

SPECIAL DOGFISH REPORT

Dogfish: Special Report

SPECIAL DOGFISH REPORT

You'd be hard pressed to find a commercial or recreational fisherman in the Northeast who doesn't have a few choice words to say about spiny dogfish. Considered to be the "plague of the ocean," this schooling species of voracious predators has become the bane of fishermen everywhere, regardless of the gear they use.

What is it with these fish, and how can people be at such disparate odds over how to deal with them?

Environmentalists hold a heavy club over the fishery. They are impenetrable in their position, utterly fixated on increasing the female component of the population to the highest level possible. Their argument? "We need to ensure adequate pup production for the future."

The National Marine Fisheries Service (NMFS), with its hand forced by the Magnuson-Stevens Fishery Conservation and Management Act, continues its steady march forward on the rebuilding mission.

While it may be hard to believe considering the total inflexibility of dogfish management, we appear to be almost there in terms of stock rebuilding. The biomass of large females has grown significantly in recent years and is now at 70% of its target level.

But because that's not good enough in the eyes of the law, NMFS refuses to ease up on the federal waters commercial trip limits – 600 pounds for bycatch purposes only. The federal dogfish plan, developed by the Mid-Atlantic and New England Fishery Management Councils, prohibits a directed fishery on dogfish until the female component of the stock is fully rebuilt. So does the Atlantic States Marine Fisheries Commission's plan for state waters, although the interstate body has called for significantly higher catch limits.

To fishermen, the very idea of producing more pups and increasing the already enormous biomass of dogfish is nothing short of ludicrous. Spiny dogfish are

everywhere. At certain times in certain places, they make it impossible to fish for anything else.

You can't drop a hook in the water or set a net without getting completely fouled with dogfish, sometimes thousands – literally thousands – of them.

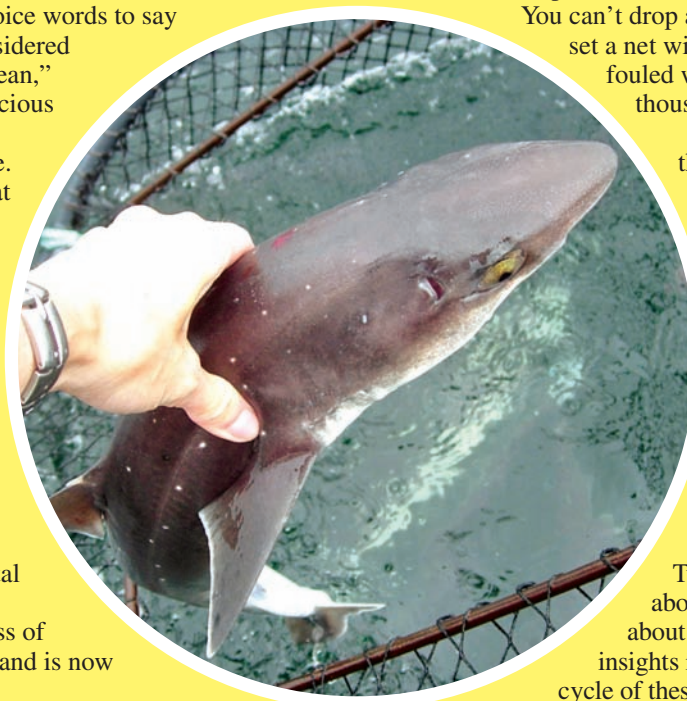
Worse yet, practically all those fish – minus the few fishermen can retain under the small bycatch quota – must be thrown overboard. The waste, the fouled nets and lines, the lost time, the spent fuel, and the financial setback are generating deep anger and resentment across the board.

On March 29, roughly 50 commercial and recreational fishermen and industry representatives gathered at the University of New England in Biddeford, ME to talk about dogfish.

The forum – organized by James Sulikowski of the university's Marine Science Center, Jay Allocca of Vessel Services Inc., Mike Jancovic of Maine River and Sea Charters, and tuna fisherman Phil Grondin of South Portland's Sturdivant Island Tuna Tournament – was an opportunity to learn more about how dogfish are managed and, more importantly, about ongoing and new research that's producing fascinating insights into the migration patterns, feeding habits, and pupping cycle of these fish.

CFN Associate Editor Janice Plante and staff photographer Peter Prybot attended the forum. This "Dogfish Special Report" details the revelations and discussions that took place. –Editor

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Tag data: Dogfish swim far, fast, very deep

by Janice M. Plante

BIDDEFORD, ME – Groundbreaking new research into dogfish migration patterns is producing some jaw-dropping preliminary results.

With the help of a satellite pop-up tag, researchers at the University of New England were able to track the swimming activity of a female dogfish for roughly three months. The tag, attached to the fish's dorsal area, released itself and "popped up" on Feb. 2, transmitting its accumulated data via satellite.

After sorting through the data,

researchers discovered that this single fish covered enormous ground – at one point traveling from Canada's Bay of Fundy down to Virginia in six weeks. She traveled inshore, offshore, north, south, back north, back inshore, back offshore, and around in loops in what was, by all accounts, a surprisingly short period of time (see chart next page for track line).

This one fish defied all the old dogma about dogfish.

A second satellite tag from a different dogfish popped up on Jan. 31. While researchers hadn't filtered through all the data yet to determine where this fish had

traveled, they did have a chance to plot the accumulated information about depth.

And as it turned out, this second dogfish swam deeper than anyone previously imagined – down to 700 meters, or roughly 2,310 feet (see chart next page). She stayed at that depth for a week at a time on two occasions and, in all likelihood, was cruising along with other females.

"These things are traveling great distances vertically and horizontally," said James Sulikowski, an assistant professor at the Biddeford-based University of New England who is heading up the research.

Sulikowski presented these and other early findings to roughly 50 commercial and recreational fishermen at a special March 29 dogfish forum held at the university's campus.

The forum was co-organized by Sulikowski, commercial industry representative Jay Allocca of Vessel Services Inc., recreational industry representative Mike Jancovic of Maine River and Sea Charters, and Phil Grondin of South Portland's Sturdivant Island Tuna Tournament.

Too deep to catch

Other speakers presented information about dogfish management, the status of the stock, and their own ongoing research (see related stories).

But the charts showing the track line and extraordinary depth profile of these two separate female dogfish are what had fishermen on the edge of their seats.

"So this means if the trawl survey is towing at the top (of the water column)



Peter K. Prybot photo

James Sulikowski, an assistant professor at the Biddeford-based University of New England's Marine Science Center, heads up the dogfish research on movement patterns and habitat.

when the fish are at the bottom, they won't catch any of them," called out one fisherman.

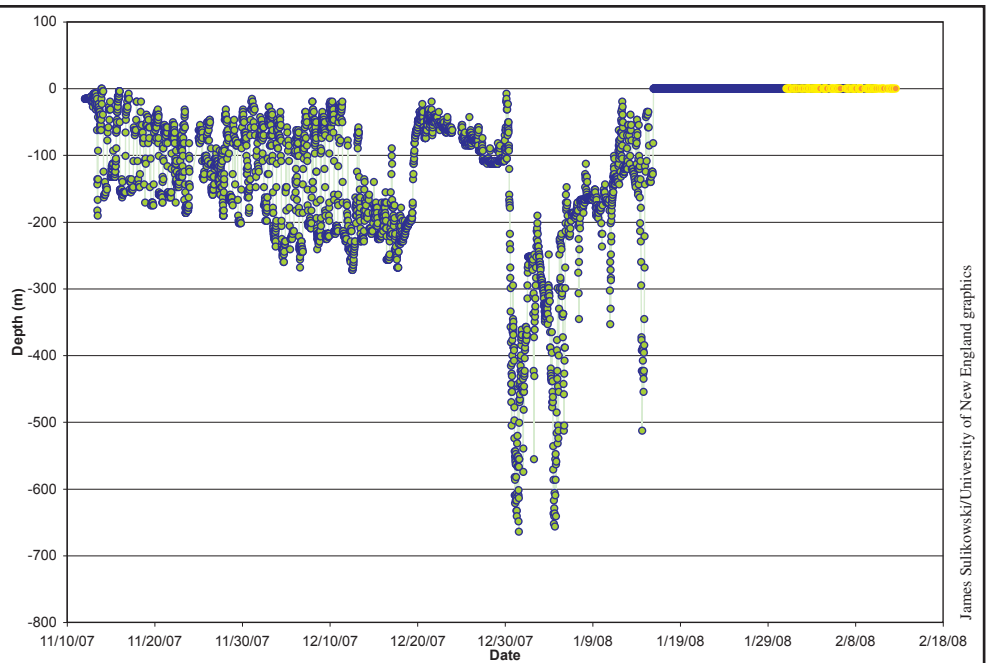
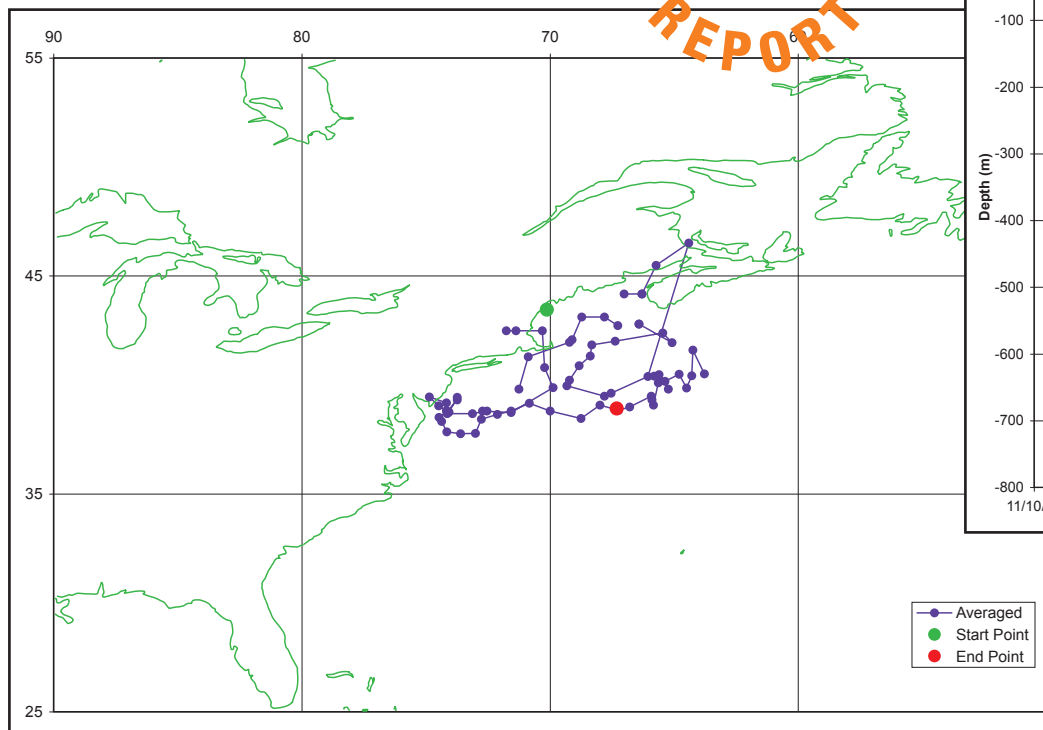
Throughout the morning-long forum, many in the audience questioned the validity of the National Marine Fisheries Service's annual trawl survey results for dogfish and asked why the agency wasn't taking into account how deep and far these fish were traveling.

See DOGFISH TAG DATA, next page



Researchers at the University of New England attach a satellite pop-up tag to a dogfish's dorsal area. They were able to track the swimming activity of two female dogfish for roughly three months. The charts on the next page were made using raw data transmitted via satellite from the popped off tags of the fish.

SPECIAL DOGFISH REPORT



James Sulikowski/University of New England graphics

The charts were created using "raw data" transmitted via satellite from the popped off tags from two female dogfish. Above, one fish's track line from early November 2007 to February 2008. The green dot is the location where the tag was placed on the dogfish and the red dot is the area the tag popped off. Above right, the chart shows one dogfish's depth profile in meters by date.

Dogfish tag data Continued from previous page

Sulikowski emphasized that the data he presented was preliminary and only from one dogfish for the track line chart and one dogfish for depth profile chart.

"This data is all new. It wasn't available before. We still need to look at the data much more closely," he said, adding that additional tagging work needed to be conducted.

Nonetheless, Sulikowski conceded that even these early findings should lead people to begin thinking about dogfish "in a different way than in the past."

Three tagged fish

Traditional tagging using devices like spaghetti tags is easy and cheap, but someone has to recapture the fish in order for scientists to get data. Even then, the data only show where tagged individuals were released and where they were recaptured.

In an effort to obtain more detailed information on migration patterns, Sulikowski's research team decided to use pop-up satellite tags even though they are extremely expensive.

They picked the smallest pop-up tags available on the market, which were priced at \$4,200 per tag. And then they had to kick in an additional \$500 per tag to cover satellite time.

The team had enough money to tag three fish – one on Oct. 31, 2007 and two on Nov. 7, 2007.

Although two of the three satellite tags had "popped off" and transmitted their data as of late March when the crowd was gathered for the dogfish forum, the third was still at large, hopefully still attached to a swimming dogfish and continuing to collect data.

Depth, location, temps

Sulikowski wasn't yet prepared to present information about the second tagged dogfish's travel path, but he did say the fish appeared to spend a considerable amount of time running north and south between New Jersey and North Carolina, with one quick jaunt to Florida.

The tags collect depth, location, and temperature readings every hour while attached to the fish and then transmit the data to the satellite once they pop off the fish and rise to the surface.

However, the tag has a considerable amount of stored information that isn't fully transmitted to the satellite, which is why researchers desperately want to

retrieve tags that have popped up and are now presumably floating around at sea.

Although it's a little like looking for a needle in a haystack, the University of New England team remains hopeful that someone somehow will find and return one of the dogfish pop-up tags. The reward is \$250 and the contact info is printed on the tag itself.

Why so deep?

The age-old dogfish paradigm goes like this: In the summer they're in the north off New England, and in the winter they're in the south off the Mid-Atlantic.

"So why do we catch them in the Gulf of Maine year round?" asked Sulikowski.

This is one of the questions researchers hoped to answer through the tagging work.

And while no one should draw any final conclusions from one tagged fish, the track line for the tagged female that ran from Canada to Virginia in six weeks and then headed north again, offshore, south, and in circles in November, December, and January clearly disputes that old thinking.

Furthermore, what was the second fish doing at such enormous depths? This female spent a considerable amount of time at around 200 meters, but she clearly spent time at much deeper depths down to 700 meters.

Sulikowski said other researchers studying shark species such as porbeagles and makos have recorded similar phenomena.

"There is clearly something going on at this depth," he said.

However, much more research is needed to determine if that "something" is feeding, mating, resting, or something else altogether.

"Fish usually move for two reasons – feeding and reproduction," Sulikowski said.

More work

Fishermen in the audience asked why there wasn't more research like this being conducted.

"It takes a lot of time to do something like this," said Sulikowski.

And at roughly \$5,000 a whack for one pop-up tag plus satellite time, money always is a significant complication.

But as costly and time consuming as the work so far has been, Sulikowski believes it's all worthwhile.

"Without this kind of information, we're not going to think outside the box," he said. ■

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Dogfish in the Gulf of Maine eat cod, herring

BIDDEFORD, ME – Fishermen are painfully aware that dogfish are insatiable predators that will eat just about anything.

But new information based on stomach content analyses from 401 dogfish caught by commercial fishermen in the Gulf of Maine is giving researchers deeper insight into exactly what dogfish in this particular area are devouring.

At a March 29 dogfish forum here, James Sulikowski of the University of New England said his research team really wanted to zero-in on what dogfish were eating on a regional basis.

“Spiny dogfish are everywhere, so obviously their diet is going to vary by where they are,” he said. “We wanted to look at the Gulf of Maine.”

Sulikowski said the team also wanted to get at the root of some key questions.

“We wanted to know, ‘Are they competing with groundfish by eating groundfish or are they competing with them because dogfish eat what groundfish eat?’” he said.

What they found

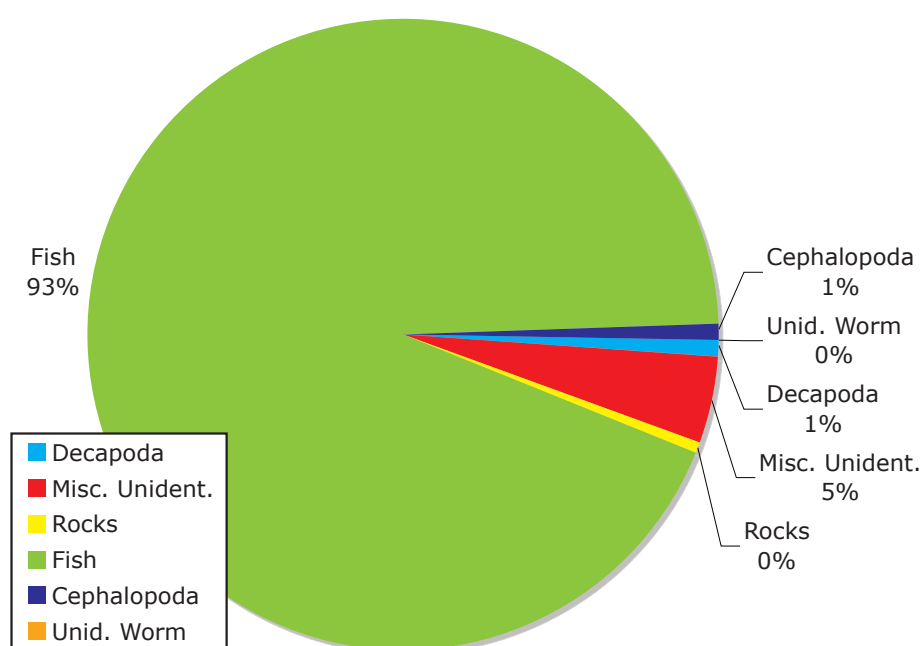
From September 2006 through December 2007, fishermen from Maine and Massachusetts collected dogfish for the study largely from the Stellwagen

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Among the organizers of the March 29 dogfish forum were, from left, recreational industry representative Phil Grondin of South Portland's Sturdivant Island Tuna Tournament and commercial industry representative Jay Allocca (blue shirt) of Vessel Services Inc. Additional co-sponsors included recreational industry representative Mike Jancovic of Maine River and Sea Charters and James Sulikowski, associate professor at the University of New England.

The present mass of prey items found in 401 dogfish stomachs



Top three fish species: cod, herring, sand lance

The chart provides a summary of the stomach contents of dogfish harvested from the Stellwagen Bank, Jeffreys Ledge, and Massachusetts Bay areas. Of the 401 fish that were sampled, 36% didn't have anything in their stomachs. In the remaining 340 fish, 87% of the stomach contents consisted of bony fish – with cod, herring, and sand lance being the top three species.

Bank, Jeffreys Ledge, and Massachusetts Bay areas – prime fishing territory for commercial and recreational fishermen.

Of the 401 fish sampled, 361 were females with an average total length of 85.93 centimeters (cm) or 34.4", and 40 were males with an average total length of 70.67 cm or 28.3".

Sulikowski received considerable help with the work from university students, who spent roughly one hour per fish tediously sorting through stomach contents.

They found that 36% of the dogfish didn't have anything at all in their stomachs.

But in the remaining 340 fish, they found – with a few notable exceptions – just about everything: herring, sand lance, flounder, hake, cod, haddock, a few crabs, anemones, worms, and even a couple of rocks, which probably were a byproduct of groveling for crabs.

All told, 87% of the stomach contents from these particular Gulf of Maine-caught dogfish consisted of bony fish – with cod, herring, and sand lance being the top three species.

Diets may vary

All of the fish sampled were adults, so Sulikowski and others in the room warned

that juvenile dogfish in the Gulf of Maine might be feeding on entirely different species.

And, inevitably, dogfish collected elsewhere along the coast – say off North Carolina – likely would have a different diet as well.

“They're very opportunistic eaters,” said Sulikowski. “That's why you really need to see what's happening in each individual area.”

The two most significant species that were missing from the stomachs of the dogfish caught in the Gulf of Maine were jellyfish and lobsters.

The lack of jellyfish was particularly noteworthy since several other stomach content studies have shown that dogfish eat a lot of jellyfish.

As for lobsters, Sulikowski said he had not yet sampled dogfish from the more inshore areas of Midcoast and Downeast Maine, so he had yet to determine whether dogfish feeding in those areas have a lobster component to their diets.

That lack of information might change soon, however. Harpswell fisherman Don Sproul immediately volunteered to provide additional

See *DOGFISH DIET*, next page

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There's no season; dogfish produce pups all year long

BIDDEFORD, ME – Most fish species have a distinct spawning season. Cut open a bunch of female cod in June from Georges Bank and chances are that most of those fish will be in just about the same spawning condition.

Not so with spiny dogfish. Researchers from the University of New England here recently cut open 50 randomly selected females harvested in December. And, to their astonishment, all the fish were in different stages of gestation. Some of the pups were tiny – essentially all yolk-sack – while others were just about fully developed. The same was true for females harvested and cut open during previous months.

"I think this is one of the most interesting things that could be going on here with dogfish," said James Sulikowski, an assistant professor at the university's Marine Science Center.

During a March 29 forum at the university's campus in Biddeford, Sulikowski said most sharks – as well as most fish – have distinct reproductive cycles where individuals within the same species mate and spawn at right around the same time.

"Dogfish do not appear to be following that same cycle," he said. "From what I can tell, they're asynchronous."

Dogfish are thought to have a 22-month

gestation period.

That's a long time for females to carry pups. But if dogfish were synchronous in their reproduction cycles, they'd all be giving birth at about the same time after carrying those pups for 22 months. Furthermore, all the pups would be relatively the same size.

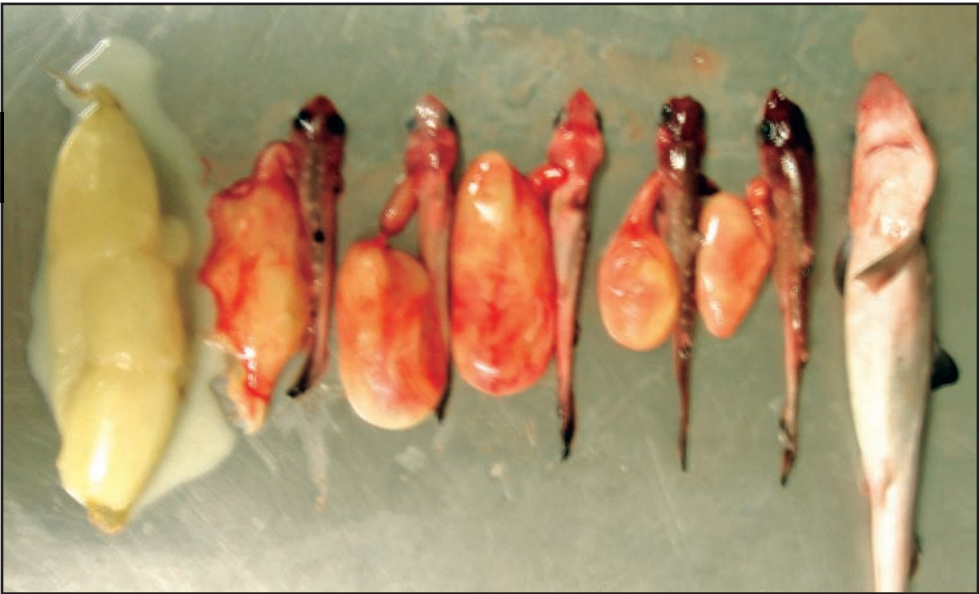
But apparently that's not the case at all with dogfish.

"Female spiny dogfish appear to be giving birth and producing pups year round," said Sulikowski.

Fishermen who deal with dogfish on deck have long sensed this to be the case. Female dogfish have a high tendency to squeeze out pups no matter what time of year they're caught.

But it usually takes documented science to change traditional mindset, and this latest work, which specifically looked at large females in their reproductive stages, is expected to advance the discussion.

The larger question, however, is: Does this reproductive phenomenon matter in



James Sulikowski/University of New England photo

Researchers were astonished to find dogfish pups in different stages of gestation, above, when they cut open 50 females harvested in December. Some of the pups were tiny, essentially all yolk-sack, while others were just about fully developed. If spiny dogfish give birth to pups year round, the question is raised whether that reproductive phenomenon matters to the management of the species.

the big picture?

Sulikowski thinks it does – and it might even explain why trawl survey data show the dogfish biomass increasing far faster than what is biologically feasible given

the slow-growing nature of the species.

"I think we may be seeing the rebounding of the species much quicker because of this," Sulikowski said.

Janice M. Plante

Dogfish diet *Continued from previous page*

dogfish samples in April from the Midcoast.

How much do they eat?

The big question on people's minds was: So how much do dogfish eat in total each year?

Using the most recent total dogfish biomass estimate of 478,000 metric tons (mt) and assuming dogfish consume roughly 1.5% of their body weight per day, Sulikowski estimated that dogfish need

somewhere on the order of 2.4 million mt of prey to support the population at its current size.

Forum co-organizer Phil Grondin, a tuna fisherman, said, "These dogfish are out-eating commercial fishermen three-to-one."

Even if the prey estimate was deemed to be on the high end and dogfish were consuming only one-half-to-one-third of that tonnage, Sulikowski concluded, "The impacts could be great."

Janice M. Plante

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Mischmetal not feasible as dogfish deterrent

BIDDEFORD, ME – Mischmetal, a mixed metal alloy that initially appeared to hold promise as a dogfish deterrent when attached in small triangular slices to longline gear, failed to produce any significant results during sea trials last September.

"It didn't work, but now we know it didn't work," said Shelly Tallack of the Gulf of Maine Research Institute, who headed up the research.

The real focus of the study was longline gear, though Tallack's team also attached mischmetal to rod-and-reel gear on selected occasions and to two lines of lobster traps, which didn't produce any significant results either.

Tallack reported these findings to roughly four-dozen commercial and recreational fishermen at a March 29 dogfish forum here at the University of New England.

It was clear that numerous audience members had been aware of the project and were eager to hear the results. Some asked pointed questions, looking for positive news in the findings.

But even the most hopeful hold-outs were convinced that mischmetal simply

wasn't the answer after Tallack showed a segment of underwater video footage shot off the Isles of Shoals at the University of New Hampshire's (UNH) aquaculture demonstration site.

There, adjacent to the university's submerged cod cages, dogfish voraciously attacked bait – completely unimpressed by the mischmetal triangles attached to the gear. A few dogfish even attacked the mischmetal itself after the bait was gone.

"Look at that," murmured several in the crowd. "They'll eat anything."

The amazing feeding frenzy was captured with video equipment aboard UNH's aquaculture vessel, operated by the university's Atlantic Marine Aquaculture Center.

Electroreception

In theory, everything about mischmetal's potential use as a dogfish deterrent made sense.

Dogfish, like many other shark species, possess small pores around their heads – collectively called the "ampullae of Lorenzini" – that detect electric fields at short ranges and help them locate prey.

When submerged in water, mischmetal gives off a gas. Tallack and other elasmobranch (shark, skate,

It did not work in the wild. Mischmetal is unlikely to be a feasible solution as a dogfish deterrent.

—Shelly Tallack

ray) researchers hypothesized this gas might interfere with the electroreception abilities of dogfish and prevent them from going after baited hooks.

Tallack initially proposed to test magnets as a dogfish deterrent. She had heard about the successful use of magnets in the Bahamas to reduce the bycatch of lemon sharks on hooks. The lemon shark magnet research won the World Wildlife Foundation's Smart Gear Competition in 2006.

But then Tallack learned about other research on the West Coast showing that spiny dogfish in the Pacific seemed to be more averse to mischmetal than magnets.

So Tallack redesigned the project, which was funded by the Northeast Consortium, to test mischmetal instead – a far more attractive proposition than testing magnets with hook gear, which was bound to lead to some nasty magnetic snarls.



Peter K. Pryor photo

Gear trials

Tallack first obtained large triangular blocks of mischmetal, which had to be imported from China via Canada and were "fairly expensive," she said.

Her first challenge was finding someone to cut the mischmetal into the needed slices for attachment to the hook gear. Mischmetal is "highly flammable," and very few people were equipped to cut it, said Tallack. In fact, the most common use of mischmetal is for flint-ignition devices found in lighters.

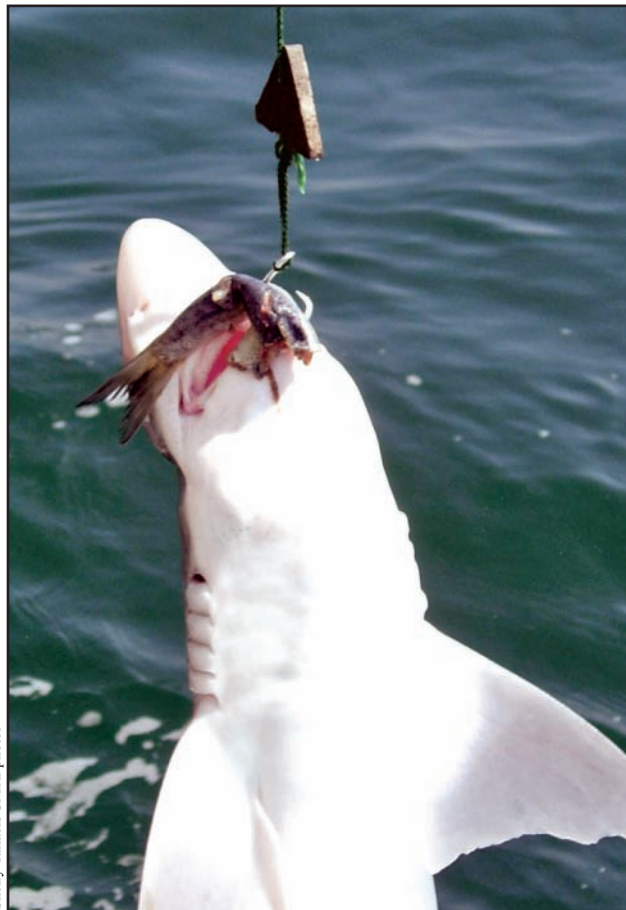
Next came the sea trials. Using the Portland-based fishing vessel *Survivor* as a work platform and with the help of Capt. Christopher Andrews and crewman Eric Tomazin, Tallack and the team rigged longline gear with 100 hooks – 50 with mischmetal and 50 without, changing between the two configurations every 10 hooks. They set four longlines each day for the first three days, but then one line was lost, reducing the gear complement to three lines.

The team intended to make seven trips but ended up completing six. On two trips, they couldn't find dogfish, at least not in large amounts as desired for the study. On the sixth trip, the gear became badly snarled and, at that point, the mischmetal was so disintegrated it wasn't worth using on a seventh trip.

After reviewing the collected data and taking a close look at the hooks with mischmetal and the ones without, Tallack said, "There was no obvious difference except for maybe trip number six."

But Tallack didn't trust the results from that trip. Since the mischmetal was disintegrating and the hooks were tangled together, she concluded, "This caused confusion in the data."

See MISCHMETAL, page 15B



Shelly Tallack/GMRI photos

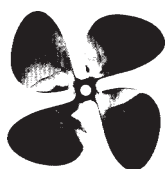
◀ *Sea testing led by Shelly Tallack of GMRI provided convincing evidence that mischmetal simply isn't a deterrent. Dogfish voraciously attacked baited hooks – completely unbothered by the mischmetal triangles attached to the gear.*

▶ *Dogfish, like many other shark species, possess small pores around their heads, collectively called the "ampullae of Lorenzini," that detect electric fields at short ranges and help them locate prey.*



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Research leads to lower 'assumed' discard mortality rates

BIDDEFORD, ME – Recent research into dogfish discard mortality is backing up what most commercial and recreational fishermen have long suspected: Spiny dogfish are resilient – as long as they're not severely wounded.

During a March 29 dogfish forum here, Gulf of Maine Research Institute (GMRI) scientist Shelly Tallack presented the collective findings of a joint discard mortality study for hook gear conducted from July through September 2006 by GMRI and the Cape Cod Commercial Hook Fishermen's Association (CCCHFA).

Final results from the study are now undergoing technical review before being submitted to a scientific journal for publication. Following the review, principals in the project expect to present their findings to the National Marine Fisheries Service (NMFS).

The information is expected to help NMFS further enhance the "assumed" dogfish discard mortality rate factored into dogfish stock assessments. Recent discard studies by other researchers for gillnet and trawl gear led NMFS to adjust estimates in the 2006 stock assessment.

Two fishing vessels participated in the Gulf of Maine portion of the GMRI and CCCHFA hook-gear study and six participated off Cape Cod.

To cut to the chase, it turned out that carefully handled dogfish had high survival rates while severely wounded and badly snubbed fish didn't fare as well.

Handling experiment

All together, 2,418 dogfish were sampled in the hook-gear study. Fish were classified by handling technique as follows:



Shelly Tallack/GMRI photo

**SPECIAL
DOGFISH
REPORT**

- Snubbed – assigned to longline-caught fish where the hook was ripped from the mouth;
 - Unsnubbed – assigned to longline-caught fish where the hook was carefully removed; and
 - Control – assigned to rod-and-reel, handline, and jig-caught fish where the hook was carefully removed.
- Each fish also was given a "hooking severity index" (HSI) number, which ranged from zero, where no external mouth wound was visible – even though some internal injury might have occurred – to five, where the hooking wound resulted in a large, gaping hole and the jaw essentially was broken.
- Besides being categorized by handling technique and HSI, the fish were given

A 2006 cooperative research project looked at spiny dogfish discard mortality rates in the commercial hook fishery. The hook-caught fish were classified by handling technique. Then live fish were placed in cages that were put back overboard. After three days, the condition of each fish was once again evaluated. The findings will help NMFS enhance the "assumed" dogfish discard mortality rate factored into dogfish stock assessments.

a "stamina index" of one-to-four, with "one" assigned to dogfish that were "alive, strong, with much resistance to being handled" and "four" being for fish that were dead.

Then, the live fish were placed in cages for approximately three days with roughly 17 dogfish per cage, explained Tallack.

After the three days, the condition of each fish once again was gauged using the stamina index, and survival rates were calculated.

According to Tallack, the results varied by region.

Of the sampled dogfish, 682 were caught in the Gulf of Maine in the GMRI

portion of the study. Forty-five percent were males and 55% were females. Total mortality for these fish was 7%.

The other 1,234 dogfish were caught in the CCCHFA part of the project. Twenty-seven percent of the fish were males and 73% were females. Total mortality for these fish was 22%.

Tallack said environmental factors might have accounted for the regional mortality differences, including water temperature and the higher presence of sand fleas where the CCCHFA vessels were fishing. Variations in dogfish handling techniques and caging procedures also could have been a factor, she said, even though a standard protocol was developed and followed in both regions.

Overall results

Several interesting results surfaced from this cooperative research, which was funded by the Northeast Consortium.

For one, males had a higher overall mortality rate than females, averaging 26% vs. 14% respectively. However, the larger dogfish of each sex seemed to be hardier and more prone to recover from hooking injuries.

Coming as no surprise, snubbed fish had the highest mortality rate at 23%, while unsnubbed fish came in at 16%. The carefully handled hand-gear caught "control" fish fared best with a 13% mortality rate, said Tallack.

When the results were further broken down by gear type, the overall mortality rate for dogfish caught in longline gear

See MORTALITY RATES, next page

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Fishermen vent frustration over dogfish

BIDDEFORD, ME – After four hours of presentations and discussions at the March 29 dogfish forum here, one thing became perfectly clear. The commercial and recreational fishermen in the room didn't believe managers had a clue about what was *really* happening on the water with spiny dogfish.

In addition to research updates from James Sulikowski of the University of New England and Shelly Tallack of the Gulf of Maine Research Institute, audience members heard management updates from Paul Perra of the National Marine Fisheries Service (NMFS) and Jim Armstrong, a staffer for the Mid-Atlantic Fishery Management Council who also is chairman of the Spiny Dogfish Monitoring Committee. Armstrong spoke to the crowd by speakerphone from his office in Dover, DE.

Starting off with an overview of the history of the fishery, Armstrong explained that extremely high landings from 1993 through 1998 had a large impact on the stock.

"That brought the biomass of mature females down to about 24% of where it should be to have a good sustainable population," he said, adding that subsequent restrictions on the fishery had

helped the stock rebuild considerably.

"We've come a long way. We're back up to 70%," he said.

However, Armstrong cautioned that fishermen shouldn't expect a return of the booming fishery of the old days now that fishery managers have witnessed what can happen to a slow-growing species like dogfish that produces few young at a time.

"Once we get up to 100% and a directed fishery is allowed to resume, the allowable removals won't be anywhere near as big as they were in the 1990s," Armstrong predicted.

Perra added that another issue restraining managers was the low pup production of the past seven or so years.

"Our surveys are not showing young dogfish coming into the fishery," he said.

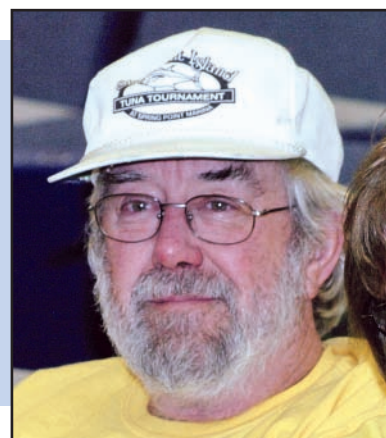
Dogfish everywhere

Audience members, who listened intently and asked numerous questions, didn't buy the stock assessment information.

Recreational tuna fisherman Mike Breton said, "The amount of dogfish

The amount of dogfish we're seeing is unbelievable. Your trawl surveys are very inadequate and don't tell the whole story.

—Mike Breton



Peter K. Pryor photos



Even at 20 cents a pound, how many pounds are you going to need at \$4 diesel fuel to go 50 miles offshore to fish? These are the kinds of things we need to think about.

—George Lapointe

we're seeing is unbelievable. Your trawl surveys are very inadequate and don't tell the whole story."

Cal Robinson, who conducts guided charters for striped bass and tuna, expressed equal frustration.

"If dogfish were worth a dollar a pound, we wouldn't be sitting here right now having these discussions," he said.

"You just can't fish anymore. Dogfish are a problem and there are going to be repercussions," Robinson continued. "They've completely changed the nature of the fishery. I've gone from being an offshore fisherman to an inshore fisherman right in the rivers and bays now."

Ecosystem impacts

One audience member called out, "What cost will it take before NMFS comes along and says it's recovered? When will they say there's more benefit to other species like cod? Dogfish are scavengers of recovering species."

Mortality rates

was 22%. For hand-gear-caught fish, it ranged from 8% to 17% depending on the type of hand gear used – handline, rod-and-reel, or electronic jigging machines.

Furthermore, Tallack said the HSI factor became an important indicator in the study.

"Mortality overall increased for fish with more severe hooking injuries," she said. "Internal injuries, ripped insides, swallowed hooks, these also affected the fish and appeared to cause mortality."

Discard assumptions

The cooperative GMRI and CCCHFA project investigated discard mortality rates for commercially hook-caught dogfish only and is still in the final stages of technical review.

But other research by John Mandelman and Marianne Farrington of the New England Aquarium looked at discard mortality rates for trawl caught dogfish, and Roger Rulifson at East Carolina University conducted research on gillnet caught dogfish.

Perra said, "We're moving to ecosystem management where we would take all these things into account."

But Perra and others cautioned that "we're not there yet," so for now, NMFS has to adhere to existing stock rebuilding rules.

"Our agency is charged by Congress to rebuild fisheries when they're down," said Perra.

He added that the rebuilding situation with dogfish was well underway and the status of the stock had greatly improved.

Audience members, polite with their comments, nonetheless continued to strenuously disagree with the strategy.

"The problem is you're protecting the wrong fish," said one.

Another spoke out saying, "It doesn't make any sense to me. Why would we put the time and effort into recovering a stock that's devouring our high-value species?"

Mike Breton said, "There's no anecdotal information being considered. I

Continued on next page

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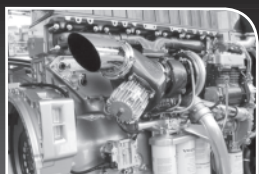
The results from these studies led NMFS to revise the dogfish discard mortality estimates used in the 2006 spiny dogfish stock assessment as follows:

- Gillnets – 30%, down significantly from a previously assumed dogfish discard mortality rate of 75%;
- Trawl gear – 50%, which remained unchanged from the previously assumed rate of 50%;
- Commercial hook-and-line gear – 10%, down from the previously assumed rate of 25%; and
- Recreationally caught dogfish – 20%, down markedly from the previously assumed discard mortality rate of 100%.

Fishermen towing trawl gear at times encounter extremely large schools of dogfish, which often get crushed in the net simply due to their sheer volume. This full-net/crushing factor is the primary reason the discard mortality rate for trawl caught dogfish remained so high, explained Tallack.

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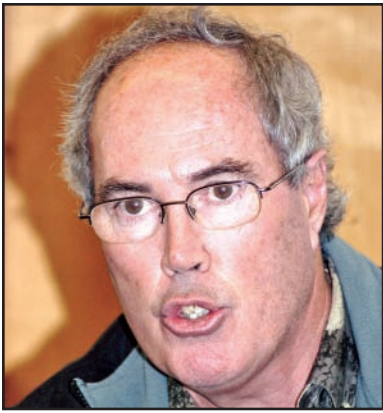
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Peter K. Pryor photos



If dogfish were worth a dollar a pound, we wouldn't be sitting here right now having these discussions.

—Cal Robinson

We need to up the bycatch level. It's crazy. Instead of me dumping them back overboard, I could sell them and pay my fuel bill.

—Rob Odlin



don't think you really understand what's happening with these dogfish. Something has to change and we need to stop doing business as usual."

Commercial fishermen considered the 600-pound dogfish bycatch trip limit in federal waters to be completely inadequate.

Gillnetter Rob Odlin said when dogfish come through and foul his nets, there can be thousands of pounds of them.

"We need to up the bycatch level," he said. "It's crazy. Instead of me dumping them back overboard, I could sell them and pay my fuel bill. I'd like to see 6,000 pounds per day. The price might go up

Mischmetal Continued from page 12B

Tallack also provided a quick overview of work being conducted at the New England Aquarium by John Mandelman and colleagues where spiny dogfish videotaped in captivity showed a very mild aversion to mischmetal. Smooth dogfish, on the other hand, showed a mild aversion to magnets.

However, all that changed when the dogfish were deprived of food for two-to-four days, and then the mischmetal and magnets had little to no affect.

"Selectivity declined as hunger

increased," said Tallack.

This is how it goes with science. Experiments sometimes fail. But negative results can be just as important as positive ones, and researchers now know that mischmetal, which in theory seemed promising, just doesn't work in practice.

Tallack said in conclusion, "The point is that it did not work in the wild. It may have shown mild impacts in the lab, but overall, mischmetal is unlikely to be a feasible solution as a dogfish deterrent."

Janice M. Plante

We're moving to ecosystem management where we would take all these things (like predation on cod) into account.

—Paul Perra



with volume. This could be a valuable fishery."

Maine Department of Marine Resources Commissioner George Lapointe agreed that 600 pounds of dogfish at 17 cents per pound didn't amount to much — just \$102.

He urged fishermen to think about what would be a more realistic catch level.

"Even at 20 cents a pound, how many pounds are you going to need at \$4 diesel fuel to go 50 miles offshore to fish?" he asked. "These are the kinds of things we need to think about."

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