

Ghost Fishing: Invisible Killers in the Oceans

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SUMMARY

Fishing gear which has been lost, dumped, or abandoned but nevertheless catches and harms wildlife is described as ghost fishing. It involves fishing nets, traps, long lines, rope, and other equipment that fishermen have abandoned or lost in the sea. This equipment, which would be often effectively invisible in the poor light and opaque waters of the ocean, could be left to drift in the open ocean until it can be washed out to sea or retrieved. It's only a matter of time until ghost fishing gear confines animals, entangles and perhaps kills marine life, suffocates habitat, and then becomes a navigational hazard.

INTRODUCTION

Abandoned, lost or otherwise discarded fishing gear (ALDFG) is of increasing concern due to its numerous negative impacts. The ability of ALDFG to continue to fish (often referred to as “ghost fishing”) has detrimental impacts on fish stocks and potential impacts on endangered species and benthic environments. Fishing gear has been abandoned, lost or otherwise discarded since fishing began, but increases in the scale of fishing operations and technologies used in recent decades mean that the extent and impact of ALDFG debris have increased significantly with the use of synthetic materials, the overall increase in fishing capacity and the targeting of more distant and deep-water grounds. ALDFG is also a concern because of its potential to become a navigational hazard (with associated safety issues) in coastal and offshore areas. Fishing gears may get lost into the seas due to rough weather conditions, damages in the gear, entanglement with bottom obstructions like wrecks and reefs or sometimes dragged away by other fishing gears/ boats. Also, gears may be discarded intentionally into seas by fishermen if the gear is found defective. These lost gears referred to as abandoned, lost or otherwise discarded fishing gear (ALDFG) continue to catch fishes even though fishermen have lost the control over those gears. The phenomenon of capturing target and nontarget fishes and other aquatic organisms by ALDFG known as Ghost fishing causes several harmful impacts on fish stocks as well as on endangered species and benthic habitats.

What is ghost fishing?

Derelict fishing gear, sometimes referred to as "ghost gear," is any discarded, lost, or abandoned, fishing gear in the marine environment. This gear continues to fish and trap animals, entangle and potentially kill marine life, smother habitat, and act as a hazard to navigation. Derelict fishing gear, such as nets or traps and pots, is one of the main types of debris impacting the marine environment today.

Lost fishing gear and gear scraps are the most hazardous type of marine debris, with relatively intact gear a source of ghost fishing, and small pieces of net and line the principal source of entanglement. Although ghost fishing and entanglement are not usually considered part of the bycatch issue, they catch many of the same species taken as bycatch. The only real difference is that one involves derelict fishing gear and the other involves active gear.

Impacts of Ghost Fishing

Ghost nets don't only catch fish; they also entangle sea turtles, dolphins and porpoises, birds, sharks, seals, and more. These animals swim into nets, often unable to detect them by sight or sonar. The nets keep animals from moving freely, cause injuries, and keep mammals and birds from rising to the surface for air. Since hundreds of animals can be caught in a single net, you can see just how monumental this threat is. And ghost nets harm coral reefs too—breaking corals, exposing them to disease, and even blocking the reefs from needed sunlight.

Lost fishing gear and gear scraps impact marine life in two ways: ingestion and entanglement. Some species, particularly turtles, eat pieces of fishing floats and line and die from blocked or damaged digestive tracks. For lost fishing gear, however, entanglement and entrapment are greater concerns. Fish and shellfish, and occasionally turtles and birds, are caught in relatively intact traps and nets. The numbers caught in

individual nets can be surprising. Most entangled seabirds, seals, and turtles, however, are found in small pieces of net and line. Once caught, animals unable to free themselves quickly become prey for predators, drown from exhaustion, starve because of limited mobility, or die from cuts or constriction injuries. The extent to which marine debris affects marine life is not well known because animals killed in marine debris quickly sink or get eaten, and because marine debris is so scattered that systematic at-sea sampling is rarely practicable. Despite these problems, there are good reasons for concern about its impact.



Sea Turtle Entangled in a Ghost Net.



A diver removes a ghost net that is choking coral reef



A sea turtle entangled in a ghost net.

In this sense, ghost fishing and entanglement are related parts of the same basic problem—namely, preventing extraneous mortality of marine life in fishing gear. Once lost, fishing gear and gear scraps catch many protected species, but some of the most seriously affected species are those on which commercial fisheries depend. In some cases, the catch by lost gear may approach bycatch levels in active gear. As discussed below, fishers and fishery managers should not neglect related problems posed by lost gear and should factor research and management needs concerning derelict fishing gear into decisions and plans to minimize bycatch. The mortality caused by ghost fishing is a factor of gear loss rate and their catch efficiency. The mortality percentage due to lost fishing gear may be depended on the species present, abundance, Vulnerability and ghost fishing status

How Does Fishing Gear Become Ghost Gear?

Ghost gear is an unintended byproduct of fishing and occurs when the fisher loses all operational control of the equipment.

Here are some reasons why fishing gear may become abandoned, lost or discarded:

Poor weather conditions

May dislodge set fishing gear, resulting in misplacement when at sea. Fishermen often dry their nets on beaches, and they may get washed away during storms. E.g: The vertical profile and zero visibility of gill nets are the primary characteristics that determines their effectiveness of gill net ghost fishing. Moreover, the depth and sea bottom type and the lost gear exposure to environmental factors like heavy storms, surge and fouling are key determinants of the effective catching efficiency of individual ghost gill nets.

Poor gear maintenance

Many commercial fishing operations rarely repair broken nets – or clean them regularly.

Conflict between fisheries & vandalism

E.g. trawlers may drive straight through gillnet areas and destroy other fisheries' nets, or when someone is fishing where they shouldn't be.

Catch overload

May damage the integrity of the net used, often resulting in breakages and improper disposal of the damaged net.

Poor access to disposal or recycling facilities

It is often easier to improperly dispose of unwanted fishing gear by throwing it overboard or leaving it in situ than to bring it back to shore.

High cost of retrieval

Discourages fishermen from recovering lost nets, which can also be time consuming.

IUU* fishing activities

If caught by a coast guard or the police, a quick departure may mean that the net is left/torn away, illegal, unreported and unregulated

Destructive fishing techniques

Bottom trawling, for example, will often cause nets to snag on the seafloor and break.

Level of ghost catches in net fisheries:

It's a technologically difficult and also expensive to stimulate gear loss and to retrieve lost gears. This makes it difficult to estimate ghost fishing mortality rates also to estimate total ghost catches for the reason that losses are limited and can be estimated approximately. Worldwide, records of marine debris ingestion and entanglement exist for at least 267 species (Laist, in press), with ingestion known in 177 species and entanglement reported for 136 species. Entanglement records alone include all but one of the world's eight sea turtle species, 58% of the world's seal and sea lion species, 60% of the baleen whale species, 16% of all seabird species, and many commercial fish and shellfish. The vast majority of reported entanglement cases involve small pieces of lost fishing gear, particularly trawl net, gillnet, and monofilament line. In August, 2018, around 300 endangered sea turtles were found dead off the southern coast of Mexico, trapped in what was believed to be an abandoned fishing net. The deaths of the olive ridley turtles dramatically underscored the dangers posed by lost or discarded fishing equipment or so-called ghost gear.

How much Fishing gear is lost?

An estimated 25,000 nets are discarded annually in the Northeast Atlantic alone, according to World Animal Protection, with the masses increasing each year. These nets can weigh up to 10,000 pounds, resulting in diving teams having to take multiple trips underwater - a single dive trip can only retrieve 200 to 300 pounds of nets of this 10,000 out of the ocean. The search is timely, and often dangerous and strenuous for divers. The United Nations Environment Programme (UNEP) and the Food and Agricultural Organization of the United Nations (FAO) conservatively estimate that some 640,000 tonnes of fishing gear are left in our oceans each year. In just one deep water fishery in the north-east Atlantic some 25,000 nets, totalling around 1,250km in length, were recorded lost or discarded annually. It is estimated that between 600,000–800,000 metric tonnes of ghost gear enters the ocean each year, with some of it lost during storms and some deliberately dumped. Nick

Mallos, Director of the Trash Free Seas Program at Ocean Conservancy, says this is likely a conservative estimate.

Solutions to Ghost Fishing and Entanglement Problems:

The efforts to reduce ghost fishing and entanglement have concentrated on two areas: (1) encouraging disposal of old fishing gear and trash on land, and (2) designing escape panels for lost traps and pots (3) Designed degradation of ghost fishing although progress has been made in both areas, far more could be done in these and other areas.

Disposal of old Fishing Gear

The arsenal of management actions to limit discharges of old fishing gear focus on promoting land-based disposal. They stem from requirements of the International Convention for the Prevention of Pollution from Ships, which took effect in 1989 more than 65 nations, requires its parties to adopt conforming rules to reduce pollution caused by discharges of ship-generated garbage and to ban the disposal of plastics at sea. Because most fishing gear has plastic components, intentional dumping of old gear or scraps from net repair at sea is prohibited. The only exceptions are throwing back plastics caught incidentally in retrieved fishing gear, and accidental gear loss.

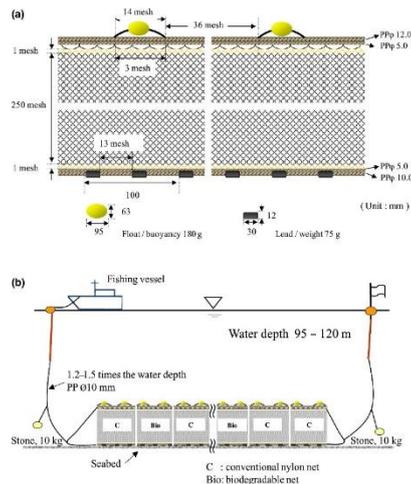
Gear design to reduce ghost Fishing

Another approach to ghost fishing is degradable escape mechanisms. This approach has focused on pots and traps and involves incorporating trap panels or flaps secured with a material known to degrade within a set time. When the degradable fastener fails, the panel or flap opens, minimizing the risk of entrapping target species. Such escape mechanisms have been investigated since at least the 1970s. The state of Alaska began requiring voluntarily return to recorded sites to attempt its recovery. Fishing practices also might be changed to avoid gear loss situations. In particular, steps could be taken to reduce fishing in known hazard areas, or fishing in fringe seasons when sudden storms or ice conditions make it less likely gear will be tended regularly, and increase the risk of gear loss. Entangling of gear on rocks and reefs are avoidable in a certain extent by technical improvement of fishing gear and methods. The true reason of fishing gear loss is, however, that fisherman choose fishing grounds, taking a risk of gear loss into account

Designed degradation of ghost fishing

Fifty or sixty years ago, nets were commonly made from biodegradable hemp or cotton. With the advent of synthetic, degrade-resistant materials such as nylon, nets now can remain active in the water for hundreds of years. Some plastics can remain in the marine environment for up to 600 years. When gear does finally break apart, further damage is done when marine animals eat plastic particles and polyurethane chemicals leach into the water.

In a recent study published in the scientific journal *Animal Conservation*, researchers from the National Institute of Fisheries Science in Korea, in collaboration with FAO, presented **an alternative biodegradable material for gillnets**. This new polymer gets degraded by microbes after only 2 years in seawater, substantially reducing the potential duration of ghost fishing. At the same time, the nets would remain economically viable, since the material ensures catch rates similar to conventional nylon nets. Experts caution that **this is not the panacea for tackling ghost fishing**. Biodegradable nets might break or get lost more easily than standard nets. They are also likely to cost more and, as a result, fishermen may be less inclined to adopt them. In general, in addition to remedies to lost gear, cheaper preventative measures should be put in place to reduce the amount of gear that gets discarded in the first place. However, if integrated into a wider management framework that includes strategies to mark nets, reduce loss and improve recovery, **biodegradable materials could play an important role** in shortening the impact of discarded fishing gear, thus reducing its socioeconomic and conservation costs.



Ghost Fishing Initiatives

There are many Ghost Fishing initiatives and organizations all over the world, aimed at removing derelict fishing gear that continues to harm, trap and kill aquatic life.

- Global Ghost Gear Initiative was set up as an alliance of non-governmental organizations, academics and fishing industry leaders to reduce the amount of ghost gear in the oceans.
- Ghost Diving Global Mission is a registered charity organization of volunteer technical divers specialized in the removal of ghost fishing gear and other marine debris.

Cost and benefits of management options

Abandoned fishing gear has become a global problem. One report, jointly issued by the Food and Agriculture Organization and the UN Environment Program (UNEP), estimates that 640,000 tons of such abandoned nets are spread across the world's oceans, comprising up to a staggering 10 percent of oceanic litter. In the Puget Sound alone, derelict fishing gear kills over a half million sea-creatures each year, according to a Northwest Straits Marine Conservation Initiative estimate. Divers and conservations worldwide are now tackling their own localized projects. Since 2010, the Olive Ridley Project freed and rehabilitated 51 endangered turtles trapped or injured in nets in the Maldives, illustrating how such gear puts added strain on an already endangered species. In Mediterranean waters off the Turkish coast, a cleanup effort to rehabilitate ecosystems damaged by ALDFG is currently underway. Ghost Nets Australia has a partnership with indigenous groups working in the area to remove ALDFG. While ALDFG cleanup projects are primarily small, a few large-scale ones do exist. The Washington state, aided by a \$4.5 million grant from the American Recovery and Reinvestment Act, began the Derelict Fishing gear removal program in Puget Sound's shallow water in cooperation with the Northwest Straits Foundation. The project's has to date removed 4,500 nets, 3,081 crab pots, and 47 shrimp pots. However, preventing gear being lost in the first place has proven far less expensive than retrieval from the depths. Washington State, for instance has to spend approximately \$190 to retrieve a single crab pot. According to the California SeaDoc cleanup initiative, one abandoned net can kill \$20,000 Dungeness crabs in one year. Removing the net costs \$1,358. According to one study cited in a UNEP report, lost tangle nets catch around 5 percent of total commercial catch globally. In the United States there has been one encouraging development — fishing for Energy program that promotes creative reuse. This partnership between Covanta Energy, the National Oceanic Atmospheric Administration's Marine Debris Program, National Fish and Wildlife Foundation, and Schnitzer Steel, is converting old fishing gear into energy.

According to the project website, "through December 2013, the Fishing for Energy partnership has provided removal services at 41 ports in nine states, collecting over 2.2 million pounds of fishing gear. Gear collected at the ports is first sorted at Schnitzer Steel Industries for metals recycling, and the remaining non-recyclable material is converted into energy at Covanta Energy locations. Through the Fishing for Energy grants fund, close to \$800,000 has been awarded with about \$500,000 matched from grantees for thirteen projects engaging over 1,000 fishermen."

NOAA estimates that one ton of derelict nets can power a home for 25 days. Another group, the Healthy Seas initiative, works to convert ALDFG into material for consumer goods, such as socks, swimwear, and carpets. Though the problem of ghost fishing gear has no foreseeable solution as of yet, there are many groups out there like Ghost Fishing, California SeaDoc, Healthy Seas, and Fishing for Energy, that are doing commendable work. In August in the Dutch North Sea, divers cleaned their hundredth shipwreck of lead, lines, and net, a milestone in the “protect a wreck initiative”.

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