November 2003

Collaborations

A monthly report on collaborative research projects in the northwest Atlantic Ocean.

image courtesy NOAA

The Black Sea Bass Tagging Project

By Michael Crocker

A few years ago I went lobstering with a friend in Massachusetts. Inside one of the traps we pulled that day was a strange creature, which neither of us had before encountered in our several decades of sailing, swimming, and fishing the waters of Cape Ann. Its scales were black with purple striations and flecks of green and orange; its eyes big and round with dark pupils haloed by copper-colored rings; its dorsal fin was segmented by long, sharp spines. We thought we had stumbled on to a rare species, accidentally flushed from a foreign tanker, or perhaps some kind of Coelacanth.

I later discovered that it was neither exotic species nor living fossil, but a fish known as the black sea bass (*Centropristis striata*).

Black sea bass are among a group of species scientists call hermaphrodites, which is to say, they begin life as a female and later transform into a male. These unusual fish are known to hide in and around wrecks and reefs and feed on crustaceans, mollusks, echinoderms, fish, and plants.

Also called rock bass, black will, and chub they occur along the Atlantic Coast from Cape Canaveral, Fla. to Cape Cod, and occasionally stray into the Gulf of Maine.

The species comprise a sizeable commercial and recreational fishery, and are regulated under Amendment 12 to the Summer Flounder Fishery Management Plan (often called the Summer Flounder, Scup, and Black Sea Bass FMP), which includes a moratorium on new permits, gear restrictions, minimum fish sizes, a commercial quota, and a recreational harvest limit.

From May to October the fish are harvested by commercial fishermen using pots and by recreational fishermen using rods and reels. When the fish move offshore, typically October through April, they are harvested by vessels with trawl gear.

For many inshore commercial fishermen in southern New England, the fishery is an important component to an annual livelihood that may also include fishing for lobster, tuna, and groundfish.

Commercial landings between 1981 and 2002 hovered around 2000 metric tons, which is roughly equivalent to recreational landings—most of which occur in the middle Atlantic.

Each spring the government conducts a bottom trawl survey for black sea bass in order to estimate their biomass. The findings form the scientific basis for the quota.

Beyond population estimates, however, relatively few details are known about the creature's biology and migration patterns.

Beginning in September of 2002, scientists at NOAA joined forces with commercial and recreational fishermen from seven states to tag some 9000 black sea bass. The $260,000 project (spread over three years) will help enhance stock assessments by providing information about the fish's migration patterns, growth and harvest rates.

Tagging is funded by NOAA's Marine Fisheries Initiative (MARFIN) a federal program intended to enhance marine resource harvesting and management by teaming scientists with fishermen on research projects. Both state and federal agencies provide the people and materials necessary for the tag and release. The reporting of tagged fish depends on commercial and recreational fishermen. About 45 scientists and fishermen participated in the project.

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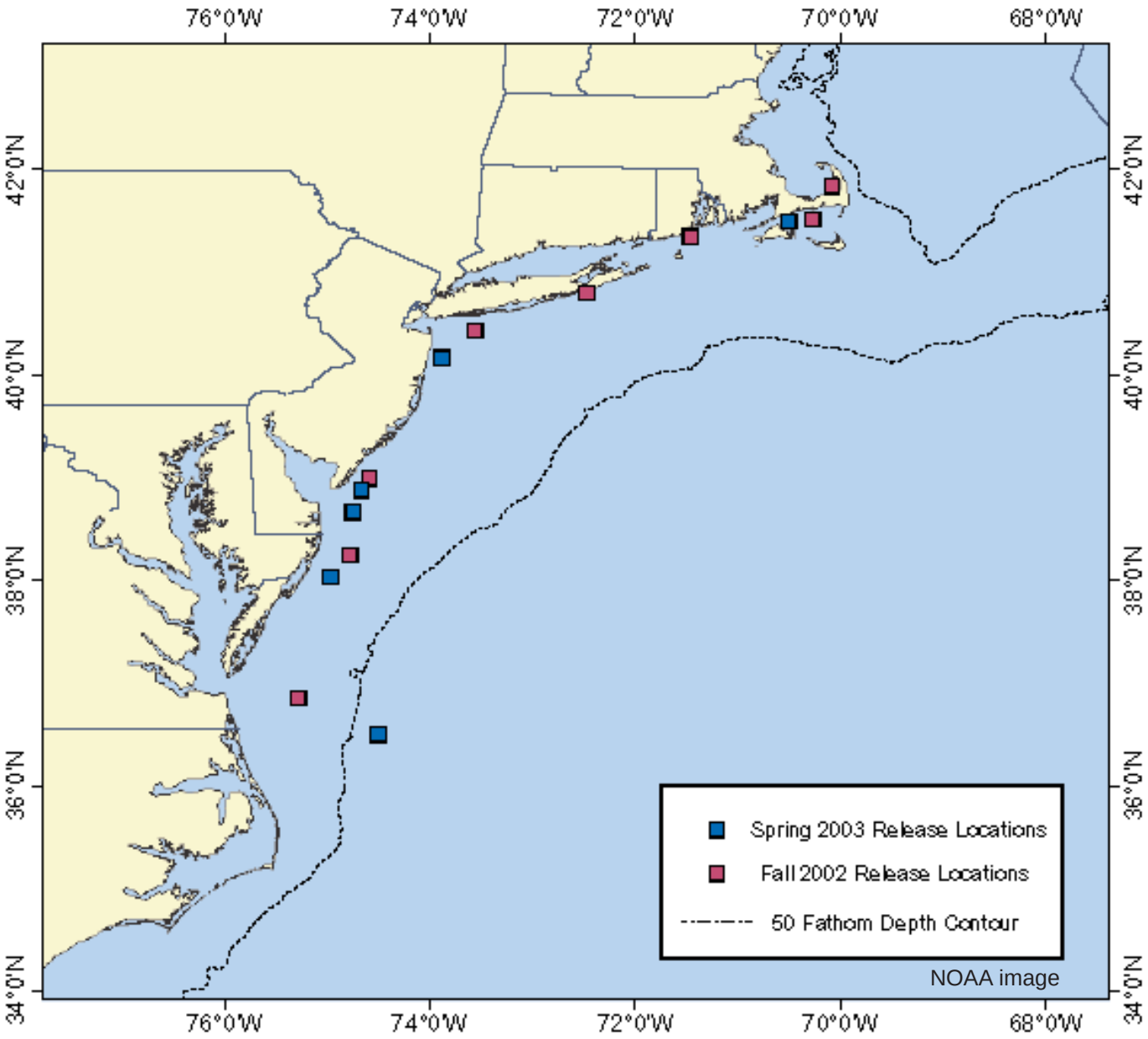

Sea bass (continued)

"The cooperation of fishermen has been great," said Gary Shepherd, the NOAA Fisheries biologist in charge of the project. "This is important, since recovering tags is the key to our improved understanding of sea bass migrations."

Shepard added that an equally valuable contribution of fishermen has been their years of experience on the water.

"In addition to returning tag numbers and information about the fish's size and location, fishermen are able to convey important observations, about things like sea and weather conditions that may have otherwise gone unnoticed."

Billy Lister, a fisherman from Barnstable, Mass., who's been catching black sea bass for over 20 years agrees.

"With [black sea bass] you need to be paying attention to a lot of different things in order to understand it well. My hope is that managers ultimately listen to the kind of data fishermen offer—things like unusual plant growth, pollution, and other environmental changes—and use it to improve regulations, not just for the good of fishermen, but for the good of fish."

Tags are thin orange or red tubes and are attached to the fish's abdomen. Fishermen are asked to remove the tag and record its number as well as the date and location of recapture (latitude and longitude or Loran C preferred), length of fish, gear type used, and whether the fish was kept or released. A phone number to report the information is printed on each tag.

Returned tags net fishermen a hat if orange and $100 if red.

The project focuses on the northern stock of black sea bass, distributed from Cape Hatteras to Massachusetts Bay. Generally, they are found inshore from May to October. From October to April they move offshore. Spawning typically begins off the coast of North Carolina in March and occurs progressively later farther north. The participating states are Virginia, Maryland, Delaware, New Jersey, New York, Rhode Island, and Massachusetts.

Shepherd has applied for funds to extend surveys for next year. Please visit the study's website for more information:

http://www.nefsc.noaa.gov/read/popdy/blackseabass-tagging/

Gear Review: A Semi-Pelagic Trawl System

As the shrimp season in the Gulf of Maine approaches, the time is ripe to review developments in fishing gear designed to maximize catch rates while minimizing sea bottom impact.

Recently, the preliminary results from tests of a semi-pelagic shrimp trawling system were posted on the Northeast Consortium's website (www.northeastconsortium.org) and, according to the report, the innovative gear exhibited catch rates equal to or better than traditional gear fishing the same grounds.

"I'm very excited about this system," said New Hampshire fisherman George Littlefield, captain of the 55-foot wooden trawler, Lady Regena, which was used to test the trawl. "Whenever you can keep iron off the bottom it's a good thing, and when you can do it without sacrificing the effectiveness of the gear it's a win-win situation. We proved that this off-bottom system is capable of fishing as well or better than normal gear."

Reducing Bottom Damage

Since the Sustainable Fishing Act of 1996 called for government managers to pay more attention to the health of "essential fish habitat," fishermen and scientists have searched for ways to reduce the impact trawling gear has on the sea floor, which is considered important to the spawning and feeding habits of fishes throughout the Gulf of Maine.

In the northwest Atlantic (and around the world) the otter trawl is the most common gear used for harvesting shrimp. The trawl uses heavy iron doors, dragged along the sea bottom, to keep the mouth of the net open. And while the impact of trawl doors on the ocean floor is not well understood, it is generally agreed that minimizing the time doors spend on the bottom would improve habitat for a variety of species.

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-George Littlefield

This $88,004 study, funded by the Consortium, was developed by Littlefield and Pingguo He, a fishing gear specialist at the University of New Hampshire "To eliminate seabed contact of trawl doors by using a pair of pelagic doors operating off the bottom, while keeping the ground gear on the bottom in order to maintain catch efficiency," said Pingguo He.

The hope is that by reducing the impact shrimp gear has on bottom habitat, managers might be willing to extend the length of the shrimp season a few days to allow fishermen to land more shrimp without causing more damage to the environment. In other words, both the ocean habitat and fishermen would benefit.

The Gear

The trawl is based on a four-panel configuration designed by gear specialist Harold DeLouche, with modifications suggested by the project's participants. Further refinements were added after tests in a flume tank.

The back of the trawl, including a Nordmore Grate, is similar to other shrimp nets used in Gulf of Maine; the front was designed to keep the trawl mouth on the bottom while keeping the doors off the bottom.

A pair of 1.9 meter squared Poly-Ice® El Cazador doors from Iceland were selected (see photo below) for their ability to stay off the bottom as well to withstand inevitable contact with rocks, boulders,

Image courtesy Pingguo He: The trawl door.

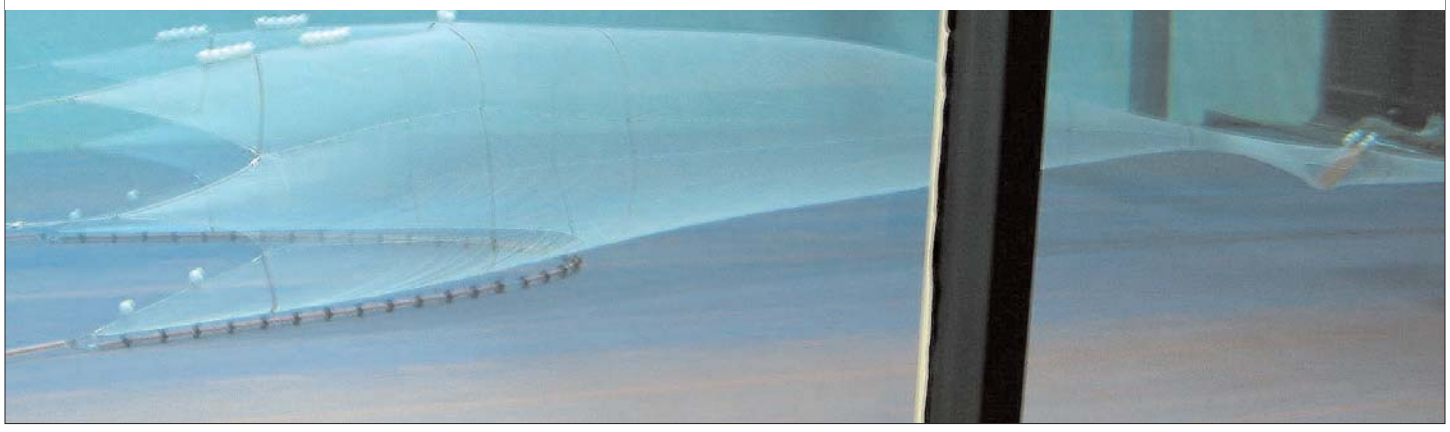

Image courtesy Pingguo He: The system was tested inside the flume tank in Newfoundland before sea trial began last year.

and other sea floor features.

They measure 1.660 meters high and 1.245 meters wide, weighing 518 pounds in air. The rigging includes two bridles splitting to three at the wingends. Upper and lower bridles were attached to the doors with two five-meter backstraps. An idler chain connects bridles per specification of the manufacturer. Backstraps and idler chains were later replaced with combination wires for ease of operation.

The bridles measure 180 feet from wingend to door minus the backstrap length. Upper bridles were made of 3/8-inch wire; the lower bridles 5/8-inch wire. Wingend weight began at 118 pounds, but was reduced as the experiment progressed.

Sea Trials

Trials were conducted in January and February 2003 off the coast of New Hampshire. The fishing was limited to eight days because of the regulated season and poor weather, but more tests are scheduled this coming season.

During each tow, an effort was made to match depths so that warp length would not have to be changed. Depth strata ranged from 30-31 fathoms, 35-36 fathoms, 38-39 fathoms, and 49-50 fathoms. However, the majority of fishing was carried out between 30-31 and 35-36 fathoms.

Towing speeds hovered around 2.4 knots, though slight deviations may have occurred due to tides and currents. Tow durations were one hour with one 30-minute tow. A NetMind® acoustic trawl monitoring system was used to ensure consistency in tows.

Samples of shrimp and bycatch from each tow were measured and weighed to the nearest pound. The average number of shrimp per pound was approximately 42.

Results

Catches ranged from zero when the net was off the bottom at the start of the experiment to as much as 347 pounds per hour. A total of 4,822 pounds of shrimp were caught in 38 one-hour tows, with an average catch rate of 127 pounds per hour.

The effectiveness of the experimental gear was then determined by comparing its catch rate to that of other vessels fishing the same area (landings data was supplied by the Yankee Fishermen's Coop in Seabrook, N.H.)

The study indicates that the experimental gear displayed catch rates very close to the vessels it was compared to and, after some fine tuning, actually exceeded that of other vessels fishing the same grounds.

Pingguo cautions that exact comparisons to the landings data cannot be made because their operations were not controlled, but said "In this phase of the experiment we wanted to determine whether or not the gear could perform with the doors off the bottom, and it did." More rigorous comparative trials with traditional gear, fishing alongside the experimental gear, is scheduled for January and February 2004

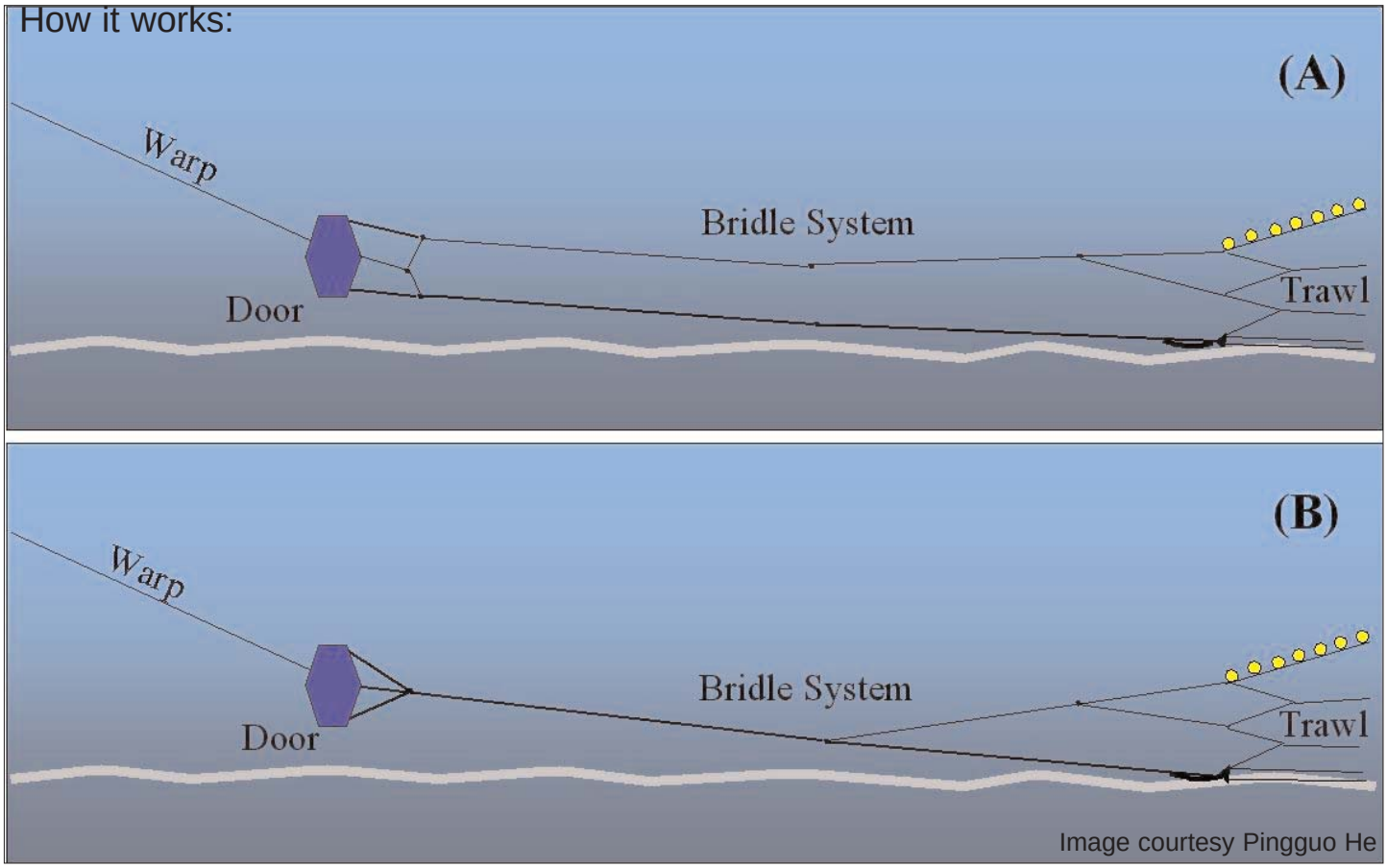

Image courtesy Pingguo He

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