

Partners gauge survival of hook-caught dogfish

DURHAM, NH – If there is one fish that aggravates both commercial and recreational fishermen, it's the spiny dogfish. It's a low value species on the East Coast, damages fishing gear when caught, steals bait, and clogs nets.

Commercial fishermen targeted spiny dogfish in the 1990s. However, concern over the lack of large females and other stock issues led to reductions in catch limits to bycatch levels. The dogfish is considered highly sensitive to overfishing due in part to its slow growth and late maturation – nearly six years in males and 12 years in females.

One problem managers of this fishery have is a lack of information on the extent to which discarded dogfish live or die.

Two recent studies have addressed this discard mortality question – one in the gillnet fishery by Roger Rulifson of East Carolina University and one in the trawl fishery by John Mandelman and Marriane Farrington of the New England Aquarium.

Now, researchers from the Gulf of Maine Research Institute (GMRI) and the Cape Cod Commercial Hook Fishermen's Association (CCCHFA) are examining discard mortality in the hook fishery.

Why it's important

You may wonder, as many fishermen and stakeholders have, why we would want to spend cooperative research dollars to quantify discard mortality in this fishery. Most people with fishing experience know the spiny dog is certainly a hardy fish, and fishermen generally agree they go overboard alive after the catch is sorted.

However, even when estimated mortality rates are uncertain, these estimates have a big effect on how scientists figure biomass size and, so, have a significant impact on how much fishing is allowed.

Scientists were able to use the data collected by Rulifson, Mandelman, and Farrington recently to adjust dogfish mortality estimates. For all three fisheries, the figures went down. Dogfish mortality estimates decreased from 75% to 30% in gillnets, 25% to 10% in longlines, and 100% to 20% in the recreational fishery.

Hook mortality

Although hook fishing accounts for a minimal amount of bycatch, the importance of accurately assessing discard mortality can be illustrated by examining estimated discards from longlines in 2002 based on 25% vs. 10% mortality.

Using catch based ratio discard estimates and a 25% mortality estimate, scientists estimated that 447.25 metric tons (mt) were discarded and died. But when a 10% discard mortality was used, scientists estimated that 179 mt were discarded and died (37th Stock Assessment Workshop Consensus Summary, Northeast Fisheries Science Center 2003).

If these fish are surviving, as fishermen feel certain they are, then the stock may be in better shape than predicted by the



Hook-caught dogfish were placed in cages and retrieved after about three days for examination to determine how well they survived the dehooking process.

At left, Chris Andrews, owner/captain of the Survivor, and crewman Eric Tumevin retrieve a longline.

Northeast Fisheries Science Center's stock assessment, and there may be biological justification for allowing a directed fishery.

On the other hand, if discarded fish are not surviving, then the stock may be in worse shape than anticipated and further management restrictions may be needed.

Fishermen see this as justification for additional cooperative research opportunities.

Cooperative partnership

During its proposal review process, the Northeast Consortium tries to identify similar research proposals that have merit and to encourage collaboration between the two investigating groups rather than fund one over the other. This may not only enhance the scientific merit of a project but also can help build collaborations between individuals and organizations that may not normally exist.

Mel Sanderson, former cooperative research program coordinator for the CCCHFA and now the association's development director, and Shelly Tallack of the GMRI, both submitted proposals to the Northeast Consortium identifying the need to better understand the delayed mortality of spiny dogfish in the hook-and-line fishery.

"Both research organizations submitted different but similar proposals to the Northeast Consortium regarding dogfish," explained Lara Slifka of CCCHFA, who managed the coordination and research phase of the project in the Cape Cod region. "The two projects merged, eliminating

and adding parts of both original proposals during the development phase of the study, ending up with a better experiment," Slifka continued. "The CCCHFA and GMRI participated equally in the consolidation and design of the project."

Field trials were completed in the summer of 2006.

The goal for the collaborative team was to assess short-term survival of spiny dogfish after release from hook-and-line gear.

"By short-term we mean three to four days," Tallack said.

Similar to other fish discard survival studies, the project participants used cages to hold the dogfish after they were subjected to three different hook fishing methods – snubbed, unsnubbed, or simply caught by handline, rod and reel, or jigging machines. Snubbing refers to the injury that results when the fish is pulled through the hauler.

When designing the cages, Tallack and Slifka relied on the experience gained from two earlier projects funded by the Northeast Consortium and two other dogfish mortality projects, specifically, the juvenile cod survival work conducted by Tom Rudolph of CCCHFA and Henry Milliken of the National Marine Fisheries Service, as well as a recent discard mortality workshop hosted by the University of Rhode Island's fisheries program.

Tallack and Slifka used as little metal as possible in the cages and a circular design to minimize the risk of injury from rubbing against the cage walls. Only the base ring of the cage was steel. All other supports were made from PVC piping materials. In addition, 1" knotless mesh was used to minimize the potential for snagging injuries among the captive dogfish.

After three days or as weather dictated, the cages were retrieved.

"The dogfish were assessed for mortality, stamina, and recovery from the hooking injury," Tallack explained.

The level of injury for snubbed fish can vary greatly from a small tear in the mouth tissue to considerably more severe mouth injuries. For this reason Tallack offered this word of caution.

"The cause of any mortality observed is likely to vary depending on the level of injury caused by the fishing procedure," she said. "Factors that are likely to work in combination include loss of blood, stress, infection, water temperature, attraction of sea lice or other parasites, and starvation if the level of mouth injury prohibits feeding."

Now that the field trials are complete, researchers are in the process of analyzing the data.

Future research

The discard mortality question is just one part of a much larger deficit in the information available to effectively assess and manage the spiny dogfish.

Both Tallack and Slifka would like to see research investigate the movement of dogfish in order to better understand the inshore/offshore migration. In turn, this information could help fishermen avoid dogfish.

They also believe it is important to quantify the survival rate of dogfish pups. Other researchers and fishermen also believe that we need to understand the ecological importance or role the spiny dogfish plays in their biological niche.

Ken La Valley

Ken La Valley is an extension specialist with University of New Hampshire (UNH) Cooperative Extension/New Hampshire Sea Grant who is working to connect commercial fishermen interested in cooperative research with scientists who want to work with fishermen. He encourages anyone with ideas to get in touch.

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