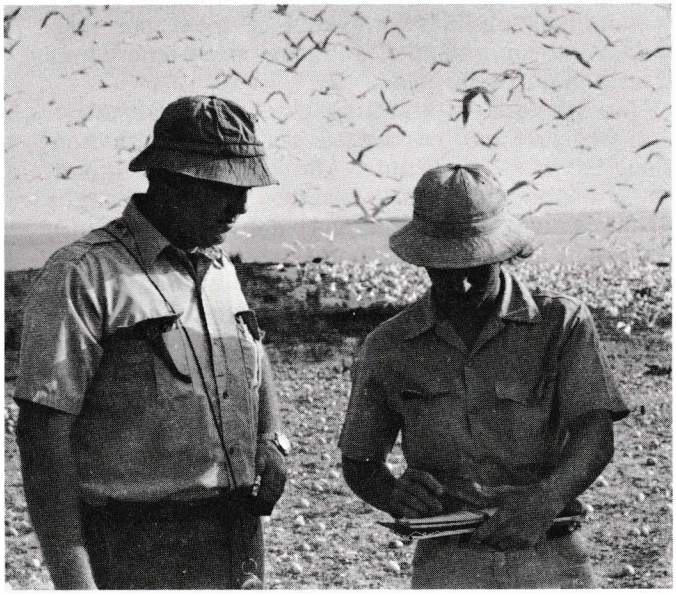
(See "Census-taking," p. 6)



Clockwise:

Nest in an Emerald Isle heronry
Bob Soots and Leon Jernigan taking a census
Common tern eggs in nest
White Ibis on Battery Island





The plight of the least tern

The bird that is causing ornithologists the greatest concern on the North Carolina coast now is the Least Tern. The smallest of the terns, the Least Tern habitually nests on the beaches, where it is exposed to the hazards of encroaching development, tourists and fishermen.

This little bird seems to be suffering all over the country. One race of Least Terns on the West Coast has already been placed on the California and federal registers of endangered species. In North Carolina, the Least Tern falls into the official category of special concern, which is one step short of a threatened species.

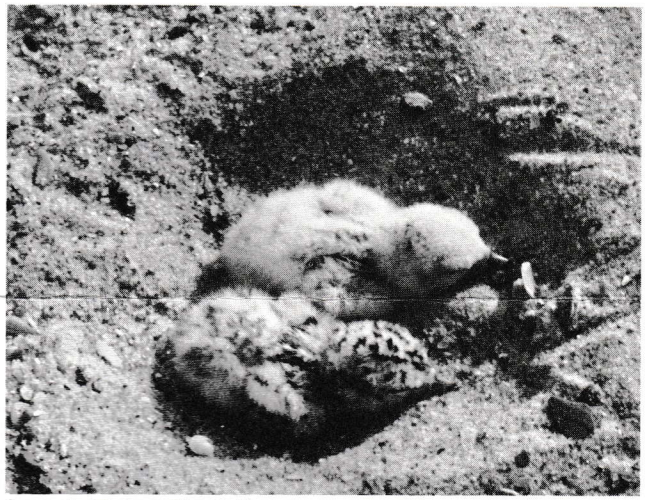
Leon Jernigan, a graduate student at NCSU, is rapidly becoming North Carolina's expert on the plight of this bird. Jernigan has been working with Sea Grant-supported researchers Jim Parnell and Bob Soots to study the size of the Least Tern population. He is also studying the bird's requirements for suitable nesting sites. When he completes his research this summer, Jernigan expects to be able to propose management techniques that might increase the size of the colonies in the state.

The Least Tern requires a bare, sandy area with little or no vegetation for nesting. In the past it has nested largely on the barrier islands and coastal beaches. It has been slower than many other species to turn to the safer habitats on dredge islands. But now an estimated two-thirds of the population nests on dredge islands. There are more suitable dredge islands that are not being used, Jernigan points out.

The Least Tern is most vulnerable during its nesting season, which can stretch from the first of May until the end of July. The female usually lays two inch-long eggs directly on the sand. The eggs have a 19- to 20-day incubation period. It is 21 days before the hatched fledgling can fly. Because they are well-camouflaged, the eggs and the young are often destroyed by vehicles and people.

Like many other birds, adult Least Terns will fight to protect their nests. Though they will leave their nests when frightened, they often dive at or excrete on people who disturb them. Such defense methods are ineffective when the enemies are the four wheel drive vehicles driven on the beaches. In recognition of this problem, the U.S. Park Service posts signs at the Cape Hatteras National Seashore which read: "Terns Nesting: Do Not Disturb."

Jernigan also points out that pets can be a problem for nesting terns. One dog could easily wipe out a colony of 15 terns, he said. In rare cases, vandalism is the cause of a colony's ruin. Sometimes people collect the eggs they find lying on the sand. "Most people have a concept that birds nest in a tree in a regular nest. I don't think they realize that an egg in the sand can be a nest, too," Jernigan said.



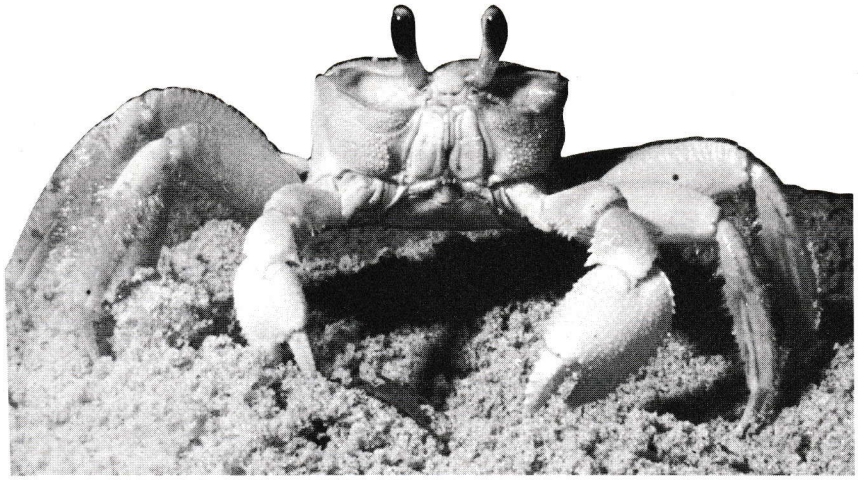
Least Tern fledglings are well-camouflaged in their sandy nest.

Foul weather hits the Least Tern hard. Last summer's rains took heavy tolls among the colonies. Many nests were washed out and adult pairs laid as many as three separate sets of eggs in an effort to reproduce.

Last summer Jernigan counted about 1500 nests in 79 colonies on the coast. He believes that figure may be somewhat inflated because some colonies moved and may have been counted twice. Still, it's a low figure when compared with statistics on other terns. The population of adult Royal Terns, for instance, was about 17,000 birds—in only seven colonies.

The Least Tern has had a rough history in the United States. Along with several other birds, it suffered a severe decline in the late 1800s when it was hunted widely. Its plumage was popular for ladies' hats. At the turn of the century a law was passed prohibiting killing of the birds.

Jernigan believes that a few compromises on the part of people who use the coast would aid in the Least Tern's recovery. Four wheel drive vehicles would do very little damage to the colonies, he contends, if people would drive them only on the first berm of the beach. Colonies usually nest against or behind the dunes. He also suggests that known nesting sites be posted during nesting season and that, if possible, traffic be routed around them. Dredge islands now being used by Least Terns must be maintained so that they do not develop too much vegetation.



Stalking the ghost crab

For the past three summers Tom Wolcott has been chasing ghost crabs up and down the beaches of North Carolina. Armed with a transistor radio and a starlight telescope, he works from dusk to dawn.

Wolcott, assistant professor of zoology at North Carolina State University in Raleigh, developed a consuming interest in ghost crabs (Ocypode quadrata) when he moved to North Carolina five years ago. "The question I asked in the beginning was 'Just how important are these guys?' " he explains. In order to find out, Wolcott had to determine what the ghost crabs eat.

"So I spent a lot of time walking up and down the beach stalking every crab that was eating and then stopping to see what he was eating," said Wolcott.

These strange antics have resulted in some surprising discoveries about the ghost crab's place in the food chain of the beach. Wolcott contends that the ghost crab is not the scavenger it was once believed to be. Until recently, it was assumed that ghost crabs picked their meals from rotting seaweed and trash which washed up high on the dry sand.

But Wolcott believes that the crab disdains such fare. What he found after many nights of observation was that these creatures spend all their feeding hours below the drift line, digging for the other two crustaceans on the beach—the coquina (butterfly clam) and the emerita (mole crab). In fact, Wolcott's studies have shown that the ghost crab consumes half or more of the population of both species. That makes it the biggest predator on the North Carolina beaches.

The ghost crab probably got its name from its habit of scampering silently across the beach at night and disappearing into a hole in the sand if threatened. During the day crabs stay in their individual burroughs underground. At night they come out to feed.

Early in his studies, Wolcott did a burrough census and discovered that the crabs are very numerous on North Carolina's beaches. During the summer months as many as 20 crabs may inhabit a one-meter wide swatch of the beach from the dunes to the ocean. "That's dull work, I tell you—counting every hole on the beach," Wolcott observed.

So far, most of Wolcott's work has been done on 50-meter wide stretches of beach at Shackleford Banks and Ft. Macon State Park. During the summers he relocates at the beach, using an office at the Marine Fisheries Lab in Beaufort. He takes with him his research vessel, affectionately called the "RV Sears," a 12-foot plastic boat.

But more important than the boat in his tracking of crabs are the tiny transmitters Wolcott makes. At about dusk on observation nights, he traps two or three crabs and tapes the transmitters to their backs. The equipment gives out rhythmic signals which Wolcott picks up on his souped-up transistor radio. Perched high on a dune, he can locate the crabs and observe them with his starlight telescope. The telescope amplifies light so that he can see the crabs from a distance.

"You can drive yourself crazy doing that. One crab may go 300 meters one way, while another scampers 100 yards in another direction," said Wolcott.

The ghost crabs do not seem to have any natural predators on the North Carolina beaches, though they are occasionally cannibalistic. Wolcott suspects that racoons might be interested in eating ghost crabs, but he can find no racoon tracks on the beach.

This particular species of crab ranges from Rhode Island to Brazil. The top weight of crabs in

(See "Ghost crabs," p. 6)

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Ghost crabs: Beach predators

(Continued from p. 5)

this area is about 40 grams. If an average-sized crab (about 20 grams) is allowed to eat all it wants, it would consume two grams of meat per day. That's the equivalent of one good-sized emerita or about a dozen coquinas.

One of the most startling pieces of information that Wolcott has uncovered has to do with how ghost crabs obtain water. After October the ghost crabs disappear from the beaches. Their burroughs close over with sand and they don't bother to dig out again until May. Nobody knows exactly what happens to them.

Wolcott contends that they don't eat during this time. But they must have water. In testing the crabs, he discovered that they can get all the water they need from the moist sand. They use their setal tufts to extract water and then suck it into their brachial chambers.

"They are sucking, which we all know crabs can't do," chuckled Wolcott.

Census-taking will Result in bird atlas

(Continued from p. 2)

The census revealed 12 species of ground nesters in the coastal area. There were 76,000 birds all together and about 83 percent of them nested on dredge islands. The most abundant of these was the Royal Tern, with over 16,000 nests. The most rare was the Great Black-backed Gull which is just beginning to nest in North Carolina.

Parnell and Soots have also found some surprises in their research. Until they started work, no one knew that there were any Herring Gull colonies in North Carolina. The researchers discovered a colony of over 300 pairs of birds. Forsters Terns, Caspian Terns and Great Black-backed Gulls were also recorded for the first time in North Carolina.

An abnormal amount of rain on the coast made last summer a difficult one for birds and ornithologists. Many of the birds that nest on the beaches were repeatedly washed out. "A lot of herons died last summer. We found the young dead of exposure by the dozens. They just can't make it in wet weather," Parnell noted.

Parnell and Soots are hoping for average weather this summer so that they can complete their census. They will compile the final statistics into an atlas of maps, pinpointing the locations of various colonial bird colonies on the coast. The maps will be valuable for local governments, developers and bird lovers.

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