

FISHERS AS GUARDIANS OF THE OCEAN

Best Practices for Waste
Management

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NETTAG⁺



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Marine litter is one of the most persistent and visible forms of Ocean pollution, with environmental, social, and economic consequences affecting coastal communities and those who depend on the Ocean for their livelihoods. While the majority of this pollution originates from land-based sources, a smaller but still relevant amount is linked to activities at the Ocean. Addressing marine litter therefore requires shared responsibility and coordinated action across multiple sectors.

Fishers operate at the forefront of the marine environment. They are among those most likely to come across marine litter at the Ocean during routine operations, such as waste caught in fishing gear. But fishers' knowledge of the Ocean and their practical experience play a crucial role in reducing marine litter and limiting its impact.

Based on the idea that fishers are key Guardians of the Ocean, being part of the solution to tackle marine litter, this handbook is designed to support fishers in their daily work. Intended for use on fishing vessels, this handbook provides fishers with background information and practical guidance on waste management on board, the disposal of marine litter passively collected in the nets, and the responsible handling of waste in ports.





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Marine litter refers to any persistent, manufactured or processed solid material that has been discarded, disposed of, or abandoned in the environment. It originates from land- and sea-based sources, including urban areas, tourism, shipping, fisheries, aquaculture, agriculture, and other activities. Litter can enter the environment directly or reach the Ocean via rivers, the wind, or storms.

Most marine litter is made of plastic. While plastic is useful due to its lightness, strength, and affordability, it is also very persistent. Once it enters the ocean, it can remain there for decades or even centuries, breaking into smaller pieces but never truly disappearing.

Marine litter causes serious environmental and economic damage. Animals can become entangled in debris or mistake it for food. Habitats such as seagrass meadows, reefs, and the seabed can become covered or damaged. Litter can also transport invasive species and harmful organisms to new areas. At the same time, marine litter incurs costs for those working at the Ocean, including damage to equipment, vessels, and catches.



MARINE LITTER

Everyday work for fishers brings them into contact with the issue of marine litter. This is not an abstract problem for them. It can:



The image displays four orange rounded rectangles arranged horizontally. Each rectangle contains a white icon at the top, a horizontal line, and a text description below. The icons are: 1) A fishhook and two fish, representing contamination and damage to catch. 2) A grid with circles at the corners and midpoints, representing fishing gear and vessels. 3) A fishing vessel, representing navigation and crew safety risks. 4) Stacks of coins, representing time losses and increased operating costs.

- Contaminate and damage the catch**
- Damage fishing gear and vessels**
(e.g. nets, hull, propeller)
- Create risks for navigation and crew safety**
- Cause time losses and increased operating costs**

When it comes to fisheries, litter manifests in two primary ways:

- Waste produced on board during normal operations
- Litter that is already in the Ocean and is caught in fishing gear

These two situations are very different. The first is under the direct control of the crew, while the second is something that fishers have to face as part of working in an environment that is already polluted.



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LITTER PRODUCED ON BOARD

MARINE LITTER

Litter produced on board during daily fishing activities is unavoidable. This includes domestic waste (such as food waste, packaging, bottles, and cigarette butts) and operational waste (such as gloves, ropes, net cuttings, oils, and damaged material).

The key issue is not whether waste is produced, but how it is managed. Any item that ends up in the Ocean becomes marine litter and can remain there for many years. Even small items, such as cigarette butts or pieces of plastic, can harm marine life and damage habitats.

Litter produced on board is the type of waste that fishers have the greatest control over. From the moment it is created, it can be stored safely and disposed of correctly when the vessel returns to the port. Good on-board practices prevent pollution before it happens, demonstrating professionalism and care for the fishing grounds that support the fishery (see the following section for practical tips).

Part of this litter originates directly from fishing operations. This includes ropes, net cuttings, oils, and old or damaged gear. A particularly serious form of fishing-related litter is Abandoned, Lost, or otherwise Discarded Fishing Gear (ALDFG), often called 'ghost gear'.





GHOST GEAR

MARINE LITTER

Ghost gear includes nets, ropes, traps, pots, floats, and lines that are lost at the Ocean. Because this equipment is designed to catch seafood, it can continue to do so after it is lost. This 'ghost fishing' traps fish and other animals, damages habitats, and creates dangers for vessels and crews.

Fishers do not want to lose their gear, as gear represents a major investment and is essential for their work. However, gear can be lost for many reasons, including strong weather and currents, rocky seabed, conflicts with other gear, accidental cutting by passing vessels, or emergency situations where gear must be released to protect the crew.

Once a fishing gear is lost, recovery can be very difficult, especially if it sinks, becomes buried, or gets tangled on the seabed, becoming a ghost gear. This is why preventing loss and trying to recover gear quickly, when possible, are so important.



© Claudia Amico

Fishing gear does not only catch seafood. It also brings up what is already in the Ocean, such as plastic, ropes, old nets, bottles, boxes, clothes, tires, metal, and many other objects as described in the Table.

These debris may damage the catches, the nets, engines and slows down operations, culminating in increases fishing costs.

When this litter comes up in the gear, fishers face a choice. Throwing it overboard means it stays in the Ocean and continues to cause problems. Bringing it back to port means removing pollution from the Ocean. When fishers land this litter and dispose of it correctly, they are actively helping to clean the Ocean, even if they did not create the problem.

Many fishers already do this, often without recognition. It is a clear example of how fishing communities are not only affected by marine litter, but can also be an important part of the solution.



LITTER CAUGHT IN FISHING NETS

MARINE LITTER

Examples of litter items caught by fishing gear, as reported by fishers during the NETTAG+ workshops in the Mediterranean and North-East Atlantic.

Fragments of nets

Ropes

Styrofoam boxes

Traps and pots

Broken pots

Plastic gloves

Cloths

Plastic boxes

Rubber boots

Recreational fishing
nets

Plastic bottles

Shoes

Balloons

Electronic equipment

Fragmented plastic
debris

Shipping bags

Plastic food package

Tires

Aluminium foil

Metal cans

Toilet paper

Glass bottles

Algae

Animal carcasses



© WWF Italia

HOW TO MANAGE WASTE PROPERLY

Although different types of waste require different handling, the principle is always the same: prevent litter from entering the Ocean and ensure that all waste produced on board or collected by the gear is disposed of correctly in port. Any waste generated during fishing operations or daily life on board should be stored safely until it can be landed. Any marine litter caught in fishing gear should also be kept on board and returned to port, without compromising the boat security. This only works well when ports provide adequate facilities for receiving and separating waste.



Many fishers are already doing their part by managing their own waste responsibly and bringing ashore the litter they find at the Ocean. These everyday actions make a real difference.



Good waste management on board requires organisation, practicality and routine.

Never throw litter overboard! This includes cigarette butts and food waste. Anything thrown into to the Ocean does not simply “disappear”, it often ends up in nets, on beaches, or even in vessels propellers. Even organic waste should be kept on board and properly disposed of in the port.

Store all waste safely on board. Keep it in closed, stable containers so that it cannot be blown, washed, or swept into the Ocean. Use separate containers for unsorted waste, recyclables, and operational or hazardous waste. If possible, also separate recyclables by type (plastic, metal, glass, paper). This makes disposal in the port faster and easier.

Do not let waste build up. Organise short, regular clean-ups on deck and in working areas, especially after net repairs, mealtimes, or maintenance work. Keeping the boat tidy during the trip prevents items from being lost overboard and saves time at the end.

Plan ahead for disposal in the port. Find out where the port reception facilities are and which types of waste they accept. Upon arrival, take the waste ashore and place it in the appropriate containers or facilities.





AT THE PORT

HOW TO MANAGE WASTE PROPERLY

Use the port reception facilities whenever they are available. If there is uncertainty about where to dispose of a particular item, ask the port staff or other fishers. Never leave waste on the quay or near the water.

Below are practical tips on how to dispose different types of waste correctly, whether it was produced on board or caught in your fishing gear. Please note that these are general guidelines and may vary between countries, regions, and individual ports; always comply with the specific waste management procedures and regulations in force at the port where you are operating.

CIGARETTES

How to dispose of it:

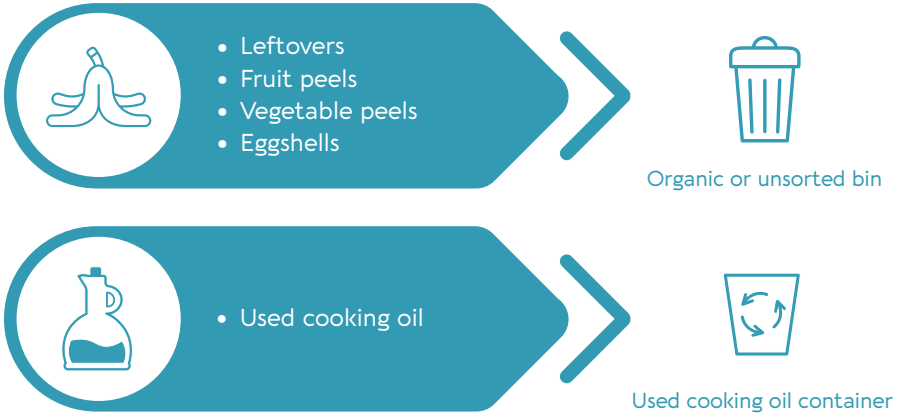


SUGGESTIONS:

- Never throw cigarette butts overboard.
- Collect and store all cigarette butts and always take them ashore.
- For example, use 5-litre plastic bottles partly filled with water and place them in different parts of the vessel. Empty these containers only in designated bins on land.
- Ask the port to provide specific collection or recycling bins for cigarette butts in easily accessible areas, if these are not available.

FOOD WASTE

How to dispose of it:



SUGGESTIONS:

- Never throw food waste overboard, even if it is biodegradable.
- Even though some marine animals may feed on organic waste, it does not belong in the Ocean and can cause harm.
- Store all organic waste safely on board and always take it ashore for disposal.
- If facilities are missing, ask the fishing port to provide specific containers for used cooking oil and other organic waste.

METAL

How to dispose of it:

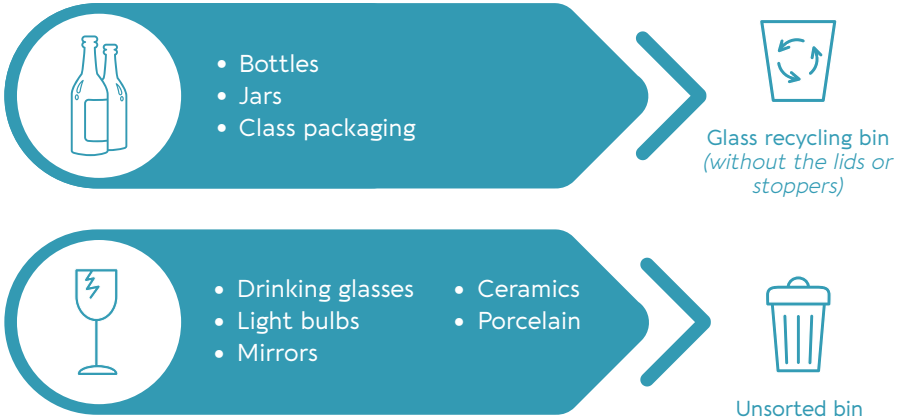


SUGGESTIONS:

- Never throw metal overboard.
- Store metal waste in a separate, closed container on board so it stays secure and ready for recycling when reaching the port.
- Ask the port to provide recycling bins in easily accessible areas for all vessels, if they are not already available.

GLASS

How to dispose of it:



SUGGESTIONS:

- Never throw glass overboard.
- Keep glass waste in a strong, closed container on board so it is kept safely and ready for recycling when reaching the port.
- Ask the port to provide recycling bins in easily accessible areas for all vessels, if they are not already available.

PAPER

How to dispose of it:



SUGGESTIONS:

- Never throw paper overboard, even if it is biodegradable.
- Keep clean, dry paper and cardboard in a separate container on board so it stays organised and ready for recycling when reaching the port.
- Ask the port to provide recycling bins in easily accessible areas for all vessels, if they are not already available.

PLASTIC

How to dispose of it:



SUGGESTIONS:

- Never throw plastic overboard.
- Keep plastic waste in a strong, closed container on board so it is kept safely and ready for recycling when reaching the port.
- Ask the port to provide recycling bins in easily accessible areas for all vessels, if they are not already available.

FISHING GEAR

How to dispose of it:

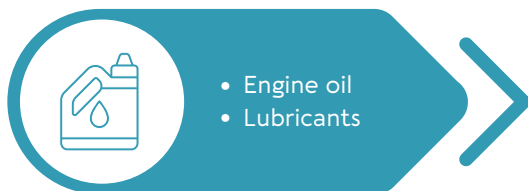


SUGGESTIONS:

- Never discard nets, traps, lines, or any other fishing gear overboard.
- If gear is damaged, bring it back to shore and use the dedicated containers for fishing gear waste.
- If gear is lost, always try to recover it. If not possible, report the loss to the relevant authorities.
- When hauling or repairing nets, collect small pieces of rope and netting in a dedicated container so they are not blown into the Ocean. These are among the most common types of litter found on beaches.
- If end-of-life fishing gear containers are not available, ask the port to provide them in areas that are easy for all vessels to access.
- Report areas with large amounts of ghost gear to the relevant authorities or port services.

OILS & LUBRICANTS

How to dispose of it:



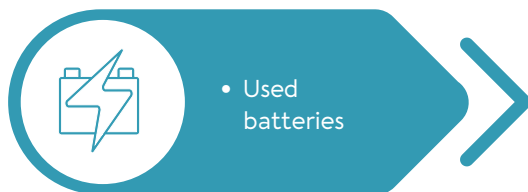
Oil container or hazardous waste facility

SUGGESTIONS:

- Never throw oils or lubricants overboard. They are hazardous pollutants.
- Store them safely on board in proper, sealed containers until reaching the port.
- Always treat oils and lubricants as hazardous waste and never mix them with other types of waste.
- Dispose of them only in specific containers for used oil or hazardous waste.
- If the port does not have these containers, do not use the unsorted waste bin; fuel stations usually have dedicated containers for used engine oil.
- Ask the port to provide appropriate collection facilities if they are not yet available.

BATTERIES

How to dispose of it:




Battery collection container

SUGGESTIONS:

- Never throw batteries overboard, they contain toxic substances.
- Store used batteries safely until they can be disposed of in dedicated containers.
- Do not place them in unsorted waste bins.
- If containers are not available, ask the port to provide battery appropriate collection facilities.


LARGE ITEMS

How to dispose of it:




Large items caught in the nets:

- Appliances
- Tyres
- Bicycles




Bring to shore and place in the area indicated by the port *(without compromising security)*




Natural material caught in the nets:

- Wood
- Animal carcasse
- Seaweed




Return to the Ocean



Land-based organic waste caught in the nets:

- Painted wood
- Pallets
- Furniture



Bring to shore and place in the area indicated by the port *(without compromising security)*

SUGGESTIONS:

- Remove all litter caught in the nets or found at the Ocean and dispose of it properly when reaching the port.
- Do not bring litter on board if it could compromise vessel or crew safety, or if there is no safe storage space.
- If it is not possible to collect litter safely, report areas with large amounts of marine litter or ghost gear to the relevant authorities or port services.
- Natural organic materials can be returned to the Ocean, but land-based materials must be brought ashore.
- If in doubt about where to leave a large item, place it near the recycling facilities and inform the port staff.
- Ask the port to provide specific areas or containers for large items.

PROTECTIVE GEAR

How to dispose of it:



- Boots
- Gloves
- Waterproof trousers




Plastic recycling bin





- Disposable masks



Unsorted bin



- Other mixed-material clothes
- Other worn-out textiles, shoes



Textile collection points, if available Unsorted bin

SUGGESTIONS:

- Never throw protective gear overboard.
- Sort worn-out protective gear on board by material, keeping it secure and ready for recycling when reaching the port.
- Ask the fishing port to provide recycling bins, if they are not already available.

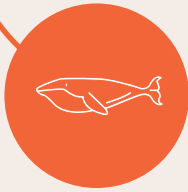
When fishing, it is possible to accidentally catch other marine life besides the target species. This can include seabirds, sea turtles, sharks, marine mammals, corals, sponges, and fishes, crustaceans, and molluscs that have no commercial value. This is known as bycatch.

If any protected species are unintentionally caught, release them back into the Ocean as soon as possible and in the safest way possible. Handle the animals gently to avoid injury and follow the safety and handling practices. A quick and careful release increases the animal's chances of survival and of continuing to play its role in the ecosystem.



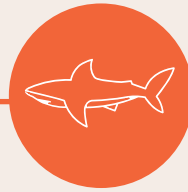
© Giuseppe Pignataro

BYCATCH



Marine Mammals

- Purse Seine
- Trammel Nets
- Gillnets



Sharks

- Trammel Nets
- Longline



Sea Birds

- Trammel Nets
- Longline
- Set Lines
- Gillnets



Corals

- Trammel Nets
- Trawl Nets



Electric Ray

- Trammel Nets
- Trawl Nets



Sea Sponges

- Trawl Nets



Rays

- Purse Seine



Turtles

- Trawl Nets

Source: Reported by fishers during the NETTAG+ workshops.



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FISHERS AS GUARDIANS OF THE OCEAN

Being a Guardian of the Ocean means taking simple, practical actions to keep the Ocean clean, reduce marine litter, and prevent the loss of fishing gear. It also means protecting marine life and ensuring safe and healthy working environment at the Ocean.

Through the NETTAG+ project, many fishers have already shown this commitment by voluntarily bringing litter back to the port and adopting good waste practices.

Every piece of litter brought back is one less threat to fish, marine life, and fishing grounds. Healthy and clean ecosystems support marine biodiversity, but they also support fishers' livelihood.

By managing waste responsibly and recovering litter from the Ocean, fishers show that they are not only users of the Ocean, but also its guardians. With the right support and recognition, together we can reduce marine pollution and protect the Ocean for the future.





© ARM

PRACTICAL ACTIONS FOR A GUARDIAN OF THE OCEAN

FISHERS AS GUARDIANS OF THE OCEAN



Never throw litter overboard, including cigarette butts and food waste. Even organic litter should be kept on board.



Store the cigarette butts in dedicated containers and dispose of them correctly once ashore.



Always **store waste safely on board** in designated containers, separating unsorted waste, recyclables, and operational waste (such as oily materials or ropes).



Dispose of all waste correctly upon arrival at the port, using the appropriate port reception facilities.

Keep docks clean after unloading materials and gear.



Secure your fishing gear properly to reduce the risk of accidental loss during operations.

If any gear is lost, make every reasonable effort **to recover it**. When recovery is not possible, **report the loss** to the relevant authorities.



Collect all net cuttings during repairs and store them in secure containers on board or on the quay, ensuring they cannot be blown, washed, or swept into the Ocean.

Dispose of end-of-life fishing gear in dedicated port facilities, as parts of the gear may be reused or recycled.



Use gear tracking systems (e.g. MyGearTag) to help prevent gear loss and facilitate recovery.



Actively remove litter caught in your nets or encountered at the Ocean and dispose of it properly when reaching the port, provided it can be done safely.

Do not bring litter on board if there is no safe storage space or if it could compromise vessel or crew safety.



If marine animals are caught accidentally, handle them carefully and release them back into the Ocean as quickly as possible, following best practices.



Report areas with significant accumulations of marine litter or ghost nets to the relevant authorities or port services.



Participate in **fishing-for-litter** or **gear recovery initiatives** whenever possible.



Ensure **good sanitary conditions** and that there are **adequate containers, bins, or bags on board** for different types of waste, and empty them regularly.

Avoid storing waste on board for long periods and carry out **regular cleaning** to reduce the risk of waste entering the Ocean.



Support and **advocate for better waste management disposal conditions at ports**, including more waste collection points along the docks, easy access for all vessels, and specific containers for fishing gear, recyclables, and hazardous waste such as used oil and batteries.

Advocate for recognition and incentives to fishers for adopting good practices.



Spread the word! Share your experience and raise awareness among fellow fishers, crews, and communities, helping to promote good practices and a shared responsibility for keeping the Ocean clean.



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THE NETTAG+ PROJECT

Funded by the European Union's Horizon Europe program, NETTAG+ is a three-year project aiming to PREVENT, AVOID and MITIGATE the environmentally harmful impacts of fishing gear and their associated marine litter, actively contributing to the European Commission Mission "Restore our Ocean and Waters by 2030".

Through collaboration between the fisheries industry, scientists and NGOs, the NETTAG+ project aims to



PREVENT

Fishers as Guardians and Cleaners of the Ocean

- Empower the fisheries sector, namely professional fishers, to adopt more environmental friendly fishing methods, prevent marine litter and increase responsible user behaviour.
- Create adequate conditions for the reception and treatment of litter at fishing ports, including through recycling and reuse.
- Recognize and reward the volunteer service provided by fishers when retrieving marine litter that is passively collected in fishing gear.



AVOID

Fishing Gear Location with Acoustic Tags

- Develop and engineer acoustic tags to be attached to fishing gear as a sustainable, low-cost and innovative low-impact solution to improve mapping, tracking and recovery of lost fishing gear.
- Improve a robotic surface system linked with the acoustic tag system for lost fishing gear location/recovery.



MITIGATE

Detection and Removal of Abandoned, Lost or Otherwise Discarded Fishing Gear (ALDFG)

- Develop a system to detect ALDFG in the Ocean water column and seabed.
- Co-develop, with fishers, a robotic tool to detect, map, track and recover ALDFG.



The three NETTAG+ solutions were tested, validated and demonstrated in real conditions in Atlantic and Mediterranean countries: Portugal, Spain, Italy, Croatia, Malta and the United Kingdom.



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NETTAG+ brings together an international and multidisciplinary team from 7 different countries, including scientists, the fishing industry, governmental fisheries authorities, NGOs, and technological and knowledge-management companies.

ACKNOWLEDGEMENTS

We are grateful to the shers, cooperatives, and stakeholders who contributed to the NETTAG+ awareness-raising workshops in the Mediterranean and the North-East Atlantic. Their active participation, practical knowledge, and constructive dialogue played a key role in informing the project's work and ensuring that its outcomes are grounded in real needs and long-term sustainability.



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