D 2.1 Education/ awareness material

Educational materials for fishers' awareness activities (e.g. posters, flyers, and roll-ups) focusing on the problem of marine litter including the role of the fishing industry as polluter; the economic impacts on fisheries; how fishers can minimise waste and reduce harmful environmental impacts (e.g. bycatch, ghost fishing); the potential use of alternative/eco-friendly materials; the strategies to reduce greenhouse gas emissions, energy and resource consumption. The educational materials produced target professional fishers using simple, non-scientific language and will be prepared in English, Portuguese, Spanish, Italian and Croatian.

Document Information

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1	Lisa Sousa, Marisa Almeida, Sandra Ramos	31/01/2024
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Summary NETTAG+ Project

NETTAG+ aims to provide a portfolio of three innovative smart and sustainable solutions to address the negative impacts of abandoned, lost or otherwise discarded fishing gear (ALDFG) on marine life and habitats. NETTAG+ will be based on synergistic activities between the fisheries industry, scientists and NGOs to develop three solutions to PREVENT, AVOID and MITIGATE the harmful impacts of ALDFG.

NETTAG+ will PREVENT marine litter derived from fisheries activities, AVOID loss of fishing gears, and MITIGATE harmful impact by removing existing ALDFG. These three solutions will jointly contribute to reduce ALDFG and marine pollution, namely by: reducing the introduction of hazardous chemicals and microplastics originating from ALDFG; reducing ghost fishing, bycatch and entanglements of sensitive or endangered species on ALDFG; and improving mapping, tracking and recovery technologies to retrieve ALDFG.

NETTAG+ aims to upgrade and upscale the integrative preventive approach that started in the previous NetTag project, and aims to replicate it in Mediterranean regions, providing the fisheries industry with three smart and environmentally-friendly solutions to reduce ALDFG and prevent the environmental impacts of fishing gears. The three solutions will be developed to maturity (TRL 7-8) by the end of the project, and will be tested, validated and demonstrated in real conditions in Atlantic and Mediterranean countries, namely Portugal (PT), United Kingdom (UK), Spain (SP), Italy (IT), Croatia (HR) and Malta (MT). NETTAG+'s ambition is to change the paradigm of the fisheries industry, aspiring to transform the societal perspectives about the role of fishers as Guardians and Cleaners of the Ocean. NETTAG+ will empower the sector to take effective actions to address marine pollution, promoting their role as key actors to tackle marine pollution.

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Contents

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Figures

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Executive Summary

Every year, tons of fishing gear are discarded to the ocean globally, inflicting severe threats to marine habitats and wildlife while causing economic losses to the fishing sector. Addressing marine pollution on a global scale requires cooperation across the science-policy-society interface, combining the know-how of the different actors involved to successfully solve the marine litter global environmental crisis.

This report is an output of 'WP2 - PREVENT: Fishers as Guardians and Cleaners of the Ocean' and delivers the educational materials co-produced by NETTAG+ partners on the issue of marine litter (Task 2.1) to be used in the awareness actions that the NETTAG+ fishers associations and representatives (APMSHM; ARVI; CoGePa; WWF; MAFA) will deliver to their associates (Task 2.2).

The educational materials target professional fishers from different countries, therefore using simple, non-scientific language and will be produced in five languages: English, Portuguese, Spanish, Italian and Croatian.

A package of six workshops was prepared:

- Workshop #1 - Seminar on marine litter
- Workshop #2 - Marine litter produced on board
- Workshop #3 - Marine litter collected by fishing gear
- Workshop #4 - Sustainable practices: bycatch reduction and marine conservation
- Workshop #5 - Reducing fisheries footprint
- Workshop #6 - NETTAG+ solutions

The educational materials will be available on the NETTAG+ project website, so they can be freely used in other projects or initiatives.

Through the development of educational materials and awareness actions, NETTAG+ aims to enhance the comprehension of marine litter issues within professional fishing communities and to foster a transformation in the fisheries industry's perception, shifting from being perceived as a 'polluter' to becoming a 'guardian and cleaner' of the ocean.

Engaging fishers' associations and representatives in the collaborative development of educational materials, as well as their participation in the planning and execution of awareness activities, guarantees that NETTAG+ outputs align with the needs of the fishing community. This approach fosters ownership and enhances the likelihood of influencing behavioural changes.

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1 Introduction

Modern fishing gear, predominantly made of non-biodegradable plastic, persist in the environment for extended periods (Brown & Macfadyen, 2007; Iñiguez *et al.*, 2016), causing adverse environmental and socio-economic impacts. This includes adverse effects on biota, water quality, and human health (Drinkwin, 2020). Cooperation across the science-policy-society interface is crucial to address the marine litter global environmental crisis. Fishers, with their local ecological knowledge, contribute significantly to effective marine management decision-making (Freire & García-Allut, 1999; Pita *et al.*, 2020), including identifying fishing grounds and areas with concentrated marine litter. Fishers also play a key role in managing marine litter, by avoiding and retrieving lost fishing gear and by voluntarily collecting and bringing marine litter to local ports for adequate management and recycling.

NETTAG+ is based on collaboration between the fisheries industry, scientists, and NGOs to develop solutions that PREVENT, AVOID, and MITIGATE the harmful impacts of lost fishing gear on marine life and habitats. The actions related with the PREVENT solution are in part focused on the development of educational materials and awareness actions to promote best practices regarding the management of litter, possible use of alternative materials and reduction of emissions and environmental harmful impacts of fishing gear.

The aim of NETTAG+ educational materials and awareness actions is to capitalise on the fishers' willingness to prevent and reduce marine litter derived from fisheries and to help clean the ocean, thus becoming a key player in addressing marine pollution.

With this solution NETTAG+ will tackle several of the specific issues raised during the previous NetTag project, namely:

- Definition of litter (as most fishers did not recognize organic waste as litter, for example), how to properly manage domestic litter on board by fishers, and how to properly manage litter passively collected by nets.
- Urgent need for appropriate facilities at the fishing ports to properly manage litter loaded by fishing vessels for recycling.
- Extent geographic coverage of actions to increase the number of fishers involved and tackle specific local/regional problems.
- Emphasise the role of fishers as guardians and cleaners of the ocean, highlighting the voluntary service they provide when they load the litter that is passively collected by their fishing gear.

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This report is an output of 'WP2 - PREVENT: Fishers as Guardians and Cleaners of the Ocean' and delivers the educational materials co-produced by NETTAG+ partners on the issue of marine litter (Task 2.1) to be used in the awareness actions that the NETTAG+ fishers associations and representatives will deliver to their associates (Task 2.2).

The educational materials target professional fishers from different countries, therefore using simple, non-scientific language and will be produced in five languages: English, Portuguese, Spanish, Italian and Croatian. The resources will be available on the project website, so they can be used in other projects or initiatives.

Through the development of educational materials and awareness actions, NETTAG+ aims to enhance the comprehension of marine litter issues within professional fishing communities and to foster a transformation in the fisheries industry's perception, shifting from being perceived as a 'polluter' to becoming a 'guardian and cleaner' of the ocean.

Engaging fishers' associations and representatives in the collaborative development of educational materials, as well as their participation in the planning and execution of awareness activities, guarantees that NETTAG+ outputs align with the needs of the fishing community. This approach fosters ownership and enhances the likelihood of influencing behavioural changes.

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2 Educational/awareness materials and actions

A package of six workshops was prepared to raise awareness on the adverse environmental and socio-economic effects of marine litter and abandoned, lost or otherwise discarded fishing gear (ALDFG), and to identify, promote and implement best practices regarding the management of litter, possible use of alternative materials, emission reduction objectives and reduction of environmental harmful impacts of fishing gear:

- Workshop #1 - Seminar on marine litter
- Workshop #2 - Marine litter produced on board
- Workshop #3 - Marine litter collected by fishing gear
- Workshop #4 - Sustainable practices: bycatch reduction and marine conservation
- Workshop #5 - Reducing fisheries footprint
- Workshop #6 - NETTAG+ solutions

NETTAG+ participatory workshops encompass a broad geographic scope, spanning the North-East Atlantic (Portugal, Spain) and the Mediterranean (Italy, Croatia, Malta). This expansion aims to increase the participation of fishers, targeting a range of 210-350 individuals.

Figure 1. Illustration of the geographical scope of the NETTAG+ awareness actions

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NETTAG+ adopts an innovative approach 'from fishers to fishers', which consists in involving fishers in initiatives designed by and for their community. This strategy aims to encourage fishers to actively address marine litter, embrace best practices in waste management, and adopt environmentally friendly fishing techniques (e.g. reducing bycatch and consumption of energy/ resources). By addressing local constraints and adapting to specific realities, including local fishing activities, this approach ensures relevance and effectiveness.

2.1 General procedures and materials

NETTAG+ partners conducting awareness actions at each venue are responsible for the invitations, managing the registrations and participations, facilitating the sessions, ensuring the signature of consent forms, disseminating the project, and providing a synthesis report. A set of materials, templates and forms have been prepared to support the organisation of workshops and ensure a consistent implementation:

- **NETTAG+ participant information sheet** (**Annex 1**)**:** providing relevant information about the project, contact details, goals of the engagement activities, and other relevant information. To be handed out to participants, together with the consent form, in the beginning of each event.
- **NETTAG+ informed consent form** (**Annex 2**)**:** to be signed by each participant in the beginning of each event and stored by partners (each participant should keep a copy for themselves).
- **List of participants template** (**Annex 3**): to support partners in the registration desk. In the beginning of the event, each participant must sign the participation sheet.
- **Feedback form** (**Annex 4**)**:** to be distributed to participants in the beginning of the event so they can evaluate it. The forms must be collected by partners in the end of the event.
- **Structure of the synthesis report (Annex 5):** to guide the organising partner in the elaboration of the event synthesis report, which must then be shared with participants.
- **NETTAG+ flyer** (**Annex 6**)**:** promotional flyer presenting the NETTAG+ project, objectives and expected results to be handed to the participants at the first event.
- **NETTAG+ roll-up banner** (**Annex 7**)**:** designed for use at internal and external events, namely the participatory workshops, to communicate the project.

These workshops can occur individually or grouped into two or three events, depending on the decision of the responsible partner (fisher's representatives) who organize them, considering the availability of participant fishers and resource management.

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2.2 Workshop #1 - Seminar on marine litter

2.2.1 Overview

The first NETTAG+ workshop, entitled 'Seminar on marine litter', is an educational seminar targeting small- and large-scale professional fishers to raise awareness of the problem of marine litter, focusing on the adverse environmental and socio-economic effects of marine litter and ALDFG, how fishers can minimise waste and reduce harmful environmental impacts associated with bycatch and ghost fishing. Moreover, this educational seminar will also address the possible use of alternative materials, and strategies to reduce greenhouse gas emissions, energy and resource consumption.

The workshop takes approximately one hour and a half and will address the following themes:

- The importance of the ocean and main threats.
- The problem of marine litter (including plastic and microplastic pollution).
- Contribution of fisheries to marine litter and its adverse environmental and socio-economic impacts (e.g., ALDFG, litter produced on board).
- Other environmental harmful impacts of fisheries (such as bycatch, greenhouse gas emissions).
- European actions to tackle marine litter from sea-based sources.
- Best practices regarding the management of litter, possible use of alternative materials and reduction of emissions and environmental harmful impacts.

The main expected learning outcomes include:

- Understanding marine litter and its effects on marine wildlife, socio-economic activities, and human well-being.
- Gaining insight into other environmental impacts associated with fisheries.
- Introducing participants to best practices to tackle these challenges.

2.2.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), the NETTAG+ Flyer (Annex 6) and the Feedback form (Annex 4). Participants are asked to sign the presence list and return the signed informed consent form (each participant should keep a copy for themselves).

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Welcome and presentation of the NETTAG+ project | 15 minutes

After the welcome, there will be a quick presentation of the objectives and activities planned for the workshop and a brief presentation of the NETTAG+ project (Annex 9).

Seminar on marine litter | 60 minutes

The 'Seminar on marine litter' will be presented, using the PowerPoint presentation previously prepared (Annex 10).

Discussion | 15 minutes

Following the presentation, participants are encouraged to pose questions and engage in a discussion on the seminar topics. Participants are requested to complete the feedback form and to leave it at the registration table.

2.2.3 Resources and materials

Two PowerPoint presentations were prepared, one with a general introduction to the NETTAG+ project (Annex 9) and another one with the themes to be addressed and discussed with fishers during the workshop (Annex 10). Both presentations, prepared in English, are available in the project drive and will be translated to local languages (Portuguese, Spanish, Italian and Croatian). After the awareness actions, the workshop presentations will be made available on the NETTAG+ website.

Note that the Seminar presentation offers theoretical knowledge intended as a foundation for all subsequent workshops. If partners opt to combine certain workshops in the same event, it's recommended to categorize them by theme and potentially divide the Seminar presentation accordingly. To facilitate this process, the slides corresponding to each workshop have been identified.

2.3 Workshop #2 - Marine litter produced on board

2.3.1 Overview

The second participatory workshop is entitled 'Marine litter produced on board' and aims to raise awareness about the marine litter produced on board by the fishing vessels, its proper management and to foster behavioural change towards the adoption of best practices. The specific objectives of the workshop are to:

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- Educate and raise awareness among participants regarding the importance of tackling marine litter issues and implementing on-board best practices.
- Identify common items of marine litter generated on board (e.g., old gear, fish containers, oils).
- Engage participants in defining effective on-board practices for managing the marine litter produced.
- Gather suggestions on how to disseminate information and encourage other fishers to adopt similar practices.

This workshop involves informative and hands-on exercises and will take approximately two hours (see the proposed agenda in Annex 11).

2.3.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), and the Feedback Form (Annex 4). Participants are asked to sign the presence list (Annex 3) and return the signed informed consent form (each participant should keep a copy for themselves).

Welcome *(plenary)* | 10 minutes

Participants are welcomed, followed by a quick presentation of the objectives and the activities planned for the workshop. The participants will randomly be divided into small groups, with a maximum of six elements.

Exercise 1: Litter classification *(group)* | 20 minutes

Participants in each group start by nominating a spokesperson to present the results at the plenary sessions. Then, participants are asked to classify various litter items, represented by images on printed cards (Annex 12), as litter or non-litter by placing each item in the corresponding section on the exercise sheet (Figure 2; Annex 13). Once a consensus is reached, participants write the name of each item in the appropriate column, to be presented in the plenary session.

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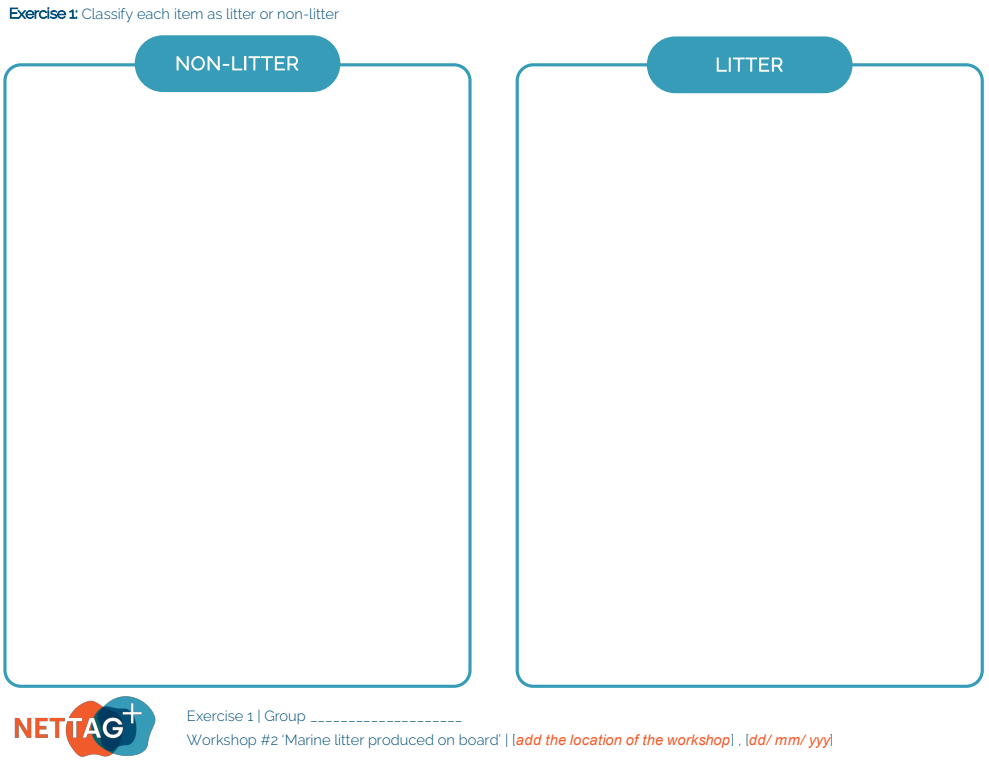

Figure 2. Example of the first exercise sheet (workshop #2)

Exercise 2: Litter destination *(group)* | 20 minutes

The second exercise is divided into two parts and aims to identify the destination of litter items (identified in the previous exercise), based on participants' fishing experience.

In the first part of the exercise (Exercise 2A), participants are asked to distinguish between litter items thrown overboard and litter brought to shore. Once a consensus is reached, participants write the name of each item in the appropriate column on the exercise sheet (Figure 3; Annex 13), to be presented in the plenary session.

In the second part of the exercise (Exercise 2B), participants are asked to identify the ultimate destination of litter items brought to shore. Litter items previously identified as *'Bring to shore'* should be allocated to one of the following destinations: i) stays on port, ii) deposited in a general garbage container, or iii) sent for recycling. Once a consensus is reached, participants write the name of each item in the appropriate column of the exercise sheet (Figure 4; Annex 13), to be presented in the plenary session.

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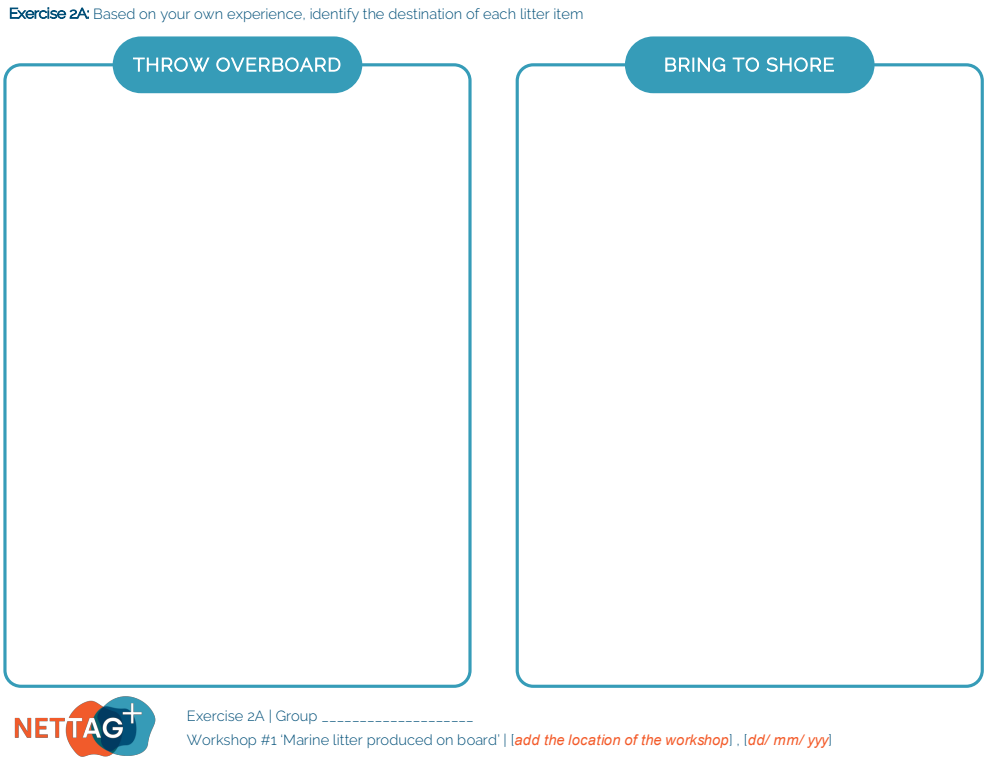

Figure 3. Example of the sheet for exercise 2A (workshop #2)

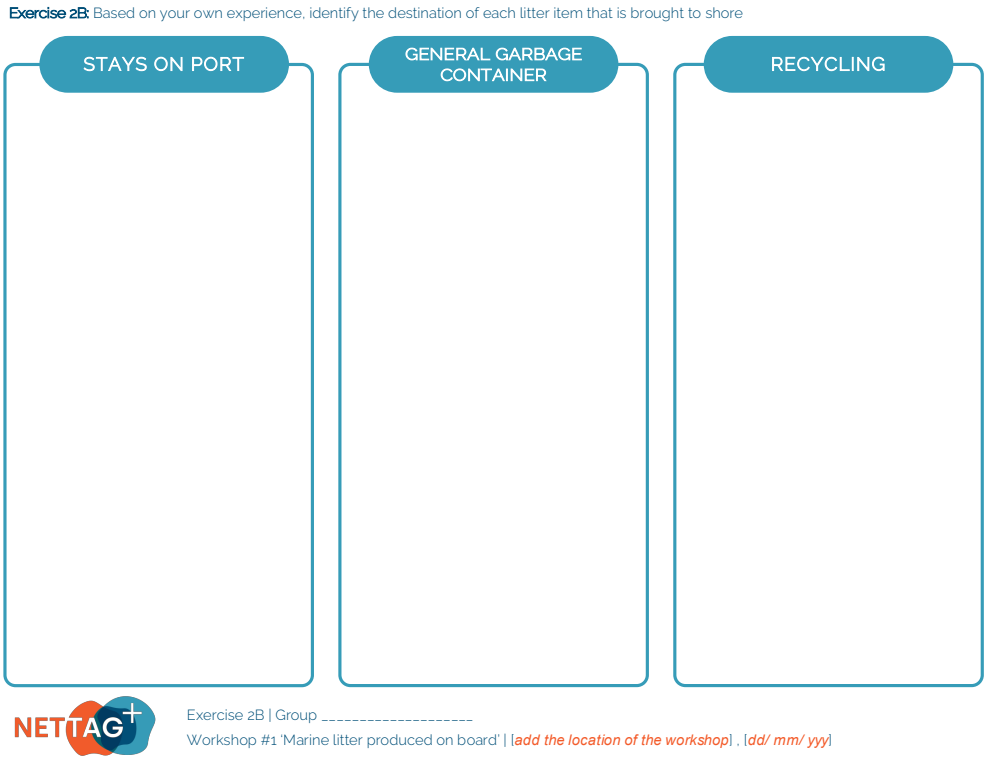

Figure 4. Example of the sheet for exercise 2B (workshop #2)

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Presentation of results & discussion *(plenary)* | 20 minutes

Following the initial two exercises, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the group's findings. A discussion among participants regarding the chosen destination for litter is encouraged (e.g. which items were not properly classified as litter/non-litter; was the destination most accurate? why wasn't litter separated for recycling?). At the end, the moderators present the correct results, fostering a reassessment of the initial evaluations.

Exercise 3: Further actions and dissemination *(group)* | 20 minutes

Back on groups, and based on previous discussions, participants are asked to give suggestions to reduce the marine litter produced on board and select measures to be implemented on board and at ports. Then, they are asked to identify internal and external factors that can influence the success of the proposed measures through a SWOT analysis. After reaching consensus, participants write their suggestions on the exercise sheet (Figure 5; Annex 13).

General guidelines to explain the SWOT analysis to fishers:

- **Strengths**: Things that fishers are really good at or have an advantage (e.g. extensive knowledge of local marine ecosystems and fishing practices, strong sense of community and cooperation, a positive attitude and willingness to adopt new practices, adaptability).
- **Weaknesses**: Areas that need improvement (e.g. lack of awareness about new methods, difficulties in accessing information or financial resources, resistance to change).
- **Opportunities:** External factors or chances for positive developments in fishing practices (e.g. policies (e.g. EU Directive 2019/883) and subsidies that encourage and financially assist the adoption of better practices, advancements in technology such as efficient gear designs or waste management tools, market demand for eco-friendly practices, opportunities to enhance the community's reputation).
- **Threats:** External factors that could pose challenges or risks to fishing practices (e.g. lack of enforcement, lack of infrastructures, economic factors, environmental changes).

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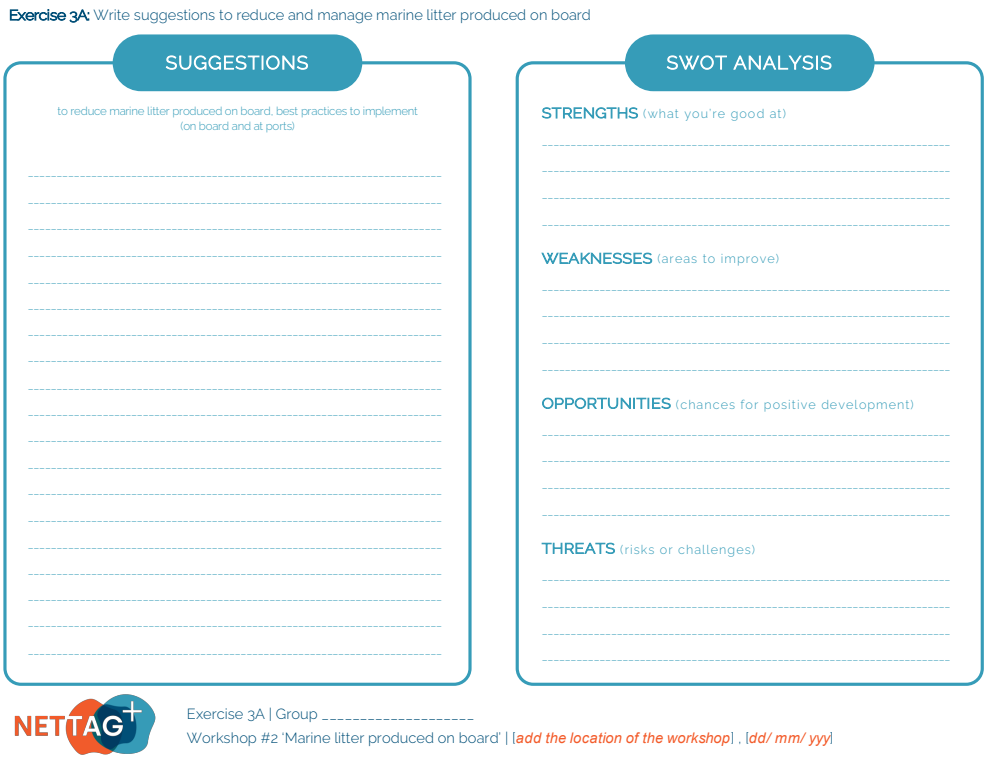

Figure 5. Example of the sheet for exercise 3A (workshop #2)

Finally, participants are asked to propose methods for disseminating best practices in reducing marine litter to fellow fishers, and to identify either individual fishers, vessels or communities that demonstrate leadership and social influence in terms of supporting innovation and sustainable behaviours relating to litter. Participants will also be asked to register the authorities they would contact in the event of witnessing a misconduct by other boats or activities, regarding pollution (in the column 'spread the word'). Once consensus is reached, participants write their suggestions on the exercise sheet (Figure 6; Annex 13).

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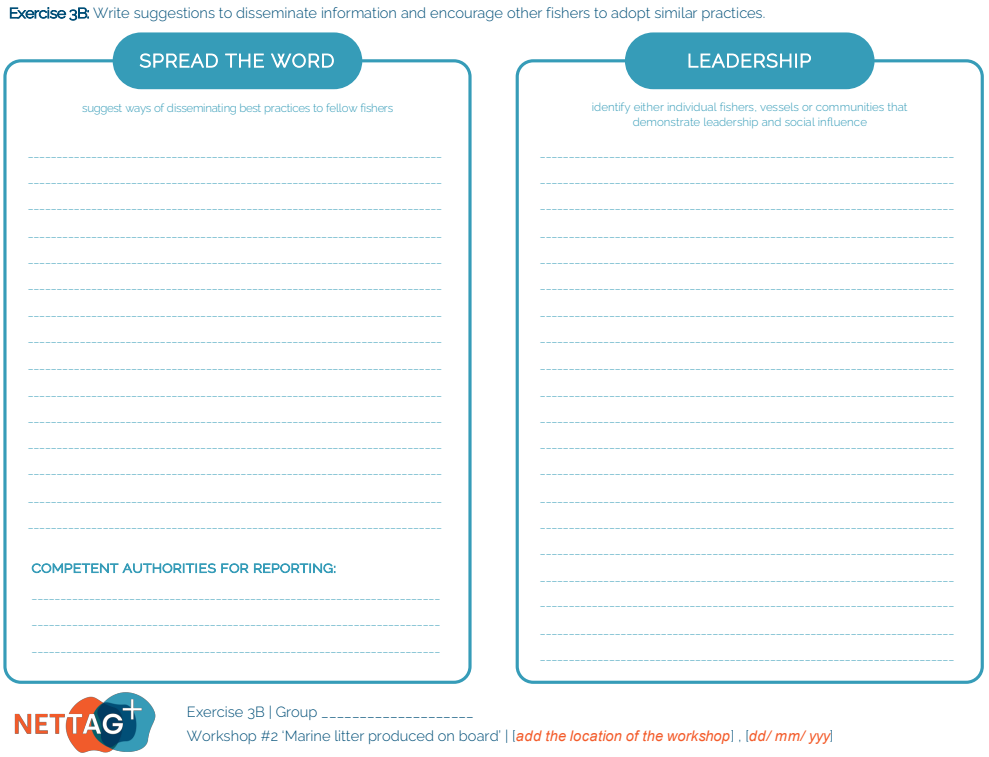

Figure 6. Example of the sheet for exercise 3B (workshop #2)

Presentation of results & discussion *(plenary)* | 20 minutes

Following the exercise, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the collective suggestions. A discussion among participants is encouraged and, at the end, moderators provide a summary of the suggestions put forth by all groups.

Workshop final conclusions *(plenary)* | 10 minutes

The workshop concludes with the presentation of final conclusions, encouraging participants to share additional insights or address any lingering questions. Participants are invited to complete the feedback form and to leave it at the registration table.

2.3.3 Resources and materials

A set of materials will be available to participants at the group tables to fulfil the workshop exercises, namely:

- Printed cards with images of litter or non-litter items (Annex 12),

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- Five exercise sheets per group (in A3 format) numbered with the practical exercise to be completed (Annex 13),
- Colourful pens.

In case partners decide to provide a theoretical background on the marine litter theme, the seminar slides corresponding to workshop 2 can be used (Annex 10). All educational materials are available in the project share point and will be translated to local languages (Portuguese, Spanish, Italian and Croatian). After the awareness actions, these materials will be made available on the NETTAG+ website.

2.4 Workshop #3 - Marine litter collected by fishing gear

2.4.1 Overview

The third participatory workshop is entitled 'Marine litter collected by fishing gear' and aims to raise awareness about passively fished waste, its proper management and to foster behavioural change towards the adoption of best practices. The specific objectives of the workshop are to:

- Educate and raise awareness among participants regarding the importance of managing correctly the litter collected by fishing nets.
- Identify common items of marine litter passively fished, including domestic litter, industrial litter, fisheries debris.
- Engage participants in defining effective practices regarding waste management.
- Stimulate discussions among participants regarding the fisheries' role as 'Cleaners of the Ocean' and explore strategies to inspire them to actively contribute to the mission of collecting marine litter.

This workshop involves informative and hands-on exercises and will take approximately two hours (see the proposed agenda in Annex 14).

2.4.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), and the Feedback form (Annex 4). Participants are asked to sign the presence list (Annex 3) and return the signed informed consent form (each participant should keep a copy for themselves).

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Welcome *(plenary)* | 10 minutes

Participants are welcomed, followed by a quick presentation of the objectives and the activities planned for the workshop. The participants will randomly be divided into small groups, with a maximum of six elements.

Exercise 1: Litter passively caught in fishing nets *(group)* | 20 minutes

Participants in each group start by nominating a spokesperson to present the results at the plenary sessions. Then, participants are asked to register the litter items commonly caught by their fishing nets on the exercise sheet (Figure 7; Annex 15).

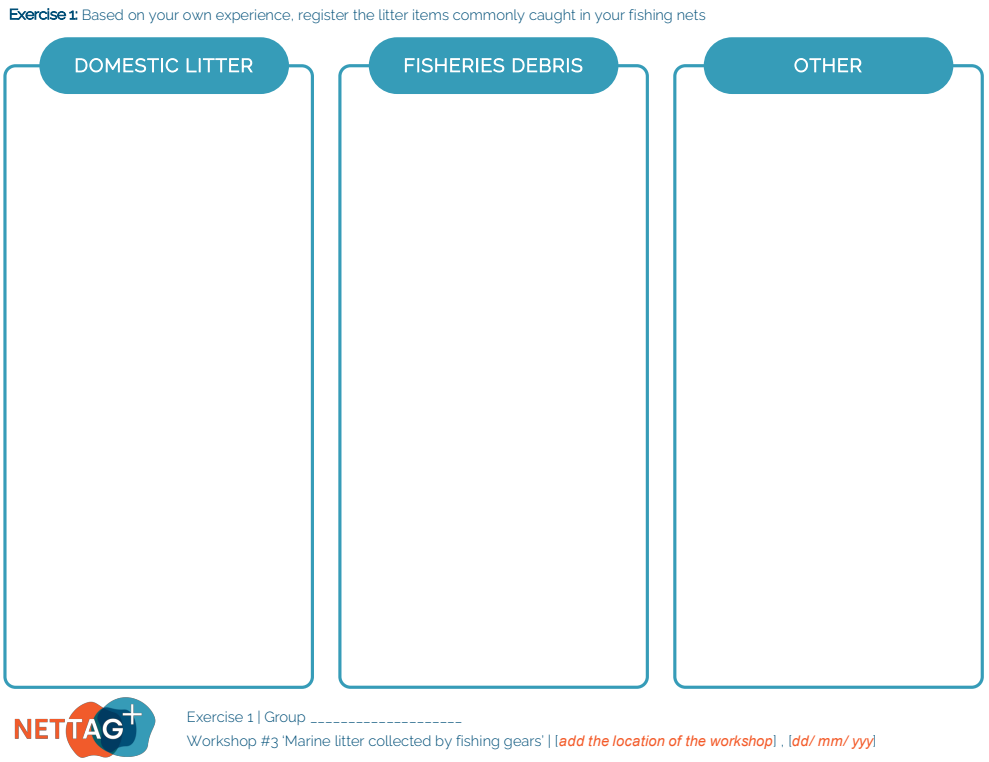

Figure 7. Example of the first exercise sheet (workshop #3)

Exercise 2: Destination of litter caught in fishing nets *(group)* | 20 minutes

The second exercise is divided in two parts and aims to identify the destination of litter items caught in the fishing nets, based on participants' fishing experience.

In the first part of the exercise (Exercise 2A), participants are asked to distinguish between litter items thrown overboard and litter brought to shore. Once a consensus is reached, participants write the name of each item in the appropriate column on the exercise sheet (Figure 8; Annex 15), to be presented in the plenary session.

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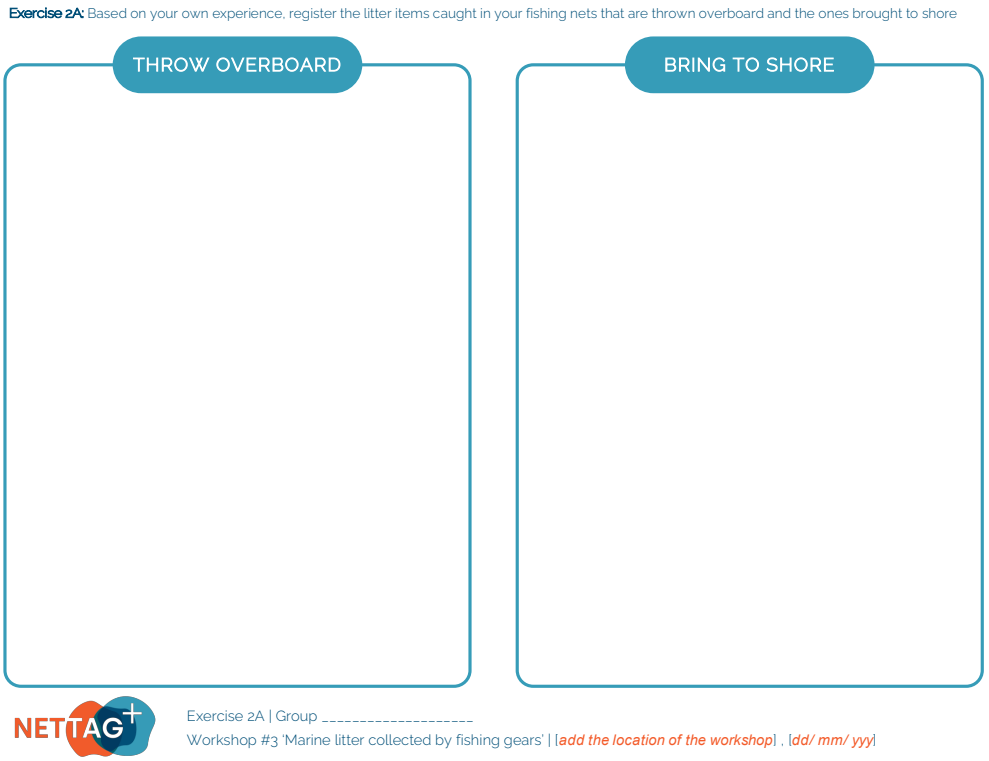

Figure 8. Example of the sheet for exercise 2A (workshop #3)

In the second part of the exercise (Exercise 2B), participants are asked to identify the ultimate destination of the litter items brought to shore. Litter items previously identified as *'Bring to shore'* should be allocated to one of the following destinations: i) stays on port, ii) deposited in a general garbage container, or iii) sent for recycling. Once a consensus is reached, participants write the name of each item in the appropriate column of the exercise sheet (Figure 9; Annex 15), to be presented in the plenary session.

Presentation of results & discussion *(plenary)* | 20 minutes

Following the initial two exercises, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the group's findings. A discussion among participants regarding the chosen destination for litter is encouraged. At the end, the moderators present the correct results, fostering a reassessment of the initial evaluations.

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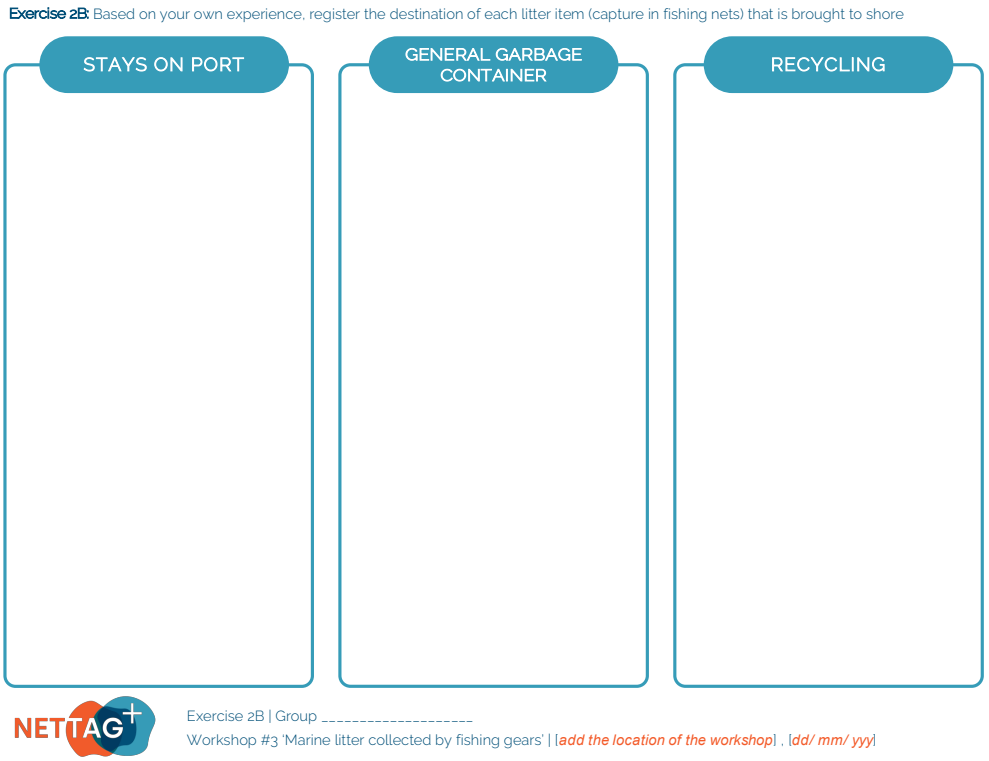

Figure 9. Example of the sheet for exercise 2B (workshop #3)

Exercise 3: Further actions and dissemination *(group)* | 20 minutes

Back on groups, and based on previous discussions, participants are asked to suggest measures (on board and at ports) to encourage the collection and proper management of marine litter, during normal fishing activities, and to identify internal and external factors that can influence the success of the proposed measures through a SWOT analysis. After reaching consensus, participants write their suggestions on the exercise sheet (Figure 10; Annex 15).

Finally, participants are asked to propose methods for disseminating best practices to fellow fishers, ways of motivating them to embrace the role of 'Guardians and Cleaners of the Ocean' and to identify either individual fishers, vessels or communities that demonstrate leadership and social influence in terms of supporting innovation and sustainable behaviours relating to litter. Participants' willingness to create or contribute to a marine litter platform should also be explored, as well as the type of data they would be willing to report (e.g., weight, typology, location/coordinates) and in what circumstances (e.g., rewards, training, collaboration with other entity responsible for litter analysis and registration). Once consensus is reached, participants write their suggestions on the exercise sheet (Figure 11; Annex 15).

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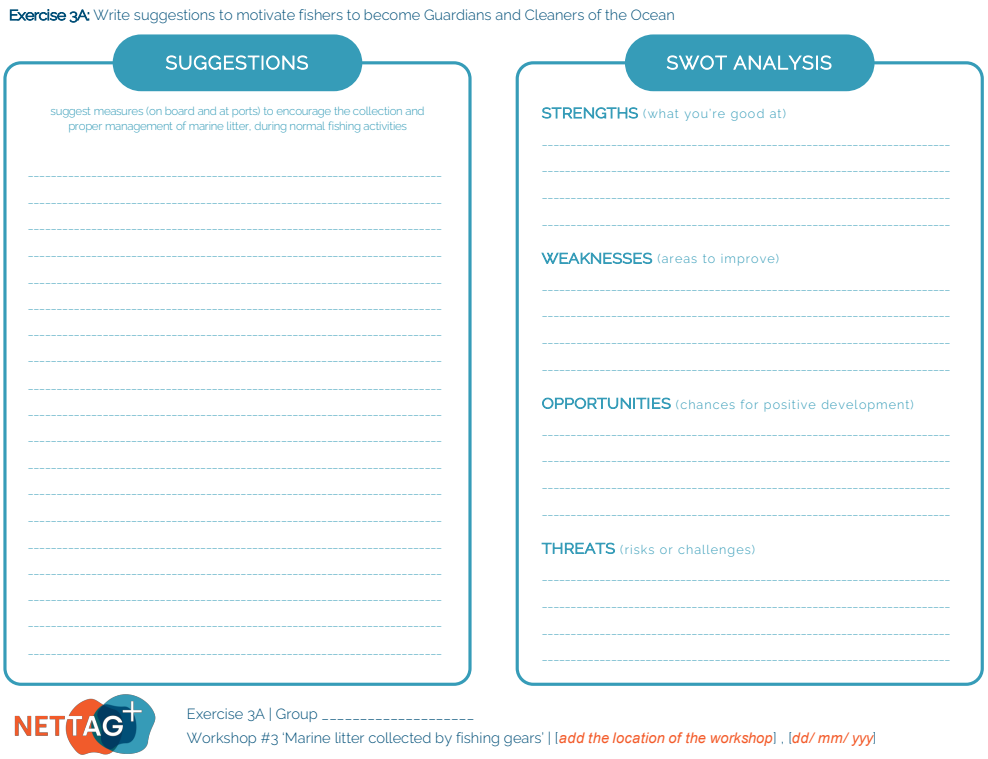

Figure 10. Example of the sheet for exercise 3A (workshop #3)

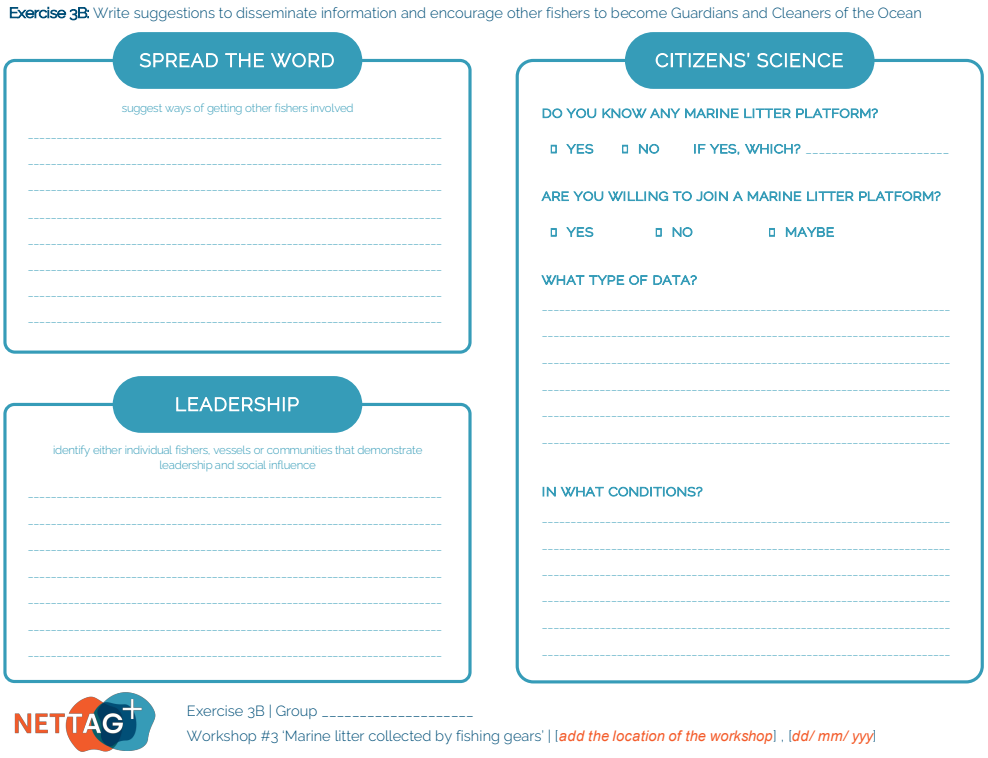

Figure 11. Example of the sheet for exercise 3B (workshop #3)

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Presentation of results & discussion *(plenary)* | 20 minutes

Following the exercise, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the collective suggestions. This moment can be used to discuss the Clean Ocean Day event (demonstration event of WP2, Task 2.4), its logistics, and to ask participants about their availability to get involved. At the end, moderators provide a summary of the suggestions put forth by all groups.

Workshop final conclusions *(plenary)* | 10 minutes

The workshop concludes with the presentation of final conclusions, encouraging participants to share additional insights or address any lingering questions. Participants are invited to complete the feedback form and to leave it at the registration table.

2.4.3 Resources and materials

A set of materials will be available to participants at the group tables to fulfil the workshop exercises, namely:

- Five exercise sheets per group (in A3 format) numbered with the practical exercise to be completed (Annex 15),
- Colourful pens.

In case partners decide to provide a theoretical background on the marine litter theme, the seminar slides corresponding to workshop 3 can be used (Annex 10). All educational materials are available in the project share point and will be translated to local languages (Portuguese, Spanish, Italian and Croatian). After the awareness actions, these materials will be made available on the NETTAG+ website.

2.5 Workshop #4 - Sustainable practices: bycatch reduction and marine conservation

2.5.1 Overview

The fourth participatory workshop is entitled 'Sustainable practices: bycatch reduction and marine conservation' and aims to raise awareness about the incidental capture of non-target species, particularly sensitive endangered species (such as sea turtles, marine mammals, seabirds, sharks, sponges and corals). The specific objectives of the workshop are to:

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- Raise awareness among fishers about the importance of reducing bycatch in fishing.
- Familiarise participants with various devices and techniques used to minimise bycatch.
- Provide guidelines and best practices for acting in case of bycatch.
- Promote the adoption of sustainable practices that benefit the health of marine ecosystems.

This workshop involves informative and hands-on exercises and will take approximately two hours (see the proposed agenda in Annex 16).

2.5.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), and the Feedback form (Annex 4). Participants are asked to sign the presence list (Annex 3) and return the signed informed consent form (each participant should keep a copy for themselves).

Welcome *(plenary)* | 10 minutes

Participants are welcomed, followed by a quick presentation of the objectives and the activities planned for the workshop. Finally, the participants will randomly be divided into small groups, with a maximum of six elements.

Exercise 1: Species commonly captured *(group)* | 20 minutes

Participants in each group start by nominating a spokesperson to present the results at the plenary sessions. A facilitated open discussion is encouraged so participants share their bycatch experiences. Then, participants are asked to:

- Identify non-target species commonly captured,
- Rank these species based on capture frequency,
- Associate captured species with the specific fishing gear used,
- Identify endangered species among the captured ones.

Printed cards with images of common bycatch species (e.g. seabirds, marine mammals, turtles, sharks, sponges and corals; Annex 17) are provided to support the exercise. Once a consensus is reached, participants write their answers on the exercise sheet (Figure 12; Annex 18).

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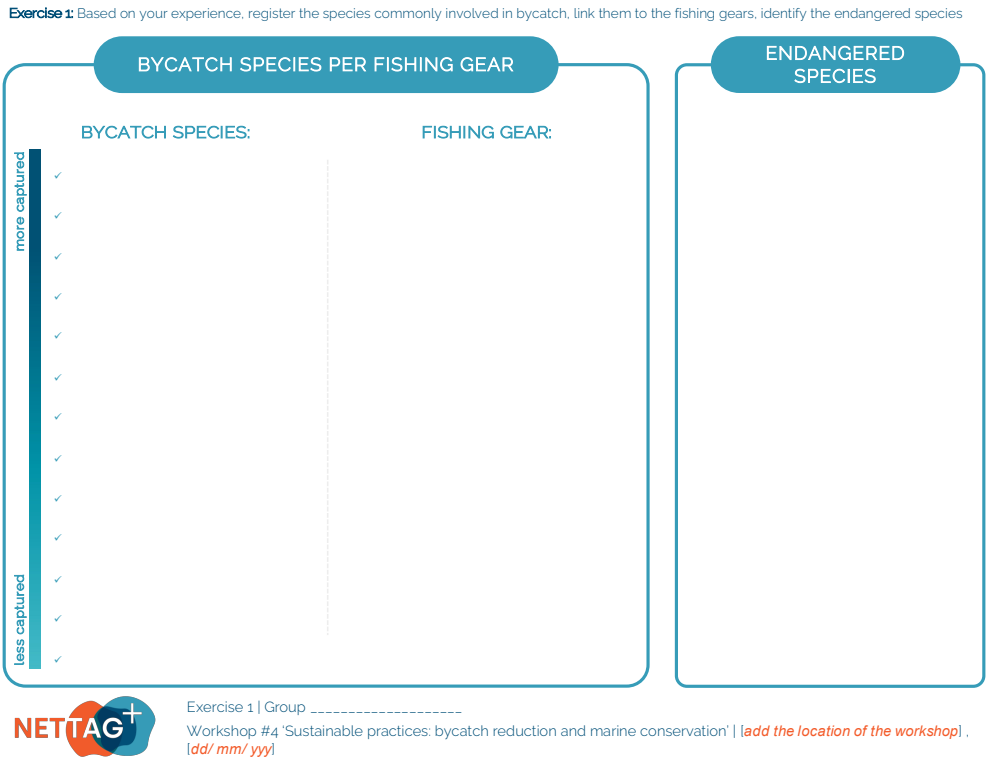

Figure 12. Example of the first exercise sheet (workshop #4)

Exercise 2: Best practices to reduce bycatch *(group)* | 20 minutes

In the second exercise, participants are asked to deliberate on the practicality and applicability of best practices. To facilitate the conversation, a table summarising available best practices for reducing bycatch will be provided (Annex 19). Participants are asked to i) identify the most suitable practices for their needs (given the fishing gear used and common bycatch species), ii) discuss ways of implementing them on board, and iii) discuss major strengths, weaknesses, opportunities and threats. Key conclusions drawn from this discussion should be registered in the exercise sheet (Figure 13; Annex 18).

Exercise 3: Protocols in case of bycatch *(group)* | 20 minutes

In the third exercise, participants are asked to deliberate on i) the rapid response protocols and on-board handling practices in case of bycatch, ii) the importance of communicating and notifying the relevant authorities, as well as iii) major strengths, weaknesses, opportunities and threats. The discussion should extend to methods of implementing these protocols/practices. Key conclusions drawn from this discussion should be registered in the exercise sheet (Figure 14; Annex 18).

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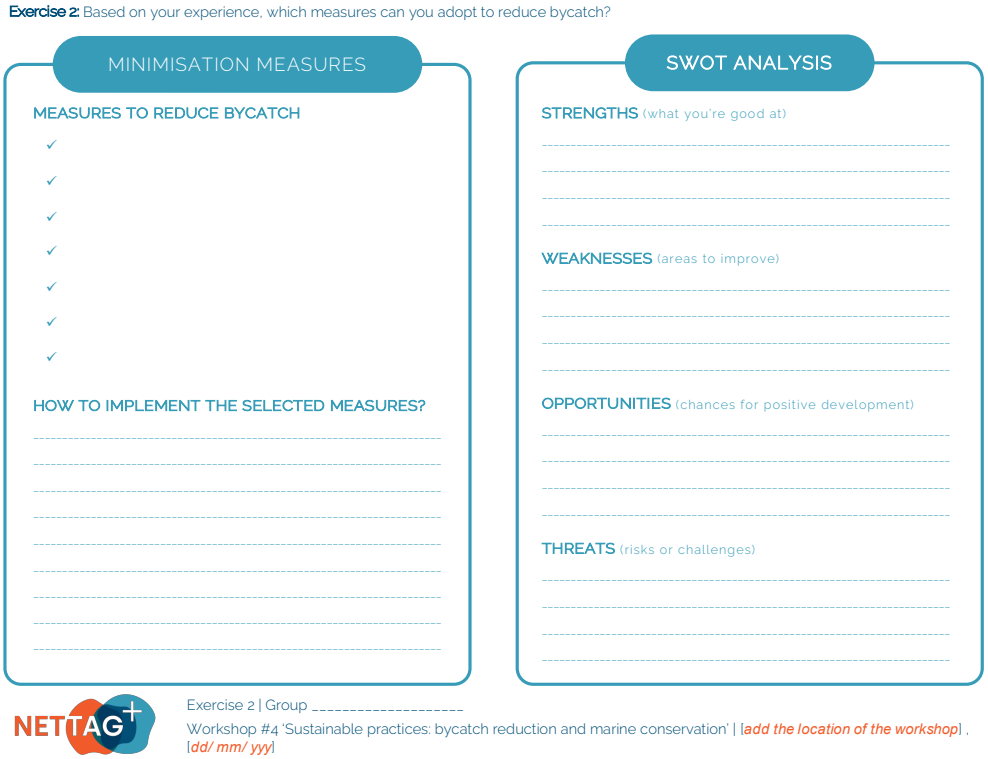

Figure 13. Example of the second exercise sheet (workshop #4)

Figure 14. Example of the third exercise sheet (workshop #4)

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Exercise 4: Dissemination and leadership *(group)* | 20 minutes

In the final exercise, participants are asked to propose methods for disseminating best practices to fellow fishers, and to identify either individual fishers, vessels or communities that demonstrate leadership and social influence in terms of supporting innovation and sustainable behaviours relating to the adoption of sustainable practices. The main conclusions should be registered in the exercise sheet (Figure 15; Annex 18).

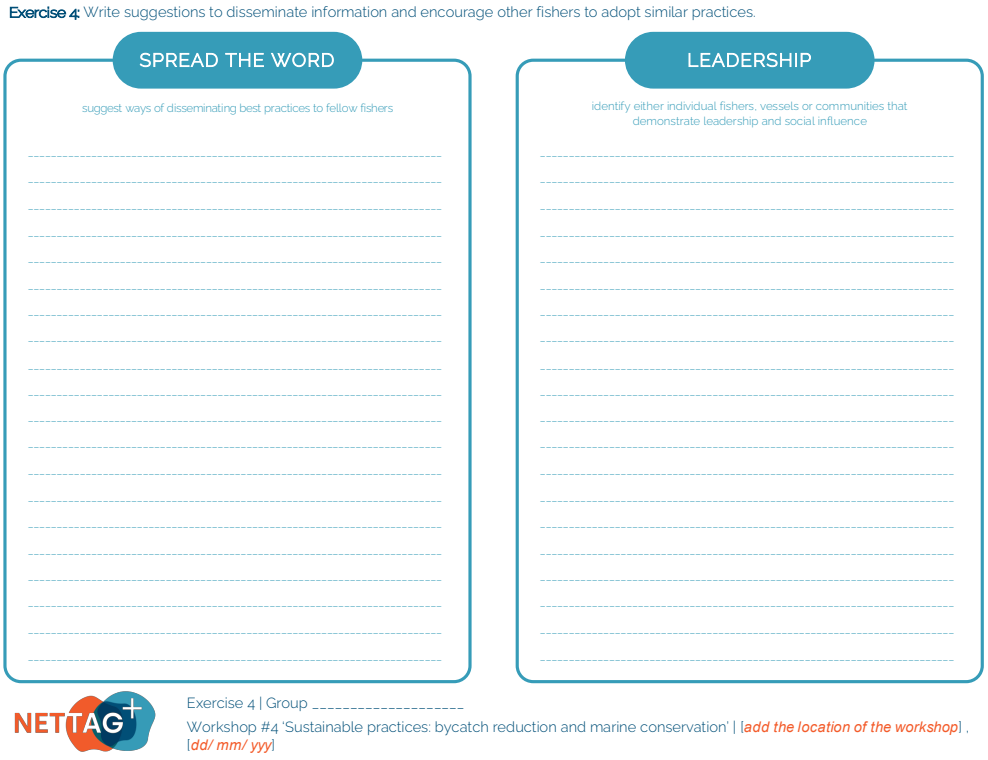

Figure 15. Example of the fourth exercise sheet (workshop #4)

Presentation of results & discussion *(plenary)* | 20 minutes

Following the exercises, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the group's findings. A discussion among participants is encouraged and, at the end, moderators provide a summary of the suggestions put forth by all groups.

Workshop final conclusions *(plenary)* | 10 minutes

The workshop concludes with the presentation of final conclusions, encouraging participants to share additional insights or address any lingering questions. Participants are invited to complete the feedback form and to leave it at the registration table.

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2.5.3 Resources and materials

A set of materials will be available to participants at the group tables to fulfil the workshop exercises, namely:

- Printed cards with imagens of the most common bycatch species (Annex 17),
- One A4 table per group summarising existing solutions to reduce bycatch (Annex 19),
- Four exercise sheets per group (in A3 format) numbered with the practical exercise to be completed (Annex 18),
- Colourful pens.

In case partners decide to provide a theoretical background on the bycatch theme, the seminar slides corresponding to workshop 4 can be used (Annex 10). All educational materials are available in the project share point and will be translated to local languages (Portuguese, Spanish, Italian and Croatian). After the awareness actions, these materials will be made available on the NETTAG+ website.

2.6 Workshop #5 - Reducing fisheries footprint

2.6.1 Overview

The fifth participatory workshop is entitled 'Reducing fisheries footprint' and aims to raise awareness and assess the viability of reducing greenhouse gas (GHG) emissions and avoiding/reducing the use of plastics to foster a reduction of fisheries ecological footprint. The specific objectives of the workshop are to:

- Educate and raise awareness about the importance of joining the global efforts on the energy transition by improving the fisheries energy efficiency and reducing greenhouse gas emissions.
- Educate and raise awareness about the importance of reducing the use of plastic by replacing it by alternative/eco-friendly materials, whenever possible and adequate.
- Familiarise participants with best practices and promote its adoption.

This workshop involves informative and hands-on exercises and will take approximately one hour and forty minutes (see the proposed agenda in Annex 20).

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2.6.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), and the Feedback form (Annex 4). Participants are asked to sign the presence list and return the signed informed consent form (each participant should keep a copy for themselves).

Welcome *(plenary)* | 10 minutes

Participants are welcomed, followed by a quick presentation of the objectives and the activities planned for the workshop. Finally, the participants will randomly be divided into small groups, with a maximum of six elements.

Exercise 1: Reduction of greenhouse gas emissions *(group)* | 20 minutes

Participants in each group start by nominating a spokesperson to present the results at the plenary sessions. Then, participants are asked to discuss the feasibility of GHG emissions reduction measures, identify the most suitable for their reality and discuss ways of implementing them on board (including a SWOT analysis). To support the exercise, a list of potential measures to reduce GHG emissions will be provided to support the discussion (Annex 21). Key conclusions should be registered in the exercise sheet (Figure 16; Annex 22).

Exercise 2: Use of alternative/eco-friendly materials *(group)* | 20 minutes

Participants are asked to discuss ways of reducing the use of plastics, using alternative or eco-friendly materials and to discuss ways of implementing these measures (including a SWOT analysis). A list of activities and materials commonly used during fishing operations was prepared to initiate and support the discussion (Annex 23). Key conclusions should be registered in the exercise sheet (Figure 17; Annex 22).

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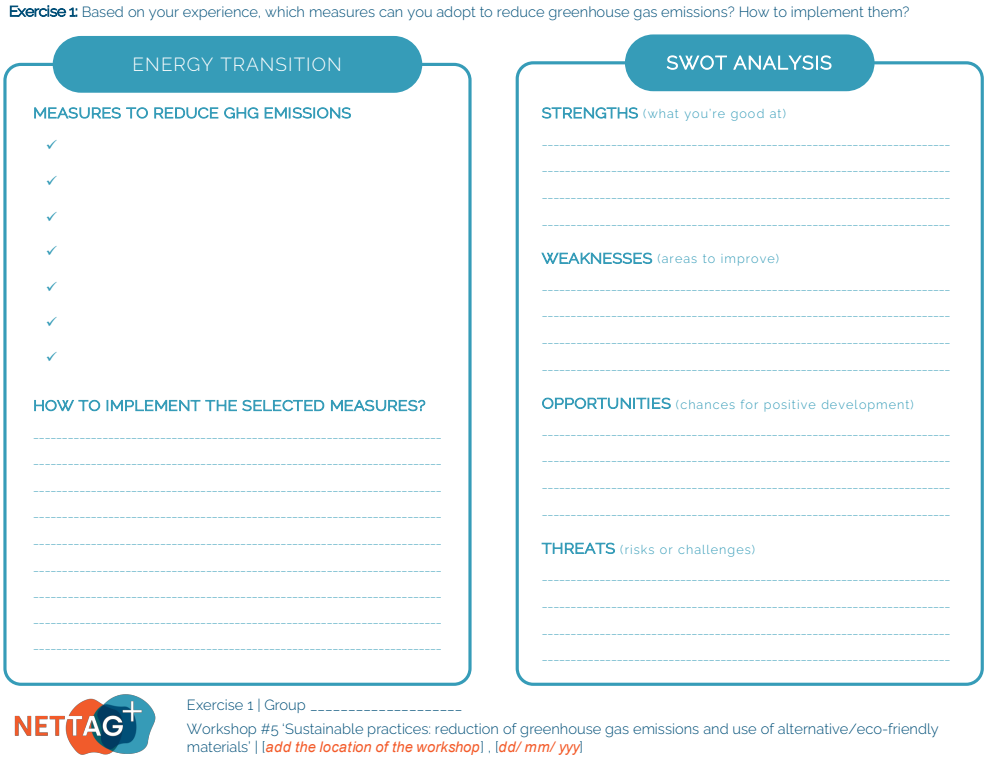

Exercise 1: Based on your experience, which measures can you adopt to reduce greenhouse gas emissions? How to implement them?

ENERGY TRANSITION

MEASURES TO REDUCE GHG EMISSIONS

✓
✓
✓
✓
✓
✓
✓

HOW TO IMPLEMENT THE SELECTED MEASURES?

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 1 | Group _____

Workshop #5 'Sustainable practices: reduction of greenhouse gas emissions and use of alternative/eco-friendly materials' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

Figure 16. Example of the first exercise sheet (workshop #5)

Exercise 2: Based on your experience, which materials can be replaced to reduce fishers' reliance on plastics? How to implement them?

ECO-FRIENDLY MATERIALS

WHICH MATERIALS CAN BE REPLACED?

✓
✓
✓
✓
✓
✓
✓

HOW TO IMPLEMENT THIS MEASURES?

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 2 | Group _____

Workshop #5 'Sustainable practices: reduction of greenhouse gas emissions and use of alternative/eco-friendly materials' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

Figure 17. Example of the second exercise sheet (workshop #5)

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Exercise 3: Dissemination and leadership *(group)* | 20 minutes

In the final exercise, participants are asked to propose methods for disseminating best practices to fellow fishers, and to identify either individual fishers, vessels or communities that demonstrate leadership and social influence in terms of supporting innovation and sustainable behaviours relating to the adoption of sustainable practices. The main conclusions should be registered in the exercise sheet (Figure 18; Annex 22).

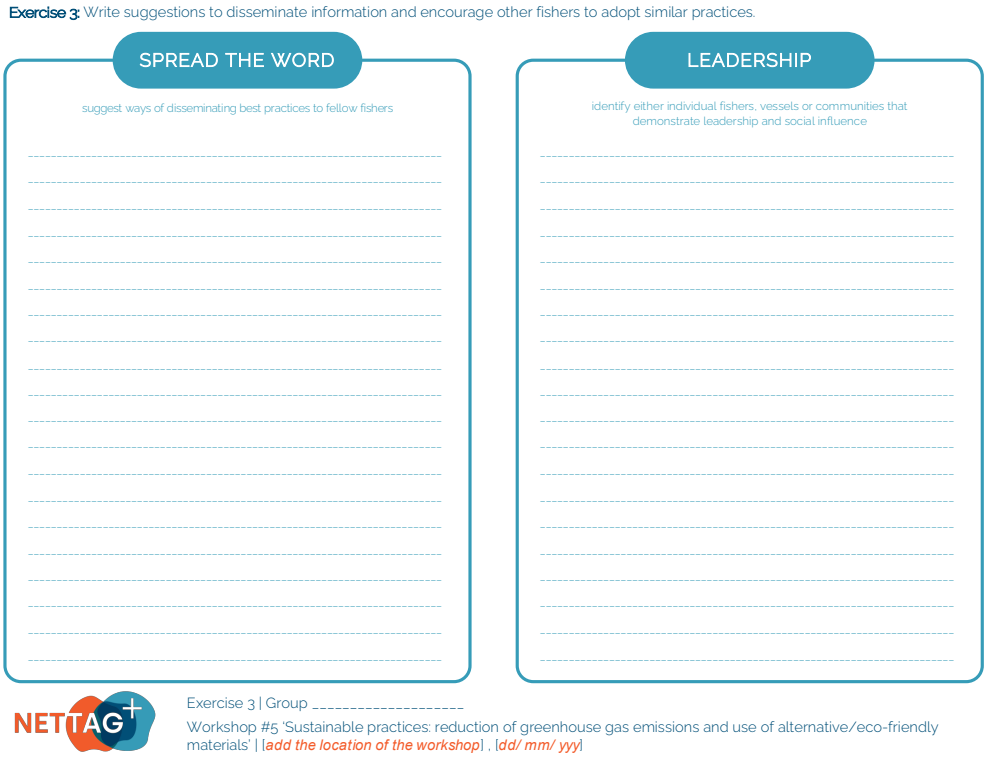

Figure 18. Example of the third exercise sheet (workshop #5)

Presentation of results & discussion *(plenary)* | 20 minutes

Following the exercises, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and presents the group's findings. A discussion among participants is encouraged and, at the end, moderators provide a summary of the suggestions put forth by all groups.

Workshop final conclusions *(plenary)* | 10 minutes

The workshop concludes with the presentation of final conclusions, encouraging participants to share additional insights or address any lingering questions. Participants are invited to complete the feedback form and to leave it at the registration table.

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2.6.3 Resources and materials

A set of materials will be available to participants at the group tables to fulfil the workshop exercises, namely:

- One A4 sheet per group with examples of best practices to reduce greenhouse gas emissions (Annex 21),
- One A4 sheet per group with examples of activities and materials that have the potential to be replaced with eco-friendly materials (Annex 23),
- Three exercise sheets per group (in A3 format) numbered with the practical exercise to be completed (Annex 22),
- Colourful pens.

In case partners decide to provide a theoretical background on the energy transition and use of alternative/eco-friendly materials theme, the seminar slides corresponding to workshop 5 can be used (Annex 10). All educational materials are available in the project share point and will be translated to local languages. After the awareness actions, these materials will be made available on the NETTAG+ website.

2.7 Workshop #6 - NETTAG+ solutions

2.7.1 Overview

The sixth participatory workshop is entitled 'NETTAG+ solutions' and aims to assess fishers' overall perception of the three solutions proposed by the NETTAG+ project, namely:

- PREVENT marine litter derived from fisheries activities.
- AVOID loss of fishing gear using acoustic tags and autonomous vehicles.
- MITIGATE harmful impacts by developing technology to help map and retrieving existing ALDFG.

The specific objectives of the workshop are to:

- Present the NETTAG+ technological solutions and awareness actions designed to prevent, avoid, and mitigate the harmful impacts of fishing gear.
- Evaluate the applicability and effectiveness of both technological and awareness approaches as reliable solutions for future implementation.

This workshop involves informative and hands-on exercises and will take approximately one hour and a half (see the proposed agenda in Annex 24).

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2.7.2 Workshop development

Registration

The registration team welcome the participants and hand them the Participant Information Sheet (Annex 1), two Informed Consent Forms (Annex 2), and the Feedback form (Annex 4). Participants are asked to sign the presence list and return the signed informed consent form (each participant should keep a copy for themselves).

Welcome & Talk on the NETTAG+ solutions *(plenary)* | 30 minutes

Participants are welcomed, followed by a quick presentation of the objectives and the activities planned for the workshop. The three NETTAG+ solutions to prevent, avoid and mitigate the harmful impacts of fishing gear are presented. Following the presentation, participants are encouraged to pose questions and engage in a discussion on the NETTAG+ solutions.

Exercise 1: General evaluation of the NETTAG+ solutions *(plenary)* | 10 minutes

The participants are asked to provide a general evaluation of each NETTAG+ solution by placing coloured dot stickers (green, yellow, or red) in the posters displayed on the wall (Figure 19; Annex 25). Then, the participants will randomly be divided into small groups, with a maximum of six elements.

Exercise 2: Discussion of the NETTAG+ solutions *(group)* | 20 minutes

The participants are asked to discuss the applicability and effectiveness of the different NETTAG+ solutions as reliable solutions for future implementation and encouraging behavioural changes (e.g. is the solution easy to implement, is it affordable, is it user-friendly, will be well received by fishers, will it produce the expected results). Participants are also tasked to propose suggestions to overcome the identified challenges, as well as suggestions and upgrades to the NETTAG+ solutions. Key conclusions should be registered in the exercise sheets (Figure 20, Figure 21, Figure 22; Annex 26).

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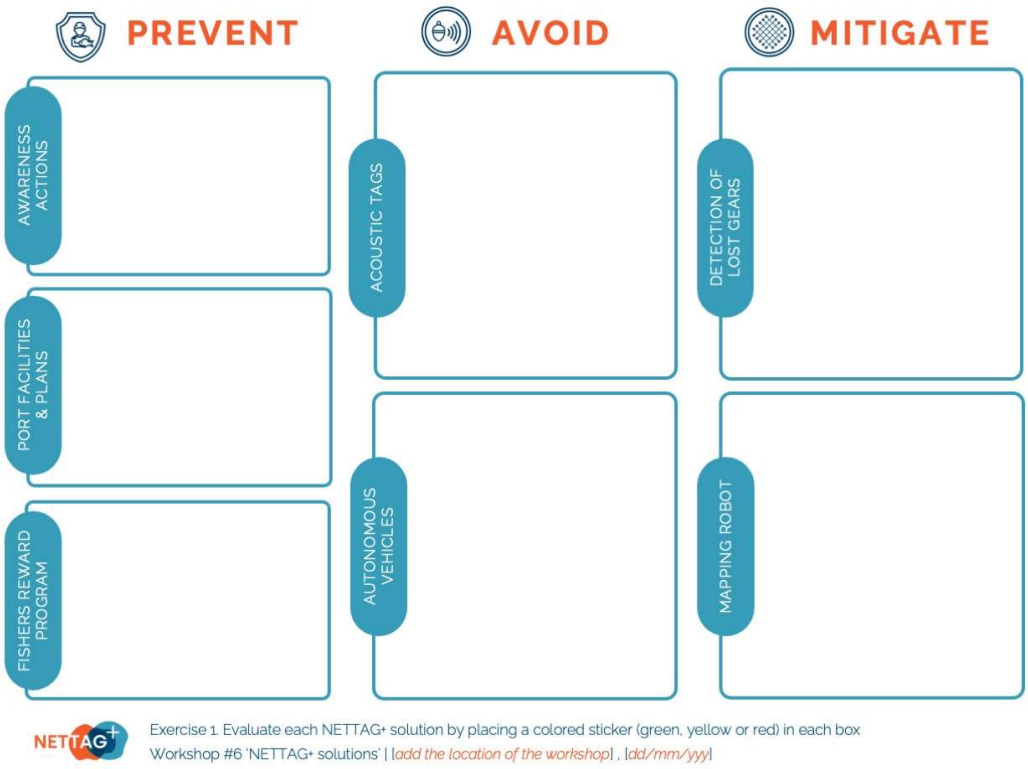

Figure 19. Example of the poster for the evaluation of the NETTAG+ solutions (workshop #6)

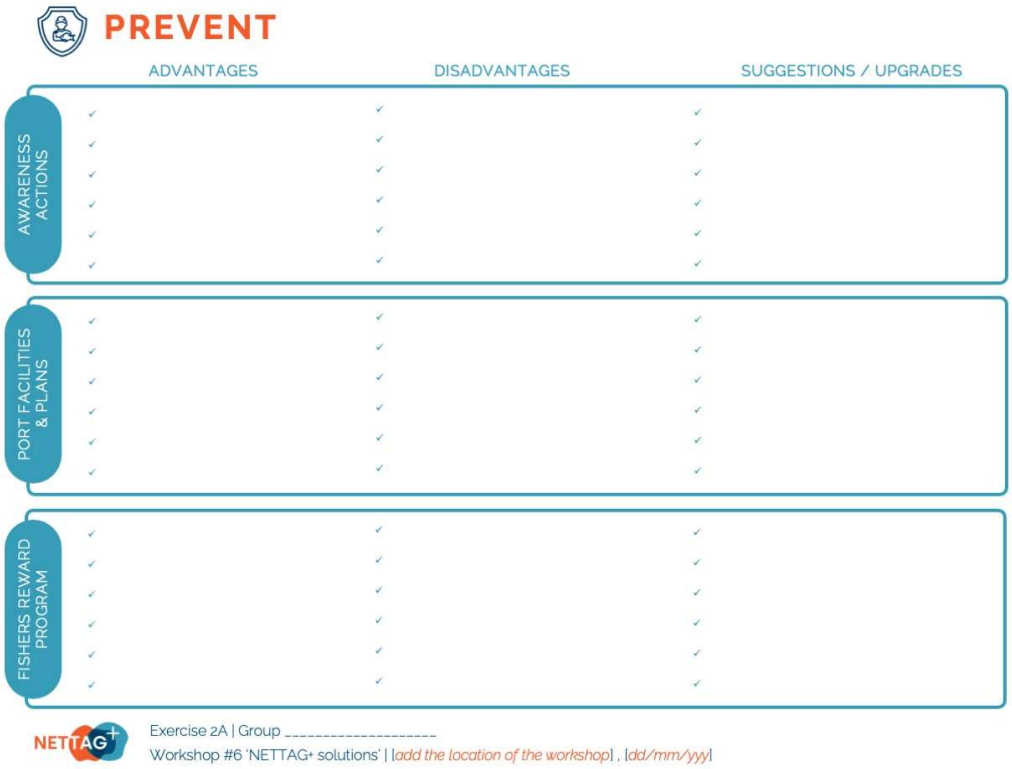

Figure 20. Example of the second exercise sheet for PREVENT solutions (workshop #6)

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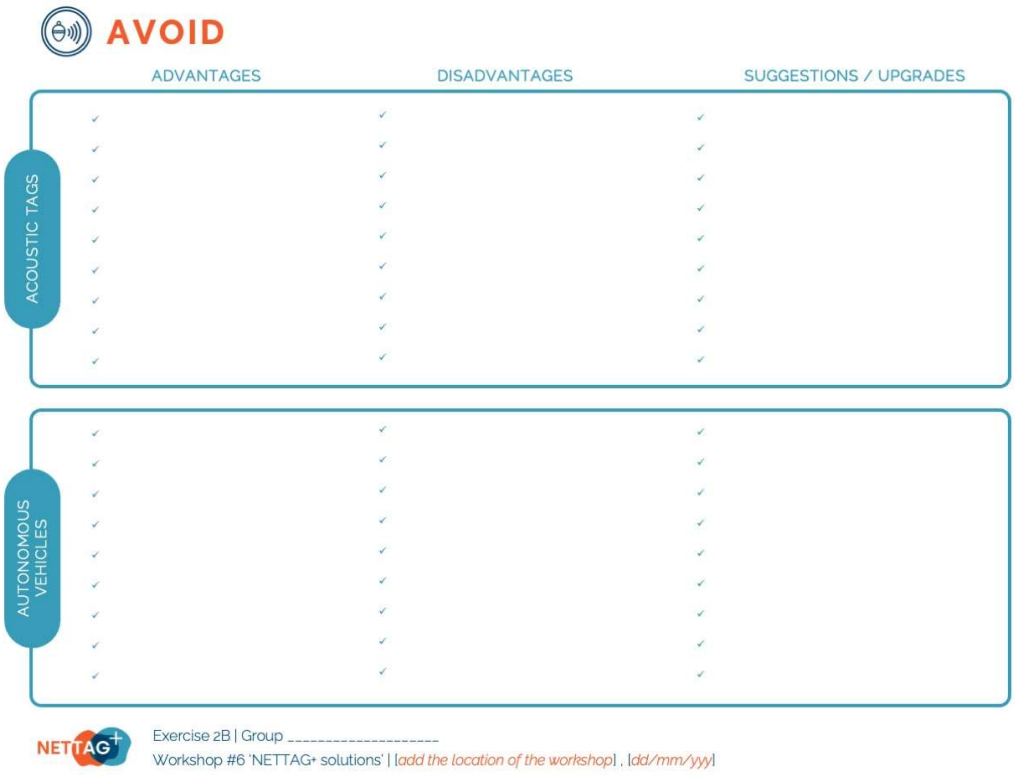

Figure 21. Example of the second exercise sheet for AVOID solutions (workshop #6)

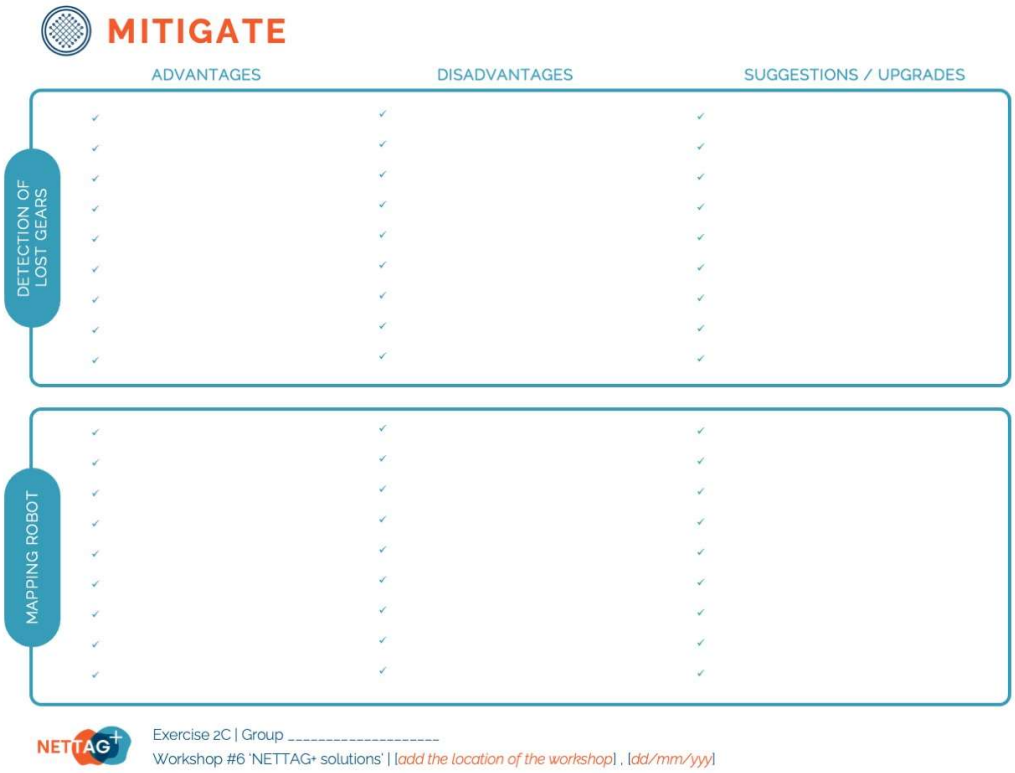

Figure 22. Example of the second exercise sheet for MITIGATE solutions (workshop #6)

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Presentation of results & discussion *(plenary)* | 20 minutes

Following the group exercise, participants convene in the plenary session to share and deliberate on the outcomes. Each group's spokesperson displays the exercise sheets and present the group's findings. A discussion among participants is encouraged and, at the end, moderators provide a summary of the suggestions put forth by all groups.

Workshop final conclusions *(plenary)* | 10 minutes

The workshop concludes with the presentation of final conclusions, encouraging participants to share additional insights or address any lingering questions. Participants are invited to complete the feedback form and to leave it at the registration table.

2.7.3 Resources and materials

A set of materials will be available to participants to fulfil the workshop exercises, namely:

- One wall poster (in A3 format) to be used in the first exercise (Annex 25),
- Three exercise sheets per group (in A3 format) numbered with the practical exercise to be completed (Annex 26),
- Colourful dot stickers (green, yellow, red),
- Post-its and pens.

To introduce the NETTAG+ solutions, the project general presentation (Annex 8) can be used and updated to incorporate developments from the work packages. All educational materials are available in the project share point and will be translated to local languages.

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3 Concluding remarks

Awareness actions are a crucial step in the comprehensive approach undertaken by NETTAG+ to address marine litter and ALDFG issues within professional fishing communities across the Atlantic and Mediterranean regions. The educational materials, designed and tailored to the specific needs and contexts of the target audience, will serve as foundational resources during the series of participatory workshops organized by NETTAG+ fishers' representatives in Portugal, Spain, Malta, Italy, and Croatia.

By engaging participants in interactive learning experiences (participatory workshops) and facilitating discussions around marine litter prevention and co-design of best practices for environmental-friendly fishing methods, the educational materials were designed to empower fishing communities with the necessary background knowledge and skills to increase responsible use behaviour. Moreover, the educational materials were produced following the approach 'from fishers to fishers' to guarantee that NETTAG+ outputs align with the needs of the fishing community and to foster ownership and increase the likelihood of influencing behavioural changes.

To ensure widespread accessibility and dissemination, all educational resources and materials generated will be made readily available on the NETTAG+ project website, serving as tools to raise awareness and for advocacy beyond the immediate scope of the project.

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Pita. P., Antelo M., Hyder K., Vingada J., Villasante S., 2020. *Frontiers in Marine Science,* 7 doi:10.3389/fmars.2020.00242

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Annex 1. Participant information sheet

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

Participant information sheet

Note: items marked in yellow need to be completed by the NETTAG+ partner using the participant information sheet in their NETTAG+ activities.

NETTAG+ is a three-year research project funded by the European Union under the Horizon Europe Program (Grant No. 101112812), 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".

Purpose of the study

Marine litter is a global problem and requires cooperation across the science-policy-society interface, combining the know-how of the different actors involved to successfully navigate towards innovative solutions. Based on synergistic activities between the fisheries industry, scientists and NGOs, NETTAG+ aims to develop three solutions to PREVENT, AVOID and MITIGATE the harmful impacts of lost fishing gear on marine life and habitats.

To PREVENT marine litter derived from fisheries activities, NETTAG+ prepared a package of six workshops targeting professional fishers from the North-East Atlantic (Portugal, Spain) and the Mediterranean (Italy, Croatia, Malta):

- Workshop #1 - Seminar on marine litter
- Workshop #2 - Marine litter produced on board
- Workshop #3 - Marine litter collected by fishing gears
- Workshop #4 - Sustainable practices: bycatch reduction and marine conservation
- Workshop #5 - Reducing fisheries footprint
- Workshop #6 - NETTAG+ solutions

The participatory workshops will be delivered by the fishers' association and representatives, beneficiaries of the project. With the development of these workshops, NETTAG+ aims to enhance the comprehension of marine litter issues within professional fishing communities and to foster a transformation in the fisheries industry's perception, shifting from being perceived as a 'polluter' to becoming a 'guardian and cleaner' of the ocean.

Photography and/or video recording will be taking place during the workshops to be used within the scope of the NETTAG+ project activities, including reporting and dissemination.

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NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

Do I have to take part?

It is up to you to decide to participate in the NETTAG+ workshops and it is completely voluntary. We have provided information on this document about the NETTAG+ project to support your decision and the technical team will be happy to answer any questions that you may have. You will then be asked to sign a consent form agreeing to take part. Nevertheless, you are free to withdraw at any time, without giving a reason and without prejudice or negative consequences.

What are the benefits of participating?

The NETTAG+ workshops will empower professional fishers (from small-scale and industrial fisheries) to build upon its role as key players in tackling marine litter and adopting environmentally friendly fishing techniques, changing the current perception of the fisheries industry as 'polluter' to 'guardian and cleaner' of the ocean.

Moreover, your knowledge and expertise will help co-creating innovative solutions to promote or implement best practices for waste management on fishing vessels and at fishing ports.

Will my participation in the study be kept confidential?

All the information we receive from you, including your name and any other identifying information (if applicable), will be strictly confidential and only accessible by NETTAG+ partners. Any information about you which is published will have your name and contact details removed so that you cannot be recognised unless you have given such permission.

As photography and/or video recording will be taking place during the workshop, your footage or images, taken in the natural course of proceedings, will be published in the context of the event.

Project coordinator

CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental
Terminal de Cruzeiros do Porto de Leixões
Av. General Norton de Matos, s/n
4450-208 Matosinhos, Portugal
https://www2.ciimar.up.pt/

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NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

Partners

The NETTAG+ consortium is composed by an international and multidisciplinary team, comprising 15 participants from 7 different countries, bringing together complementary expertise in various areas of knowledge and a robust academia-industry collaboration:

CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental (Portugal)

INEC TEC - Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência (Portugal)

USC - Universidad de Santiago de Compostela (Spain)

UNEW – Newcastle University (United Kingdom)

UA - Universidade de Aveiro (Portugal)

WWF - World Wide Fund for Nature (WWF Med, WWF Italy, WWF Adria)

ERINN - ERINN Innovation (Ireland)

ARVI - Cooperativa de Armadores de Pesca del Puerto de Vigo (Spain)

APMSHM - Associação Pró-Maior Segurança dos Homens do Mar (Portugal)

MAFA - Ministry for Agriculture, Fisheries, and Animal Rights

CoGePa - Co.Ge.Pa. di Portorosa (Italy)

SF - Succorfish (United Kingdom)

C&S - Cadilhe & Santos (Portugal)

Further information and contact details

1. For general information about the NETTAG+ project please visit https://nettagplus.eu/.

2. For specific information about the NETTAG+ project on [partner organisation's name]: contact [Responsible person name and email]

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Annex 2. Informed consent form

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

NETTAG+ Informed Consent Form

Note: Items marked in yellow need to be completed by the NETTAG+ partner using the informed consent form in their NETTAG+ activities. This template should be revised by partners in accordance with national legislation.

We are asking if you would like to take part in the NETTAG+ project. Before you consent your participation in this study, please read the participant information sheet, and in case of any question or queries, please ask to the NETTAG+ team. If you do not agree to the collection of personal data by the NETTAG+ project, unfortunately, you cannot participate in the NETTAG+ study.

The NETTAG+ consortium asks for your consent for the following:

- ✓ I am voluntarily taking part in this study (unpaid) and that I am free to withdraw at any time without giving any reason, without any consequences. To exercise these rights, please send a written request to the Sandra Ramos email: ssramos@ciimar.up.pt.
- ✓ I have read the Participation Information Sheet and fully understand what is expected of me within this study.
- ✓ I have had the opportunity to ask questions and queries, which were answered by the NETTAG+ team.
- ✓ I understand that my answers and contributions will be recorded on paper and later entered into a computer database.
- ✓ I understand that any information I give will be anonymised and may be published.
- ✓ I understand that once my data have been anonymised and incorporated into themes it might not be possible for it to be withdrawn, although every attempt will be made to extract my data, up to the point of publication.
- ✓ I consent that information from my participation will be used in reports, conferences and events.
- ✓ I consent that [NETTAG+ partner organisation's name] will keep copies of any information I give for 10 years after the study has finished.

1/2

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NETTAG+ Preventing, Avoiding and Mitigating
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and associated marine litter

- ✓ I consent to my photographed being taken in the context of the NETTAG+ project and images where I appear to be used within the scope of the NETTAG+ project activities.
- ✓ I consent to my being filmed in the context of the NETTAG+ project and images where I appear to be used within the scope of the NETTAG+ project activities.

Participant Full Name: _____

Participant email: _____

Date: ___/___/_____, in _____ *(Please indicate the place where the form is signed)*

_____

(Signature according with identification document)

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Annex 3. Template of the participants list

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

[Name of the awareness action]

Place

Date | Time

List of participants

Name	Role/Type Fisheries	Signature

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Annex 4. Template of the workshop feedback form

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

Feedback Form

We ask you to take a moment to provide your feedback on the workshop. Your responses will be used to improve future NETTAG+ workshops.

Name (optional): _____

On a scale of 1 to 4 where 1 is strongly disagree and 4 is strongly agree, please circle the most appropriate answer:

1. The Workshop venue was:

a) Comfortable	1 2 3 4
b) Well located	1 2 3 4
c) Food and refreshments were adequate	1 2 3 4

2. The Workshop content was:

a) Relevant	1 2 3 4
b) Comprehensive	1 2 3 4
c) Easy to understand	1 2 3 4

3. The Workshop was:

a) Well paced	1 2 3 4
b) Breaks were sufficient	1 2 3 4
c) A good mix between listening and activities	1 2 3 4

4. The facilitators were:

a) Knowledgeable	1 2 3 4
b) Well-prepared	1 2 3 4
c) Responsive to participant's questions	1 2 3 4

5. What did you like best about this Workshop?

6. What did you like least about this Workshop?

Thank you for participating, we appreciate your feedback.

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Annex 5. Structure of the synthesis report

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

Synthesis report of the participatory Workshop #_ [fill with the workshop number and name]

Date | Place

Introduction

Every year, tons of fishing gear are discarded to the ocean globally, inflicting severe threats to marine habitats and wildlife while causing economic damage to the fishing sector. Addressing marine pollution on a global scale requires cooperation across the science-policy-society interface, combining the know-how of the different actors involved.

NETTAG+ collaborates with the fisheries industry, scientists, and NGOs to develop solutions that PREVENT, AVOID, and MITIGATE the harmful impacts of lost fishing gears on marine life and habitats.

To PREVENT marine litter derived from fisheries activities, NETTAG+ prepared a package of six workshops targeting professional fishers from the North-East Atlantic (Portugal, Spain) and the Mediterranean (Italy, Croatia, Malta):

- Workshop #1 - Seminar on marine litter
- Workshop #2 - Marine litter produced on board
- Workshop #3 - Marine litter collected by fishing gears
- Workshop #4 - Sustainable practices: bycatch reduction and marine conservation
- Workshop #5 - Reducing fisheries footprint
- Workshop #6 - NETTAG+ solutions

With the development of participatory workshops, NETTAG+ aims to enhance the comprehension of marine litter issues within professional fishing communities and to foster a transformation in the fisheries industry's perception, shifting from being perceived as a 'polluter' to becoming a 'guardian and cleaner' of the ocean.

This report summarises the results from the NETTAG+ participatory workshop performed in … [provide the name of the workshop and the region where the actions took place].

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and associated marine litter

Workshop objectives and structure

[Indicate the purpose of the workshop, its objectives and general structure]

…

Workshops results

[Indicate the target audience (brief description of the participants preserving their anonymity, e.g., number of participants, type of fishing activity, no. of groups, no of participants per group, etc.). Then, describe the results obtained in each exercise e major conclusions form the discussion. Include photos from the event (group tables, plenary session, materials/exercise sheets).]

…

Workshop evaluation results

[Summarize the main results from the participants evaluation of the workshop]

…

Final considerations

…

Acknowledgements

[If applicable]

…

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Annex 6. NETTAG+ flyer

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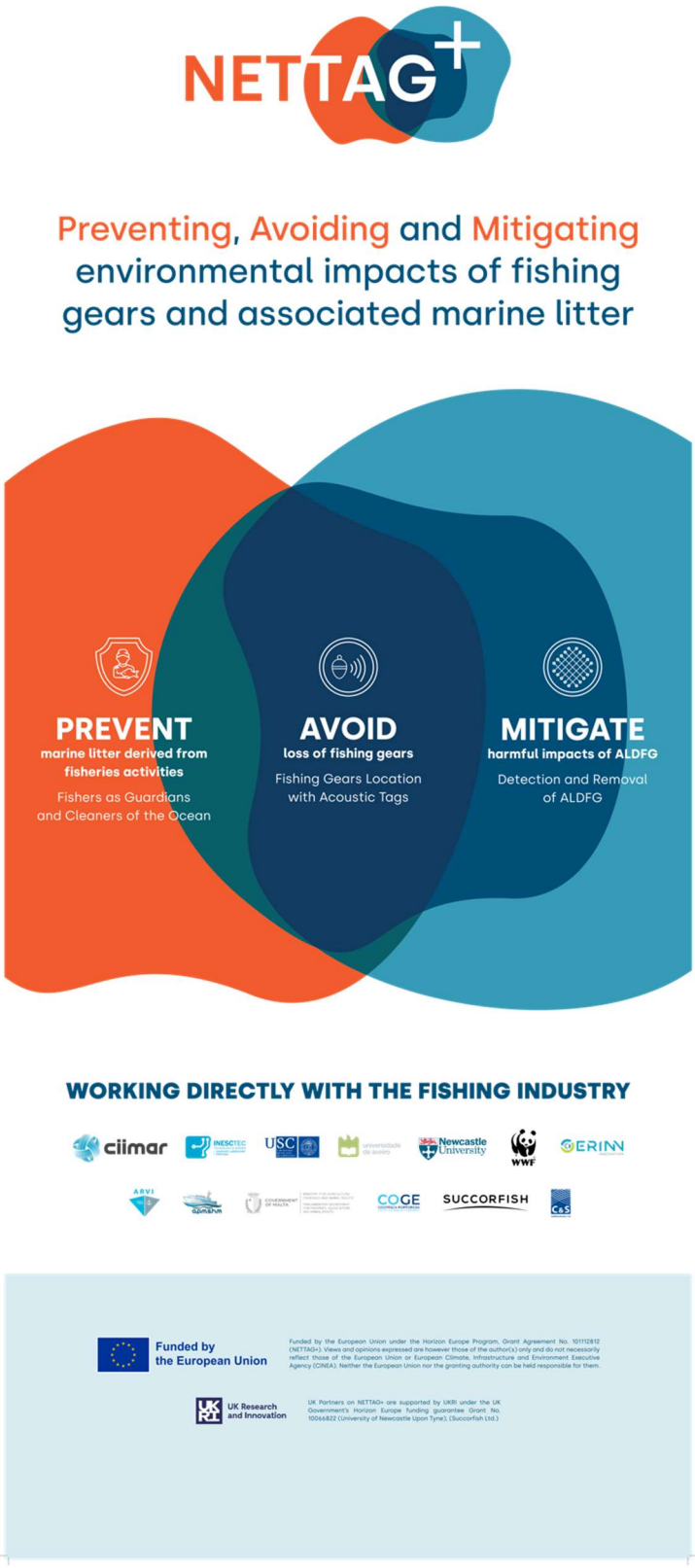
Annex 7. NETTAG+ roll-up banner



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Annex 8. Proposed agenda for Workshop #1

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

1st WORKSHOP

Seminar on marine litter

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:15	Welcome and presentation of the NETTAG+ project
14:15 - 15:15	Seminar on Marine Litter
15:15 - 15:30	Discussion
15:30 - 15:50	Coffee Break

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Annex 9. NETTAG+ general presentation

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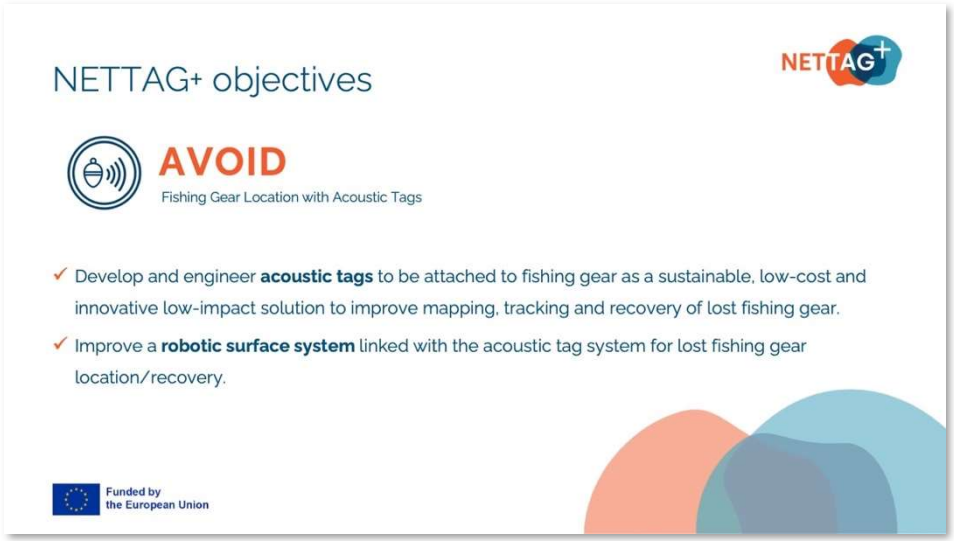

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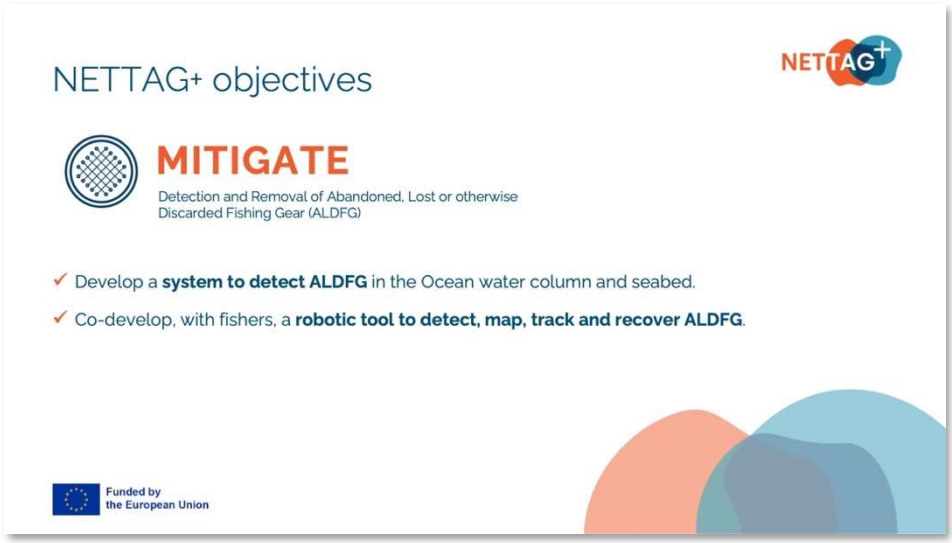

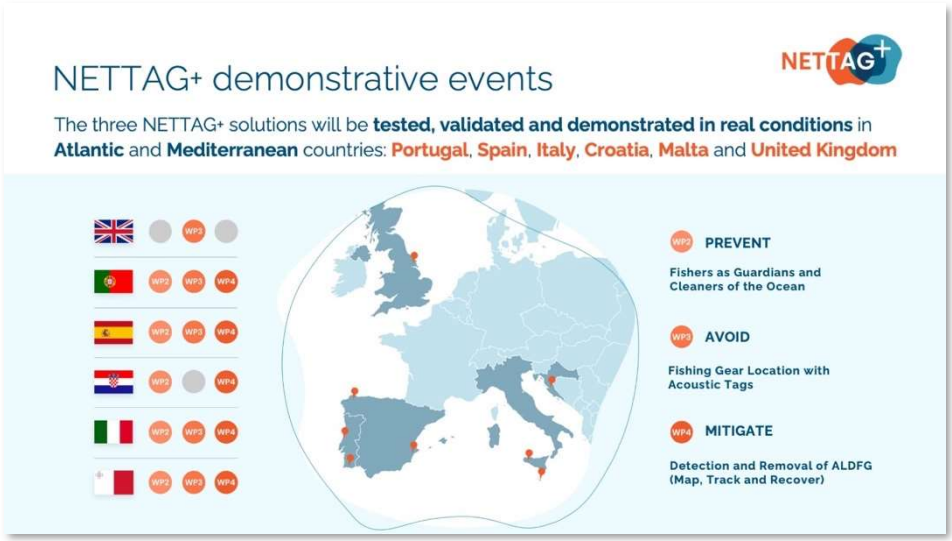

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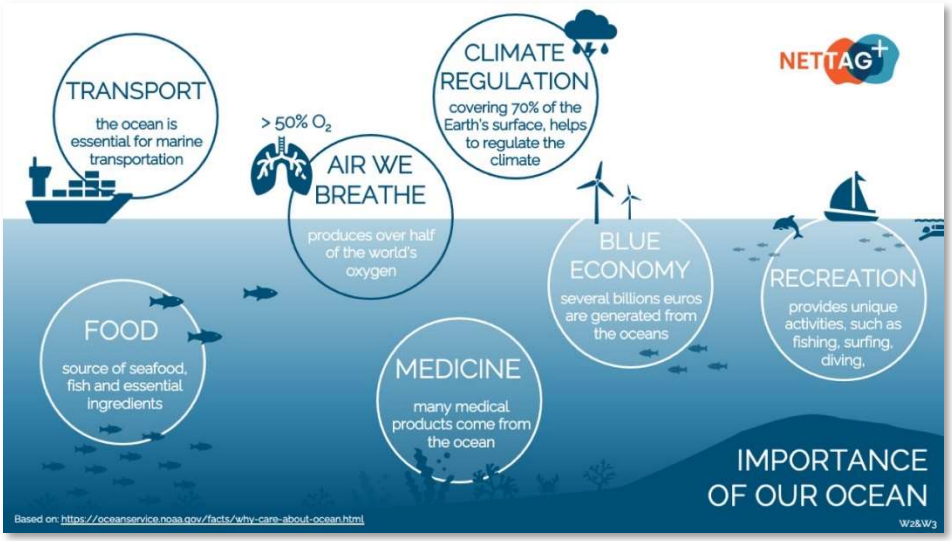
Annex 10. Seminar on marine litter presentation



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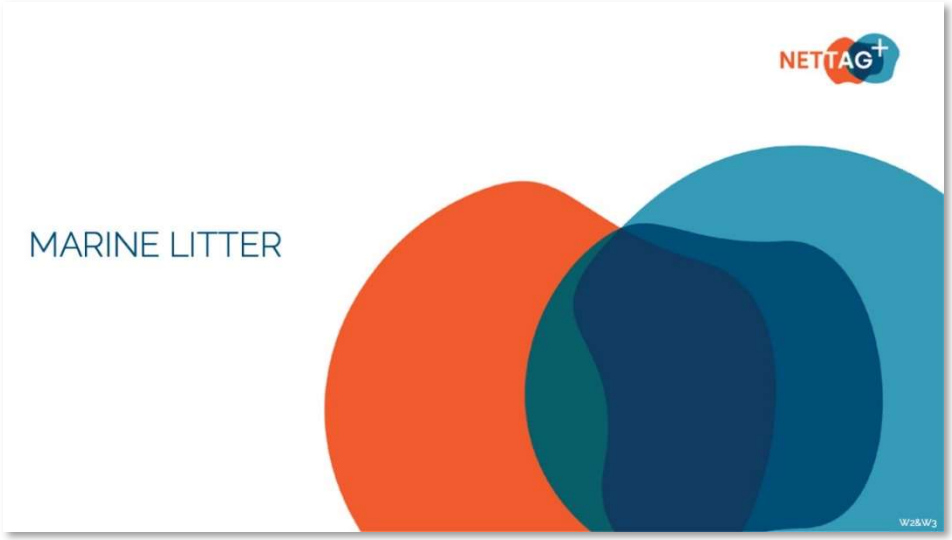

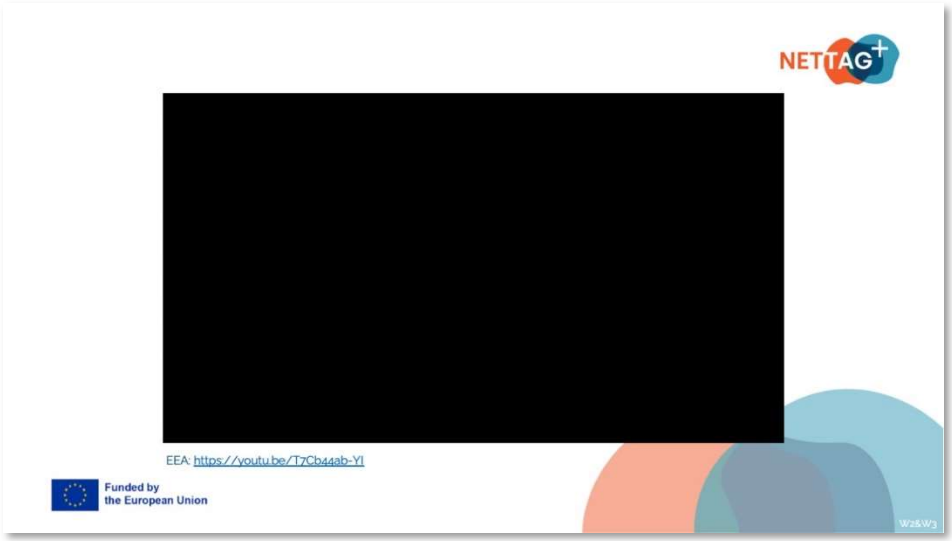

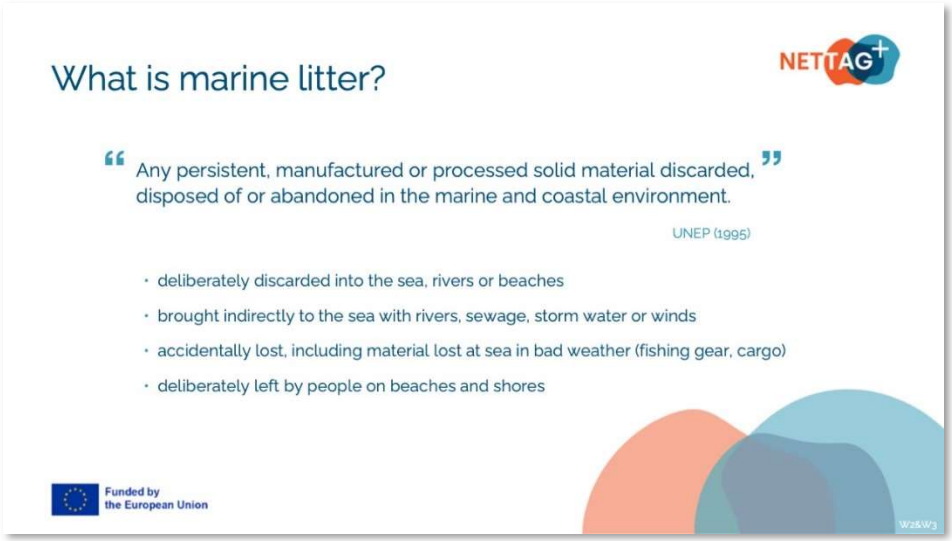

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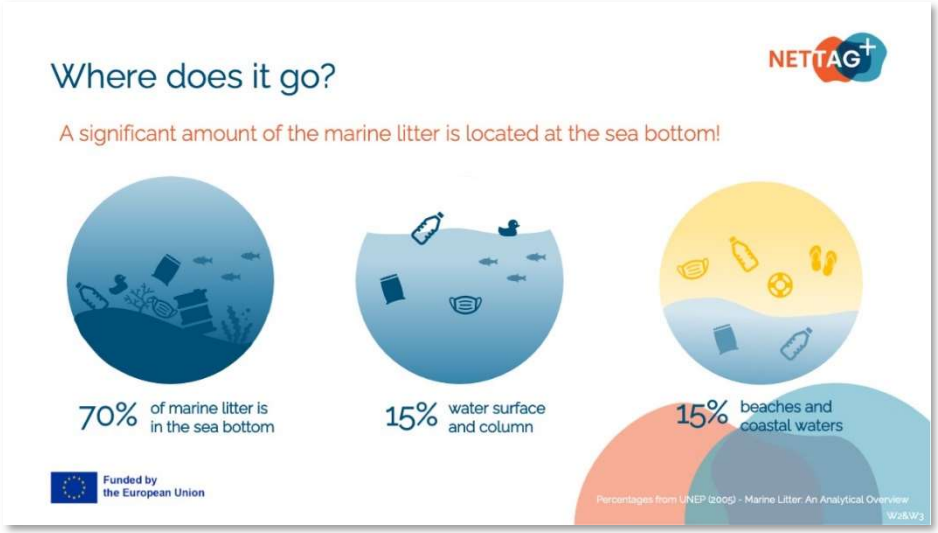

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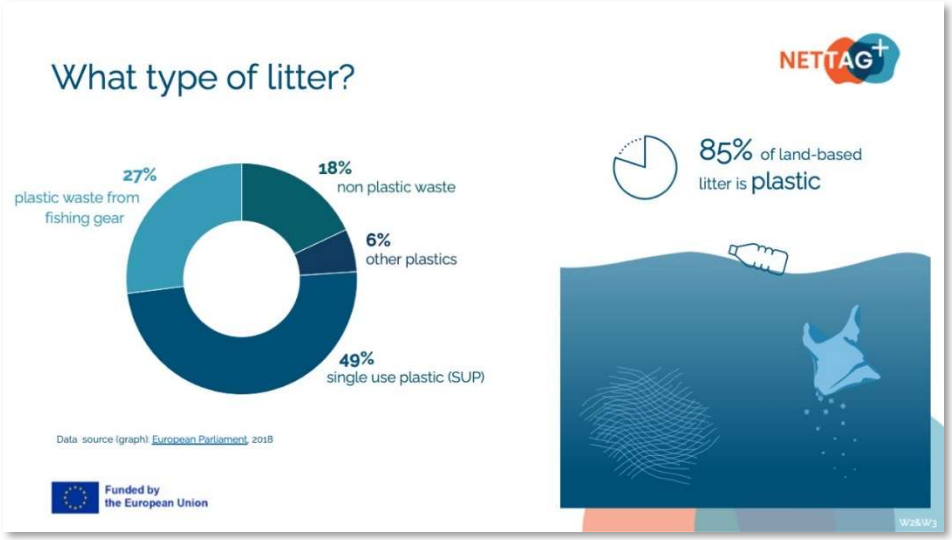

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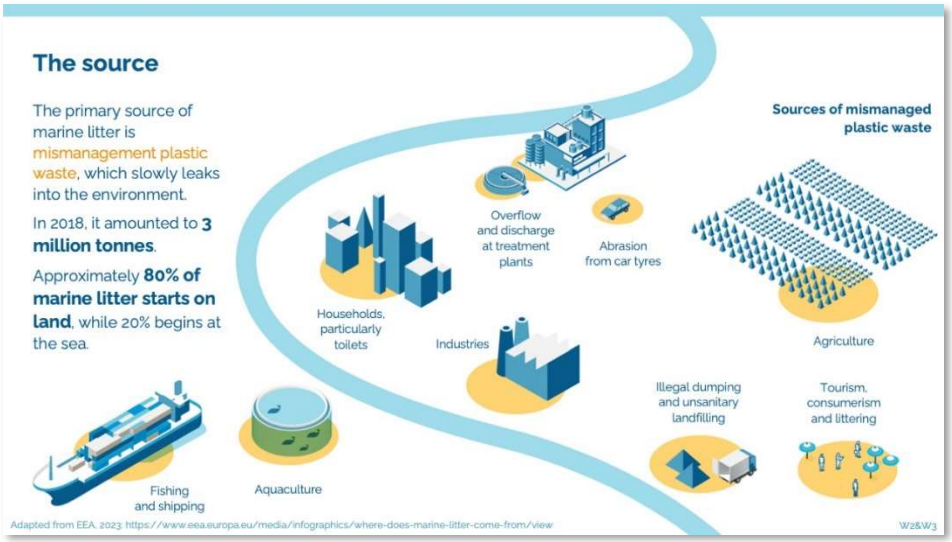

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How plastics spread to the environment?

Adapted from: https://www.eea.europa.eu/media/infographics/sources-and-pathways-of-plastics/view

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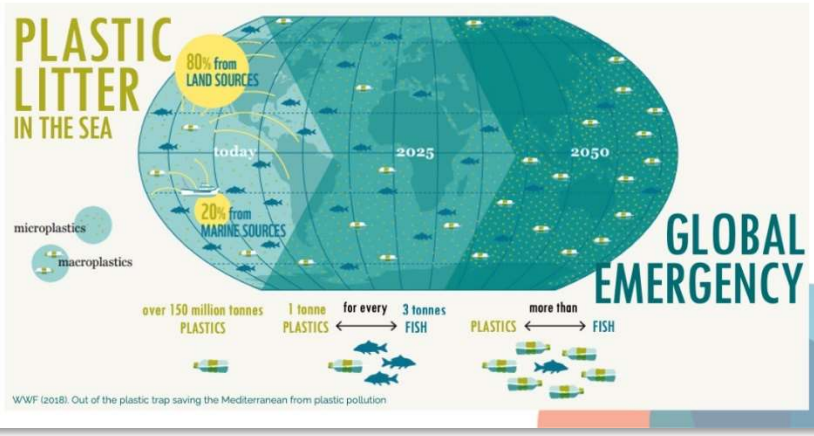
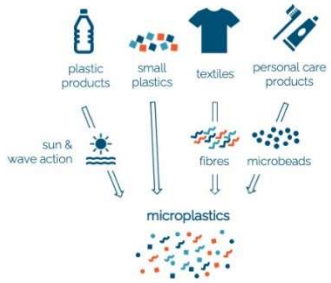
Plastic litter in the sea



WWF (2018). Out of the plastic trap saving the Mediterranean from plastic pollution

Microplastics

What are microplastics and where do they come from?



- Microplastics are tiny pieces of plastic material typically **smaller than 5 mm**
- Originate from degradation of larger plastic objects, such as plastic bags, bottles or fishing nets
- Directly released in the environment as small particles

European Parliament 2018. Microplastics: sources, effects and solutions, accessed Nov. 2023

Based on https://mp-litrcweb.org/environmental-distribution-fate-and-transport/#gsc.tab=0

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Plastics and microplastics

Some numbers in the marine environment

- Plastic waste enters the ocean at a rate of **11 million metric tons per year**
  (The Pew Charitable Trusts and SYSTEMIQ, 2020)
- Over **200.000 tonnes** of plastic waste enters the Mediterranean Sea every year - a number that is expected to double if significant measures are not taken
  (IUCN, 2020)
- Recent research estimates that at least **14.4 million tonnes of microplastics** have found its way to the bottom of the world's oceans
  (Barrett *et al.*, 2020)

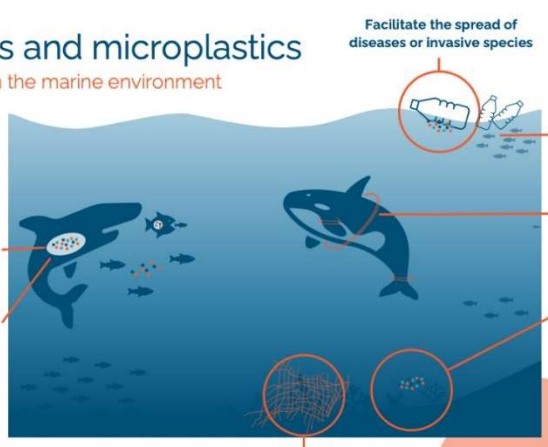
Funded by the European Union

EEA, 2021. Plastics, the circular economy and Europe's environment — A priority for action, accessed Nov. 2023

W2&W3

Plastics and microplastics

Impacts on the marine environment



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Based on UNEP 2021. Drowning in plastics

W2&W3

FISHERIES CONTRIBUTION TO MARINE LITTER

W2&W3

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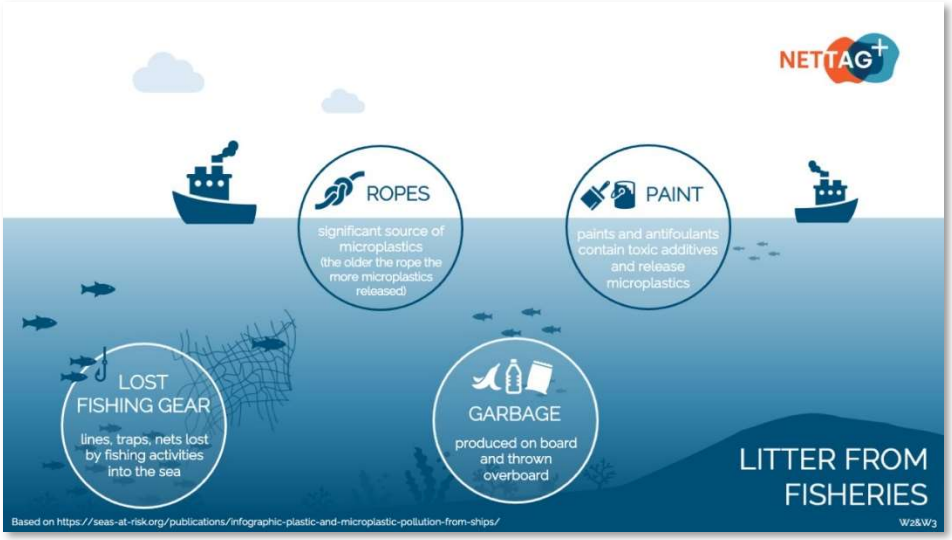

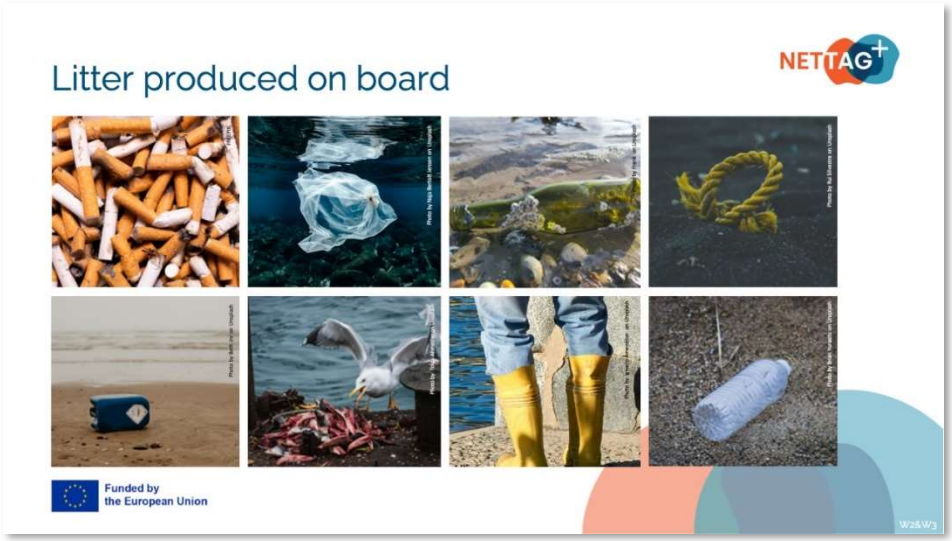

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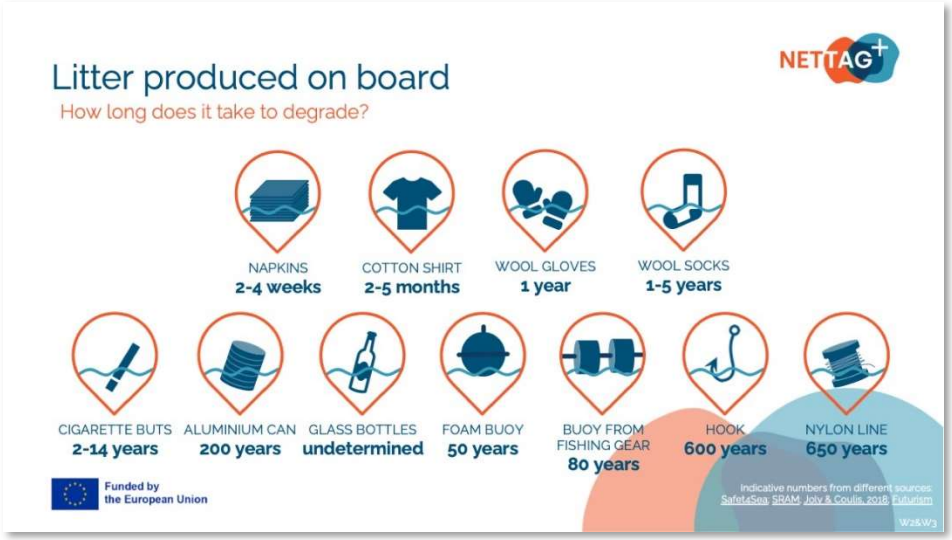

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Marine litter caught in fishing nets

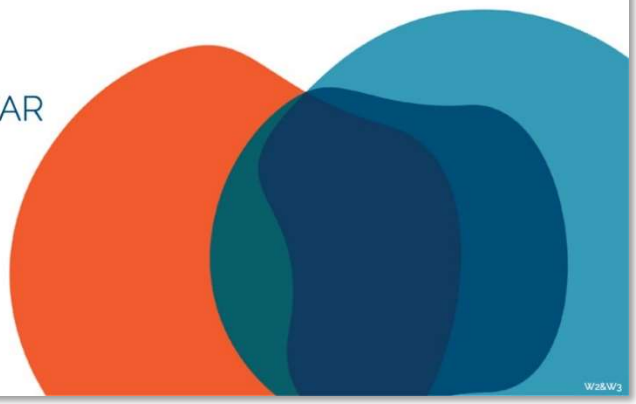
Economic impacts on the fishing sector

- Floating plastic debris can **affect the engine** cooling systems and become entangled in propellers
  (Takehama, 1990; McIlgorm et al., 2011)
- Litter caught in fishing gears can be responsible for **damaging fishing gears**, **contaminating catch**, and even **damaging fishing vessels**
  (Thomson *et al.*, 2004; Andrady, 2011)
- The total economic cost of this impact has been estimated to be nearly **€61.7** million in the European Union alone
  (Mouat *et al.*, 2010; Acoleyen, 2014)
- The costs of removing litter from fishing nets, damage to catches, repairing gear, entangled propellers and obstructed cooling systems account between 1% and 5% of fishers' revenue
  (FAO, 2018)

Funded by the European Union

W2&W3

LOST FISHING GEAR



W2&W3

Lost fishing gear

Abandoned, lost, or otherwise discarded fishing gear (ALDFG)

- ALDFG represent about **10%** of the plastic waste volume present in the oceans
  (IUCN, 2021)
- That means somewhere between **500,000** and **1 million tonnes** of fishing gear gets left in the ocean every year
  (WWF, 2020)
- Fisheries-related debris is the **largest single category** by volume found in beach litter
  (UNEP, 2021)
- ALDFG can continue fishing for years ("ghost fishing") with high impacts on marine ecosystems and consequently on fish stocks. Ghost gear is the **most deadly** form of marine plastic debris
  (WWF, 2020)
- EU estimates that about **20%** of the fishing gear used in Europe is dispersed in the Mediterranean Sea, approximately **11,000 tons**
  (INTEMARES, 2023)

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WWF, 2020. Stop Ghost gear. The most deadly form of marine plastic debris

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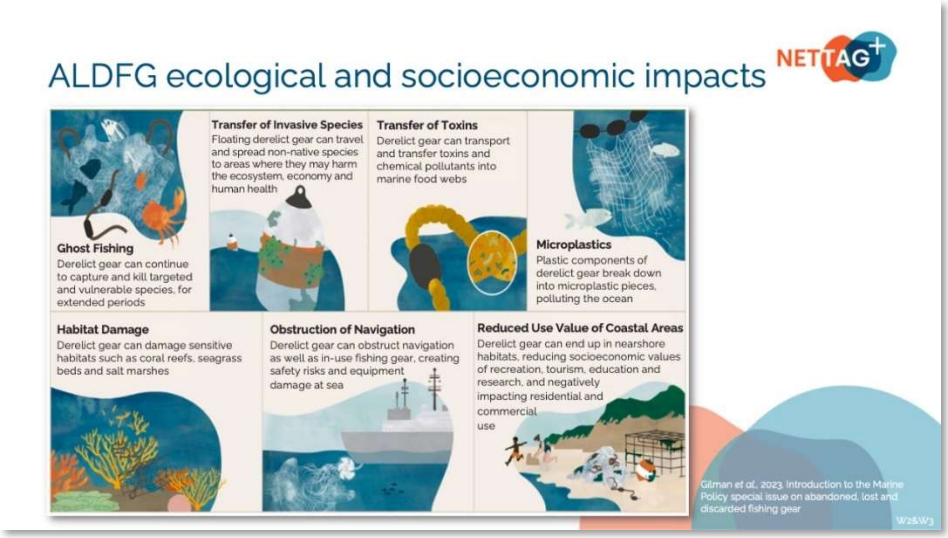

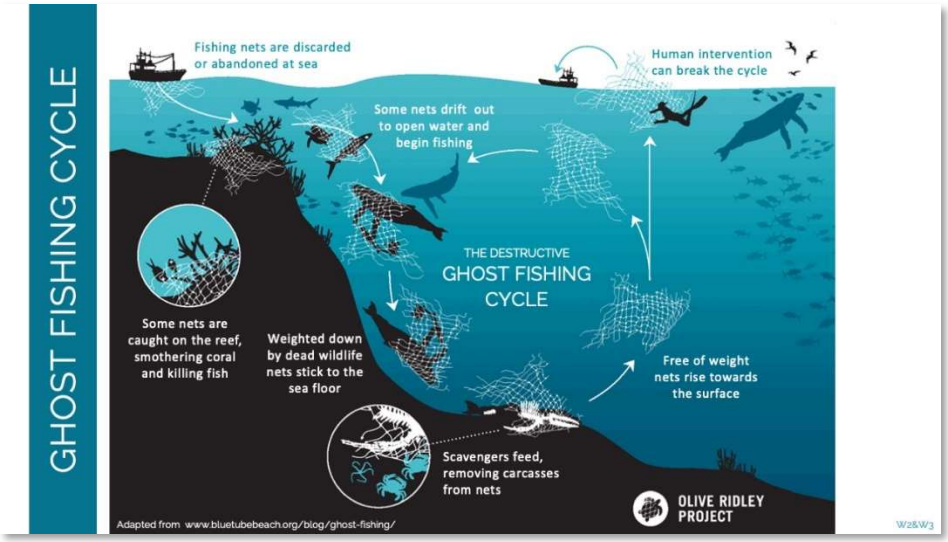

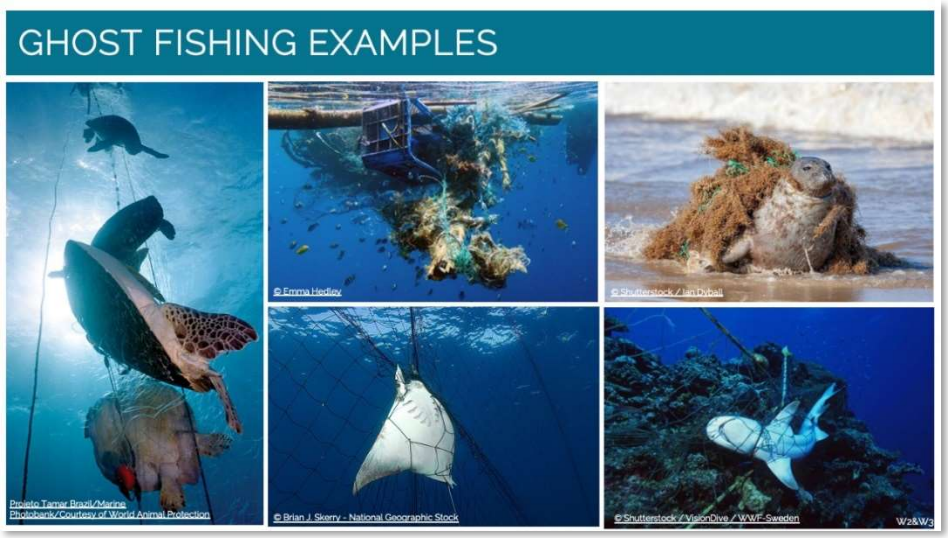

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Causes of lost fishing gear

Direct causes

- Poor weather conditions
- Gear entangled on bottom (rocks)
- Conflict with fishing gear
- Shipwrecks and other artificial wrecks
- Vessel conflict with gear

Indirect causes

- Lack of disposal facilities
- Inaccessibility to disposal facilities
- Differentiated disposal facilities (oils, recycling)
- Expenses of disposal facilities

Adapted from World Animal Protection (accessed Nov. 2023) and UNEP, 2021

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Lost fishing gear

NetTag project results (2019)

- **Fishing gear more frequently lost:** traps and small pieces of nets
- **Reasons for losing gear:** type of bottom, shipwrecks, adverse weather conditions, bad handling of the gear or interactions with other fishing gear
- **Hotspots for ALDFG:** fishing areas characterised by irregular bottoms (such as rocky bottoms, reefs, wrecks) or high hydrodynamic areas, up to 5-6 NM from the coast
- **Costs of retrieving lost gear:** a trawler vessel can spend between 5000€ to 12000€
- **Financial incentives to recycle fishing gear:** different national/local programs (not well-known by all fishers)

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ALDFG reporting and retrieval

Why is important?

- When gear is lost it can often be retrieved if its location is known
- Understanding the extent, locations and causes of gear loss is key to developing effective prevention and mitigation strategies
- The **retrieval of lost gear is the only way to eliminate its negative impacts** (related to navigational safety, habitat or wildlife damage)
- For certain fishing gear like gillnets, prompt retrieval is most effective (delayed retrieval may lead to a loss of structural integrity, reduced fishing capacity, and is less effective in mitigating negative impacts)
- In case of traps and pots, delayed retrievals (conducted days or weeks after loss) can still effectively mitigate significant negative impacts on species

Drinkwin 2022. Reporting and retrieval of lost fishing gear: recommendations for developing effective programmes

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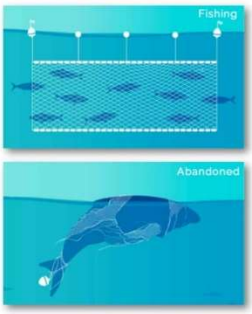
ALDFG | Gillnets

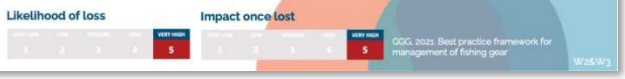
GILLNETS



WWF 2020. Ghost Gear Report

Funded by the European Union

- Gillnets are passive fishing gear, work as a "wall" resting in the water, catching fish that get gilled or entangled
- Highly susceptible to getting lost, often neglected due to its affordability and ease of replacement
- Continues catching fish after being lost, impacting the seabed even as it loses buoyancy
- Recommendations: Implement gear marking, explore alternative materials, and incentivise recovery efforts to minimise its environmental impact

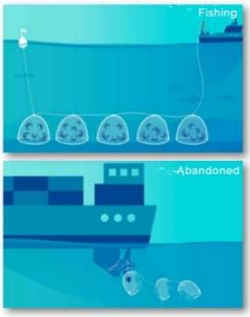


GGG, 2021. Best practice framework for management of fishing gear

W2&W3

ALDFG | Pots & Traps

POTS & TRAPS



WWF 2020. Ghost Gear Report

Funded by the European Union

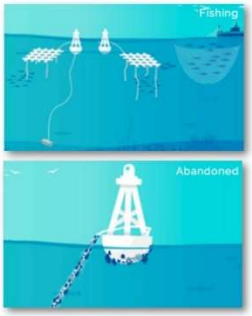
- When lost, pots and traps continue attracting animals due to the lingering bait, creating a feedback loop with scavengers preying on trapped animals
- As this fishing gear is usually tied with a buoy, entanglements can still happen after traps/pots are destroyed
- Some countries enforce guidelines or regulations, making it mandatory to implement tracking mechanisms (gear marking or GPS) of devices

GGG, 2021. Best practice framework for management of fishing gear

W2&W3

ALDFG | Fish Aggregation Devices

FADs



WWF 2020. Ghost Gear Report

Funded by the European Union

- Often constructed with netting from old purse seines, posing entanglement risks for fish and other animals around the FADs as well as predators that are attracted to the aggregations of prey species
- While many drifting FADs are tracked using satellite buoys, it is common practice to cease tracking drifting FADs, rather than recovering them, when they drift out of fishing areas
- When lost: continued entanglement of vulnerable species in FAD netting and rafts; and harmful impacts to marine and nearshore habitats of beached FADs

GGG, 2021. Best practice framework for management of fishing gear

W2&W3

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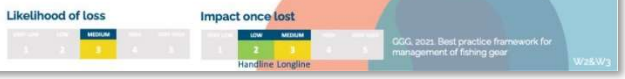
ALDFG | Hooks & Lines

HOOKS & LINES

WWF 2020. Ghost Gear Report

Funded by the European Union

- Often discarded when damaged, as they can be quite cheap
- Longlines can span lengthy distances, but their impact when lost is less than other fishing gear, especially if deployed away from the surface
- However, baited hooks continue to catch fish, creating a feedback loop with larger predators preying on baited fish
- Mainline ropes attached to hooks are made from plastic-derived materials, posing entanglement risks to birds if close to the surface
- Curled turtle-safe hooks help mitigate sea turtle entrapment, reducing this specific impact



ALDFG | Trawl nets

TRAWL NETS

WWF 2020. Ghost Gear Report

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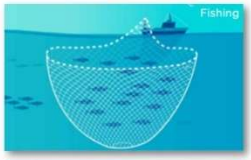
- Expensive and fishers try to avoid losing them
- Often equipped with marking devices for tracking if lost, but entire net loss, necessary for tracking, is rare
- Near seabed trawling, especially in rocky areas, can lead to partial net loss, sinking and moving on the seabed
- Crumpled trawl netting on the seabed has limited chances of catching more fish but may entangle other species like crabs and affect the seabed through smothering
- Surface trawls, usually of polypropylene, can float if torn without weights or catch, having negative impacts similar to FADs

ALDFG | Purse seine nets

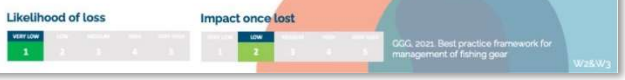
PURSE SEINE NETS



WWF 2020. Ghost Gear Report

Funded by the European Union

- Segments of nets might unintentionally be lost if left on the working deck -> Dedicated containers for repair sections mitigate this risk
- Large segments of purse seine nets can cause similar harm on the sea surface as FADs and floating trawl segments
- Loss of entire nets is rare and intensive recovery efforts are made for lost nets due to their high economic value and replacement cost
- Lost weighted fishing nets likely sink to the seabed, posing entanglement risks for other animals if mesh size is small
- At the seabed, these nets may impact biodiversity or be moved around by bottom currents once the contained catch is degraded



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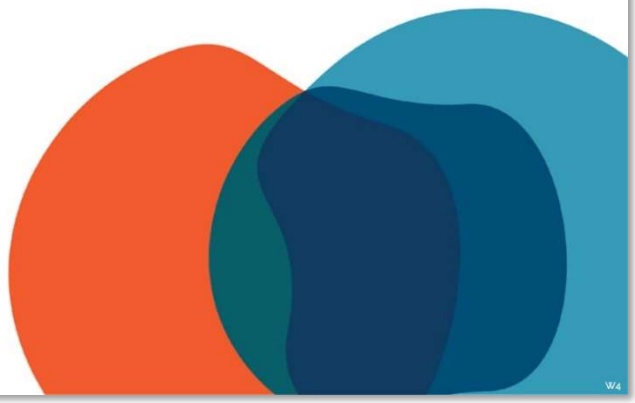
BYCATCH



W4

Bycatch

- Bycatch encompasses **unintentional captures** during fishing operations, extending beyond target species
- **Trawl, longline, and gillnet** have the highest bycatch rates
- **Major threat to marine vulnerable species**: sea turtles, seabirds, elasmobranchs, marine mammals, corals, and sponges
- Also impact fisheries' profitability and sustainability

Funded by the European Union

MedBycatch, 2022. Understanding and addressing bycatch: key steps for sustainable fisheries

W4

Seabirds

- Seabirds are at risk of entanglement in various fishing gears, including longlines, trawls, and nets
- An estimated 200,000 seabirds suffer accidental fatalities annually in Europe due to interactions with fishing gear
- Seabirds, attracted to bait used by anglers, often fall victim to hooks and entanglement in fishing lines
- Diverse feeding habits, including surface and deep diving, increase the vulnerability of seabirds to fishing gear interactions

BirdLife International; NOAA

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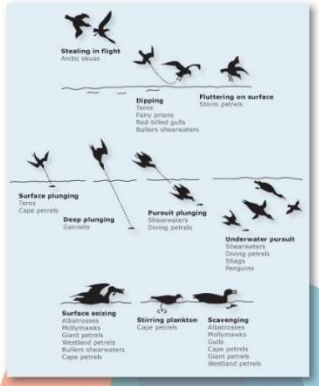

Seabird feeding methods (https://teara.govt.nz/en/interactive/5480/seabird-feeding-methods)

W4

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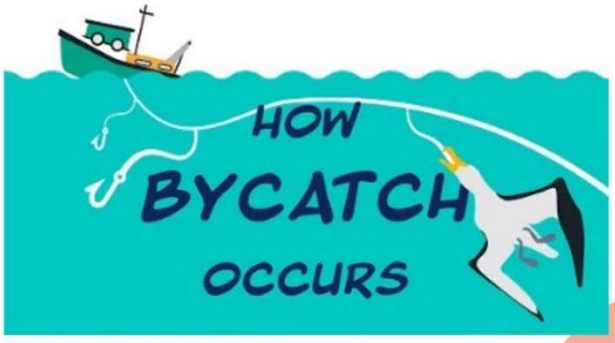
How bycatch occurs



BirdLife International: https://youtu.be/o_a30XbfsXo

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Making fisheries safe for seabirds

BirdLife International: https://youtu.be/YGK_1xAZiWQ

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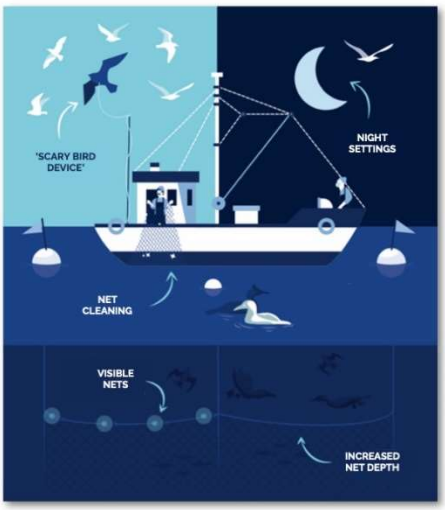

Gillnet bycatch minimisation measures:

- **'Scary bird device':** Simulates a predator (eagle or falcon) driving birds away from the area of the fishing operation
- **Night settings:** When seabird activity is reduced
- Proper net cleaning and disposal of discards outside of fishing periods: Minimise attraction to birds
- Increased net visibility: Add high-visibility mesh to the top of the net or LED lights
- Increased net depth

Adapted from SPEA, 2021 MedAves Pesca Project

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Longline bycatch minimisation measures:

- **'Scary bird device':** Simulates a predator (eagle or falcon) presence to deter birds
- **'Bird scaring lines' or tori lines:** Colourful streamers, to deter birds from the stern of the vessel
- Setting of nets/lines at night: To avoid peak seabird feeding times
- Weighted Lines: To increase baited hooks' sink rate, reducing bird snag risk

Trawl bycatch minimisation measures:

- **Tori lines**
- Night settings

Adapted from SPEA, 2021 MedAves Pesca Project

W4

Making fisheries safe for seabirds

- Examples of bird-scaring lines or tori lines

Video: https://vimeo.com/709031744

Video: https://youtu.be/szNQpQzETK4?feature=shared

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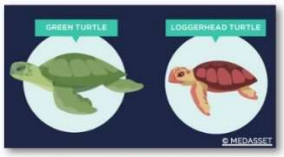
W4

Sea turtles

- Sea turtles have survived for more than 200 million years
- There are 7 recognised species in the world
- In Europe, turtles are primarily found in the Mediterranean Sea
- Turtles are **migratory** species; they take **20-30 years to mature** and can **live longer than 100 years**
- Turtles have an important role in the ecosystems maintenance and reflect marine environmental health
- 6 out of the 7 are listed as vulnerable, endangered, or critically endangered on the IUCN Red List



-> Nesting populations in the Mediterranean

-> Largest species of turtle
-> Occasional visitor of the Mediterranean and NE Atlantic

Source: WISE MARINE; MEDASSET; WWF 2022

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W4

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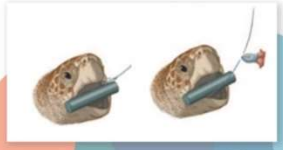
Sea turtles

- Bycatch poses a significant threat to all species of marine turtles globally, leading to hundreds of thousands of deaths annually
- Turtles are **air-breathers** and can drown if submerged for long, as it can happen when captured by trawl or set nets
- Turtles incidentally captured by longlines are usually released alive, but many will die, mainly for the ingested line
- Simple **onboard best practices** that can reduce the high mortality of captured turtles:
  - Keep any turtle apparently dead or very weak on the deck until they become active again
  - Cut the line very close to the mouth



FAO, 2018

Source: EuroTurtles; WWF 2022

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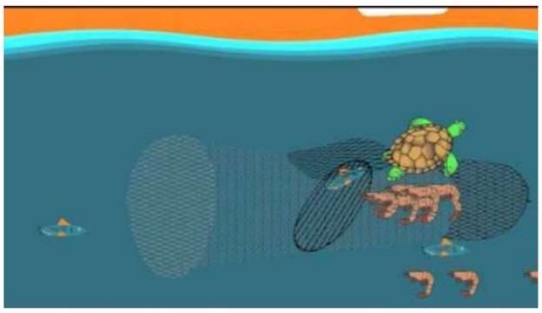
Making fisheries safe for sea turtles



Video: https://youtu.be/jvhumLE7B40

Turtle Excluder Device (TED)

- a grid which diverts marine turtles and other large marine fauna out of a trawl net, already used in tropical shrimp trawls

Source: WWF 2022

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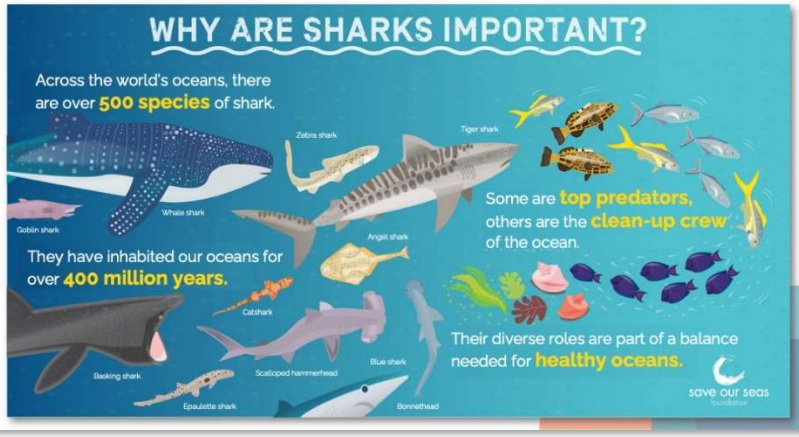
W4

Sharks

Adapted from: Artwork by Jamy Silver © Save Our Seas Foundation



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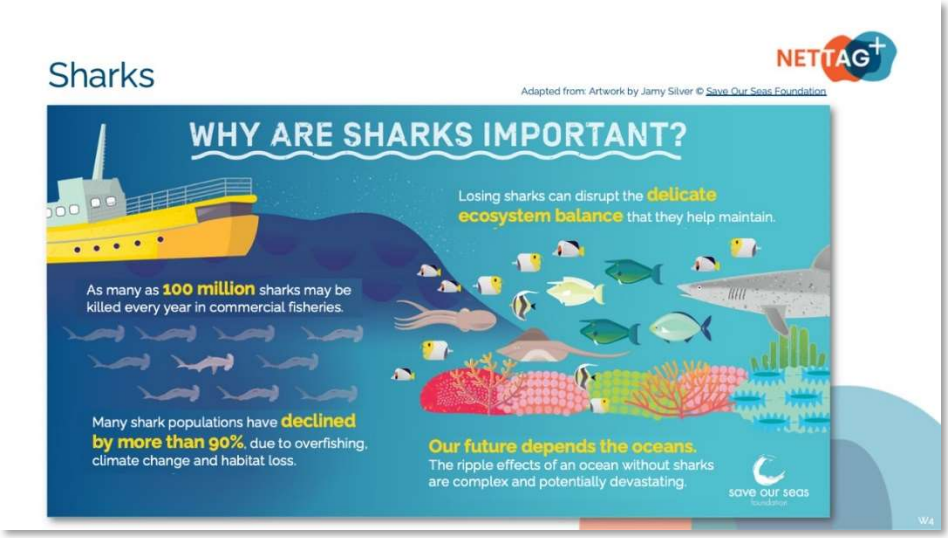

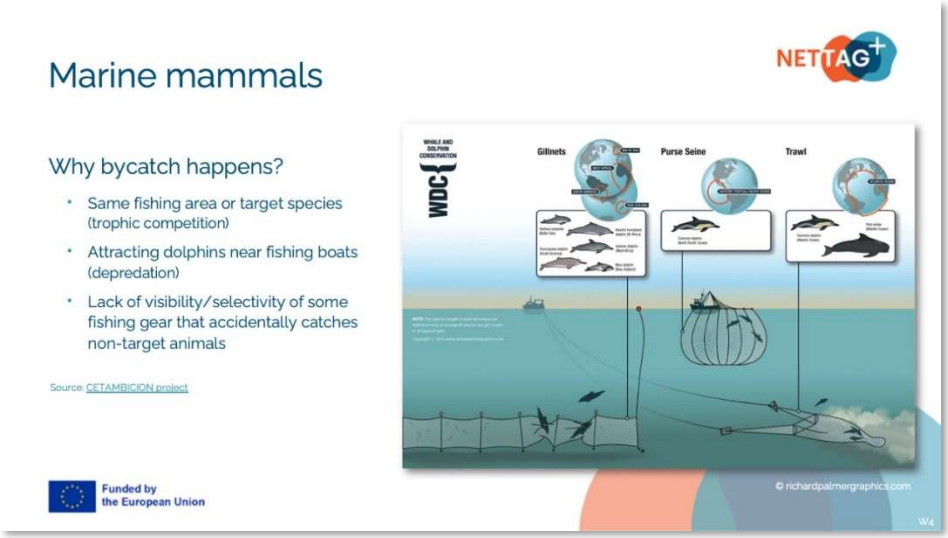

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Marine mammals bycatch mitigation

- Improving the visibility of fishing gear
  - ✓ Active or passive acoustic deterrents
  - ✓ Acoustic reflectors
  - ✓ Informative warning signal (DOLPHINFREE project)
  - ✓ Change of net colour
  - ✓ Lighting of nets
- Modification of fishing gear
  - ✓ Modification of the nets
  - ✓ Trawl exclusion system
  - ✓ "Intelligent" fishing gear
- Changes in fishing practices
  - ✓ Alternative fishing gear
  - ✓ Duration and period of immersion of the fishing gear
  - ✓ Depth of the net (2-4m below surface)
  - ✓ Adoption of good practice
- Fishing effort limitation and management
  - ✓ Time and space closure
  - ✓ Area closure based on reaching a catch limit
  - ✓ "Move-on" rule
  - ✓ Predictive fisheries management
- Regulatory and incentive measures
  - ✓ Regulation, Monitoring and surveillance
  - ✓ Economic levers

Source: CETAMBICION project

Funded by the European Union

W4

Acoustic Deterrent Devices - 'pingers'

Pingers emit a warning sound © Fishtek

Excluder Device

Source: https://teara.govt.nz/en/diagram/8377/reducing-by-catch

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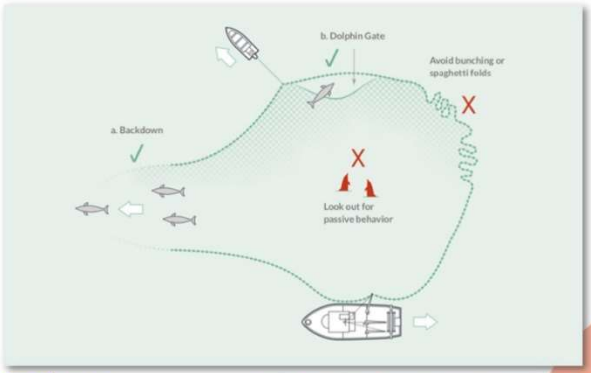
W4

Backdown procedure



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Source: UNEP/CMS & WWF. 2020. Guidelines for the safe and humane handling and release of bycaught small cetaceans from fishing gear.

W4

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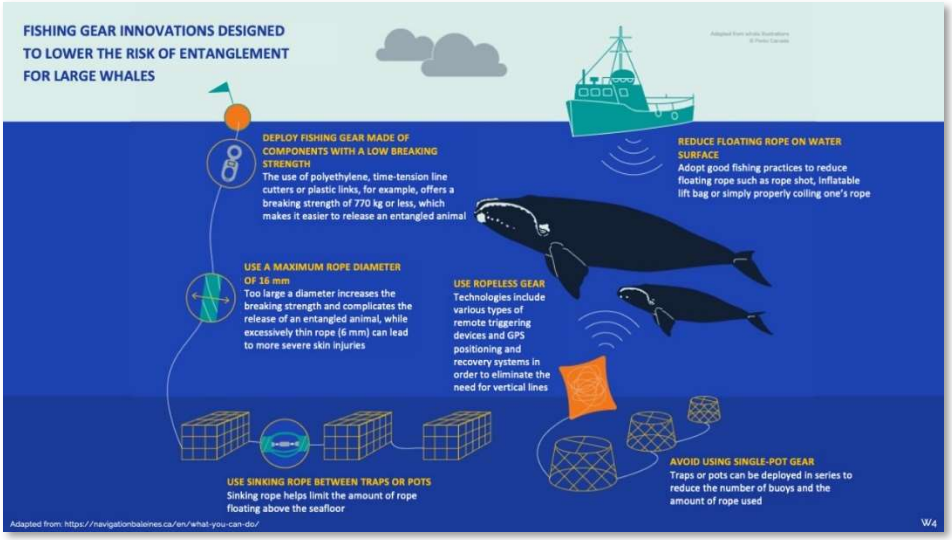

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Tackling sea-based marine litter sources

EU actions

- **EU Directive** 2019/883 on **port reception facilities** to tackle sea-based marine litter
- **EU Directive** 2019/904 on **single use plastic** products and **fishing gear** containing plastic
- One of the six main interim targets of the **Zero Pollution Action Plan** for 2030 is **reducing litter at sea by 50%**
- Council Regulation (EC) No 1224/2009 requires Union fishing vessels to have the equipment on board to **retrieve lost gear**

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DG MARE, 2018. Lost fishing gear - a trap for our ocean [infographic]

W2&W3, W5

Directive 2019/883 on Port Reception Facilities

EU Directive for the delivery of waste from ships

- Aims to protect the marine environment by reducing discharges of waste from ships, and to improve efficiency of maritime operations in ports; ensuring that more waste is delivered on shore, in particular garbage, including waste from the fishing sector such as derelict fishing gear
- **100% INDIRECT FEE OBLIGATION** – allows the **FREE delivery of all litter** (including fishing gears and passively fished litter), up to the maximum dedicated storage capacity of the boat
- **GREEN-SHIP rebate** - fishing vessels should be encouraged to undertake certain measures (waste prevention and on-board waste management) to be eligible for a green-ship rebate

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W2&W3, W5

Potential use of eco-friendly materials

Preventing plastic from ending up in the ocean in the first place!

- Current development of **biodegradable nets and line** -> reducing ghost fishing and microplastics
- Maintaining strength and durability for a few months and degrades in water

https://www.ipocean.com/pages/sustainable-fishing

https://www.britannica.com/explore/savingearth/commercial-fishing

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W5

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Tackling sea-based marine litter sources

Fishers are part of the solution!

- Delivery of waste to port reception facilities, including fishing gear waste
- Collecting and bringing passively fished waste ashore
- Retrieving or reporting lost fishing gear
- Recycling end-of-life fishing gear
- Participation on Clean-up Initiatives; Fishing for Litter

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W2&W3, W5

Tackling sea-based marine litter sources

Fishers are part of the solution!

- All fishers have a bag or trash bin on board
- All boats have space on board to bring the waste produced back to land

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W2&W3, W5

How to reduce plastic waste?

Individual actions

use your own bottle

avoid unnecessary packaging

opt for fully recyclable packaging

prevention is key!

bring your own lunch box

dispose of plastic recycling correctly

pick up litter & participate in beach clean-ups

Based on EUFIC and Safety4Sea

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W2&W3, W5

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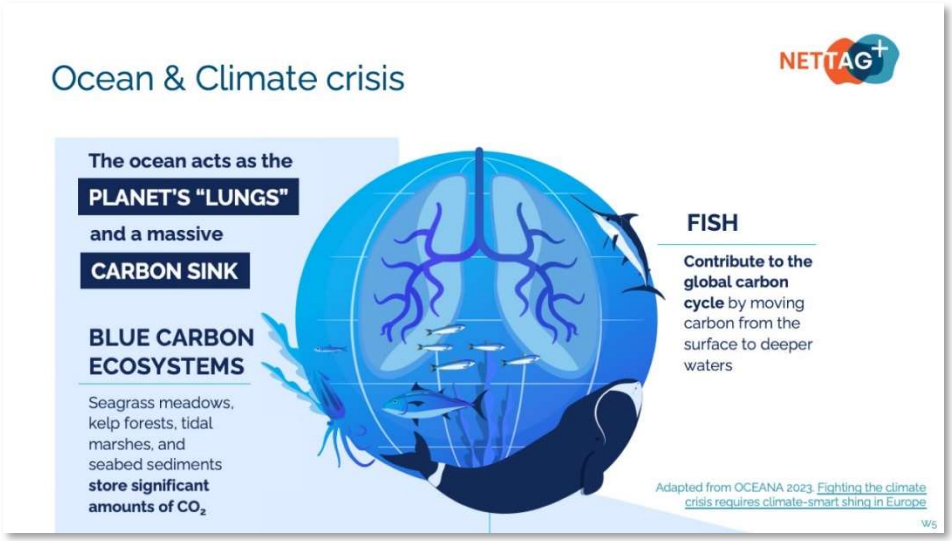

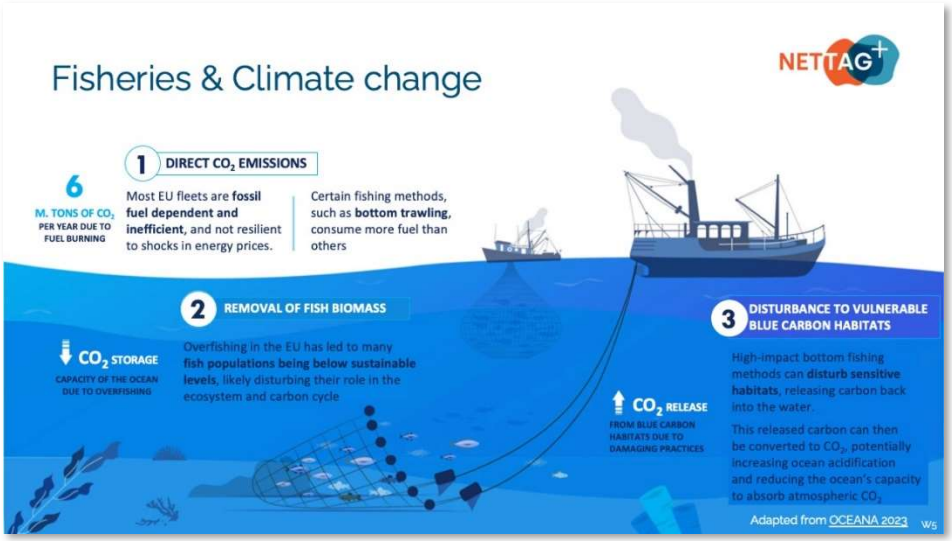

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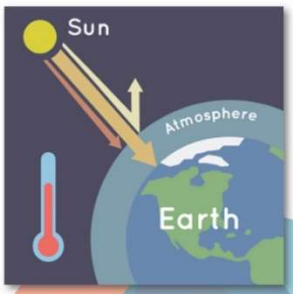
Greenhouse gases (GHG)

What are GHG and how do fisheries contribute to them?

- Human activities, including fisheries, produce GHG through the consumption fossil fuel
- GHG is a group of gases contributing to global warming and climate change (carbon dioxide, methane, nitrous oxide and fluorinated gases)
- GHG trap heat from the sun to keep surface warm while some heat is released back into space

NOAA

Funded by the European Union

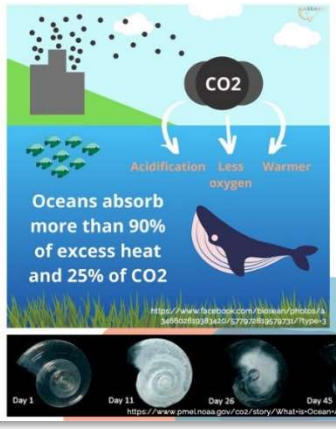


GHG effects on the ocean

1. **Ocean acidification**
   - shelled organisms (e.g. oysters, clams, sea urchins) have difficulties building and maintaining shells
   - jeopardises this food source and the larger food web
2. **Sea level rise**
   - as the ocean warms, the volume of water increases
   - coasts at risk from erosion and high-tide flooding
3. **Warmer temperatures melting sea ice** (contributing to sea level rise)
   - glaciers are shrinking
   - the Arctic is warming most rapidly compared to global average

NOAA 2021

Funded by the European Union



Net Zero emissions by 2050

Fisheries and aquaculture sectors

- Under the Green Deal, Europe has committed to become the first **climate-neutral** continent **by 2050** and to **cut the GHG emissions by at least 55% by 2030** (compared to 1990)
- This means a **reduction of 30% by 2030** (compared to 2005) in the **fishing sector**
- To reach a neutral CO_2 footprint, all sectors must play their part in **emitting less** and **protecting natural ecosystems**, such as the ocean, so they absorb more carbon
- The European Commission proposed **measures to accelerate energy transition**, focusing on fuel efficiency and renewable, low-carbon power sources (COM(2023) 100 final)

EC, 2023 OCEANA, 2023

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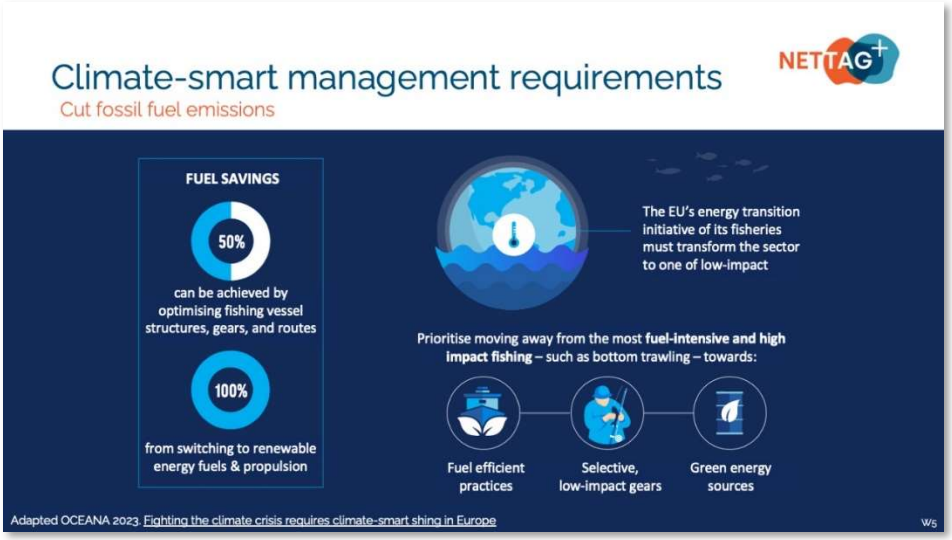

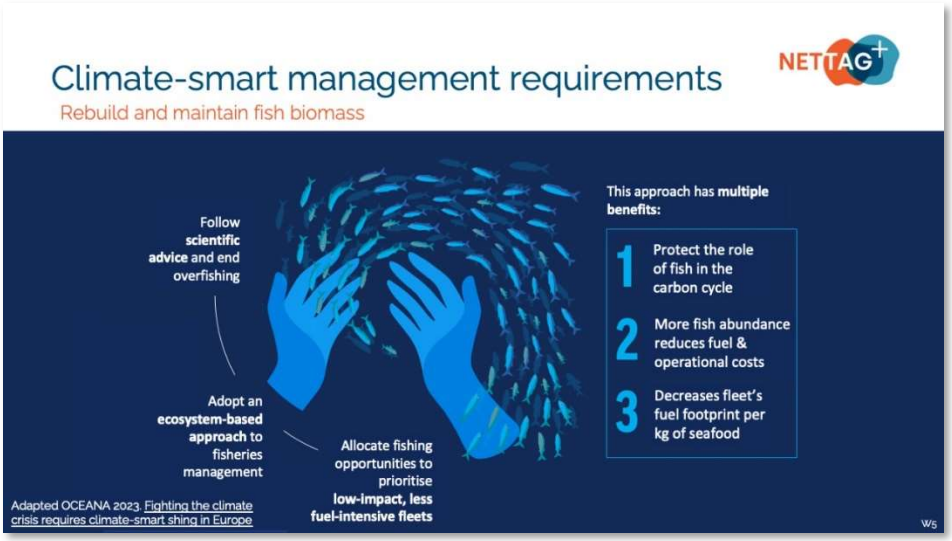

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Strategies to reduce GHG emissions

- Fuel loads per catch can range based on gear, vessel, catch, and more
  - Slowing down during steaming (reduce fuel use whenever possible)
  - Investing in technological innovations for vessels
  - Remaining adaptable and resilient as the industry evolves

EPRS, 2023: Decarbonising the fishing sector

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Let's clean up the ocean together!

Thank you for your attention

www.nettagplus.eu Follow @NetTagProject

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Annex 11. Proposed agenda for Workshop #2

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

2nd WORKSHOP

Marine litter produced on board

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:10	Welcome
14:10 - 14:30	**Exercise 1:** Litter classification
14:30 - 14:50	**Exercise 2:** Litter destination
14:50 - 15:10	Presentation of results & discussion
15:10 - 15:30	**Exercise 3:** Further actions and dissemination
15:30 - 15:50	Presentation of results & discussion
15:50 - 16:00	Workshop final conclusions
16:00 - 16:20	Coffee break

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Annex 12. Support material for the Workshop #2

PLASTIC BAG

PLASTIC BOTTLE

YOGURT PACKAGING

ALUMINUM FOOD CONTAINER

PLASTIC FOOD PACKAGE

FOOD CONTAINER

FRUIT WASTE

CAN

GLASS BOTTLE

TOILET PAPER

FACIAL TISSUE

ALUMINUM FOIL

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PLASTIC GLOVES


RUBBER BOOTS


CIGARETTE BUTTS


CONTAINER


PLASTIC BOXES

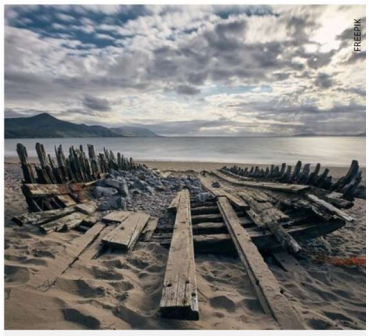

STYROFOAM BOXES


SCRAP METAL


BROKEN SMARTPHONE


BROKEN TELEVISION


OLD TIRES


WOOD


ROPE

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FISHING NETS

FISHING POTS & TRAPS

FISHING NET FLOATS

FISHING MATERIAL

STARFISH

MACROALGAE

SEABIRDS

DOLPHINS

SEA TURTLES

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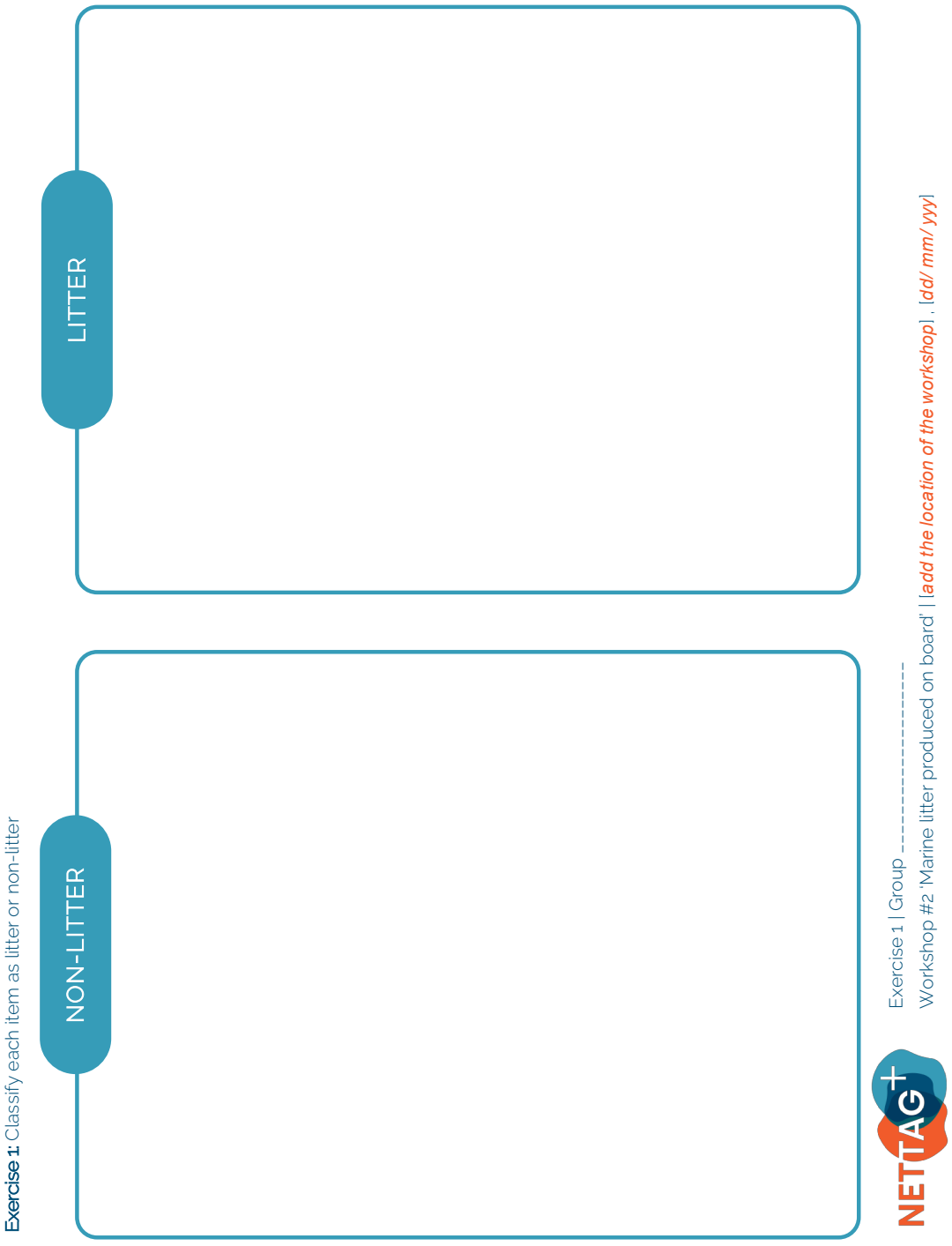
Annex 13. Exercise sheets for the Workshop #2



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Exercise 2A: Based on your own experience, identify the destination of each litter item

BRING TO SHORE

THROW OVERBOARD

Exercise 2A | Group _____

Workshop #2 'Marine litter produced on board' | *[add the location of the workshop]* , *[dd/ mm/ yyy]*

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Exercise 2B: Based on your own experience, identify the destination of each litter item that is brought to shore

STAYS ON PORT	GENERAL GARBAGE CONTAINER	RECYCLING

Exercise 2B | Group _____

Workshop #2 'Marine litter produced on board' | *[add the location of the workshop]* , *[dd/ mm/ yyy]*

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Exercise 3A: Write suggestions to reduce and manage marine litter produced on board

SUGGESTIONS

to reduce marine litter produced on board, best practices to implement (on board and at ports)

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 3A | Group _____

Workshop #2 'Marine litter produced on board' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 3B: Write suggestions to disseminate information and encourage other fishers to adopt similar practices.

SPREAD THE WORD

suggest ways of disseminating best practices to fellow fishers

COMPETENT AUTHORITIES FOR REPORTING:

LEADERSHIP

identify either individual fishers, vessels or communities that demonstrate leadership and social influence

Exercise 3B | Group _____

Workshop #2 'Marine litter produced on board' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Annex 14. Proposed agenda for Workshop #3

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

3rd WORKSHOP

Marine litter collected by fishing gear

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:10	Welcome
14:10 - 14:30	**Exercise 1:** Litter passively caught in fishing nets
14:30 - 14:50	**Exercise 2:** Destination of litter caught in fishing nets
14:50 - 15:10	Presentation of results & discussion
15:10 - 15:30	**Exercise 3:** Further actions and dissemination
15:30 - 15:50	Presentation of results & discussion
15:50 - 16:00	Workshop final conclusions
16:00 - 16:20	Coffee break

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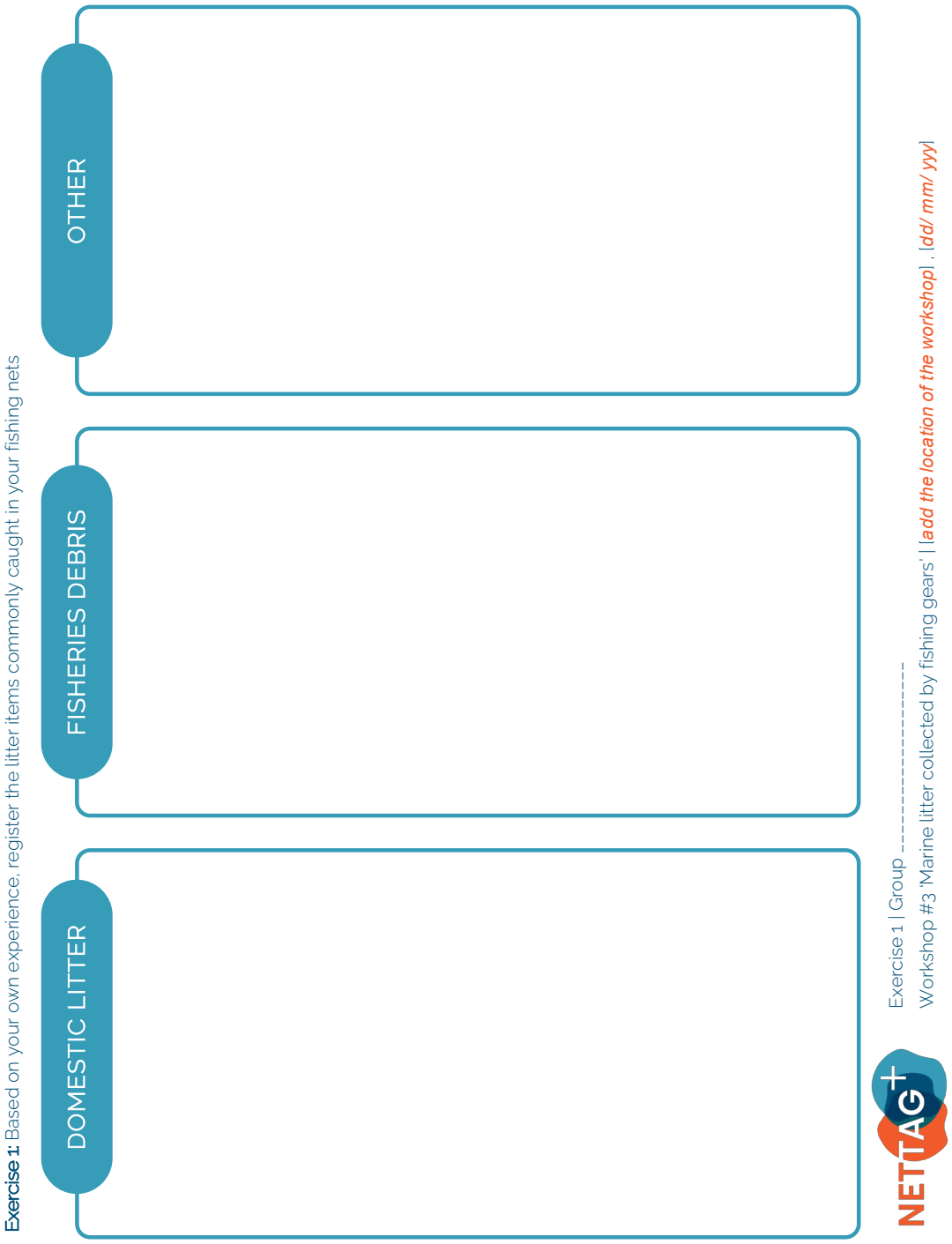
Annex 15. Exercise sheets for the Workshop #3



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Exercise 2A: Based on your own experience, register the litter items caught in your fishing nets that are thrown overboard and the ones brought to shore

THROW OVERBOARD

BRING TO SHORE

Exercise 2A | Group _____

Workshop #3 'Marine litter collected by fishing gears' | [*add the location of the workshop*] , [*dd/ mm/ yyyy*]

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Exercise 2B: Based on your own experience, register the destination of each litter item (capture in fishing nets) that is brought to shore

STAYS ON PORT	GENERAL GARBAGE CONTAINER	RECYCLING

Exercise 2B | Group _____

Workshop #3 'Marine litter collected by fishing gears' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 3A: Write suggestions to motivate fishers to become Guardians and Cleaners of the Ocean

SUGGESTIONS

suggest measures (on board and at ports) to encourage the collection and proper management of marine litter, during normal fishing activities

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 3A | Group _____

Workshop #3 'Marine litter collected by fishing gears' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 3B: Write suggestions to disseminate information and encourage other fishers to become Guardians and Cleaners of the Ocean

SPREAD THE WORD

suggest ways of getting other fishers involved

LEADERSHIP

identify either individual fishers, vessels or communities that demonstrate leadership and social influence

CITIZENS' SCIENCE

DO YOU KNOW ANY MARINE LITTER PLATFORM?

▯ YES ▯ NO IF YES, WHICH? _____

ARE YOU WILLING TO JOIN A MARINE LITTER PLATFORM?

▯ YES ▯ NO ▯ MAYBE

WHAT TYPE OF DATA?

IN WHAT CONDITIONS?

Exercise 3B | Group _____

Workshop #3 'Marine litter collected by fishing gears' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Annex 16. Proposed agenda for Workshop #4

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

4th WORKSHOP

Sustainable practices: bycatch reduction and marine conservation

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:10	Welcome
14:10 - 14:30	**Exercise 1:** Species commonly captured
14:30 - 14:50	**Exercise 2:** Best practices to reduce bycatch
14:50 - 15:10	**Exercise 3:** Protocols in case of bycatch
15:10 - 15:30	**Exercise 4:** Dissemination and leadership
15:30 - 15:50	Presentation of results & discussion
15:50 - 16:00	Workshop final conclusions
16:00 - 16:20	Coffee break

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Annex 17. Support material for the Workshop #4

SEABIRDS

MARINE MAMMALS

SHARKS

SEA TURTLES

SPONGES

CORALS

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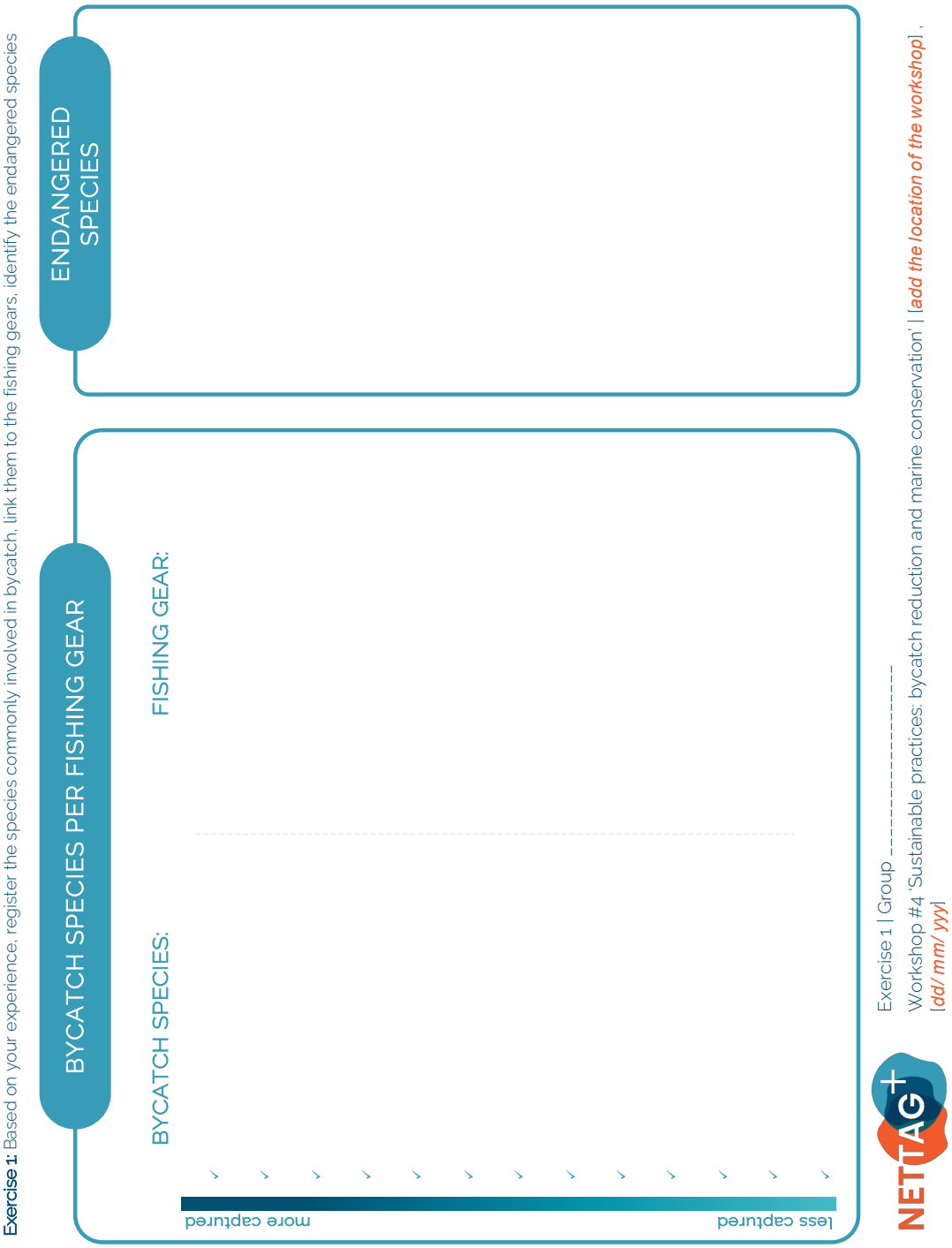
Annex 18. Exercise sheets for the Workshop #4



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Exercise 2: Based on your experience, which measures can you adopt to reduce bycatch?

MINIMISATION MEASURES

MEASURES TO REDUCE BYCATCH

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

HOW TO IMPLEMENT THE SELECTED MEASURES?

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 2 | Group _____

Workshop #4 'Sustainable practices: bycatch reduction and marine conservation' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 3: Based on your experience, how do you handle bycatch and which protocols /best practices can you adopt in case of bycatch?

BEST PRACTICES/ PROTOCOLS

COMMON PRACTICES IN CASE OF BYCATCH:

NOTIFICATION (competent authorities, other):

ARE THERE IMPLEMENTED PROTOCOLS?

▯ YES ▯ NO IF YES, WHICH? _____

SUGGESTIONS:

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 3 | Group _____

Workshop #4 'Sustainable practices: bycatch reduction and marine conservation' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 4: Write suggestions to disseminate information and encourage other fishers to adopt similar practices.

SPREAD THE WORD

suggest ways of disseminating best practices to fellow fishers

LEADERSHIP

identify either individual fishers, vessels or communities that demonstrate leadership and social influence

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Annex 19. Support material to discuss best practices to reduce bycatch (Workshop #4)

This annex provides a comprehensive list of potential measures aimed at minimising bycatch. Partners should select the most relevant measures for discussion with fishers according to local specificities.

GEAR AND BEST PRACTICES		FISHERIES TYPE						BYCATCH SPECIES				
		Gillnets	*Longlines*	*Pots/ Traps*	*Trawls*	*Purse Seine*	*Marine mammals*	*Sea turtles*	*Sharks and rays*	*Seabirds*
Acoustic Pingers	Acoustic pingers serve as a marine mammal deterrent device in net fisheries by emitting a sound that can be detected within a certain distance of the net. Implementation of acoustic pingers in gillnet fisheries has become widespread over the last decade, especially in the northern Atlantic, where it is required by law in numerous fisheries.	✓					✓			
Avoid Hotspots	Hotspots are areas that have a higher abundance of bycatch taxa where it is more likely to have high bycatch rates if fishing is conducted. It is a best practice to avoid setting fishing gear in these locations.	✓	✓		✓	✓	✓	✓	✓	✓
Backdown Method	The backdown method is conducted after setting the purse seine net but before finishing the haul. This process creates a channel and an opening at the back of the net where non-target species (especially small cetaceans and sea turtles) can escape at the surface.					✓	✓	✓	✓	
Bird scaring devices	Shaped like a small eagle or hawk, the kite simulates the presence of a predator, driving the birds away from the fishing area. To maximise its effectiveness, it should be combined with other measures.	✓	✓		✓					✓
Circle Hooks	In circle hooks, the pointed tip is bent back towards the shaft decreasing the spacing between the sharpened tip and shaft and changing the hook angle. The shape of the circle hook makes it harder for ETP bycatch to get hooked due to differences in jaw morphologies, but doesn't impact catch rates in fish and can even in some cases increase catch rates.		✓				✓	✓		

1/5

Exercise 2 support material: Examples of bycatch solutions
Workshop #4 'Sustainable practices: bycatch reduction and marine conservation'

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GEAR AND BEST PRACTICES		FISHERIES TYPE					BYCATCH SPECIES			
		 *Gillnets*	 *Longlines*	 *Pots/ Traps*	 *Trawls*	 *Purse Seine*	 *Marine mammals*	 *Sea turtles*	 *Sharks and rays*	 *Seabirds*
Decreased Soak Times	Soak time is the amount of time that deployed fishing gear stays in the water. The longer the gear is set in the water, the higher the bycatch rate will be.	✓	✓		✓	✓	✓	✓	✓	✓
Excluder Devices	Excluder devices are modifications to trawl nets that block specific taxa from getting dragged into the cod end of the net and allows them to swim out while the trawl net is being towed. Excluder devices are effective and being used in trawl fisheries that interact with bottlenose dolphins, common dolphins, seals, and turtles, for example.				✓		✓	✓		
Hook Shielding Devices	A hook shielding device encases or covers the tip of the baited hook during the longline set to prevent predation by seabirds. The shielding devices is designed to then open or release the hook at a specified depth below which seabirds can dive.		✓							✓
Jelly FAD	Jelly FADs are non-entangling biodegradable fish aggregating devices that have proven to be just as effective as traditional FADs at aggregating targeted fish species. Due to their structure design and materials used, they do not pose an entanglement risk to sea turtles, dolphins/porpoises, and sharks/rays, and if lost will biodegrade much faster than traditional FADs.					✓	✓	✓	✓	✓
Management of offal and discards	Birds are attracted to fishing vessels to feed on processing waste and discarded fish. To reduce this attraction, effective waste management is crucial: i) retain waste onboard during trips. If impracticable, avoid discharge during fishing activity; ii) where retention of waste is impracticable, convert offal into fish meal and restrict discharge to liquid only; iii) where meal production and		✓		✓					✓

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GEAR AND BEST PRACTICES		FISHERIES TYPE					BYCATCH SPECIES			
		 Gillnets	 Longlines	 Pots/ Traps	 Trawls	 Purse Seine	 Marine mammals	 Sea turtles	 Sharks and rays	 Seabirds
	retention are impracticable, temporally store waste for at least two hours before controlled discharge it in batches; iv) if other methods aren't feasible, reduce waste to smaller particles. Efforts should be made to eliminate or limit offal discharge during active fishing periods.									
Modified Purse Seine	Modified purse seines were developed to address seabird bycatch in the Chilean anchovy and sardine purse seine fisheries. Specific modifications include moving the locations of the buoys and decreasing the amount of excess netting. The implementation of the modified purse seine resulted in a 98% decrease in seabird bycatch rates for vessels with an increase in target catch.					✓				✓
Net Lights	Net lights are LED lights attached directly to fishing nets, most commonly in gillnet fisheries, that serve to illuminate the top of the net making it more noticeable to bycatch.	✓					✓	✓		
Night Settings	Seabirds are visual hunters and most active during daylight hours. By shifting to setting fishing gear when it is dark, seabird interaction with baited hooks and nets is greatly reduced thereby decreasing bycatch rates.	✓	✓		✓					✓
Non-Dolphin/Whale Shark Sets	Dolphins/porpoises and whale sharks are often found with target fish in the open ocean, and were often used as an indication of where to set purse seine nets. This led to large bycatch rates for both in historical purse seine fisheries leading to very high mortality rates.					✓	✓		✓	
Non-Entangling Biodegradable FAD	Fish aggregation devices (FADs) are structures that attract target fish, normally tuna, which are used to increase fishing efficiency. Nets and ropes that attach to the main					✓	✓	✓	✓	

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GEAR AND BEST PRACTICES		FISHERIES TYPE					BYCATCH SPECIES			
		 Gillnets	 Longlines	 Pots/ Traps	 Trawls	 Purse Seine	 Marine mammals	 Sea turtles	 Sharks and rays	 Seabirds
	structure and hang in the water often entangle non-target species such as sea turtles, seabirds, and sharks that are also attracted to the FAD.									
Non-Steel Leaders	Leaders are a segment of the branch line that the baited hook is directly attached to. For fisheries that do not retain sharks, it is recommended to use a leader material that can be cut, allowing sharks to break off in the water, or be cut from the main line by the crew when hauling.		✓						✓	
Ropeless (On-Demand) Pot/Trap Systems	Ropeless (On-Demand) pot/trap systems are designed to be deployed without surface buoy lines in the water column and therefore nearly entirely reduce the risk of entanglement for ETP species. Most of these systems utilise an acoustic release device that can be activated from the boat which will either release a buoy line or inflate a float bag attached to the pots/traps in the water. The pots/traps can then be retrieved by fishers.			✓			✓			
Sharkguard	Longline fisheries set out a long main line with hundreds to thousands of baited hooks attached on branch lines. Sharks and rays are attracted to baited hooks in addition to target species resulting in tens of millions caught as bycatch in longline fisheries each year.		✓						✓	
Smart Buoys	Smart buoys provide constant location information so that gear can be tracked remotely, which helps fishers locate gear if it has come loose or moved in a storm. Importantly, it also can alert fishers when buoy lines are being dragged, for example provide continuous real-time location data of entangled whales which would greatly increase disentanglement success.	✓	✓	✓		✓	✓	✓	✓	✓

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GEAR AND BEST PRACTICES		FISHERIES TYPE					BYCATCH SPECIES			
		 *Gillnets*	 *Longlines*	 *Pots/ Traps*	 *Trawls*	 *Purse Seine*	 *Marine mammals*	 *Sea turtles*	 *Sharks and rays*	 *Seabirds*
Streamer (tori) lines	Streamer lines, also called tori or bird scaring lines, deter birds from sinking baits, dramatically reducing seabird attacks and related mortalities. Runs from a high point at the stern to a device or mechanism that creates drag at its terminus. Brightly coloured streamers hanging from the aerial extent of the line scare birds from flying to and under the line, preventing them from reaching the baited hooks, becoming hooked and subsequently killed.		✓		✓					✓
Sub-Surface Sets	Surface set gillnets can catch sea turtles and small cetaceans that spend most of their time at the surface. By increasing the depth of the float line (the top rope on the net) a few meters, sea turtles and small cetaceans at the surface can pass over without becoming entangled, decreasing the bycatch rate.	✓					✓	✓		✓
Weak Inserts, Weak Rope	Pots and traps fisheries use buoy lines (high-strength ropes) attached to pots and traps to mark gear on the ocean bottom. Buoy lines that extend from the trap on the seafloor to the surface sometimes cause marine mammals and sea turtles to become entangled often leading to severe injury or death.			✓			✓			
Weighted Branchline	Weighted branch lines increase the sink rate of baited hooks decreasing the amount of time that they can be predated on by seabirds and that seabirds can get hooked.		✓							✓

Source of data: Bycatch Solutions Hub (https://bycatchsolutions.org/solutions/?keyword=&active-filter=ocean&ocean=northern-atlantic-ocean); Bycatch Management Information System (https://www.bmis-bycatch.org/mitigation-techniques); FAO (Marine mammal bycatch mitigation, https://www.fao.org/fishery/en/bycatch-mitigation-mammals/search); ACAP (https://www.acap.aq/bycatch-mitigation/mitigation-advice); SPEA (https://www.spea.pt/wp-content/uploads/2021/10/Factsheetsx3_FINAL.pdf)

Source of fishing gear and species icons: Bycatch Solutions Hub (https://bycatchsolutions.org/solutions/?keyword=&active-filter=ocean&ocean=northern-atlantic-ocean)

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Annex 20. Proposed agenda for Workshop #5

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

5th WORKSHOP

Reducing fisheries footprint

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:10	Welcome
14:10 - 14:30	**Exercise 1:** Reduction of greenhouse gas emissions
14:30 - 14:50	**Exercise 2:** Use of alternative/eco-friendly materials
14:50 - 15:10	**Exercise 3:** Dissemination and leadership
15:10 - 15:30	Presentation of results & discussion
15:30 - 15:40	Workshop final conclusions
15:40 - 16:00	Coffee break

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Annex 21. Support material to discuss the reduction of GHG emissions (Workshop #5)

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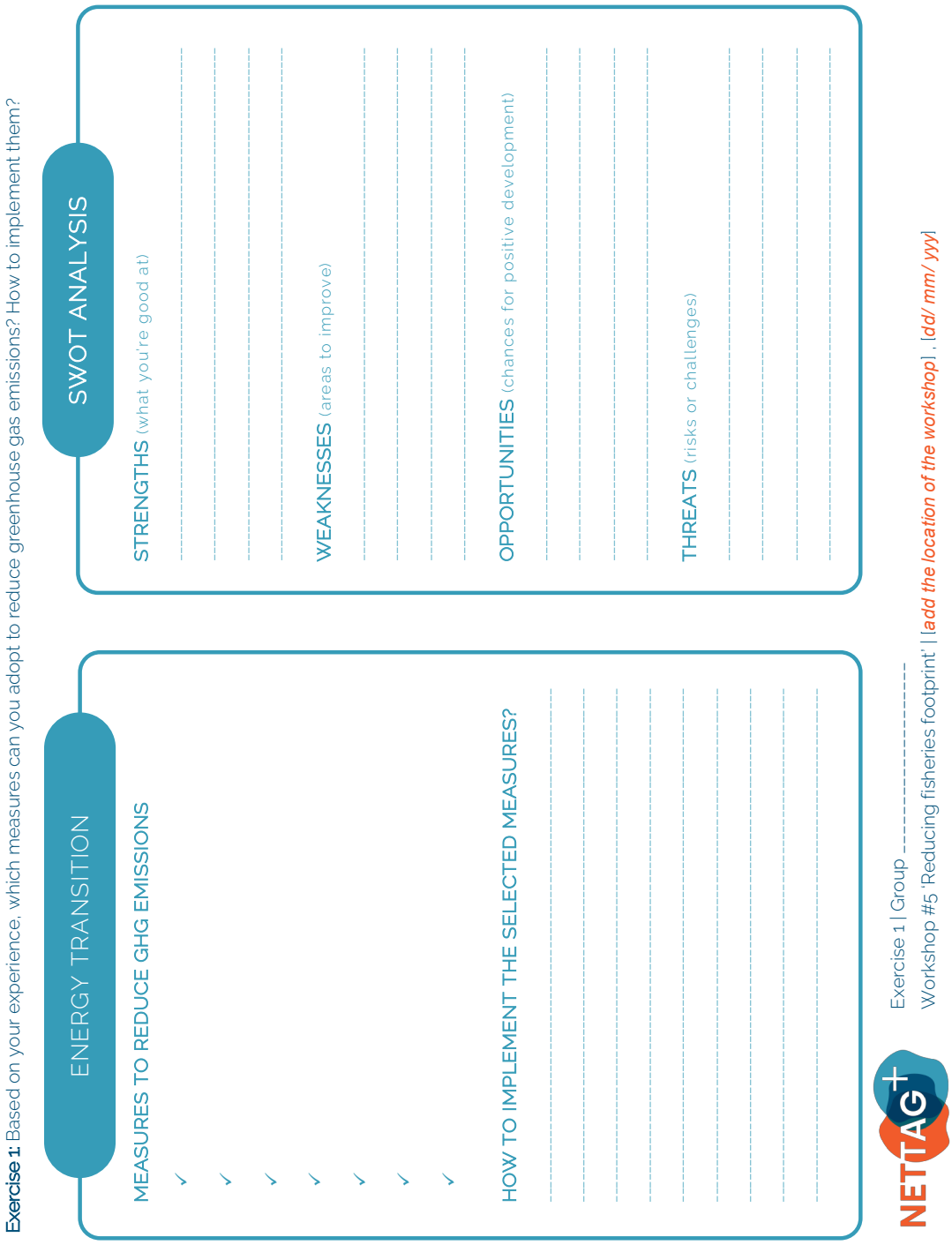
Annex 22. Exercise sheets for the Workshop #5



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Exercise 2: Based on your experience, which materials can be replaced to reduce fishers' reliance on plastics? How to implement them?

ECO-FRIENDLY MATERIALS

WHICH MATERIALS CAN BE REPLACED?

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

HOW TO IMPLEMENT THIS MEASURES?

SWOT ANALYSIS

STRENGTHS (what you're good at)

WEAKNESSES (areas to improve)

OPPORTUNITIES (chances for positive development)

THREATS (risks or challenges)

Exercise 2 | Group _____

Workshop #5 'Reducing fisheries footprint' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Exercise 3: Write suggestions to disseminate information and encourage other fishers to adopt similar practices.

SPREAD THE WORD

suggest ways of disseminating best practices to fellow fishers

LEADERSHIP

identify either individual fishers, vessels or communities that demonstrate leadership and social influence

Exercise 3 | Group _____

Workshop #5 'Reducing fisheries footprint' | [*add the location of the workshop*] , [*dd/ mm/ yyy*]

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Annex 23. Support material to discuss the use of more eco-friendly materials (Workshop #5)

Exercise 2 support material

Workshop #5 'Sustainable practices: reduction of greenhouse gas emissions and use of alternative/eco-friendly materials' | [*add the location of the workshop*] . [*dd/ mm/ yyyy*]

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Annex 24. Proposed agenda for Workshop #6

NETTAG+ Preventing, Avoiding and Mitigating
environmental impacts of fishing gears
and associated marine litter

6th WORKSHOP

NETTAG+ solutions

Agenda

Place | Date | Time

13:45 - 14:00	Registration
14:00 - 14:30	Welcome & Talk on the NETTAG+ solutions
14:30 - 14:40	**Exercise 1:** General evaluation of the NETTAG+ solutions
14:40 - 15:00	**Exercise 2:** Discussion of the NETTAG+ solutions
15:00 - 15:20	Presentation of results & discussion
15:20 - 15:30	Workshop final conclusions
15:30 - 15:50	Coffee break

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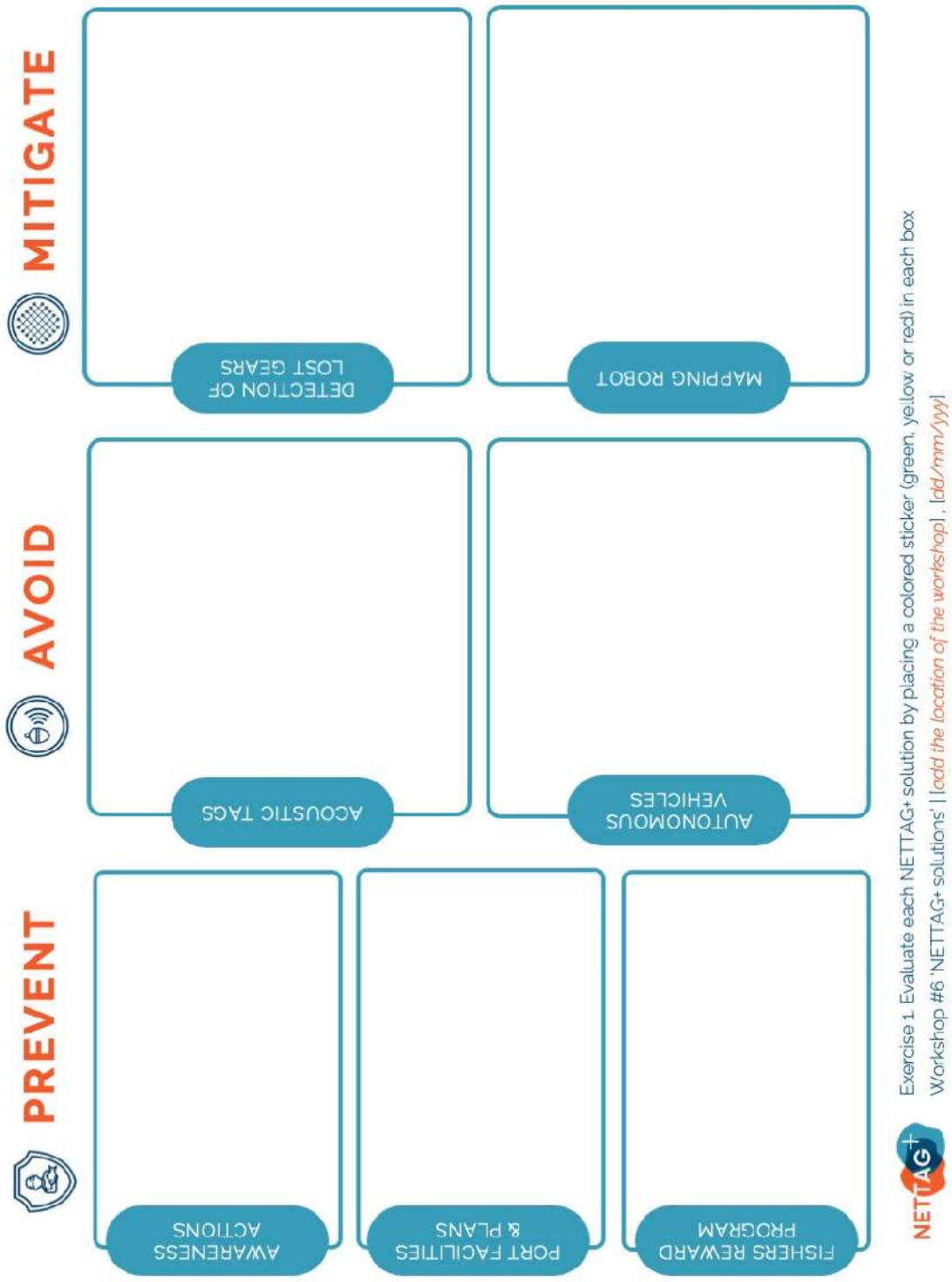
Annex 25. Poster for the Workshop #6



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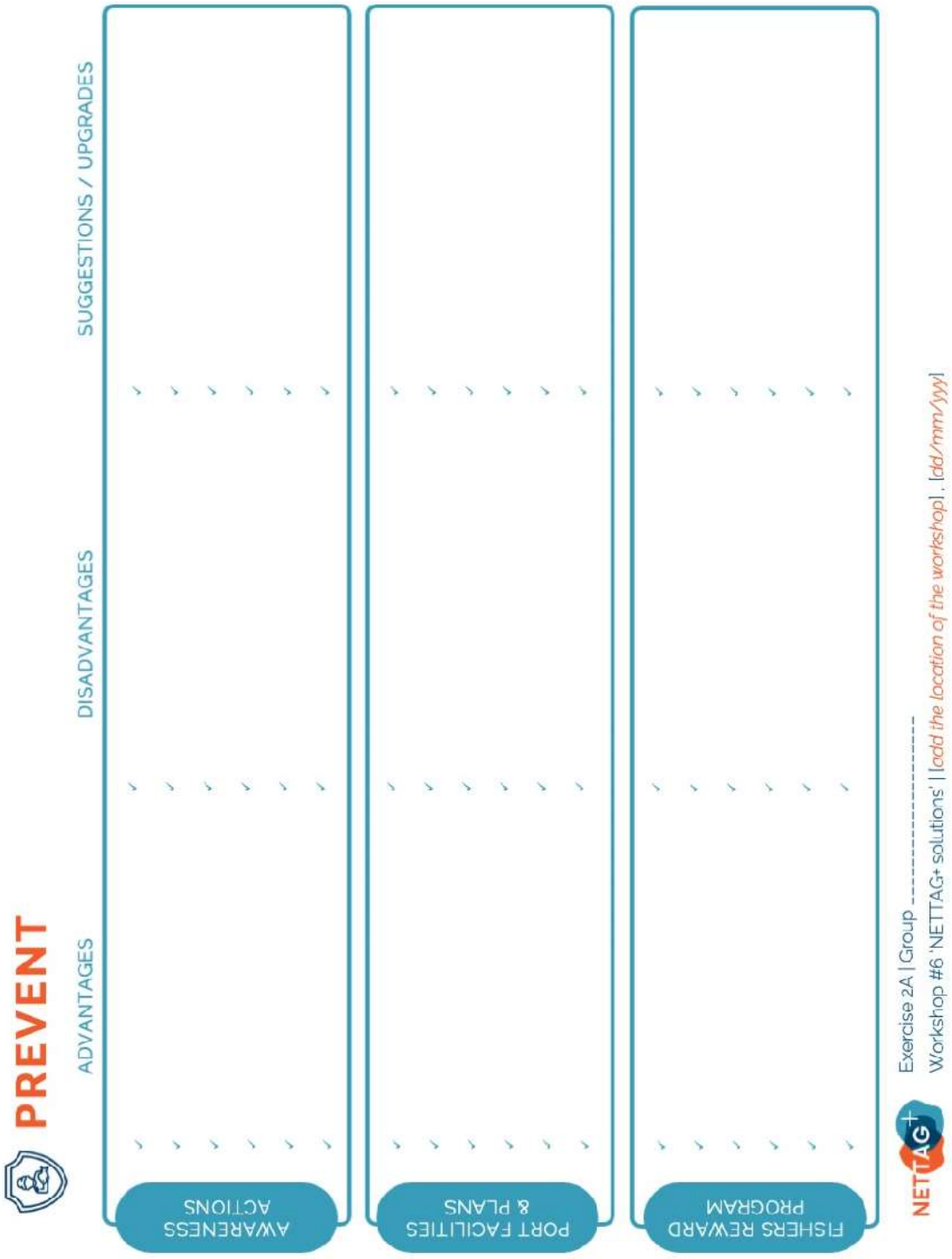
Annex 26. Exercise sheets for the Workshop #6



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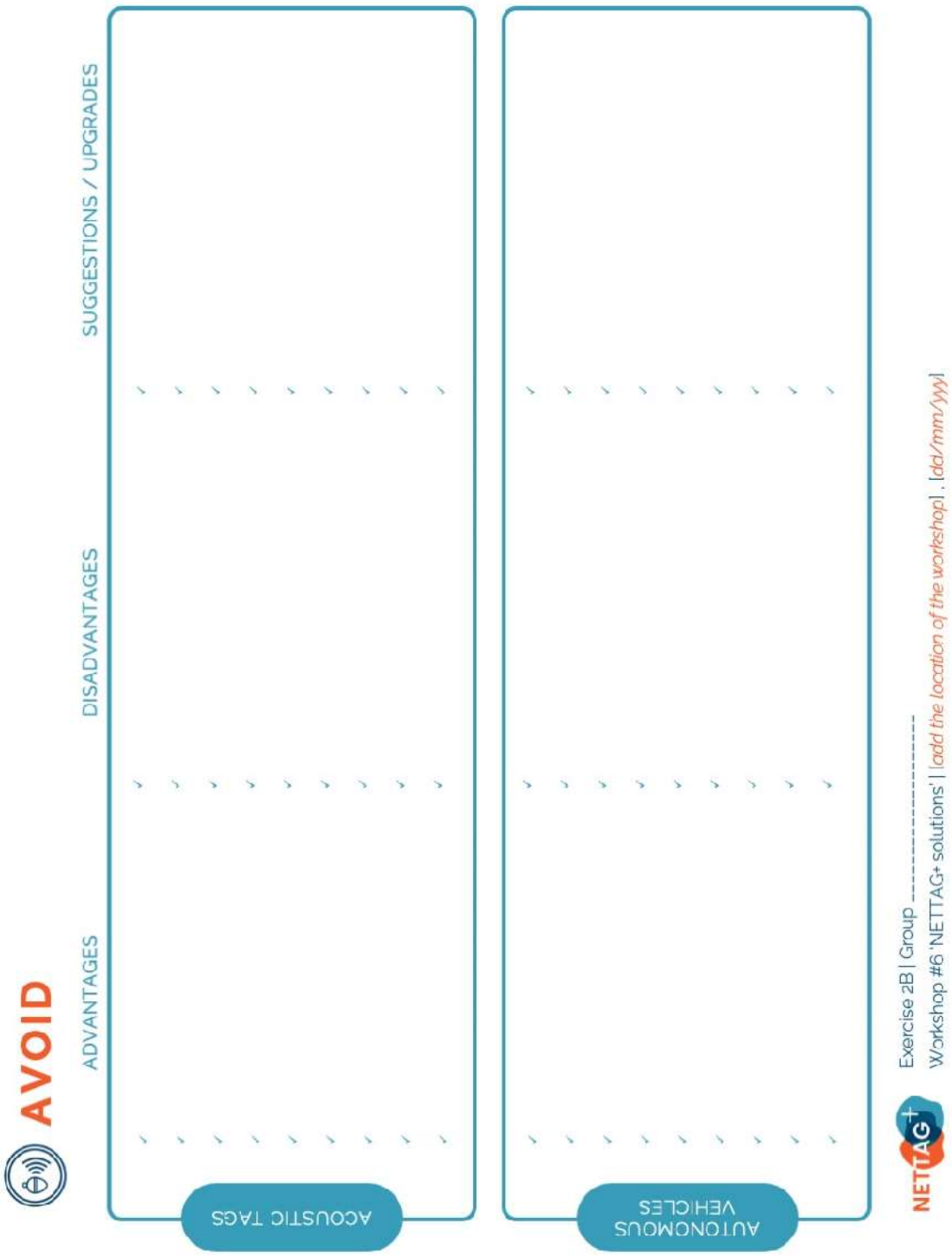

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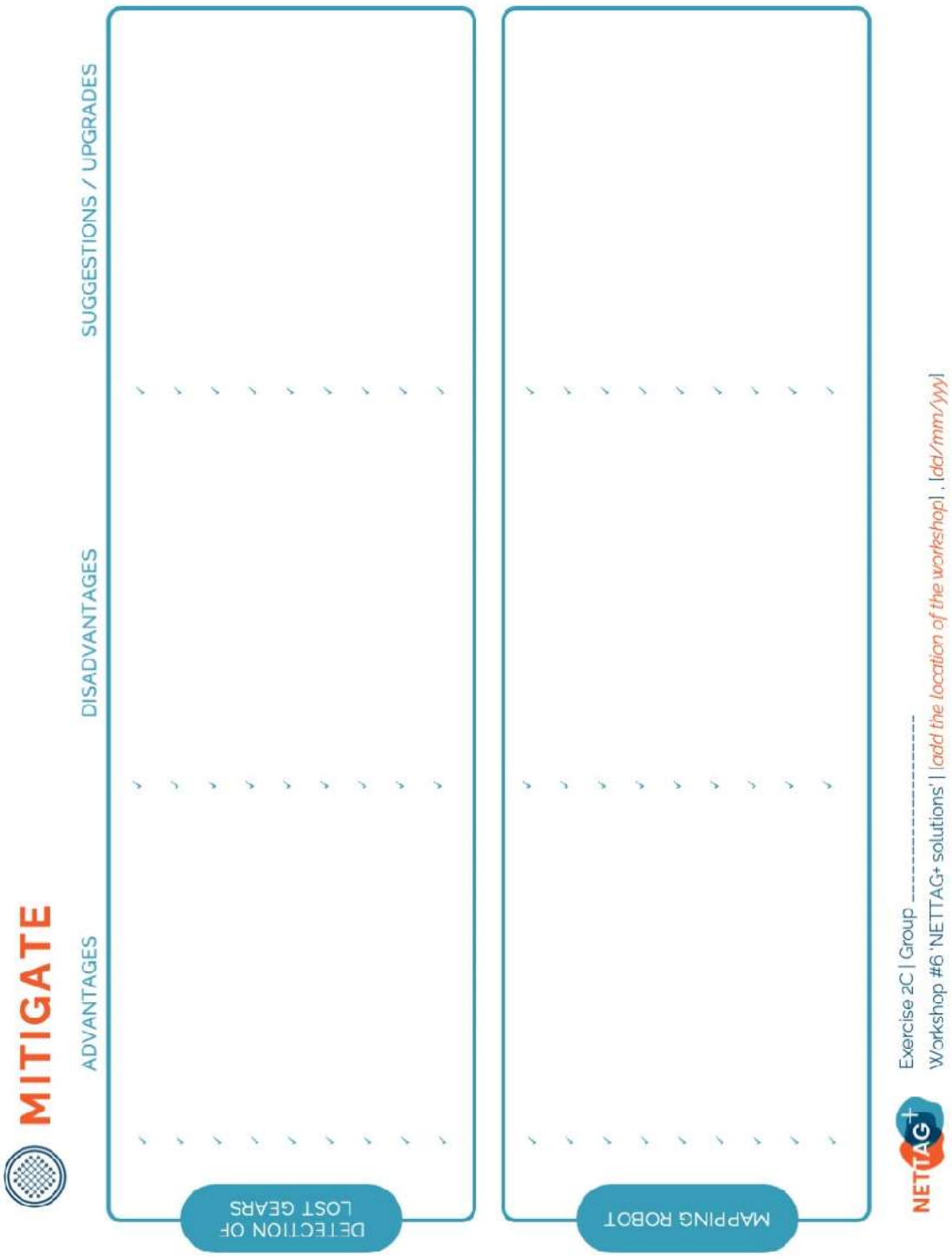

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