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Sea life at its smallest

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Even in midwinter, they arrive by the thousands, baby fish that float hundreds of miles toward the narrow wooden bridge over Little Sheepshead Creek in Little Egg Harbor.

"This is a plankton net. The mesh size is 1 millimeter, so anything larger is going to get caught in it," said Roland K. Hagan, a fisheries technician with the Institute of Marine and Coastal Sciences at Rutgers University. Watching Hagan prepare his net in the glare of truck headlights, about a dozen Rutgers students huddle in the chilly night wind sweeping across Great Bay.

They are here for the university's Estuary in Winter program, an introduction to ocean sciences for freshmen, and an opportunity for upperclassmen to learn marine biology from some of the best scientists in the business. The evidence that comes out of their nets can help determine the health of East Coast fish populations … and eventually affect the jobs and businesses that depend
on those fish … while charting the effects of climate change on sea life.

Now in its 18th year, the winter sampling ""is the longest data set of its kind on the East Coast," said Professor Kenneth W. Able, director of the Rutgers marine field station at the far end of Great Bay Boulevard. This winter, Hagan's weekly samples are hauling in tiny summer flounder, American eels, menhaden and Atlantic croakers … a typically southern species that Able says have established a breeding foothold in New Jersey, likely because of warmer average water temperatures.

"We're trying to identify some of the larval fish that come into the estuary," Hagan explained, as the group waited for the net to collect passersby in the tidal flow under the bridge deck. Most of the tiny animals do not even swim yet, but they can control their buoyancy, and rise from the bottom at night to feed on microscopic plants and animals called plankton, he said.

"Some of our best catches are 8,000 to 10,000 fish a night. Of course, most of them aren't any bigger than your thumbnail," Hagan said.

Sample counts of summer flounder larvae could help refine population projections that are critical for managing that species, which supports an estimated 40 percent of New Jersey's recreational party boat industry. Winter survey counts of American eel showed the species's numbers appear to be holding steady here, and helped federal and state authorities respond to worries that eel populations might be in decline, Able said.

Known locally as Seven Bridges Road, the route to the field station crosses four miles of prairie-flat salt marshes and hops one-lane bridges until coming to the last one over Little

Sheepshead Creek. It's the closest creek to the ocean inlet, and "because a lot of water flows through it, it's the last to freeze in the winter," Able said.

At night, the lights of Beach Haven sparkle to the north while Atlantic City glows amber under wind-driven clouds on the southern horizon. To the east, it is a great dark over the ocean. For first-time visitors, the place can seem ""like the end of the earth," said Brendan Newell, a junior from Haddon Township who is majoring in marine biology.

"I'm here for the identification class," said Jessica Hoffman, a junior from Howell who is majoring in animal science, with a minor in marine biology. She's about to get a workout in those skills, for the net collects not just baby fish but a host of other tiny animals.

At the bridge rail, Rutgers junior and Scarlet Knights football linebacker Brian Tracey from Brooklyn is toughing the cold in a sweat shirt and long shorts, ready to help Hagan retrieve the net. Up it comes, with the collection end bulging. As Hagan dumps the contents into a pail, professor Rose Petracca calls out, ""Inverts!" It's her classroom shorthand for invertebrates, little animals without backbones.

Even by flashlight, Pertracca's practiced eye can pick out a few fluttering around in a pail of water.

"They're baby ctenophores," she said, pointing out tiny jellyfish that are more shadow than shape. "There's mysids (small shrimp)... And that looks like a larval menhaden."

Bundled into a vehicle, the pail and some students head to the station to sort the catch. The fish that hold most interest are so small they can be identified only by bone structure viewed under a microscope, Able said.

At the lab, Newell carefully pours the pail's contents into a series of glass dishes, and the students get to work with tweezers.

"Don't play dead on me," Tracey scolded something that looks like a fish larvae. A sand shrimp poses more of a challenge. "I want to get this guy, but he's too feisty," Tracey said.

A sand shrimp jumps explosively in Hoffman's dish. ""Yeah, I tried to pick one up and that's what freaked me out," she said.

The exercise teaches taxonomy, the process of classifying organisms, with the help of text illustrations to guide students. "You start with the big general illustration," Tracey explained. "You work down through family, then to species. They have tables set up to help you."

When freshmen troop into the lab, Petracca turns the juniors toward explaining their findings to the younger students. She and coastal institute director J. Frederick Grassle have taught this course since 1992, and now "Rutgers has been trying to get freshmen more involved with research," Able said.

At the big state university, the first-year student's experience is often basic classes that crowd a couple hundred students into lecture halls, Able said. The marine science intersession course is one way for freshmen to meet top researchers, learn about their work and decide if a field of study is right for them, he said.

"Think about it,'' Able said. "Wouldn't you have liked some help making up your mind when you were young?"
