



# Coastwatch

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**E**verything in nature is related to everything else.

People are an integral part of the scheme of things. That's why it's important to understand the cycles of nature, the ebbs and flows of mechanisms that have repeated themselves for millions of years.

This month, *Coastwatch* takes a look at one of these processes—the annual winter migration of infant fish from the warm waters of the Gulf Stream into North Carolina's estuaries.

We examine the estuaries and explore how they work in the natural scheme. We also look at man's influence on this fragile coastal process.

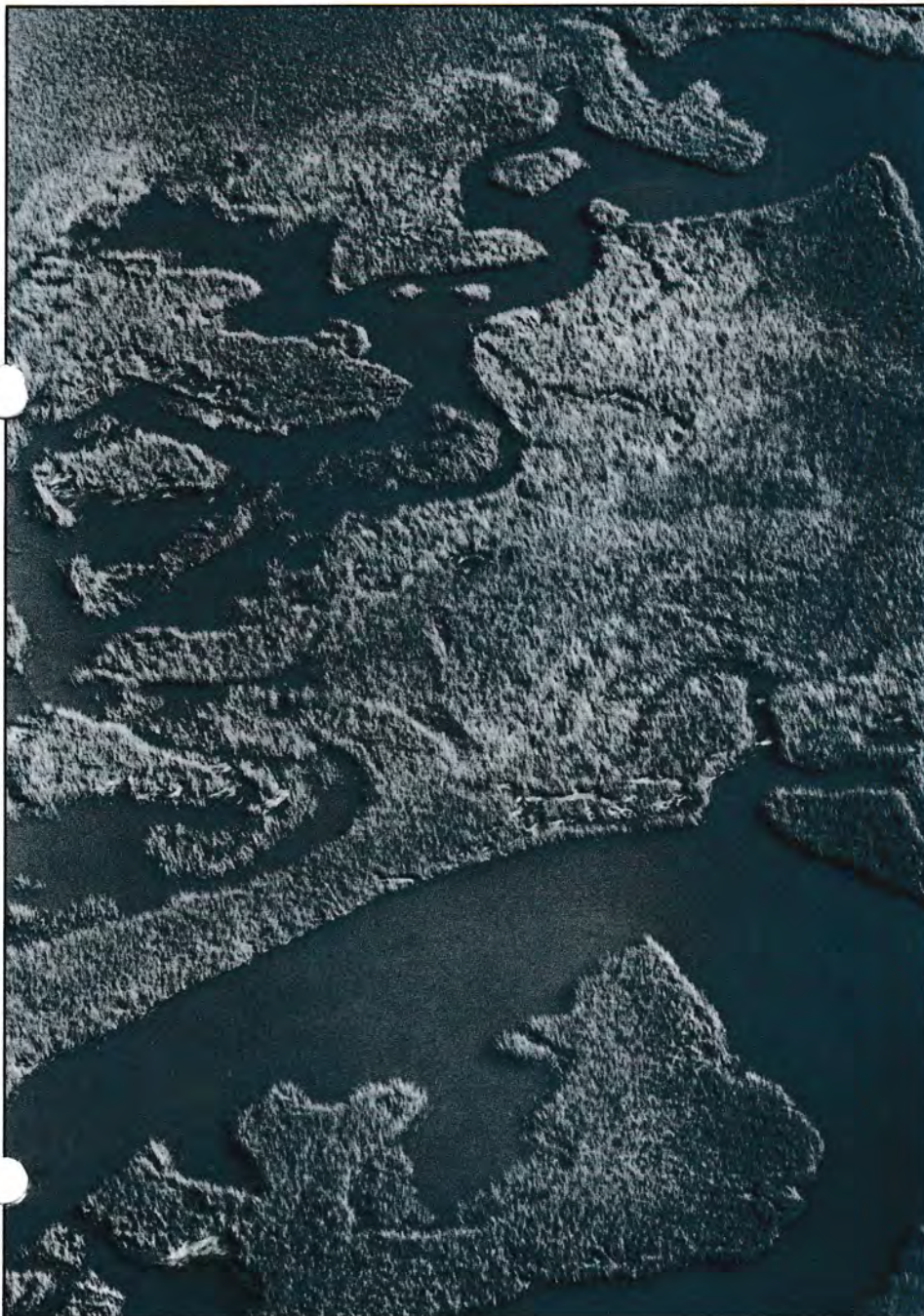


Photo by Scott Tye





# Amazing Journey Into

By C.R. Edgerton

**U**nder the cool night sky off Ocracoke Inlet, several fishermen keep a vigil, casting their lines again and again into the foamy surf.

Silhouetted by the moon's orange glow, they catch spot, croaker, flounder.

They've spent uncounted nights here, relishing the salt air in their lungs and the spray of surf in their faces. They figure they know all there is to know about fishing in Ocracoke Inlet.

But they don't.

Just beyond their heavily weighted lines, a mysterious process unfolds in the open sea.

A dynamic merging of water, wind and currents prompts the migration of millions of recently hatched fish from the warm waters of the Gulf Stream, through the inlet and into the calmer waters of Pamlico and Albemarle sounds.

Within this migration are the infant spot, flounder, croaker and other fish that one day might dangle at the end of an angler's line. Yet, most fishermen don't know the migration process or how important it is to life in the sea.

Nor do they realize that the numbers of fish in the sounds may be traced to this migration.

Sea Grant researcher John Miller, a North Carolina State University zoologist, calls the winter migration of infant fish one of the most important biological events on the East Coast.

"People need to be aware that a great many of the most important species in the estuaries don't spawn there," Miller says. "They spawn offshore and migrate into the sounds through a quite remarkable process."

Miller says the fish involved in this annual migration account for a significant slice of the state's fishing economy, with menhaden topping the list in volume. About 90 percent of the fish caught in the state belong in this group.

The fish are spawned and hatched in early winter in the Gulf Stream and spend the next 60 days crossing the waters of the continental shelf. Currents toss them toward the Outer Banks with a fury, sometimes carrying the quarter-inch creatures four miles a day.

Sea Grant researcher Len Pietrafesa, an NCSU oceanographer, says the fish are ferried along by upwellings produced by the northward flow of the Gulf Stream. These twirling masses of undersurface water push toward shore carrying the fish to within a few

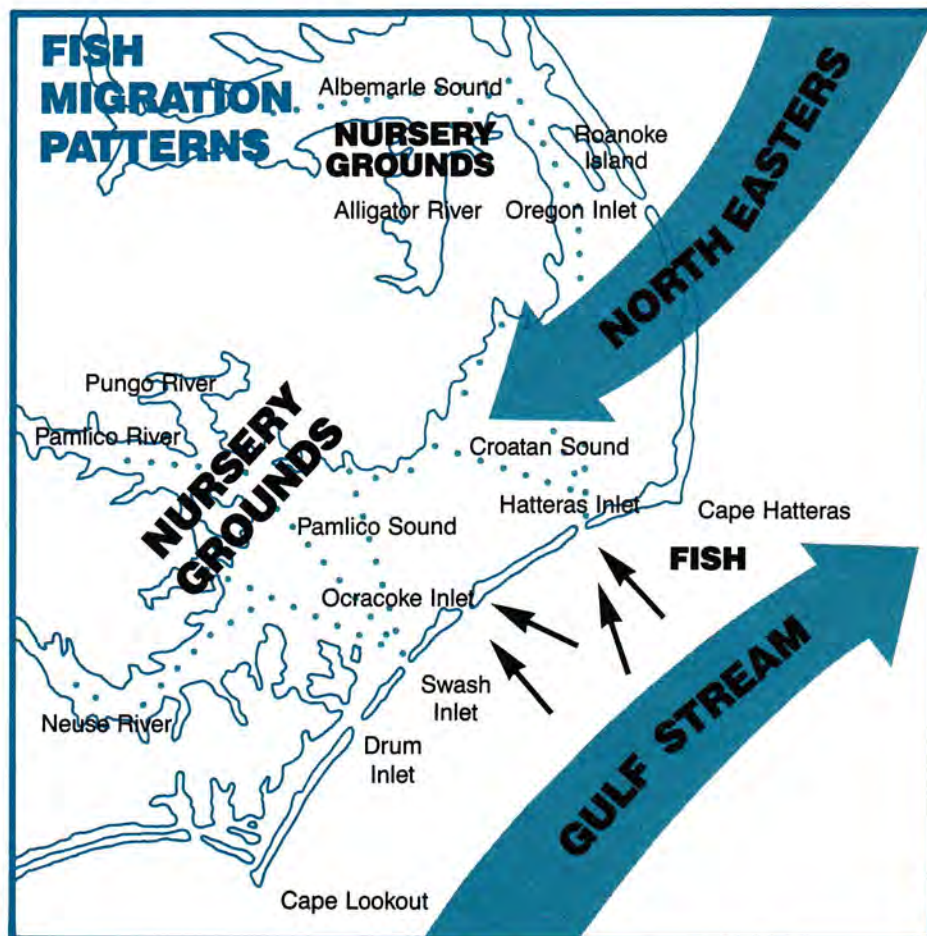
hundred feet of the Outer Banks.

As they reach the coast, the infant fish are carried along a "conveyor belt" of shoreline currents, Pietrafesa says. If luck is with them, those currents push the fish into Pamlico and Albemarle sounds through Ocracoke, Hatteras and Oregon inlets.

Millions of them squeeze through.

Inside the sound, these small creatures become part of yet another amazing combination of wind and water.

In winter, cold fronts blow in from the northeast every seven to 10 days, their winds pushing the water of the sounds toward the barrier islands. Gravity creates an opposite current in bottom waters, carrying the fish into the estuaries. There, they will grow and develop into adult fish.





# 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, Box 8605, NCSU, Raleigh, N.C. 27695-8605.



When North Carolina's shrimp fishermen haul in their nets, they usually catch more than just shrimp. Finfish and other sea creatures are caught with them.

For shrimpers, the bycatch can be a nuisance. Because they're only after shrimp, they cull the other fish and toss them back into the water. Some of the bycatch don't survive. Also, culling is time-consuming for shrimpers; and too much bycatch can reduce the quality of the shrimp catch.

But shrimpers aren't alone in concerns over bycatch. Fishermen who seek the species thrown overboard by shrimpers say reduced bycatch will increase the number of fish they haul in.

That's where Sea Grant comes in. Marine Advisory Service agent Jim Bahen and others are beginning to gather ideas from shrimpers on how their gear can be improved to separate finfish from shrimp nets.

Since November, some progress has been made. With the N.C. Division of Marine Fisheries, Sea Grant set up a bycatch advisory committee that held its first meeting December 12.

During the meeting, committee members compared notes on the status of bycatch research and agreed to hold a workshop later in the year.

Meanwhile, Bahen continues his investigations into ways to construct finfish separator devices that could reduce bycatch by 50 percent. He hopes to come up with at least three designs that will be tested in laboratories and on commercial shrimping vessels.

"The key to the project's success will be

the ideas we obtain while interviewing shrimpers," Bahen says. "Collectively, they have thousands of years on the water and I am confident we can use their suggestions to come up with a feasible design."



Landlubbers, let your senses explore the sights, sounds, tastes and feel of coastal North Carolina at the Second Annual Coastal Celebration in Raleigh. The two-day event will feature entertainment, educational exhibits, activities for the kids and authentic coastal fare.

You can hear champion goose caller Erleen Snow from Currituck and the rhythmic cadence of the Menhaden Chanteymen singers. For a feel for the coast, let your fingers do the walking at the marine touch tank. And let the smell of fried fish and Stump Sound stew lure you to pay the price of a good coastal meal.

And there's more.

The celebration will feature more than 40 educational exhibits. Sea Grant, the N.C. Wildlife Resources Commission, the N.C. Aquariums, the N.C. Maritime Museum and others will man exhibits that will teach folks what makes our coast unique.

And bring the kids. There will be special activities that will heighten your children's awareness of our coastal environment.

Sponsored by WRAL, the Coastal Celebration will be held in the Kerr Scott Building at the N.C. State Fairgrounds in Raleigh, April 7 from 10 a.m. to 6 p.m. and April 8 from 10 a.m. to 5 p.m. It's free and open to the public.

Stop by the Sea Grant booth. We'll be happy to tell you about our latest research and extension projects.

Working papers dealing with artificial reef programs and fisheries management policies have been published by Sea Grant.

*A Policy and Management Assessment of Southeast and Mid-Atlantic Artificial Reef Programs* by Sea Grant's Marine

Advisory Service Director Jim Murray examines artificial reef programs in 12 coastal states from Texas to New Jersey.

Murray describes the status of the artificial reef programs and provides recommendations to develop effective state policies for artificial reef management.

*A Methodology for the Analysis of Fishery Management Policies, with an Example of the North Carolina Brown Shrimp Fishery* by Marc-david Cohen uses mathematical models to help determine the best opening dates for the brown shrimp fishery.

Murray's paper is \$3 and Cohen's is \$3.50. To order copies, send a check or money order to UNC Sea Grant, Box 8605, North Carolina State University, Raleigh, N.C. 27695-8605.



The Indians had a great idea. When European colonists began to settle America's coastal areas in the early 1600s, they were intrigued by the Indian's use of fish as fertilizer. Contemporary observers noted that Indian farmers dropped a small fish into each hill of corn planted.

Sea Grant's Rich Novak, a regional marine specialist on Roanoke Island, has taken the idea of fish fertilizer a step further. He's used waste from a fish-cleaning operation to make a form of compost that's raised the eyebrows of at least one coastal vegetable farmer.

Novak says his compost pile serves two purposes: it provides good fertilizer for vegetables, shrubs and other vegetation, and it demonstrates that fish waste doesn't have to be dumped offshore or into area landfills.

The compost pile was constructed of a layer of oyster shells (gravel works well, too), a layer of PVC pipe for aeration, a layer of peat moss or cornstalks, fish waste mixed with peat or wood chips and a final layer of peat, cornstalks or chips. The pile was not turned during the composting period, which took from 40 to 75 days.

A video on the composting project has



been shown on a Norfolk television station. A copy of the video is available in Novak's office in Manteo. For more information contact Novak at 919/473-3937.

**S**ea Grant is looking for committed men, women and youngsters who want a cleaner, safer environment and who wouldn't mind turning that commitment

into positive action.

Site coordinators are needed for The Big Sweep '90, the annual statewide waterway cleanup scheduled for September 22.

If you know of a stretch of beach or a creek, river or waterway that isn't already under the watchful eye of a Big Sweep site coordinator, and you would like to lead a group of folks in cleaning it up, we want to hear from you.

For more information or to volunteer, contact George Norris, Streamwatch Coordinator, N.C. Division of Water Resources, Archdale Building, Raleigh, N.C. 27611. His telephone number is 919/733-4064.

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**Coastwatch is a free newsletter. If you'd like to be added to the mailing list, fill out this form and send it to Sea Grant, Box 8605, NCSU, Raleigh, N.C. 27695-8605.**

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**To help us specialize our services, please answer these questions.**

I am in the following line of work:

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|---|--|--|
| <input type="checkbox"/> Boatbuilding/repair    | <input type="checkbox"/> Homemaker         | <input type="checkbox"/> Seafood processing/marketing    |
| <input type="checkbox"/> City/county government | <input type="checkbox"/> Lawyer            | <input type="checkbox"/> State government                |
| <input type="checkbox"/> Commercial fishing     | <input type="checkbox"/> Marina operator   | <input type="checkbox"/> University professor/researcher |
| <input type="checkbox"/> Educator               | <input type="checkbox"/> Marine recreation | <input type="checkbox"/> Other _____                     |
| <input type="checkbox"/> Farming                | <input type="checkbox"/> Mass media        | _____  |

Coastal property owner:  yes  no    Boat owner  yes  no

\$\_\_\_\_\_ contribution to defray printing costs for *Coastwatch*



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