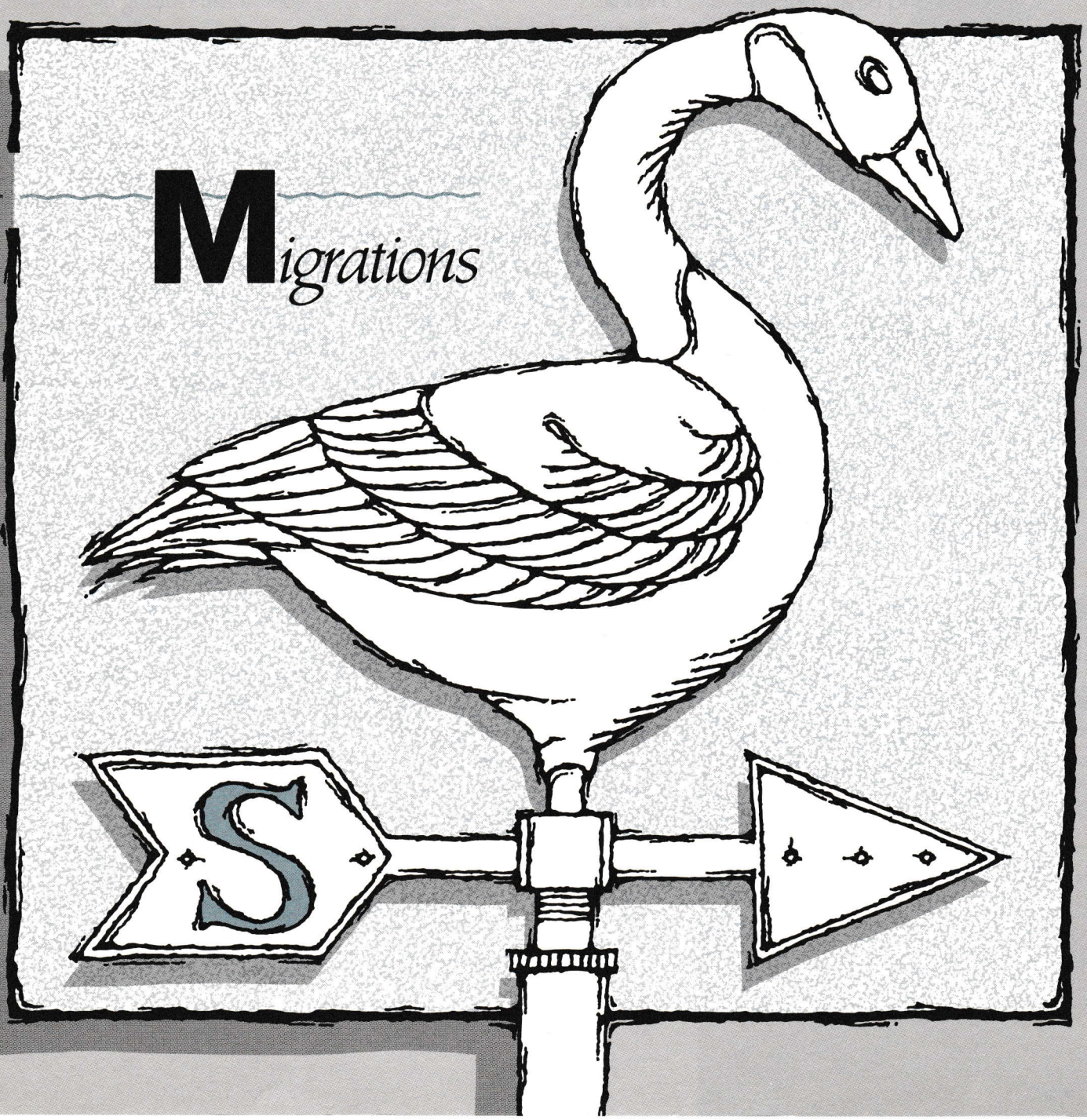
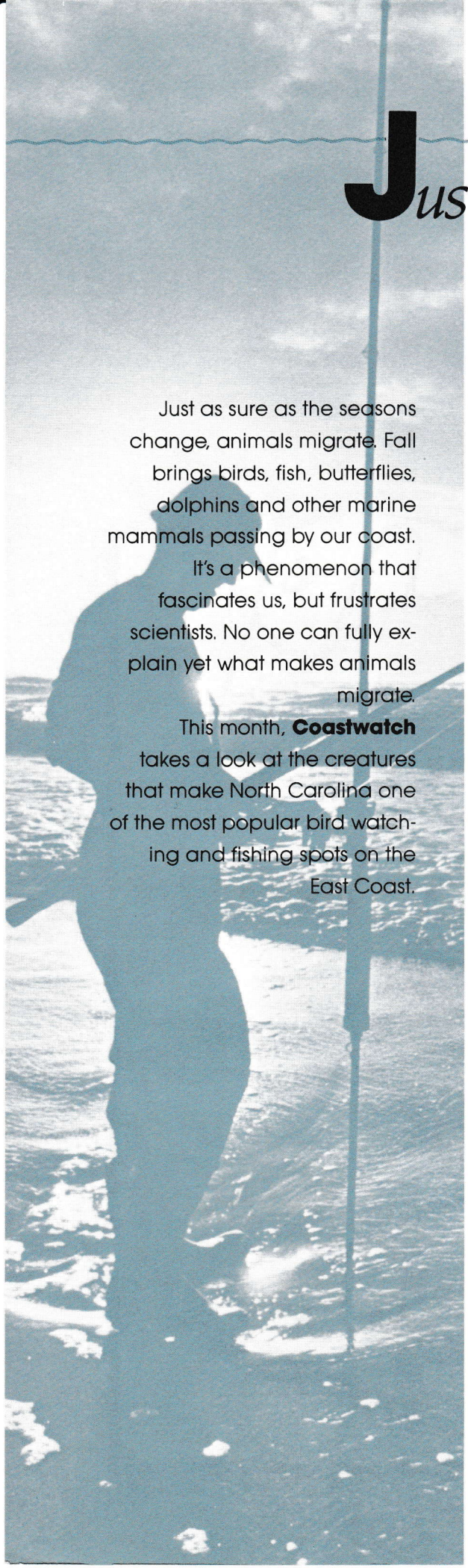
UNC Sea Grant

October 1988

# COASTWATCH





# Just Passing Through

By Sarah Friday

Just as sure as the seasons change, animals migrate. Fall brings birds, fish, butterflies, dolphins and other marine mammals passing by our coast. It's a phenomenon that fascinates us, but frustrates scientists. No one can fully explain yet what makes animals migrate.

This month, **Coastwatch** takes a look at the creatures that make North Carolina one of the most popular bird watching and fishing spots on the East Coast.

Ask any North Carolina fisherman his favorite time of year and chances are he'll say the fall.

The weather's cool, the crowds are gone and, of course, the fish are running. Thousands of mullet, blues and mackerels pass by the coast like tourists on the way to Florida.

But ask a fisherman why the fish migrate this time of year and the answers are not quite as clear.

Some say it's temperature changes in the water. Others say it's to spawn, or to find new sources of food.

Scientists seem just as perplexed. Countless theories ranging from celestial navigation to magnet-like "compasses" in a fish's snout attempt to solve the mystery.

Still another school of thought suggests the key to migration may be related to light and a fish's hormones.

While scientists search for answers, angler Harvey Elam waits in the surf off Bald Head Island for a run of red drum.

"It's a fisherman's dream when you catch a 30- to 40-pounder," Elam says.

Sometimes in the fall Elam can snag a drum up to 55 pounds. The fishing's best from mid-September to mid-October, he says. And he doesn't miss a day.

In more than 40 years of fishing, Elam's learned the ebbs and flows of North Carolina's migrating fish.

And there are plenty of them here.

"North Carolina is geographically located where we see a lot of northern species of fish, a lot of southern species of fish and some tropical fish," says Sea Grant advisory agent Jim Bahen.

The warm waters of the Gulf Stream keep the larger and more tropical fish cruising by the state most of the year, Bahen says.

For other species, "The fish basically come about the same time of year," Elam says. In the fall, fish such as swordfish, bluefish and tuna bypass North Carolina on their way south to Florida.

"You know they're coming," Elam says. You wait and watch for the schools, he adds. You know you've hit one when you start catching one fish after another.

In the spring, offshore species swim to cooler waters off the coasts of New Jersey, Maryland, Virginia and other more northern states.

A round trip for larger fish such as tuna, marlin and bluefish can cover as much as 1,000 miles, says Charles Manooch, a research biologist with the National Marine Fisheries Service in Beaufort.

But migrating doesn't always mean a north-south trek. Inshore species such as menhaden and cobia take a different route. Some saltwater fish classified as anadromous species migrate from the ocean to fresh water. Catadromous fish, or freshwater fish, move out to sea—most often to spawn.

Manooch and fisheries agent Jim Bahen agree spawning plays a major role in North Carolina's seasonal fish migrations.

"Herring, striped bass and sturgeon migrations are strictly based on spawning," Manooch says. Other species like spot, whiting and croaker make their moves to spawn, too, Bahen adds.

Most fish spawn over a large geographical area and over a long period of time, so it's hard to pinpoint details on each species. But fisheries experts realize healthy spawning grounds such as North Carolina's estuaries and natural and artificial reefs are vital.

"If we lose those," Bahen says, "we'll see a decline in the species."

Food may be another reason fish migrate. When larger species detect that their food sources of smaller fish are moving on, they follow them.

But North Carolina has plenty of food fish year-round, Bahen argues. "Something triggers that inner clock and says you better start moving south."

It's water temperature, say most fishermen.

Fish are cold-blooded, explains Sea Grant agent Bob Hines. When the water gets too hot or too cool, they move to an area where it's more preferable, he says.

"The water temperature is the key," Manooch says. "There are preferred water temperatures for all species. They stay in the water temperature they want."

King mackerel, for example, like 65- to 70-degree water. Bluefish like the thermometer to read 68 degrees.

Most fish such as tuna, billfish and blues have about a 7-degree range of water temperatures they favor, Manooch says.

Other theories suggest imprinting or certain scents lead fish home. Stars may play a part for some other fish. And one West Coast researcher is testing the correlation between magnetism and migration with fish that have bits of magnetite in their snouts.

Environmental changes and reproduction are the two primary motives for migration, says Bori Olla, a fish behavior scientist at the Cooperative Institute for Marine Resource Studies in Newport, Oregon.

If conditions for fish or any other animals are constant and food is plentiful, they don't need to move, Olla says. But if a fish could not survive in one place because of temperatures or a change in its food source, it is selectively advantageous for the fish and its species as a whole to migrate.

Bluefish, for example, migrate south in the fall to escape low water temperatures and scarce food sources. They travel where they can "get more energy from the environment," Olla says. This leads to higher productivity and larger populations.

His research in Sandy Hook, N.J., and in Oregon points to temperature and light as the forces that trigger migration.

"We're pretty sure light—day length—becomes a signal to the animal," Olla says.

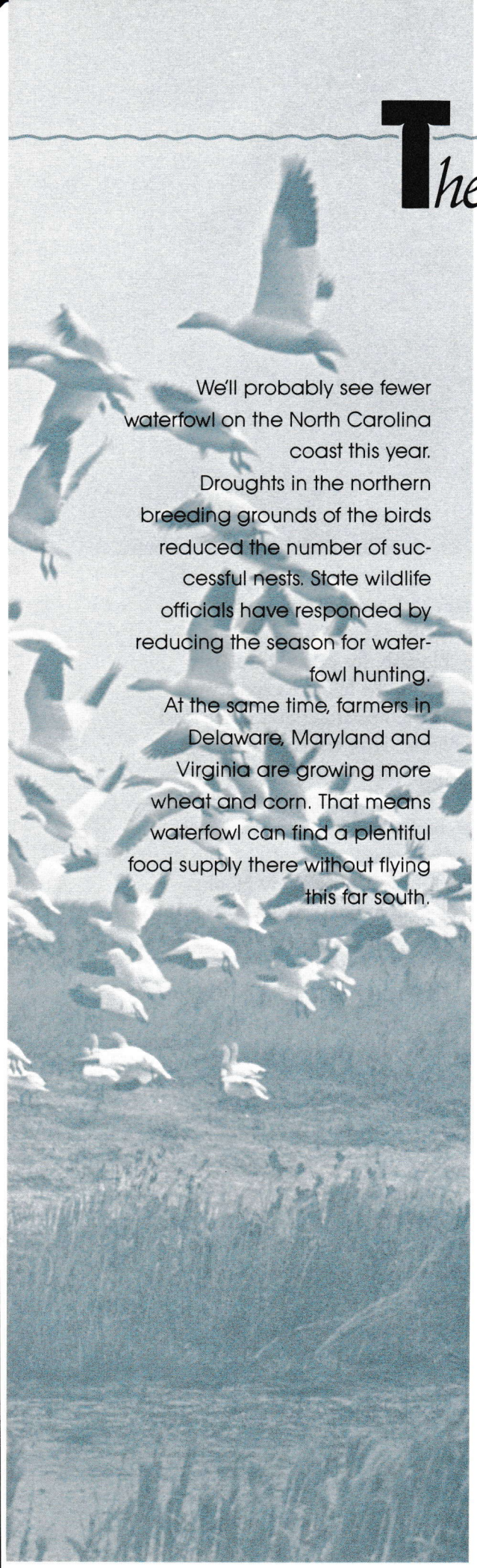
Since the 1920s, researchers have known that the time animals are exposed to light invokes hormonal changes. Somehow that link between light and hormones triggers migrations.

The right combination of light and temperature spurs the fish to move.

While scientists search for answers, angler Harvey Elam waits in the surf off Bald Head Island for a run of red drum.

# The Carolina Flyway

By Nancy Davis



We'll probably see fewer waterfowl on the North Carolina coast this year. Droughts in the northern breeding grounds of the birds reduced the number of successful nests. State wildlife officials have responded by reducing the season for waterfowl hunting. At the same time, farmers in Delaware, Maryland and Virginia are growing more wheat and corn. That means waterfowl can find a plentiful food supply there without flying this far south.

For 10 days in the early fall, the sandpiper gorged herself on the crustaceans that were so abundant that time of year in Canada's Bay of Fundy.

She ate so much, in fact, that she nearly doubled her weight.

She would need the energy. She was about to make a non-stop, intercontinental flight to Surinam on the North Coast of South America.

This trip was just for the girls. The rest of the flock would fly down later on a series of much shorter trips.

It's the same every year.

After nesting in the spring and molting in the summer—both energy-demanding activities—these and other birds of passage go on a binge to build up a layer of fat that will provide them with enough fuel for a long trip South.

Then, as the days grow shorter and temperatures get cooler, they get restless to spread their wings.

But what finally sends them packing is a cold front.

The barometric pressure drops and the wind changes direction. They can always count on a good tail wind when a front passes through.

Each year about this time, millions of birds travel from their breeding grounds in the northern United States and Canada to wintering spots in the southern United States or South America, says James Parnell, an ornithologist at the University of North Carolina at Wilmington.

And since coastal North Carolina is in the flight path of many of the migratory birds, the state's beaches and the skies overhead are usually flooded with transients this time of year.

But even though ornithologists can predict almost to the day when certain species will arrive on our coast, they say it's much harder to say **why** they arrive. Obviously, the birds have it figured out, they say. But scientists are still guessing at what makes birds pick up and move on, year after year, often to the same place.

Ornithologist Tom Quay says that birds don't "know" that it's time to migrate. Instead, they "sense" it, he says. "It's an innate, internal, annual mechanism," he says. "It's a built-in response to the weather and climate."

The need to eat also plays a part, says Jeff Walters, a North Carolina State University ornithologist. "For any animal, migration is tied to the food supply. If the feeding conditions change enough so that survival is better in a new area, they'll move on. And birds are real mobile. They can cover such long distances so cheaply in terms of food, it pays for them to move," Walters says.

Parnell has another perspective. "Essentially, birds migrate for the most part from a difficult, harsh winter environment to one that is less difficult," he says.

Whatever the reason, most birds in the Northern Hemisphere migrate in the spring to nest and in the fall to pass the winter.

When it comes time to move south, birds seem to have a meteorological sense about them, Walters says. "Birds are incredibly sensitive to weather conditions. In the fall, they look for a cold front because the winds are usually north/south at the leading edge of a cold front. And the temperatures change at the edge of the front, and the birds sense that," Walters says.

"Then everybody who's fat enough takes off," he adds.

Those north/south winds are partly responsible for North Carolina's popularity with birds. And since our coast is oriented from northeast to southwest, the winds help sweep vast numbers of birds to our shores, Quay says.

For beachgoers, the fall months are a perfect time for bird-watching. There are good locations all along our coast for catching a glimpse of migrating birds, Quay says.

There's no major peak of migration along the Carolina coast in the fall. Instead, you're likely to see birds overhead throughout August, September and October, especially a day or two after a cold front.

Shorebirds, such as sandpipers and plovers, are early arrivals, beginning to move into the state around mid-July.

Colonial waterbirds, including pelicans, gulls, terns, herons and egrets, may stay in the state all winter. But if a hurricane or northeaster blows in, they're likely to head farther South, Quay says.

Waterfowl, including ducks, geese and swans, are regular visitors to the Carolina coast in the winter. Expect to see them during the full moons of October and November, particularly behind a cold front, Quay says.

And there's a heavy migration of hawks, including the endangered peregrine falcon and the bald eagle, along the Carolina coast and the Blue Ridge Mountains.

But when they travel, birds of a feather don't always flock together.

Adult sanderlings, for example, migrate ahead of their young.

But for waterfowl, migrating is a family affair. They all fly south together.

On the other hand, some of the flocks you see overhead aren't quite the tight-knit group they seem. Warblers, for example, don't form special bonds when they travel, Walters says. "Everybody's on their own. They'll join one group one day and another the next. They don't have any migration buddies. Those flocks are just anonymous mobs."

Ornithologists aren't sure how birds navigate. But Walters says they believe birds may use a combination of the sun, stars and magnetism.

Waterfowl, for example, migrate by day, leading experts to believe they may use the sun and topographic memory to guide them on their travels.

But for landbirds, it's a fly-by-night affair. Perhaps they use the stars to guide them.

Even more amazing are the distances migrating birds travel.

If you think the 26-mile marathon is an amazing feat, consider the two-day flight of some shorebirds from the Bay of Fundy in Canada to South America.

Walters estimates some birds are able to fly 20 to 40 mph. Add the help they get from the wind, and they may be moving even faster.

Migrating isn't always a vacation.

The weather, the long trip and the uncertainty of travel make for a tough life.

Storms can blow birds off course. On a recent boating trip to the Gulf Stream, Walters noticed an exhausted warbler taking a rest on the boat.

And with the country becoming more and more developed, birds are running into even more problems—literally.

Skyscrapers pose special problems. For example, it's not unusual to find as many as 2,000 dead birds at the base of a high-rise in Chicago during migrating season, Walters says.

After a long migration, the birds are understandably weary, Walters says. And that makes them vulnerable prey.

"You'll see housecats around town just loading up on migrating birds," he says.

# An Eye For Birds

If you've ever driven through coastal North Carolina in the fall, you've probably caught yourself gazing at the flocks of birds that fill the sky.

You may not have been able to identify them, but that doesn't matter. You were bird watching all the same.

That's how Bob Hader, a retired professor of statistics from North Carolina State University, got started.

Hader has been bird watching since 1959 when he built a house near what was then the outskirts of Raleigh. Birds flocked to his heavily wooded yard in such numbers that he bought a bird book and binoculars.

Since then, Hader has turned a hobby into a passion. He's traveled the country looking at birds. For 15 years, he organized the Audubon Society's Christmas count of birds in the Raleigh area. And he's even written a pamphlet, *Checklist of Birds for Raleigh*.

He's not a scientist or a photographer. And he's not out to add one more bird to his list of sightings.

Instead, Hader takes pleasure in just watching, identifying and enjoying birds.

"Birdwatching is a recreation for me. It's a way to be outdoors, get some exercise and do something interesting," Hader says.

"A lot of birders enjoy listing birds. I'd sooner go to the area just to see what's there," he says.

Coastal Carolina is one of Hader's favorite places for watching his feathered friends.

"In the fall, you'll see plenty of shorebirds. And if you're lucky enough to get down there after a cold front, you'll see plenty of landbirds and hawks," Hader says.

Lake Mattamuskeet is a prime spot for watching waterfowl. But he warns, "Get there before the hunters do."

Hader does much of his bird watching by car, stopping every now and then to scan the horizon with his binoculars or telescope.

If you're interested in bird watching, Hader has some simple advice. You don't need a lot of fancy, expensive equipment, he says. Inexpensive binoculars will do.

Then check your local bookstore for a good guide to birds.

The N.C. State Museum of Natural Science's Tail of the Whale Bookstore offers this selection:

*Birds of the Carolinas*, by Eloise F. Potter, James F. Parnell and Robert P. Teulings, $14.95.

*Autumn Land Bird Migrations on the Barrier Islands of Northeastern North Carolina*, by Paul W. Sykes Jr., $5.

*Checklist of North Carolina Birds*, a pamphlet by David S. Lee and Eloise Potter, $.25.

*Checklist of Birds for Raleigh*, a pamphlet by R.J. Hader and Harry LeGrand, $.25.

The books and pamphlets are available by writing the museum. Please include 5 percent sales tax and $1 for handling and postage. Write to: Tail of the Whale Bookstore, N.C. State Museum of Natural Science, P.O. Box 27647, Raleigh, NC 27611.

# THE BACK PAGE

*"The Back Page" is an update on Sea Grant activities—on research, marine education and advisory services. It's also a good place to find out about meetings, workshops and new publications. For more information on any of the projects described, contact the Sea Grant offices in Raleigh (919/737-2454). For copies of publications, write UNC Sea Grant, NCSU, Box 8605, Raleigh, N.C. 27695-8605.*

Andy Wood had heard of playing volleyball or an occasional game of baseball on the beach. But until Sept. 24, he'd never heard of beach bowling. Wood, one of the regional coordinators for Beach Sweep '88, said volunteers for the cleanup found a bowling ball from Brazil on Wrightsville Beach.

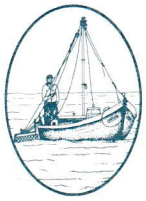
The ball was one of the more curious finds gathered during Beach Sweep. Altogether, volunteers collected more than 47 tons of trash during the four-hour cleanup. Items ranged from plastic bottles and bags to lawn chairs and mattresses.

Beach Sweep '88 brought 3,500 people to North Carolina's coast, three times the number from last year's cleanup. As volunteers cleared the beaches from Duck to Sunset Beach, they recorded each piece of trash on data cards. Final tallies will be made by the Center for Environmental Education and the Environmental Protection Agency in Washington, D.C.

"From all accounts, Beach Sweep—coastwide—was a major success," says Lundie Spence, Sea Grant's marine education specialist and one of the coordinators for the event. "The volunteers were really enthusiastic," she added. And, "The public support and the media were outstanding."

Spence also noted that some volunteers who had participated in Beach Sweep '87 said that many of the public beaches were cleaner this year. One reason may be new trash cans, but Spence says greater public awareness may have helped, too.

The wild, more isolated areas such as Shackleford Banks and Masonboro Island, however, have not improved, Spence says. And for her, that's all it takes to start planning Beach Sweep '89.



From time to time, *Coastwatch* spotlights some of Sea Grant's research. We want our readers to know more about the problems Sea Grant scientists are trying to solve. But we also want you to know about the benefits of Sea Grant research and extension programs.

This month, *Coastwatch* begins a new series of reports in "The Back Page" that will bring you up-to-date on the results we've achieved with our program.

Before Sea Grant marine agents organized the first North Carolina Commercial Fishing Show, the state's fishermen did not have accessibility to new developments and technologies in the industry.

Now, the annual show features more than 60 exhibitors demonstrating the latest in fisheries technology and a series of seminars on fishery trends and techniques.

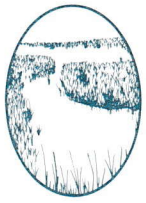
The show generates more than $1 million in sales for its exhibitors. And in 1987, the Carteret County Waterman's Association assumed control of the show, enabling them to make a profit that will support their activities.

Sea Grant agent Bob Hines became a "First Mate" this summer without even stepping on a boat. Hines received the "First Mate of the Year Award" from the Carteret County Waterman's Association at a dinner in his honor in July.

The group of Eastern North Carolina fishermen also presented Hines with a VHF radio scanner at the dinner in Morehead City.

Hines was recognized for his support of the association and his work with the North Carolina Fishing Show. Hines started the show in 1982 and has continued to serve as a coordinator until this year.

"We are deeply appreciative of Bob's help in guiding us to the point where we are able to be primary sponsors of the show," write the watermen in their August newsletter. "The N.C. Commercial Fishing Show has been a huge benefit to the Carteret County Waterman's Association. It has opened many doors for us, and established us in the community as an organization."



Meadows of seagrass line the bottom of North Carolina's sounds and tidal creeks. These grasses provide food and protection for the state's young fish, and they contribute to the health of our estuaries.

Two types of seagrasses grow in North Carolina's sounds—northern eel grass and southern turtle grass. Both are flowering plants with small yellow buds enclosed in jelly-like sheaths. Each plant can produce 500 to 1,000 seeds each season. Fish and waterfowl pick and eat the seeds for food. Some seeds are buried by mud-burrowing organisms. The seeds that survive sprout into mature grasses in about two years.

Large seagrass beds are an underwater world of activity. Young scallops find shelter at the base of the leaves. Sea horses wrap their bony tails around the long, slender blades. Juvenile fish dart through the grasses to find food and protection from predators. Millions of burrowing animals such as shrimp, worms and small crabs dig about the roots. And myriads of microscopic plants and animals attach to the blades forming the base of a food web.

The productivity within the seagrass beds is vital to the health of our estuaries. But seagrasses are in trouble.

Once-healthy beds along the East Coast and around the world are dying. The huge grass beds of Chesapeake Bay, for example, have almost disappeared. Where seagrass habitats have declined, so have important fisheries and the number of visiting waterfowl.

Two Sea Grant scientists want to study North Carolina's seagrass beds before it's too late.

*Continued on next page*

Joanne Burkholder and Larry Crowder speculate that an overabundance of nutrients such as nitrogen and phosphorus causes excessive amounts of algae to grow on the plants. The algae shades the grasses from the sun and photosynthesis is slowed. Eventually the grasses die. The researchers also will test the correlations between small grazing marine animals and the algae.

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