

CHAPTER 6

RESPONSIBLE FISHING

- A. Marine debris and derelict fishing gear
- B. Bycatch from tuna longlining
- C. Releasing hooked turtles alive
- D. Avoiding seabirds and bait loss
- E. Depredation by toothed whales
- F. Recording catch and effort data
- G. Recording and reporting tagged species
- H. Observers and port samplers

INTRODUCTION

This chapter describes the various areas that fishermen can and should be responsible for, especially in regard to the environment and the recording and releasing of unwanted species. Marine debris and derelict fishing gear is covered, highlighting the destruction that plastics and oils can cause to the marine environment as well as the problems they cause with marine animals, especially endangered or protected species. The bycatch issue is also examined, with ways suggested to reduce interactions with unwanted or protected species. The correct handling procedures, in the event that a turtle is caught, are described along with ways to reduce bait loss caused by seabirds. The importance of recording all catch and effort data is summarised. Working in cooperation with observers and port samplers who collect tuna longline data is also emphasised.

A. MARINE DEBRIS AND DERELICT FISHING GEAR

Marine debris is a worldwide problem that needs to be addressed by all people, while derelict fishing gear in the marine environment is a more specific problem created by fishermen.

What is the problem?

Fishermen and boat operators may not be aware of the serious consequences of dumping oil, plastic and other garbage overboard. The ocean has long been seen as limitless and able to absorb anything that is dumped or discharged into it. While much marine debris is washed, blown or dumped from land, a lot is generated from boats.

Plastics, oil and other debris can represent a threat to the environment for many years — in some cases hundreds of years — and can injure and kill marine life. They can also endanger humans, damage boats, and cause serious losses to the tourism industry.

How long does it take to break down?

Many items of marine debris, especially plastics, take a long time to break down and may be lying around our beaches and reefs for years to come.

Why should fishermen care?

The thoughtless disposal of garbage and oil from vessels is bad because it can:

- kill fish, sea turtles, dugongs, corals, invertebrates and other marine species;
- spoil the appearance of beaches, mangroves and reef flats for everyone;
- block cooling water intakes, which can damage boat engines, resulting in costly repairs; and
- foul propellers and disable vessels.

What can fishermen do?

It is up to each fisherman and boat owner to take responsibility for ensuring his vessel does not pollute.

This can be done by making sure that:

- crew and passengers know that throwing trash overboard is wrong and against the law;
- notices are displayed on board that explain how and where garbage should be disposed of;
- plastic trash is separated from other garbage and carried back to shore to be disposed of;
- a drip pan is fitted under the engine rather than letting oil leak directly into the bilge;
- oil absorption materials are also placed in the bilge to absorb all oils and fuel;
- oil leaks are fixed before they drip into the bilge;
- old engine oil is transferred into a container and properly disposed of on shore; and
- detergent is not used to clean up oil in the bilge (this only disperses it more).



What types of garbage are bad?

Plastic

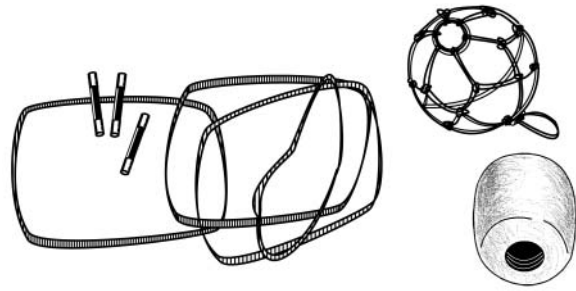
Plastic is the worst kind of garbage. Because most plastics float, they can be carried hundreds and even thousands of miles by ocean currents and winds. Plastic is used for all sorts of purposes on boats, including containers and fishing gear. Such items all have one thing in common: nature has a hard time breaking them down.

Plastics found on most types of boats include:

- fuel and oil containers;
- plastic bags and sheeting;
- fibreglass;
- disposable cups, plates and eating utensils;
- drink bottles and other containers; and
- six-pack rings.

Additional plastic products found on tuna longline boats include:

- monofilament line and possibly bait netting;
- ropes and twines;
- lightsticks used for swordfish;
- plastic and styrofoam floats; and
- bait box strapping.



Oil and oily waste

Inboard engines tend to leak oil into bilges over time, and sump oil is sometimes drained directly into the bilge. When oil accumulates in the bilge and is pumped out — whether at sea or dockside — it causes damage to reefs and other marine life. Do not use detergent to break down the oil as it only causes it to sink when the bilge is pumped, where it will harm marine life on the seabed.

Ships running aground provide the biggest potential risk of marine pollution, when massive quantities of oil, diesel, and other contaminants can be released directly into the ocean.

Other garbage

Many beaches and reefs are strewn with marine and other debris, including, beer bottles, tin cans, tyres, light bulbs, old shoes, hospital wastes etc.

What happens to the garbage and oil you dump overboard?

- Sea turtles often mistake plastic bags and balloons for one of their favourite foods — jellyfish. When they do, they die because their guts become blocked.
- Marine animals such as whales, sharks and dolphins see bait box straps and six-pack packaging rings as items of curiosity and become tangled up or strangled to death as a result of ‘playing’ with them.
- Seabirds eat small plastic pellets and bits of styrofoam mistaking them for food such as small fish, which can cause the birds to die.
- Seabirds and other marine animals can end up with plastic beverage rings around their necks, and slowly strangle to death.
- Fish, turtles and other marine animals can get entangled in derelict fishing gear such as gill nets; this gear can continue to catch fish many years after being lost or discarded.
- Marine animals that encounter nets and other fishing gear may drown, lose their ability to catch food, and be more susceptible to disease and predators.
- Seabirds that get covered in oil often die because when they try to clean themselves they ingest some of the oil, which poisons them. The oil also destroys the insulating and waterproofing properties of their feathers.
- Oil can destroy seagrass beds, mangroves, corals, crabs and lobsters, giant clams and trochus and other reef organisms by smothering them and cutting off light and oxygen necessary for their survival.

The garbage you throw overboard may ruin your boat or cost someone else his life

Items such as rope, fishing line, and plastic bags can easily get tangled around boat propellers and block cooling water intakes, causing major damage and expensive repairs to vessels. With no working engine, a boat and its passengers may drift with no hope of rescue.

What is the law?

A number of Pacific Island countries have signed the International Convention for the Prevention of Pollution from Ships – MARPOL 73/78. This Convention lays down three basic rules:

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| <ul style="list-style-type: none"> • DO NOT discharge oil or oily mixtures into the sea. • DO NOT throw plastic products into the sea. • DO NOT throw garbage overboard within 12 nautical miles of the nearest land or reef. | <p>As responsible members of the international community, Pacific Island countries support these international laws, and some are now implementing national legislation based on these pollution regulations.</p> |
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B. BYCATCH FROM TUNA LONGLINING

The incidental take or interaction with protected or unwanted species by tuna longline vessels has become a major issue in some countries. This issue needs to be recognised and addressed by all tuna longline fishermen.

What is bycatch?

Horizontal tuna longlining targets specific species (Chapter 1 C), although non-target species (Chapter 1 D) are also caught at the same time. Non-target species are either:

- **bycatch**, or unwanted catch (discards) that is returned to the sea because it has little or no commercial value (includes protected species); or
- **byproduct** which, like target species, has a value and is kept and landed. In many countries it is an important part of the overall catch.

What are the problems?

Declining sea turtle stocks: Sea turtle populations are declining worldwide due to human activities including: destruction or disturbance of nesting beaches; hunting for food and sale; and incidental catches related to some fishing activities such as trawling, gillnetting, purse seining and tuna longlining.

Perceived overfishing: There is worldwide concern about the catch and use of pelagic sharks and, to a lesser extent, marlins and other pelagic fish species by longline vessels. Some concerns are related to a belief that these species are being overfished, although current scientific evidence does not indicate this is true in the western and central Pacific.

Seabird interactions: The incidental take of seabirds by longline vessels (both pelagic and demersal or bottom-set) has been widely publicised, although this mainly occurs with albatross in higher latitudes.

Not working together towards practical solutions: In some parts of the world there is an active movement to close down pelagic longline fisheries because of concerns regarding sea turtles and other bycatch. In many parts of the region, fishermen, governments and scientists are not working together to identify the extent of the problem and develop and apply workable solutions to reduce bycatch.

Why should tuna longline fishermen care?

The western and central Pacific Ocean supports the largest and healthiest tuna stocks in the world. Pacific Islanders can increase their participation in tuna fisheries by using sustainable and responsible pelagic longline fishing practices.

Fishermen and nations have an international and moral obligation to look after the resources they harvest, including all byproduct and bycatch. It is especially important to minimise the incidental catch and/or death of protected species such as turtles.

Higher catch rates of target species and reduced bycatch and bait loss can be achieved by altering fishing practices such as changing fishing depth or setting gear at night. It is in the interest of fishermen to avoid bycatch so there are more hooks available for target species.

Bycatch issues should be seriously addressed before restrictions and possible closures are imposed on fisheries.

Self-regulation and the cooperative development of solutions by governments, researchers and fishermen is a better approach to solving the bycatch issue than the drastic measures that may be taken.

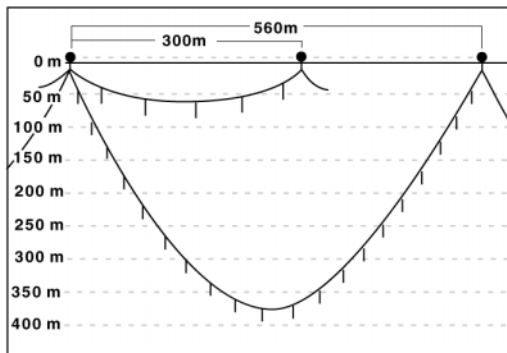
What can tuna longline fishermen do?

- Follow the advice in this section and seek other ways to minimise the incidental catch of unwanted bycatch species.

- Keep good data in logbooks on all fishing activities, including the recording of byproduct and bycatch taken or interactions with protected species.
- If a sea turtle is caught, follow the handling techniques in Chapter 6 C to maximise its chance of survival.
- Cooperate with observer programmes and the observer on board your vessel, as he is there to record catch data including numbers of target, byproduct, bycatch and protected species for scientific analysis.

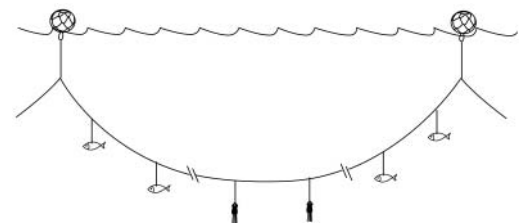
How to reduce bycatch

Setting pelagic longline gear deeper than 100 m will reduce the incidental catch of many bycatch species (especially sea turtles). Setting deep, using a line setter, puts the bait in the zone where catches of albacore and bigeye (target species) will be maximised.

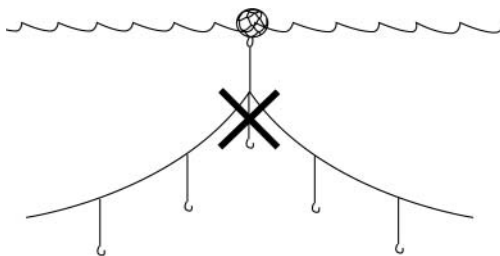


Deep set vs shallow set

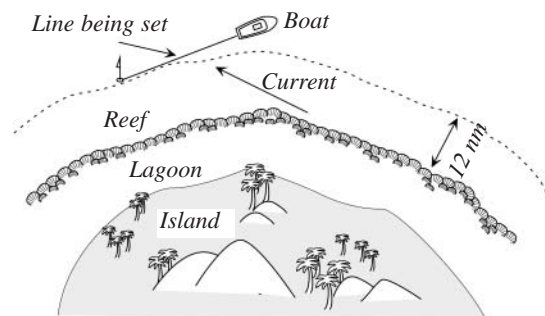
Not using squid for bait on shallow-set hooks (those closest to the float and floatline) will lessen the chance of hooking sea turtles, as this is a favourite food of theirs.



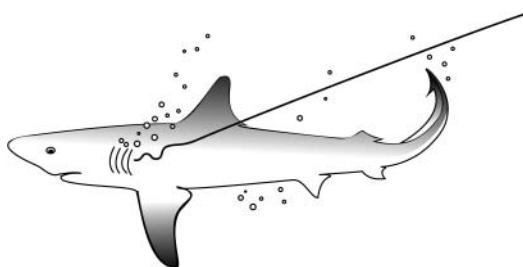
Not using a branchline under the float to target sharks.



Setting pelagic longlines at least 12 nm from a reef or island, and ensuring they drift offshore, will minimise interactions with reef sharks (not pelagic sharks) and some turtle species, as they do not venture far from the reef.



Using monofilament leaders (not wire) directly onto the hook will allow sharks to bite off the hook and escape.



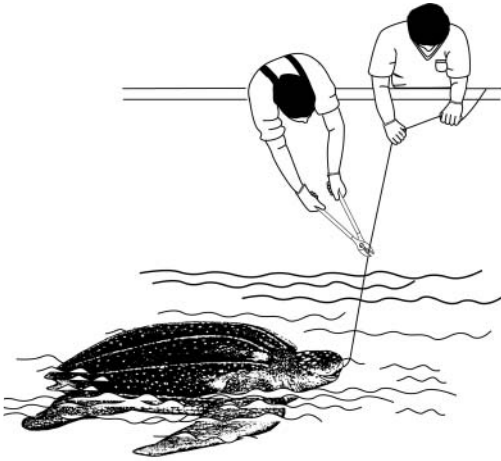
The incidental catch of seabirds is not an issue in the western and central Pacific region (with the exception of Hawaii) because albatross and other large seabird species are not found in the region. Longline hooks are generally too large for the smaller seabird species in the region to swallow. Chapter 6 D covers the issue of interactions with seabirds, especially bait loss from bird attacks.



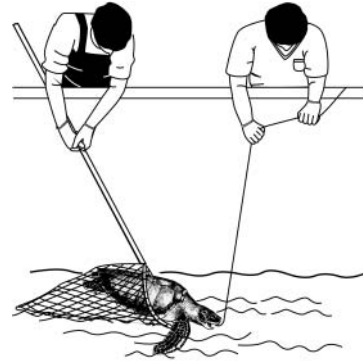
C. RELEASING HOOKED TURTLES ALIVE

The bycatch of sea turtles by pelagic longlining is an issue of great concern. If a turtle is caught, the following steps should be taken to give it the best possible chance of survival:

1. Assess the turtle's size, then release it or bring it on board. If the turtle is too large to bring on board, bring it as close to the boat as possible without putting too much strain on the line, then cut the line as close to the turtle as practical.

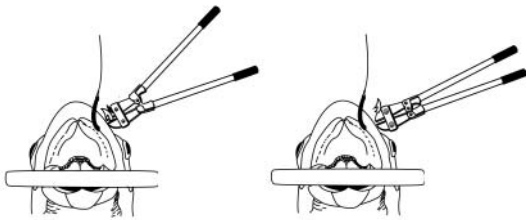


If the turtle is small, use a dip net to lift the animal on board. **DO NOT** use a gaff and **DO NOT** pull on the line or grasp the eye sockets to bring the animal on board.

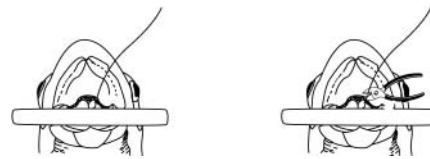


2. Place a piece of wood in the turtle's mouth so it cannot bite, then cut the hook or line.

If the hook's barb is visible, use bolt cutters to cut the hook in half, and remove the two parts separately.

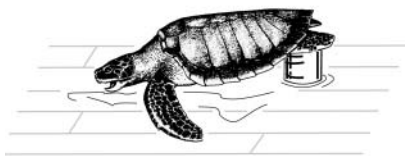


If the hook is not visible, remove as much line as possible without pulling too hard on the line, and cut it as close to the turtle as practical.

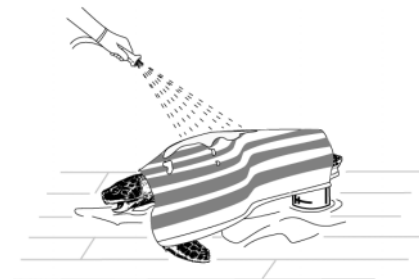


3. Assess the condition of the turtle before releasing it: depending on how lively it is, keep it on board for a minimum of 4 hours, and up to 24 hours.

If the turtle is sluggish or not active when lifted on board, it may have water in its lungs. In this case the rear flippers should be raised and kept about 20 cm off the deck while it is recovering.

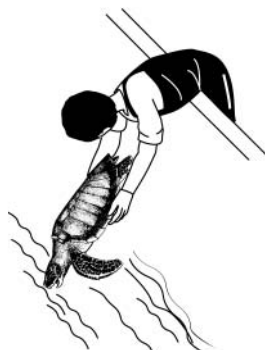


In all cases, place the turtle in a secure shaded location of the boat. Cover the turtle's body with wet towels. **DO NOT** spray the turtle in the face with water or cover the animal's nostrils with the towel.



4. Carefully return the turtle to the sea

Gently put the turtle to the sea head first, while the vessel is **STOPPED** and the engine is **OUT OF GEAR**. Ensure the turtle is clear from the vessel before motoring off.



5. Record the interaction in your logbook, identifying the turtle species if possible, and record tag numbers if the turtle has tags on its flippers.



D. AVOIDING SEABIRDS AND BAIT LOSS

The issue of tuna longline gear interacting with seabirds, causing incidental takes, is not an issue in the region, as stated in Chapter 6 B. There is a problem though at times with bait loss through seabirds attacking baited hooks as they are set.

In areas where seabird interactions have occurred, mitigation measures have been developed and introduced. These measures also work to reduce bait loss, by making it difficult for the seabirds to get to the baited hooks, or getting the baited hooks to sink faster.

Night setting

Setting tuna longline gear at night is by far the simplest and easiest way to avoid bait loss to seabirds, as most seabirds are day feeders. However, in some fisheries the setting time is dictated by the main feeding time of the target species, and night setting of the gear may result in lower catch rates.

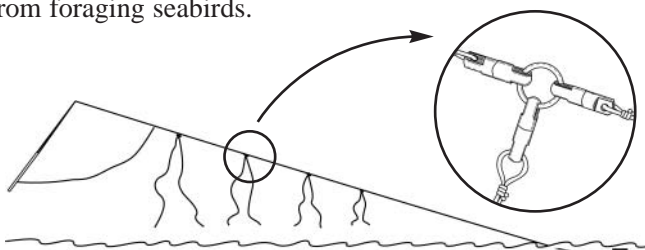
Thawing bait fully before use

It is important that bait is fully thawed before the setting operation commences. Thawed bait sinks faster than frozen bait. This is important when seabirds are in the area. It is also easier to put the hook into a thawed bait, as often a frozen bait will break or a large hole is made when trying to force a hook through it.



Use of a bird pole and line

A bird pole and line is probably the simplest method to scare seabirds away from the stern of the boat and the baited hooks, when setting tuna longline gear. It is simply a line around 3 mm diameter and 150 m long attached to a pole, towed off the stern with 3 to 5 pairs of streamers attached. The attachment point for the line to the pole should be as high as practical, therefore the length of the pole is determined by this. The streamers are also made of 3 mm cord, and can be covered with tubing of 5 mm inside diameter. The streamers are attached to the line by three-way swivels, and their lengths vary such that they are just clear of the water (varying lengths depending on their position along the bird line). Wave action and wind will cause the streamers to flick and whip around erratically. The baited hooks are thrown under the bird line to maximise protection from foraging seabirds.

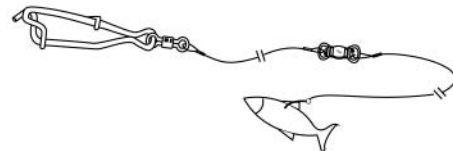


Baits with air or swim bladders

Some bait species have swim bladders. Also, some bait may have air trapped in the gut area. When air is present in bait, it tends to float until it is pulled under by the weight of the gear. Fully thawed bait will have less chance of having trapped air.

Using weighted branchlines

If seabirds are a problem, then using leaded swivels on the branchlines is a good solution, because it helps to sink the bait faster. However, leaded swivels are not cheap, so this adds to the cost of the gear being used.



Using dyed baits

Some fishermen are using dyed baits to make them less visible to seabirds. Blue is the usual colour used, as it blends in with the ocean colour.

Bait casting machines

A bait casting machine has been developed to cast baited hooks clear of propeller turbulence. This allows the baited hook to sink unrestricted by water turbulence that may keep the bait on or close to the surface. The white-water created by the vessel's wake also serves to hide the bait. The bait caster is best used in association with a bird pole and line, with the baits cast under the line for added protection.

Note: Do not discard offal or anything to attract feeding seabirds to the boat during line setting.

E. DEPREDAATION BY TOOTHED WHALES

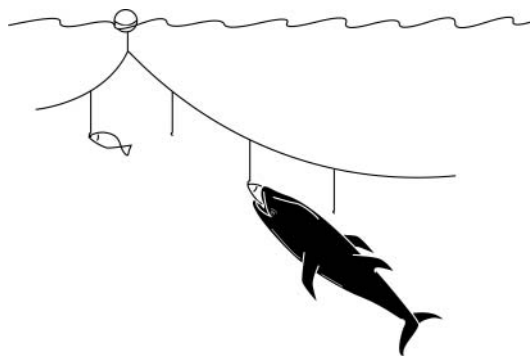
‘Depredation’ is the term used when unwanted species such as cetaceans or sharks consume hooked fish, while predation refers to one species preying on another.

Toothed whales sometimes attack and eat tuna and swordfish that are caught on longlines. When a pod of these whales finds a longline with fish, they follow the line eating everything except the head of the hooked fish.

Some dolphin species have been associated with the loss of bait from longline gear. Some whales have interacted with the longline gear itself and become caught, putting the whale at risk and damaging the gear.

The incidence of depredation has been increasing in recent years, and this could be attributed to:

- increased tuna longlining effort;
- increased rates of reporting interactions;
- increases in cetacean numbers and their distribution;
- increased competition and spatial overlap with fisheries;
- past incorrect assessment of whale damage as shark damage; and
- cetaceans learning new behaviours and realising there is ‘free’ or trapped food available.

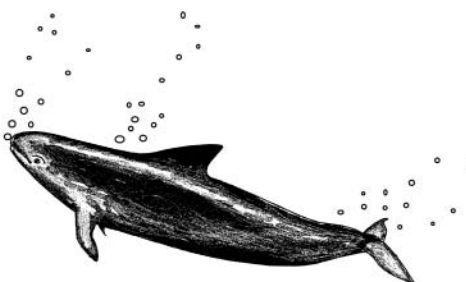


There are no known mitigation measures that are 100 per cent effective. Experiments have been conducted with acoustics to try to identify sounds that might repel some whale species. One of the unknowns is the actual effect of acoustics — will it attract or repel the whales and which whales will it affect?

Given there are no foolproof mitigation measures available at present, fishermen can make use of the following measures to avoid or minimise the chance of interactions or depredation.

- Reduce vessel noise, possibly through vessel design.
- Manage gear noise through its operation (turn off echo sounders when not in use, reduce noise of deck machinery, propeller noise etc.).
- Consider changes to gear and setting and hauling practices.
- Consider changing fishing areas and fishing seasons.
- Avoid areas where cetaceans are known to congregate.
- Keep a lookout for signs of cetaceans in the area being worked.
- Try to identify the species of cetaceans in an area to know which ones may be the problem.
- If cetaceans are sighted during the set, discontinue the set, haul the line, and move to another location.
- Use acoustic equipment to try to locate and subsequently avoid cetaceans.
- Avoid discarding offal and used bait in the vicinity of fishing locations.
- Communicate with other fishermen and pass on information on sightings, interactions and depredation.
- Document and pass on to others your experiences with mitigation measures, whether they have been successful or not.
- Carry observers to assist with species identification and recording of data.

The extent of the depredation problem is not fully known, and scientists, managers and fishermen need more information. Therefore it is very important that all fishermen document in their logbook, all cetacean sightings, interactions, and the number of fish heads left on the line, so that the magnitude of the problem can be better measured and understood.



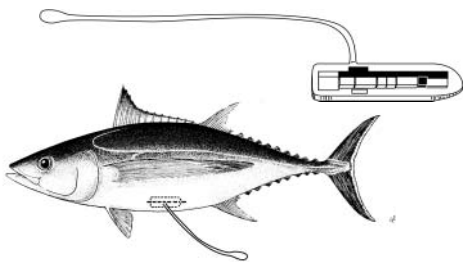
G. RECORDING AND REPORTING TAGGED SPECIES

Every once in a while, a tagged fish comes along. Fish and other marine animals are tagged so scientists can understand both their movement and their growth. SPC's last big tagging programme may be over, but many of the tags are still out in the ocean. As well as SPC tags, there are tags from many other organisations covering a wide range of different species.

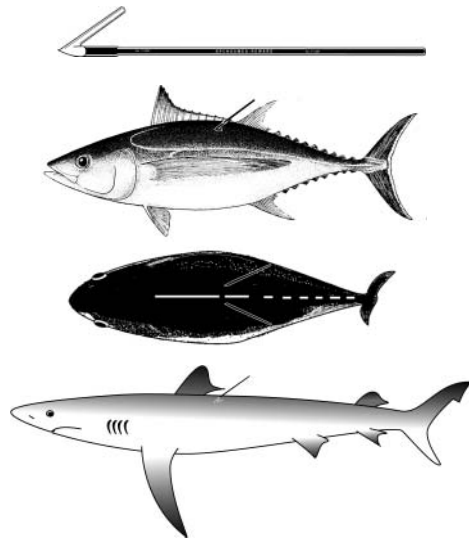
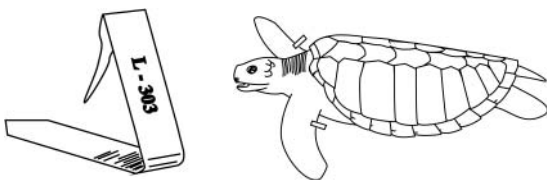
Many of the larger tagging programmes use the traditional small plastic dart tag and reward the finder with caps, T-shirts, or small sums of money. Some gamefishing and sportfishing associations promote tag and release of pelagic species. These are generally voluntary programmes and may have no reward for returned tags. The dart tag is usually located on the top of the fish behind the dorsal fin.

More sophisticated 'archival-type' tags are also being used. Archival tags collect data at regular intervals over time (depth, temperature and position) and store it on a computer chip.

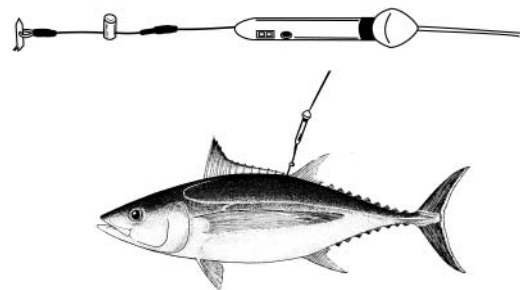
The original archival tags were stitched inside the body of the fish, with a long trailing 'tail' or sensor left outside the fish, making them easy to spot. The fish has to be recaptured to retrieve the tag, and the data downloaded onto a computer. Because of the investment involved, rewards for archival tag are much larger than the rewards for dart tags.



The Pacific also has a major turtle tagging programme running. Turtles are tagged on the flippers with a numbered metal tag. People returning these tags are rewarded with a cap or T-shirt.



Pop-up tags are attached to the outside of the body of the fish. They are programmed to detach from the body at a predetermined time or depth and float to the surface. Once on the surface, pop-up tags transmit their information via satellite to scientists where the information is downloaded onto computer for analysis.



What should a fisherman do if a tag is found?

If you catch a tagged fish or marine animal, it is imperative that you return the tag and relevant information to SPC, the organisation listed on the tag, or your local fisheries department. The information gained from tag returns is vital to the scientific analysis conducted on these species.

Tag details that need to be reported

Please record and forward the following information to SPC or your fisheries department:

- the tag, stickytaped to a piece of paper, or the tag number if the animal was released;
- date of capture;
- area or location of capture;
- name of the vessel;
- gear type used;
- species captured with a tag;
- length and weight (an estimation is OK) of the captured species; and
- your name and address so that the reward can be sent to you.

H. OBSERVERS AND PORT SAMPLERS

Three other very important methods of collecting data are used to supplement the logbooks that fishermen complete. These are observer, unloading and port sampling data. The people who collect these data are trying to work with and assist tuna longline fishermen — they are NOT the ‘opposition’ or ‘enemy’. If everyone works together then each gets his work completed quickly and efficiently.

Observers and their data

Observer data are the best monitoring data. However, observer coverage is time consuming and relatively expensive to collect. Therefore, only a small percentage of fishing trips are monitored. To help observers do the best job possible, they need the assistance and cooperation of the crew. Some of the recording or tasks an observer may undertake include:

- where, when and how much fish were caught, including byproduct and bycatch;
- fishing effort and position of fishing activities;
- length measurements of the catch;
- retention of biological samples or specimens of unusual fish;
- interactions with unwanted or protected species;
- photograph and record specifications on fish, gear, fishing operations, charts and records; and
- position and activities of other vessels sighted, to help control illegal or unlicensed activity.

Obligations of the vessel operator

Different countries have different requirements for vessel operators when it comes to observers on tuna longline vessels. Each operator should check what the requirements are in his country. In general, vessel operators are obliged to cooperate with the observer and provide the following:

- adequate sleeping quarters and all meals while at sea, and for a nominal day or two in port;
- space for the observer’s equipment, supplies and samples;
- advice on where all sea safety equipment is stored, how it is used, and vessel safety procedures;
- access to the vessel’s log and other records including logbooks;
- information and assistance on the use of vessel electronics including navigation equipment that shows the vessel’s position;
- access to the vessel’s bridge and communication equipment, and the use of this equipment for transmitting information from the vessel to a shore base;
- access to the line setting area, work deck, fish holds and processing areas at all times; and
- when requested, permission for samples to be collected, information to be recorded and photos to be taken.

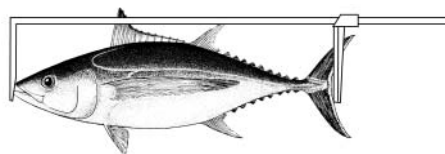
Harassment of an observer should be avoided at all costs, as this is a criminal offence in most countries.

Unloading data

Unloading data are collected by the company agent. The number of fish by species being unloaded from a catcher vessel to a carrier vessel, a cannery or other receivers is recorded. Unloading data provide the estimated total unloaded weight of the catch by species from a vessel trip.

Port sampling

Port samplers measure the catch at either the point of unloading or during the processing and packaging of the catch, whichever is the most convenient. Port sampling of the landed catch from tuna longliners gathers the length, and possibly weight, of each fish being measured. Length and species composition data are fundamental to the stock assessment work conducted by scientists.



Again, a little cooperation will make the port sampler’s task easier, so that everyone gets his needs met and the quality of the fish is maintained.

Note: All logbook, observer, unloading and port sampling data are confidential; they remain the property of the national government. They are only released with approval into the public domain in an aggregated form (usually 5 x 5 degree squares).

CONCLUDING REMARKS

Horizontal longlining is the main tuna fishing method that holds potential for economic development in many Pacific Island countries and territories. The method targets the larger, deeper swimming tunas that command high prices in export markets if they are handled carefully and quality is maintained throughout the catching, processing and exporting processes. The costs for local operators to set up a longlining operation are high, but the potential returns are also great.

SPC is actively promoting tuna longlining as a means of helping Pacific Islanders draw greater benefits from the region's large tuna resource, improve the quality of food available to the population and, where possible, divert fishing pressure away from reef and lagoon stocks that are often overfished. In promoting horizontal tuna longlining, SPC is focusing on sustainable and responsible fishing by Pacific Islanders. It is up to all fishermen to be good stewards of the resources they harvest or interact with.

We hope this manual has been useful to any readers who are inclined to try horizontal longlining. For further information, advice, or technical assistance, contact your local fisheries department, or write directly to SPC at the address below.

Secretariat of the Pacific Community
Coastal Fisheries Programme — Fisheries Development Section
BP D5
98848 Noumea Cedex
New Caledonia

Phone: + 687 26 20 00
Fax: + 687 26 38 18
Email: fishdev@spc.int
Website: <http://www.spc.int/coastfish>