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Net Loss: Is Ghost Gear Hurting the Fishing Industry?

For generations, fishermen wrote off abandoned equipment as the cost of doing business. But now, the profusion of ghost gear has reached a critical mass, and is actively hurting their livelihoods.

By Casey Lyons

FROM THE WHEELHOUSE of the *Barbara L. Peters*, everything looks normal. The net goes taut behind the 55-foot fishing boat, and Scituate fisherman Frank Mirarchi starts to pull it in, hoping to find a big clutch of cod. As the net gets closer to the boat, though, Mirarchi sees something else.

At the back of the net hangs a mangled lobster pot, the prongs of its steel cage hooked into the plastic webbing like a burr in a sock. Mirarchi idles the wide-bottomed boat, puts on his work gloves, and heads out to the deck. His son Andrew has already laid the net down, opened its "window" — a hole that can be opened and closed to extract things that aren't fish — and begun working the pot toward the escape hatch. Cod are flopping everywhere. Ten minutes later, the battered pot clangs to the deck. Andrew sews the window closed again, and then it's back to fishing — until another hunk of abandoned gear gets caught in their net.

Today Massachusetts fishermen are hauling in trash and marine debris on nearly every trip, even in protected areas like the Stellwagen Bank National Marine Sanctuary — the 842-square-mile section of the sea just east of Boston Harbor that serves as a habitat for endangered species of whales. More often than not, the fishermen are pulling in "ghost gear," or lost fishing lines, nets, and pots. Along with by-catch (the accidental catching of the wrong types of fish) and rising ocean temperatures (due to climate change), ghost gear is one of the major issues confronting the North American fishery in the 21st century. While hard stats are impossible to gather for the total amount of ghost gear littering the ocean floor, the few studies that have been done reveal the extent of the problem: One 37-square-mile area in Stellwagen Bank that's known for good lobstering contains an estimated 61,440 pots, plus 457,000 pieces of rope and 7,680 nets. Another 198-square-mile sliver of sea floor was projected to contain a stunning 700,000 gill nets and 164,000 pieces of rope and fishing line — and that area has been closed to commercial fishing for more than 20 years.

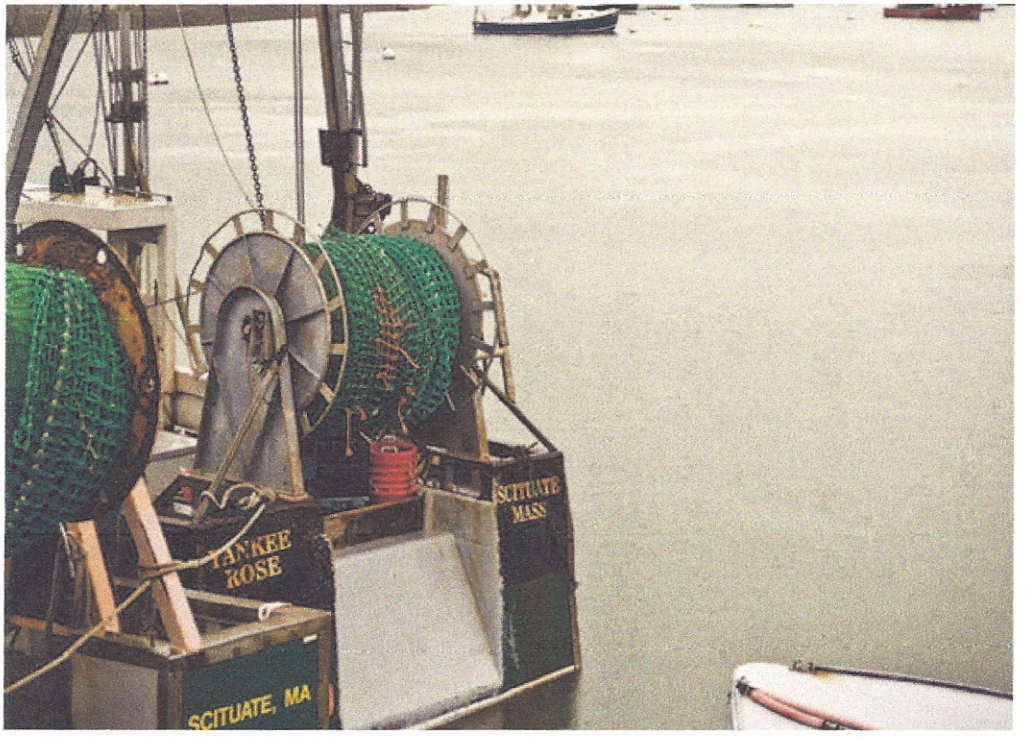
For generations, fishermen wrote this off as simply the cost of doing business. They even dumped their old, busted gear into the water — better than hauling it ashore. But now, the profusion of ghost gear has reached a critical mass, and is actively hurting their livelihoods. And beyond the productivity that's lost when fishermen like Mirarchi have to stop fishing to remove broken gear, there's the fact that all that gear is still working: Unmanned nets and lobster traps continue to catch fish, which, instead of being harvested and winding up on our dinner plates, slowly starve to death. They, in turn,

become bait for a new round of fish lured to their death. "What's surprising," says Bob Glenn, an aquatic biologist with the Massachusetts Division of Marine Fisheries (MDMF), "is that the traps will often continue to catch animals when the original bait is gone."

Absent any new technique to identify and remove big collections of the gear, the ocean will turn into a denser and denser soup of nets, traps, and rope. "Just because [this stuff] is 'out of sight, out of mind,' " says Ben Cowie-Haskell, assistant superintendent of the Stellwagen Bank sanctuary, "doesn't mean it's not a problem, [or] that it doesn't exist."

ARMED WITH FOUR GPS screens in the Barbara L. Peter 's cabin and two plastic trawl nets on the deck, Mirarchi returns again and again to the same little ribbons of muddy and sandy bottom in the Stellwagen Bank sanctuary. Yet his fish-finding technology is blind to ghost gear. Wave action from nor'easters can toss and tangle lobster pots that are as much as 50 feet deep, creating pickup-truck-size balls of rope, pots, and nets that are like giant tumbleweeds blowing across the ocean floor. In lap after lap over the same water, Mirarchi can eventually skim an area clean of trash, but each winter, storms refill his lanes with debris and ghost gear — as much as 8,000 pounds per year. You clean it up, Mirarchi says, "then you start all over again. It never really ends."

Photos by Mark Fleming



Fishermen have been working the waters of Massachusetts Bay since long before the states united. One of the early maps of the area, dated to 1616 and credited to Captain John Smith, depicts a sailing vessel over today's Stellwagen Bank sanctuary. Nineteen years later, the map was amended to include a pyramid of cod heads as a sign of good fishing. Some academics theorize that this abundance helped the first European settlers survive.

For nearly 400 years now, fishermen have been exploiting these resources. Local knowledge and understanding of the area and its seasonal cycles have increased as time's gone by, but fishing methods remain unchanged. At its core, the process consists of a group of men (mostly) lowering nets, hooked lines, or traps where they think the fish should be. Sometimes they'll come up with a full clutch, other times nothing at all, and sometimes their nets will simply vanish.

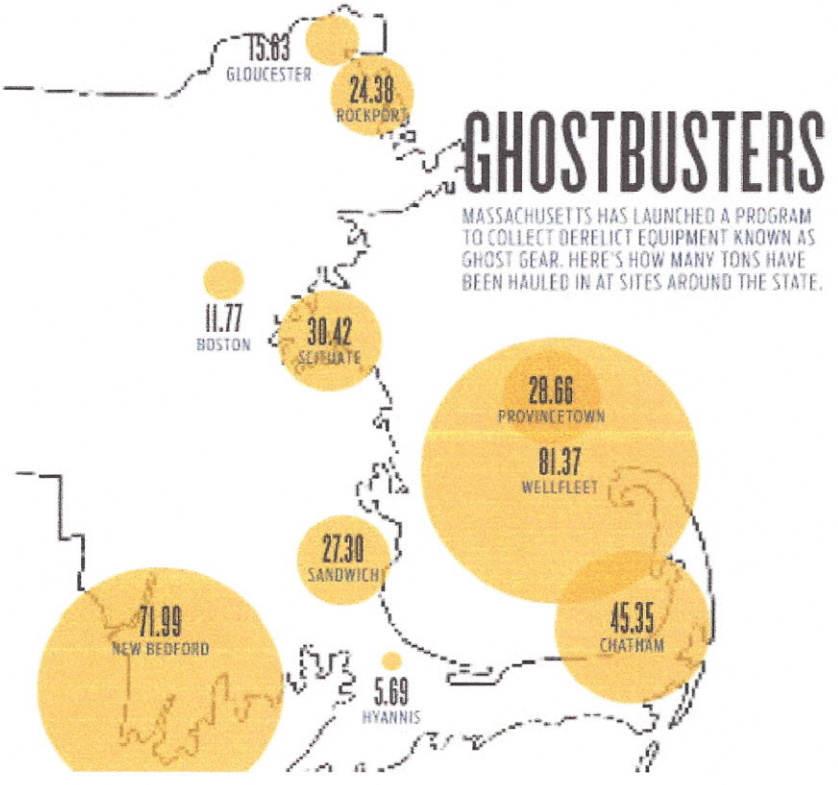
There are loads of reasons that ghost gear plagues local waters. One common scenario involves a fisherman losing equipment that settles on the bottom and becomes artificial habitat for fish, which are always looking for shelter. Now he has a problem: Fish could be hiding next to his lost gear, but that sea junk makes it riskier to fish there — he could lose *more* gear. (This is the commercial version of getting your hooked worm caught on a submerged log and having to cut the line.) But since he wants to make more money, he comes back and catches more fish at the spot. Eventually he's going to lose still more equipment. And so it goes, until you have a giant knot of gear on the bottom.

Barges are another problem: While being pulled into port, the boats can snap the lines running from buoys to lobster traps, leaving entire trawls stranded on the ocean floor. And finally, there's the age-old issue of dumping. While most fishermen aren't *trying* to lose gear — a single trawl of lobster pots can cost its owner a few hundred to a few thousand dollars to replace, depending on the size — many of them used to simply throw their torn nets and busted lobster pots back into the water. A good number of the commercial fishing ports around here have generations-old gear graveyards near their mouths. Determining the scope of the problem is difficult, because hard data is elusive. Fishermen aren't required to report lost gear, and few of them do.

The Massachusetts Division of Marine Fisheries maintains a record of catastrophic loss of commercial gear, but in the past four years, there have been only four reported losses. However, preliminary results of a new survey conducted by the MDMF suggest a 4.5 percent annual loss rate for lobster gear. Given that Massachusetts has about 320,000 actively fished commercial lobster traps, that means roughly 14,000 traps go missing each year. The annual cost just to buy replacement traps runs about $1.4 million — and that doesn't account for the untold lost man hours spent searching for the gear or getting replacement trawls up and running.

Loss rates get fuzzier when it comes to nets. In its 2008 book *Tackling Marine Debris in the 21st Century*, the nonprofit National Research Council writes that "anecdotal evidence suggests that, in some fisheries, 30 kilometers of net are lost or discarded during a typical 45-day trip, which translates into 1,254 kilometers of lost or discarded netting per year." That's about 800 miles' worth — enough to stretch from Boston to Detroit — every year, and that's just for one fishery.

The problem has been exacerbated by modern materials. Beginning in the 1970s, fishermen transitioned from cotton nets to plastic ones, while wooden lobster pots were traded in for vinyl-coated steel. There was also the introduction of monofilament fishing line, which the Woods Hole Oceanographic Institution — an international leader in oceanic research that's located on the Cape — says can remain intact for 600 years. These advances were meant to increase the profits of fishermen. But because lost gear now lasts much longer, the improvements are instead threatening the very sustainability of the industry.



Also contributing to the problem is the fact that even if fishermen like Mirarchi do haul in ghost gear, it's technically illegal for them to bring it ashore and dispose of it — a law originally meant to prevent people from swiping lobster pots for their Cape Cod coffee tables. To comply with state laws, fishermen have to either radio the Environmental Police or pitch the stuff back overboard — which for years is exactly what they did.

And that gets at part of the reason that lobstermen, in particular, are set on edge by any talk of gear cleanup. Some doubt the dangers posed by lost equipment — they say it becomes habitat — but many are looking out for their public image, which they fear skews more toward raiders of the sea than hardworking guys trying to make a living. "There is already an existing public perception of commercial fishermen, that we burn, pillage, plunder, and rape the ocean," Dave Casoni, a longtime fisherman and member of the Massachusetts Lobstermen's Association, said at a recent conference on derelict fishing gear held in Portland, Maine. "We could also be accused of now trashing the ocean. That's what we're afraid of, that all of a sudden something will be done to us because of what's already there."

He's talking about money, and he has a point. When new regulations to protect the critically endangered right whale came online in 2007, for example, fishermen had to pay to replace all their rope with non-floating line and install breakaway mechanisms that release when they entangle a whale. Lobstermen say these whale regulations are now one of the top three reasons for gear loss.

Rather than pointing fingers, though, most people pushing cleanup efforts are looking for solutions. Until scientists devise methods to track equipment loss, no one will know for sure how much slips away each year or what tonnage of fish it's responsible for killing. It's true that the extent of the

ghost-gear problem is unknown, but one startling fact puts the whole thing in perspective: More derelict nets, pots, and other gear are sitting on the bottom of the ocean than are being actively fished at any given time.

FED UP WITH LOSING gear and reeling in other people's junk, Mirarchi contacted Cowie-Haskell of the Stellwagen Bank sanctuary in 2007. Mirarchi wanted to pitch a plan for a project to start removing the junk, and it turned out that Cowie-Haskell didn't need much convincing. Like the rest of the sanctuary staff, the assistant superintendent is charged with managing ship traffic. In that role, he'd already spent several days 80 feet underwater the previous summer, getting a firsthand education on the outsize frustrations and challenges of gear removal. He and a team of divers had gone to the bow of the sunken schooner *Paul Palmer*, which went down after catching fire in 1913. Over the years, lost nets had formed a tight cocoon around part of the ship. For 20 minutes at a time, Cowie-Haskell would grab a handful of cotton net, pull until it went taut, then cut. When a piece came off, he'd attach it to a float bag and send it toward the light. It took two days of painstaking work to finish the job, and only a couple of nets had been removed.

Mirarchi told Cowie-Haskell that what he really wanted to do was target bigger tangles of ghost nets — the monster gear balls that he and other fishermen went out of their way to avoid. So they set out on the *Barbara L. Peters*, Mirarchi's boat, and headed for a big pile of underwater traps that Mirarchi knew about. For five hours they worked the grappling hook, fishing for trash. Most of the time, when they went to winch their catches up, the underwater ropes snapped like old rubber bands. By day's end, they'd spent about $1,000 to operate the boat — and collected a grand total of four lobster pots and a few hundred feet of rope with frayed ends. In a photo taken on the ship's deck that afternoon, both Mirarchi and Cowie-Haskell look decidedly nonplussed.

Illustration by Liz Noftle

By December 2008, they'd hatched a new, two-pronged plan. The first part involved a refined effort to haul gear from the ocean floor. The second part was an attempt to keep it from getting there in the first place. Mirarchi and Cowie-Haskell knew that one of the reasons fishing gear gets dumped into the sea is that fishermen are prohibited from bringing it to town transfer stations (it gums up incinerators). Add to that the fact that it's prohibitively expensive for them to ship it to the distant facility that can process it, and you get old gear on the ocean floor. So Stellwagen Alive!, a nonprofit organization supporting the sanctuary, has placed dumpsters at ports in Scituate and Provincetown for the collection of old fishing equipment. A year later, the group teamed up with the National Oceanographic and Atmospheric Administration and Covanta Energy, a private power company, to put dedicated dumpsters near the ports. To date, this trash-collection partnership, called Fishing for Energy, has brought in more than 685,000 pounds of fishing gear from 10 sites around Massachusetts. The trash was incinerated, producing enough energy to power 23 homes for a year.

In 2008, Stellwagen Alive! also organized an ocean cleanup effort under the banner Stellwagen Sweep, commissioning several captains and teams of volunteers to remove gear from the bottom. This time, rather than a powerful dragger like the *Barbara L. Peters*, they used lobster boats, which pull with more finesse and therefore break line less often. In its three sweeps to date, the group has collected 100,000 pounds of gear.

The victories, though, have been tempered by setbacks. In 2010, the Massachusetts Division of Marine Fisheries placed 18 lobster pots with biodegradable escape panels on the ocean floor in Cape Cod Bay and Buzzards Bay, part of a study to find out if lost gear continues to catch fish. Turns out these biodegradeable escape hatches — standard on today's lobster pots — don't work well. Half of the trawls in the study kept catching lobsters and other sea life long after they were supposed to have stopped.

BY THIS TIME OF YEAR, the threat of nor'easters has mostly passed. The ghost gear churned up this winter has had a chance to settle again under calmer seas. Crews involved with this year's Stellwagen Sweep, which is scheduled to get under way this month, are looking for new gear balls, relying once again on the knowledge of local lobstermen and their skill with the grapple hook. And this year, sweep organizers are planning their biggest removal project to date, courtesy of a grant from the National Fish and Wildlife Foundation. They're hoping to incorporate two types of sonar — which should provide fishermen with precise, real-time information on where the abandoned traps are — and will use a remotely operated diving submarine to fasten hauling lines to gear aggregations in deep water. The gear that's still in good working condition will be returned to its owners based on identification tags, and the rest will be disposed of, recycled, or incinerated for energy.

Frank Mirarchi will continue to fish Stellwagen Bank, trawling the depths for cod, haddock, and flounder. He'll stop almost daily to disentangle old lobster pots and random ocean junk like metal-spring mattresses and dishwasher racks from his nets. He'll pile it on the dock, and if it's busted beyond repair, he'll haul it over to Covanta's Fishing for Energy bin at the town transfer station. All across the state, those dumpsters will start to fill up again with an alternative fuel that will power homes.

Mirarchi helped pioneer the cleanup efforts that would become Stellwagen Sweep, but he's stepping aside, having realized that the amount he can

contribute is limited. This year he's leaving the grappling to the fishermen who are best at it — the lobstermen. But the *Barbara L. Peters* stands at the ready — if the Stellwagen Sweep crews manage to bring any big ghost-gear tumbleweeds to the surface, Mirarchi has promised to lift them out of the water with his onboard crane. Until scientific data finally catch up with the experience of fishermen, these types of partnerships remain the best chance to get the equipment out of the sea, cut down on the overall fish kill, and slowly change the public perception of fishermen from plunderers to stewards of maritime resources. "After so many years, I figure I owe the ocean something," Mirarchi says. "It's fed my family for 49 and a half years, so the least I can do is pick it up."