

Dogfish research reveals migration surprises

SOUTH KINGSTON, RI – It's been a long-held belief that spiny dogfish migrate south for the winter and return to New England each spring, so much so that the federal dogfish fishery management plan has long allocated quota based on seasons.

However, two recent research studies funded by the Kingston-based Commercial Fisheries Research Foundation (CFRF) provide evidence that most spiny dogfish do not mass migrate. In fact, only a small percentage of dogfish do.

Roger Rulifson, professor and senior scientist at East Carolina University's Institute for Coastal Science and Policy in Greenville, NC, and James Sulikowski, associate professor at the University of New England's (UNE) Marine Science Center in Biddeford, ME, presented their findings during a research session on Dec. 17 in South Kingston sponsored by CFRF.

Rulifson's final report comes after acquiring two years of data from external and acoustic tags that tracked dogfish as they traveled. He hypothesized that there were two stocks, one in Canada and one in the US. He also sought to determine the sex ratio of dogfish aggregations during the day by making trips with New England gillnetters and longline fishermen.

For his part, Sulikowski used paired trawls to document the vertical movement of dogfish in the water column. Coupled with temperature, depth, and location data culled from satellite tags deployed as part of a UNE study with funding from the Saltonstall-Kennedy (S-K) Grant Program through the National Marine Fisheries Service (NMFS), Sulikowski also was able to collect annual migration data.

While both researchers were looking to dispel or verify the conventional wisdom that spiny dogfish migrate south for the winter, they found that dogfish go offshore on a daily basis to deeper waters, possibly to feed. And both had insights to offer commercial fishermen on dogfish feeding and reproduction habits.

Changing assessments

Commercial fishermen in New England have been seeing dogfish year-round, according to Chris Brown, owner of the Galilee, RI-based Proud Mary, which was one of the trawlers that participated in Sulikowski's study. Maine and North Carolina fishermen are seeing them year-round as well,

Rulifson said.

Until recently, the spiny dogfish total allowable catch (TAC) allocation was based on seasonal migration with 57.9% allocated to Period I, which ran May 1-Oct. 31, and 42.1% to Period II, which ran Nov. 1-April 30. The idea was to preserve part of the annual quota for fishermen from southern states based on the belief that dogfish migrate south as the year progresses.

This fall, both the Mid-Atlantic and New England Fishery Management Councils adopted Amendment 3 to the federal dogfish plan. The amendment

eliminates seasonal allocations in favor of a geographic strategy used by the Atlantic States Marine Fisheries Commission (ASMFC) and instead allocates 58% of each year's quota to the "northern region" to cover states from Maine to

Connecticut and the remaining 42% on a state-by-state basis from New York to North Carolina.

The amendment is currently under review by NMFS, but is expected to come online for the start of the new fishing year on May 1.

Pinning down dogfish location and seasonality is important for enhancing understanding of the resource. In 2000, dogfish were considered overfished, and both councils adopted low quotas to allow the stock to rebuild. ASMFC followed suit in 2002.

But dogfish surprised everyone – except possibly fishermen – by rebounding in four short years, between 2005-2009. According to the 2012 stock assessment, the female spawning biomass is now at 241,000 metric tons (mt). The quota was increased in 2010 from 12 million pounds to 15 million pounds, again in 2011 to 20 million pounds, and to 35.694 million pounds in 2012.

For 2013, the spiny dogfish quota is expected to be 40 million pounds with an increased possession limit of 4,000 pounds.

When severe catch restrictions began in the late 1990s, many processors closed, according to John Whiteside, a New Bedford attorney who represents the Sustainable Fisheries Association, a processors group. The remaining dogfish processors need time to rebuild markets to handle the catch, he said. Spiny dogfish historically have been used for fish and chips, fertilizer, and bait.

Daily, season movement

Although both Sulikowski and Rulifson have been studying dogfish

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Dogfish can adapt to even very warm waters while other fish cannot, tolerating a very broad range of temperatures, from 32° F to 80° F.

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Dogfish

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for several years (see CFN May 2008 and September 2008), previous efforts relied heavily on conventional external tags. These tags can tell researchers starting and recapture points, but not where the dogfish traveled in between.

That's where specialized tagging comes in.

An acoustic tag is equipped with a battery that can last up to three years and is surgically implanted in a dogfish. Whenever the dogfish is near an underwater acoustic array, the tag transmits an ID and location.

Using 120 acoustic tags and 42° latitude as the north-south cutoff, Rulifson found that spiny dogfish tagged north of the line mostly stayed in the north, generally in the Gulf of Maine.

Much dogfish movement was east and west, or inshore and offshore. Those tagged with external tags in the south, stayed in the south. Some did travel down the coast to North Carolina.

Because there are gaps in the acoustic listening system, Rulifson said additional data on dogfish travel patterns could help differentiate the two stocks.

Given a hypothesis that spiny dogfish are not migrating, and that they may be found in deep water offshore, Sulikowski performed paired trawls – one bottom and one midwater – in Rhode Island Sound.

He also looked at data from the S-K/ NMFS research project in which he implanted 43 satellite tags on female spiny dogfish in North Carolina and Maine, which offered more evidence that dogfish move vertically within the water column daily.

Satellite tags can store up to 12 months of information on depth, temperature, current, and location

Spiny dogfish tagged north of the 42° latitude line mostly stayed in the north, generally in the Gulf of Maine, and those tagged in the south stayed south.



before popping up and transmitting their data to a satellite.

Data from these tags confirmed that 75% of the dogfish stayed generally where they were tagged over the course of a year whether in North Carolina or Maine. And, seasonal migration was limited to east-west movement as dogfish moved to cooler waters in the summer and warmer inshore waters in the winter.

Environmental impacts

Sulikowski also sought to determine the impact voracious dogfish have on



UNE Marine Science Center photos

One study finding was the possible location of a pup nursery ground on sandy bottom to the northeast of Block Island.

Stomach contents from sampled dogfish included partially eaten and nearly intact flounder.

Working 9 to 5?

While testing whether gillnets or longlines were more efficient for the directed dogfish fishery, Rulifson's study found a sex-segregated stock in the Gulf of Maine, with females staying inshore and males going to deeper water each day, during daylight hours.

"There may also be an opportunity to have a male-directed fishery based on time of day northeast of Chatham," said Rulifson. His study included 59 surveys using gillnet and longlines between the fall of 2010 and summer 2011.

And recently, Rulifson, who has had a winter spiny dogfish tagging program since 1998, had tag returns from dogfish taken off Cape Cod that are about 10 years old.

"They may have been small when they were tagged – 600 millimeters. These could be the adults who traveled to the Cape," said Rulifson.

He added that he believes dogfish may spend years in the deep ocean waters of the Mid-Atlantic.

"One of my tags came back from Iceland," he said.

This would indicate that there even may be mixing of northwest and northeast Atlantic spiny dogfish stocks.

For now, there are still more questions to answer. Rulifson is seeking anecdotal information from commercial fishermen on the historical presence and migration of spiny dogfish in New England.

Anyone with observations to share may contact him by phone at (252) 328-9400 or by e-mail at <rulifsonr@ecu.edu>. Sulikowski may be reached by phone at (207) 602-2730 or by e-mail at <jsulikowski@une.edu>.

More information on these and other projects may be found on the CFRF website at <www.cfrfoundation.org>.

Joyce Rowley



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