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NOAA Atlantic Sea Scallop Survey Shows Strongest Recruitment on Georges Bank in Seven Years

High Number of Seed Scallops Seen in Great South Channel

Researchers conducting the annual summer Atlantic sea scallop survey off the northeastern coast of the U.S. between North Carolina and Massachusetts are encouraged by the high number of small seed scallops, or recruits, detected in the Great South Channel of Georges Bank and in other survey areas.

The numbers are the highest seen on Georges Bank since 2000 and the second highest since 1979 in the Mid-Atlantic Bight, and help document the effectiveness of a key measure used to manage the commercial fishery, that of rotating access to highly productive sea scallop areas while closing others to allow scallops to grow.

“Unusually large numbers of seed scallops were evident in the Great South Channel on the western edge of Georges Bank, both two-year old recruits between 4 and 7 centimeters in size (roughly 1.5 to three inches) and one-year-old pre-recruits less than 4 centimeters (under 1.5 inches),” said Dvora Hart of NOAA’s Northeast Fisheries Science Center (NEFSC), a nine-year veteran of the survey and chief sea scallop assessment scientist for the agency. “High numbers of recruit and pre-recruit scallops were also found on the northern edge of Closed Area II on Georges Bank, and in many portions of the Mid-Atlantic Bight, especially the Delmarva area. That is very encouraging news for both the resource and the fishery during the next few years.”

Regions surveyed included the Delmarva, Elephant Trunk, Hudson Canyon and Long Island areas of the Mid-Atlantic Bight. Delmarva, the region off of Delaware, Maryland and Virginia, was closed to scallop fishing in 2007. The Elephant Trunk area was closed in 2004 and reopened in 2007, and the Hudson Canyon area was closed in 2008. Areas surveyed on Georges Bank and vicinity included the Great South Channel, the Northern Edge, the Southeast Part, the Nantucket Lightship Closed Area, and Closed Areas I and II. Closed areas allow the scallops to grow larger and reproduce more often before being subject to harvest since reproduction starts at age two.

The sea scallop survey has been conducted annually since 1979. The 2008 survey was conducted in two 17-day legs, the first in July in the Mid-Atlantic Bight and the second during August on Georges Bank. Both legs were conducted aboard the UNOLS (University-National Oceanographic Laboratory System) research vessel *Hugh Sharp*, a 146-foot ship operated by the University of Delaware. Prior to 2008, the annual surveys were conducted by the NOAA ship *Albatross IV*, which is being retired this year after 45 years of service.

To calibrate the survey results between the new and old vessels, researchers are comparing scallop catches on the *Sharp* with those obtained by the *Albatross IV* at 50 stations in 2008 and more than 80 stations in 2007. In 2008, the *Sharp* conducted 44 paired stations with the *Albatross IV* in Closed Area I and the Nantucket Lightship area. In addition, 103 paired stations in the Mid-Atlantic Bight and on Georges Bank were surveyed in 2008 using the Habitat Mapping Camera System (HabCam), a towed underwater camera system operated from the commercial sea scallop fishing vessel *Kathy Marie*.

The scallop survey uses a random stratified design, in which the ocean is divided into zones, or strata, of similar depth and habitat, and then dredge and camera samples are taken randomly within these zones. This is similar to the sampling design used in political polls to achieve a statistically accurate assessment of political views for all U.S. citizens.

Samples are collected using a modified eight-foot sea scallop dredge with two-inch rings, a 4.5-inch stretched mesh twine top, and a mesh liner to retain the very small seed scallops. At each sampling station, the gear is deployed on the bottom for 15 minutes at an average tow speed of 3.8 knots (just over four miles per hour). Each station covers an area about 4,500 square meters, or about one acre. After each haul, the catch is sorted, counted and measured on deck. Some additional stations are included in the survey to monitor annual recruitment and growth rates.

Several scallop captains from New Bedford, Mass. helped NEFSC researchers redesign the scallop dredge for use on the *Sharp*. A sorting table to make the work easier on the crew was also installed on the vessel this year.

The HabCam, developed by the Woods Hole Oceanographic Institution and the Advanced Habitat Imaging Consortium, was used aboard the New Bedford-based *Kathy Marie* in both 2007 and 2008. The bottom mapping imaging system enables researchers to compare the dredge survey data directly with those from the high resolution, rapid fire digital still camera images. Use of the HabCam was supported with funding from the New England Fishery Management Council's Sea Scallop Research Set-Aside (RSA) program, administered by the NEFSC's Cooperative Research Program.

"Dredge catches provide some information about bottom type and habitat, but this is difficult to quantify," said Hart. "The dredge data provide relative indices of the average density of animals over the towed areas, but do not provide finer spatial scale information. The HabCam image surveys furnish absolute densities of scallops and other species, are less labor intensive in terms of crew, and provide much more information about the bottom habitat, all in near-real time. Using the two methods provides the best of both worlds."

John Hoey, who coordinates cooperative research programs for NEFSC, said the continuous digital imagery from the HabCam has the potential to sample a greater proportion of the sea bottom than either the survey dredge or drop camera systems, such as the cooperative industry survey with SMAST (School for Marine Science and Technology) at the University of Massachusetts Dartmouth.

"All three survey methods (dredge, drop camera images, and continuous digital images) provide scallop population estimates, including the variances of these estimates relative to the areas sampled," Hoey said. "Evaluation of the variability and precision of the estimates relative to survey costs will help determine the best mix of technologies used in future surveys."

In 2007 and 2008, the HabCam survey images also revealed the occurrence and spatial distribution of invasive species like the tunicate *Didemnum*, first reported on Georges Bank in 2003. *Didemnum* smothers many bottom-dwelling organisms like sea scallops. HabCam and drop camera images also provide information on the abundance of bottom-dwelling finfish, starfish and other benthic marine life, and furnish detailed images of the sea floor types (i.e., sand, rock, mud, gravel, cobble, etc.) in the survey areas.

Atlantic sea scallops (*Placopecten magellanicus*) are distributed in the Northwest Atlantic from Cape Hatteras to Newfoundland and also occur in the Gulf of St. Lawrence. They live on the ocean bottom, generally at depths from 30 to 100 meters (about 100 to 300 feet) and can live up to 20 years. Scallops usually spawn in late summer and early fall, although spawning in spring can also occur, especially in the Mid-Atlantic region. After hatching, larvae remain in the water column for four to six weeks before settling on the sea floor.

The sea scallop fishery is the largest and most valuable wild scallop fishery in the world, and in 2007 was the most valuable single-species fishery in the United States. Recent landings have been worth about \$400 million dock-side, with major landing ports at New Bedford, Mass., Cape May, N.J., and Hampton Roads, Va.

“One of the key pieces of information generated by the NOAA scallop survey is estimates of recruitment of small scallops that will grow and be available to the fishery over the next few years,” said Russell Brown, the lead scientist for the NEFSC’s Ecosystem Surveys Program. “We look forward to working with university and industry partners to conduct additional surveys funded by the Sea Scallop RSA program and other sources to further refine estimates of these recruitment events.” Brown noted that accurate estimates will promote effective management of the scallop resource to optimize economic benefits to the fishery and the nation.

“NOAA Fisheries has been conducting annual scallop surveys for almost thirty years, and landings data go back to the beginning of the 20th century,” Hart said. “We have observed large year classes of scallops on Georges Bank about every ten years, with the last occurring in 2000. Scallop landings have doubled at the same time that biomass or abundance of scallops has increased. The fact that there are now larger, more abundant scallops and many more recruits highlights that management efforts have been very successful.”

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Related Links:

Status of the Stock: <http://www.nefsc.noaa.gov/sos/spsyn/iv/scallop/>

Sea Scallop Fishery Monitoring: <http://www.nero.noaa.gov/ro/fso/scal.htm>

FishWatch – Atlantic Sea Scallops:

http://www.nmfs.noaa.gov/fishwatch/species/atl_sea_scallop.htm

Habitat Mapping Camera System (HabCam): <http://habcam.whoi.edu/>

Article on HabCam: <http://www.whoi.edu/oceanus/viewArticle.do?id=15526>

Marine Nuisance Species- *Didemnum*: <http://woodshole.er.usgs.gov/project-pages/stellwagen/didemnum/>