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**TESTING THE VALIDITY OF
CATING'S (1953) METHOD FOR
AGE DETERMINATION OF
AMERICAN SHAD USING SCALES**

**IS THE COLLAPSE OF SHARK
POPULATIONS IN THE NORTHWEST
ATLANTIC OCEAN AND GULF OF
MEXICO REAL?**



AMERICAN FISHERIES SOCIETY

Corps fish study nets useful data

In a New York City conference room with large windows overlooking the Port of New York and New Jersey, Mary Fabrizio, chief of the Behavioral Ecology Branch of the Northeast Fisheries Science Center (NEFSC), recently presented to scientists the results of an extensive fish tagging study she performed for the U.S. Army Corps of Engineers.

As the study's principal investigator, Fabrizio told the scientists, "The findings will be used to update the Environmental Protection Agency's [EPA's] criteria that determine what dredged material from the port is environmentally safe to place in the Historic Area Remediation Site [HARS]."

After undergoing a series of biological and chemical analyses, dredged sediment from the channels within the Port of New York and New Jersey is placed in the Atlantic Ocean at the HARS if found acceptable as remediation material.

The HARS is an approximately 15.7 square nautical mile area—3.5 nautical miles east of Highlands, New Jersey, and 7.7 nautical miles south of Rockaway, New York. Remediation material is used to cover or "cap" dredged sediment that was placed there previously which does not meet EPA's current placement standards. This cap remediates the site and improves the habitat conditions for aquatic life in the HARS.

After consultation with the Corps New York District, the U.S. EPA Region 2 sets the final criteria for what is suitable for placement in the HARS.

"Several years ago the EPA indicated they wanted

to update these criteria by using a risk-based approach," said Monte Greges, chief of Dredged Material Management Section, U.S. Army Corps of Engineers, New York District. "One of the parameters that goes into creating this risk-based criteria is the

residency time of fish in the HARS because it is assumed that the more time the fish spend at the HARS, the more organisms they will eat that have been impacted by dredged material placed there. The New York District felt that the EPA's information on residency time was incomplete and needed to be improved, so we initi-

ated and funded a fish tag study to better answer the question of how much time the fish actually spent within the HARS boundary," said Greges. "The results from this study will be provided to the EPA for use in their development of these risk-based criteria for dredged material proposed for HARS placement."

The Corps' U.S. Engineer Research and Development Center, Waterways Experimental Station in Vicksburg, Mississippi managed the study and contracted the NEFSC to perform it.

The study was performed from June 2003 to June 2004 and included 145 healthy adult fish captured at the HARS. The species captured included 122 black sea bass (*Centropristis striata*) and 23 summer flounder (*Paralichthys dentatus*) or "fluke," both important to recreational and commercial fishing. The two species studied were active at the HARS from May to December. During the winter these species move to deeper offshore waters.

To monitor activity, fish were tagged with ultrasonic transmitters that were surgically implanted in their abdominal cavities. The transmitters are 30 mm long and 9 mm in diameter and were programmed to send 68KHz signals, or pings, once every 3 to 5 minutes for about an entire year.

To pick up the signals, 72 receivers were strategically moored throughout the HARS, 800 m apart. Every signal detected by a receiver was decoded electronically and the receiver recorded the identification number of the transmitter, the date, and the time of the day the signal was detected. These records were accumulated in the memory of the receiver. The receivers were retrieved in summer 2003 and summer 2004. When each receiver was retrieved, scientists downloaded the data to a computer, collecting a total of 1.4 million records.

Recently, preliminary results revealed information on the fishes' use of the HARS habitat, seasonal activity, and dispersal out of the HARS.

Preliminary Results

- **Habitat usage:** The ocean floor of the HARS is composed of varying levels of dredged sediment. During the summer, both fish species spent most of their time in the shallow areas of the placed sediment.
- **Seasonal activity:** Black sea bass exhibited greater activity in the HARS during the summer than during the fall. Summer flounder activity patterns were more complex.
- **Dispersal:** All of the fish were captured and released within the HARS boundaries, but each species dispersed out of the HARS at different times and rates. A handful returned to the HARS one year later.

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Above: Historic Area Remediation Site study site.



Left: Retrieving an array that holds the receiver. The array is also composed of mooring and a pop-up buoy.

Fabrizio said the study was extremely interesting and she learned the importance of using appropriate equipment, selecting sufficient staff to conduct the work at sea, and coordinating the logistics required for a large field study.

"Deploying and retrieving sensitive acoustic equipment at sea for long periods of time is difficult," said Fabrizio. "Each time we attempted to retrieve the 72 receivers, we usually needed about 10 full days, which we had to schedule around the weather, including Hurricane Isabel in September 2003."


"If I did the study again I would use acoustic receivers with modern capabilities—this allows the scientists on board the vessel to download the information from the receiver's memory without having to retrieve the gear off the bottom of the sea," she said. "However, this equipment was not yet developed when we started our work and it's very expensive."

Fabrizio was still satisfied with the equipment used and was confident it would work because she performed pilot studies prior to performing this study at the HARS.

When it came to field deployments and retrievals of the receivers, Fabrizio said that the most important aspect was the skill of the captain and the capabilities of the vessel. She said, "Never underestimate the complexity of these tasks! Hire a captain who has years of experience and is a

good trouble shooter—he or she is worth every penny!" She added, "It was also very interesting learning from and working with the captains of the vessels that assisted us on this study."

The results of the study answered questions about the length of time fish reside at the HARS, but there are additional data that were obtained that still need to be analyzed. "In complex studies such as these, it is not unusual for the analysis phase to require as much time, or sometimes more, as the field work," said Fabrizio. "Some of the findings we will examine further include the black sea bass's increased activity during dusk, the bass's dispersal out of the HARS early in the summer, and both species preference for the shallow complex habitats at the HARS."

"Data from this study will benefit both the public and the environment. Scientifically defensible data will be used by the EPA to create the new HARS criteria, a more realistic picture of human and ecological risk will be ascertained and dredged material that poses an unacceptable risk for introduction into the food chain will not be disposed in the ocean," Greges said. 



Above: Scientists disassembling an array that holds the receiver in order to retrieve the data.

Below: Inserting a transmitter into a black sea bass.



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