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Pohnpei, Federated States of Micronesia

28 – 30 September 2016

REPORT OF THE EXPERT CONSULTATION ON THE MARKING OF FISHING GEAR

Rome, 4−7 April 2016

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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PREPARATION OF THIS DOCUMENT

The issue of abandoned, lost or otherwise discarded fishing gear (ALDFG) has been a concern for FAO and its Members for many decades. It has been noted that the elaboration of a standard for the marking of fishing gear would be of benefit to coastal States in addressing problems associated with AFDGL. Marking of fishing gear can also be an important mechanism for identifying illegal fishing gears and may assist in meeting various obligations under relevant international instruments whether they are a binding agreement or voluntary guidelines. Gear marking also contributes to improved safety at sea as inappropriately marked fishing gear, as well as abandoned, lost or otherwise discarded fishing gear, are navigational hazard. Appropriately marked fishing gear also provides important information for tracing the origin of gear components associated with entanglement of marine mammals and endangered, threatened and protected species.

At the Thirty-first Session of the FAO Committee on Fisheries (COFI) held in 2014, concern was expressed over the continued fishing by ALDFG and that greater attention should be paid by Members, regional fishery bodies (RFBs) and regional fisheries management organizations (RFMOs) to mitigate ALDFG impacts, noting that cost effective technologies and practices were available. In response to these concerns, FAO convened an Expert Consultation on the Marking of Fishing Gear from 4 to 7 April 2016 at FAO Headquarters in Rome, Italy, with the purpose of developing guidelines to assist States, RFBs, regional fisheries management organizations and arrangements, as well as the fishing sector in implementing the Code of Conduct for Responsible Fisheries by applying a system for the marking of fishing gear.

This is the report of the Expert Consultation on the Marking of Fishing Gear adopted on 7 April 2016 in Rome, Italy.

FAO. 2016.
Report of the Expert consultation on the Marking of Fishing Gear, Rome, Italy, 4–7 April 2016.
FAO Fisheries and Aquaculture Report No. 1157. Rome, Italy
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ABSTRACT

This document summarizes the outcome of the Expert Consultation on the Marking of Fishing Gear held in Rome, Italy, from 4 to 7 April 2016. The Consultation was convened by the Director-General of FAO to develop draft guidelines on the application of a system for the marking of fishing gear, to be submitted for consideration at the Thirty-second Session of the Committee on Fisheries (COFI) in 2016. The Consultation also made recommendations regarding further development of the draft guidelines.

Contents

OPENING OF THE MEETING AND ARRANGEMENTS FOR THE SESSION

1. The Expert Consultation on the Marking of Fishing Gear was held in Rome, Italy, from 4 to 7 April 2016. The agenda of the Consultation is attached as Appendix A.

2. The Consultation was attended by 18 experts in their personal capacity and four resource persons. A full list of participants is attached as Appendix B. The documents distributed before the Consultation are listed in Appendix C.

3. The Consultation was hosted by FAO.

4. Mr Árni M. Mathiesen, Assistant Director-General of the FAO Fisheries and Aquaculture Department, welcomed the participants and outlined the purpose of the Consultation. Mr Mathiesen reminded participants of the resolutions and recommendations iterated by the FAO Committee on Fisheries (COFI) and other relevant international organizations regarding the need for a standardized system for the marking of fishing gear. He summarized the work to be done at the Consultation and wished participants well in their endeavours. Mr Mathiesen's opening statement is attached in Appendix D.

5. The Technical Secretary, Mr Petri Suuronen, called the Consultation to order.

ELECTION OF THE CHAIRPERSON

6. Ms Deirdre Warner-Kramer was elected Chairperson of the Expert Consultation.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

7. The draft agenda and the general arrangements of the Consultation were adopted by the participants.

REVIEW OF THE OBJECTIVES OF THE EXPERT CONSULTATION

8. Mr Suuronen reviewed the objectives of the Expert Consultation and the process through which the draft guidelines could be developed. He reminded the participants that an executive summary of the draft guidelines in all official languages of FAO will be submitted to the Thirty-second Session of COFI and that the full document will be made available during the session as a Session Background Document in English only.

REVIEW OF BACKGROUND DOCUMENTS

9. Mr Suuronen gave a brief overview of the documents submitted for the Consultation and explained how the preliminary text of the guidelines was compiled, and described the background and scope for the development of a system for the marking of fishing gear.

10. Mr Tim Huntington, a resource person, presented two background papers on: (i) *Key issues associated with the marking of fishing gear;* and (ii) *Outstanding issues and potential for improvement in gear marking*. Mr Pingguo He, a resource person, presented a paper entitled *New technologies for the marking of fishing gears*.

11. The Secretariat informed participants that there had been significant changes in fisheries, fishing technologies and fishing practices since the 1991 FAO Expert Consultation on the Marking of Fishing Gear. The Secretariat drew attention to an increasing number of international instruments that highlight the need to mark fishing gears. The Secretariat also noted the ecological and economic benefits that could ensue when such systems are used and that off-the-shelf technologies were available to facilitate such marking of fishing gear.

12. During the discussion of the background documents, the experts agreed that adequately and systematically marked fishing gears can facilitate reducing:

i. the abandonment and discarding of fishing gears in the aquatic environment;
ii. the unintended catch of endangered, threatened and protected species of fish and other animals;
iii. the level of illegal, unreported and unregulated (IUU) fishing;
iv. dangers to navigation and accidents at sea associated with unattended fishing gear, as well as abandoned, lost or otherwise discarded fishing gears (ALDFG);
v. the accumulation of ALDFG in the aquatic environment;
vi. damage to vulnerable and sensitive aquatic habitats; and
vii. economic losses to fishermen resulting from ghost fishing and degradation of fishing grounds.

13. The experts also noted that ALDFG that drift have the potential to transport invasive species between areas of national jurisdiction.

14. The experts noted that gear marking is one of the several fisheries management tools that could contribute to reducing adverse fishing impacts. They also noted that due consideration should be given to the specific characteristics of a fishery and the nature and extent of problems to be addressed when implementing a gear marking system.

15. The experts noted that depending on the nature and extent of the problems, gear marking may be used in combination with other fisheries management measures to mitigate specific problems in a fishery.

16. The experts noted that the effectiveness of gear marking systems would be significantly enhanced when incentives exist to: (i) encourage the uptake of gear marking systems, (ii) the reporting of lost or abandoned fishing gears, and (iii) the safe retrieval and responsible disposal of ALDFG.

17. While recognizing that the systematic marking of fishing gear was important, the experts expressed concern over the paucity of robust data on the ecological and economic impacts of ALDFG (marked or unmarked) in the aquatic environment and noted that the absence of such information has constrained the formulation of effective mitigation measures.

18. The experts noted that fish aggregating devices (FADs) are increasingly used in some fishing operations and welcomed their inclusion in the preliminary text. It was also noted, that the need for, and nature of marking of FADs would depend on the particular circumstances in which FADs were used.

19. The experts noted that illegal fishing operators were unlikely to comply with any gear marking regime. A view was proposed that guidelines should contain recommendations specifically aimed at promoting accountability across the fisheries value chain. For this purpose, measures to facilitate traceability of fishing gears through manufacturer batch-marking and responsible fishing certification schemes were noted as an important element of the guidelines.

20. The experts noted that effective implementation of a gear marking system is a shared responsibility between the relevant authorities and the fishing sector. In this regard, guidelines for the application of a system for the marking of fishing gear should include reference to benefits associated with, *inter alia*:

i. Broad stakeholder participation in the development of gear marking systems, including the risk-based assessment of fishing gear becoming ALDFG and its consequences;

ii. Collaboration between fishers and the relevant authorities in the retrieval and responsible disposal of ALDFG;
iii. Transparent and timely decision-making in managing a gear marking system; and
iv. Incentives to encourage adoption of gear marking systems and the reporting of lost and abandoned fishing gears.

21. The experts also noted that the effective implementation of a gear marking system may require significant capacity development within the competent authorities, as well as within fishing communities. Moreover, uptake of gear marking, reporting of abandoned and lost gear, and safe ALDFG retrieval and disposal would require promoting and raising awareness on the benefits associated with such measures.

22. The experts expressed concern about placing disproportionate burdens on fisheries authorities and the fishing sector through the implementation of gear marking systems that were high in cost, complex in application and constrained in their capacity to resolve the specific problems of unmarked gear. Accordingly, the experts stressed the importance of using risk-based approaches to inform decisions on the type of gear marking systems to be implemented in a fishery or region.

REVIEW OF THE DRAFT GUIDELINES

23. The preliminary text of the draft guidelines was introduced and the overall structure discussed. This discussion focused on the need for actionable, practical and user-friendly guidelines that will assist States and regional fisheries management organizations and arrangements (RFMO/As) in meeting the objectives set out by COFI and in conformity with relevant international fisheries instruments.

24. The Expert Consultation reviewed the preliminary text prepared by the Secretariat and developed a text containing the draft guidelines. The adopted draft guidelines text is attached as Appendix E.

RECOMMENDATIONS

25. The Expert Consultation tasked the Secretariat with:

i. all non-technical editing of the draft guidelines prior to publishing the draft text; and
ii. consolidating the information contained in the annexes to the guidelines, based on the inputs and guidance provided by the experts.

26. The Expert Consultation recommended that COFI consider:

i. That the draft guidelines, as adopted by the Expert Consultation, should be considered as a draft text to be further developed through a technical consultation;
ii. Tasking FAO to lead further work associated with effective implementation of a system for the marking of fishing gear. In this regard, the Expert Consultation identified the following priority activities:

    a. Capacity development of the relevant national and regional authorities and the fishing sector to implement effective gear marking systems;
    b. Preparing studies upon which best practices including incentives to enhance the uptake of gear marking systems; and
    c. Collaborating with relevant intergovernmental organizations and regional organizations to raise awareness, improve communication and develop capacity on implementing effective systems for the marking of fishing gear, including FADs, as well as to attempt to quantify the extent of ALDFG worldwide.

OTHER MATTERS

27. No other matters were raised.

ADOPTION OF THE REPORT

28. The draft report of the Expert Consultation was adopted on 7 April 2016.

APPENDIX A

AGENDA

1. Election of the Chairperson
2. Adoption of the agenda and the arrangements for the session
3. Review of the objectives of the Expert Consultation
4. Review of background documents
5. Review of draft Guidelines for the Application of a System for the Marking of Fishing Gear
6. Recommendations
7. Other matters
8. Adoption of the report

APPENDIX B

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APPENDIX C

LIST OF DOCUMENTS

ECFG/2016/1	Provisional Agenda for the Expert Consultation
ECFG/2016/2	Draft Guidelines for the Application of a System for the Marking of Fishing Gear (Preliminary text)
ECFG/2016/Inf. 1	Key issues and current status
ECFG/2016/Inf. 2	Outstanding issues and potential for improvement
ECFG/2016/Inf. 3	New technologies for marking of fishing gear
ECFG/2016/Inf. 4	New technologies for marking of fishing Gear – Appendices
ECFG/2016/Inf. 5	Application of MARPOL Annex V in the context of the reporting of accidental loss or discharge of fishing gear

APPENDIX D

OPENING STATEMENT

by

Mr Árni M. Mathiesen
Assistant Director-General
Fisheries and Aquaculture Department

Distinguished delegates, friends and colleagues:

On behalf of the Director-General of FAO, Mr Graziano da Silva, it gives me much pleasure to welcome you to this Expert Consultation to prepare the "Draft Guidelines for the Application of a System for the Marking of Fishing Gear".

I have followed closely the preparations for the meeting and I am delighted that FAO has been able to assemble such an impressive group. As you know, each expert here today, in his or her personal capacity, has been chosen because of the unique professional and geographical experience he or she would bring to the Consultation.

Turning to the issues of substance of the Expert Consultation, we are all aware that the protection of living marine resources has become a high priority issue on the international agenda. In this context, the environmental impacts caused by abandoned, lost and otherwise discarded fishing gear have been widely recognized and greater attention has been requested. Another related topic of high concern is illegal, unreported and unregulated fishing.

Appropriate marking of fishing gear can be an effective tool to improve the state of the marine environment by combatting the abandonment, loss and discarding of fishing gear, and to facilitate the identification and recovery of such gear. Marking can also be an important mechanism for identifying illegal fishing gears and may assist in meeting various obligations under relevant international instruments whether they are binding agreement or voluntary guidelines.

Gear marking also contributes to improved safety at sea as inappropriately marked fishing gear as well as abandoned, lost or otherwise discarded fishing gear are navigational hazard. Appropriately marked fishing gear also provides important information for tracing the origin of gear components associated with entanglement of marine mammals and endangered, threatened and protected species.

You may recall that in 2009 the Committee on Fisheries (COFI) during its Twenty-ninth Session endorsed the International Guidelines on Bycatch Management and Reduction of Discards, an international instrument of reference to help States and RFMO/As in formulating and implementing appropriate measures for the management of bycatch and reduction of discards in all fisheries and regions of the world. In this regard, paragraph 8.1 iii) calls on States and RFMO/As to consider measures to address the impact ghost fishing on living aquatic resources including through actions for identification of gear ownership, reduction of gear losses, development of gear retrieval procedures and programs, and reducing, and where possible eliminating, fishing power of lost gear.

More recently, the Committee on Fisheries during its Thirty-first Session, held in June 2014, expressed concern over ghost fishing by ALDFG and noted that greater attention should be paid by Members and regional fisheries bodies including regional fisheries management organizations (RFMOs) to mitigate ALDFG impacts, noting that cost effective technologies and practices were available. It is worth noting

that a growing number of international organizations and other stakeholders, including the fishing industry, have expressed concern over ghost fishing and ALDFG.

In response to these concerns, FAO is convening the Expert Consultation on the Marking of Fishing Gear here at FAO Headquarters. The main objective of this Expert Consultation is to develop and elaborate a draft text of the Guidelines for the Application of a System for the Marking of Fishing Gear. To facilitate this task, the Secretariat has prepared an initial text, as a starting point and as a basis for discussion.

Regarding the work to be done this week, it is expected that participants in this Consultation will review systematically and methodically the structure, form and contents of the text.

I would urge that, in this endeavour, every effort be made to ensure that the draft text prepared by the Expert Consultation is not overly complex, is practical to implement and addresses all relevant fisheries and jurisdictions.

We must not forget that the people who will use these guidelines and those who may have to comply with the requirements contained therein will not all be lawyers.

We recognize that the time that you have available to do the job is very short. However, FAO has in the past worked with many of you and I know that you are accustomed to working to tight deadlines. I am therefore confident that it should be possible to achieve the goal that has been set for the Expert Consultation.

Ladies and Gentlemen, I wish you a fruitful and successful meeting and hope that your time in Rome will provide you with an opportunity to enjoy this beautiful city.

Thank you very much.

Árni M. Mathiesen

APPENDIX E

DRAFT GUIDELINES FOR THE APPLICATION OF A SYSTEM ON THE MARKING OF FISHING GEAR

INTRODUCTION

1. Abandoned, lost or otherwise discarded fishing gear (ALDFG) is a significant component of marine litter and may have serious impacts on habitats, fish stocks and other marine species. ALDFG may result in reduced profits and increased operational cost for vessel owners/operators and may be a significant cost to the relevant authorities in attempting to address this global issue. In addition, risk factors associated with navigation and safety at sea will become more prevalent if ALDFG is not reduced and managed. Causes of ALDFG include excessive fishing effort, gear conflicts, extreme weather, operator error and deliberate abandonment. ALDFG is also linked to illegal, unreported and unregulated (IUU) fishing as IUU fishers are more prone to discard their fishing gear at sea.

2. It has been identified that multiple benefits can be gained via the implementation of a common system for the marking of fishing gear, including: (i) reduction of economic losses to gear owners; (ii) assistance with the prevention of illegal fishing operations; (iii) reduction of damage to the environment via reducing gear loss in ALDFG 'hotspots'; (iv) prevention of harmful interactions between marine wildlife and fishing gear; (v) assistance with the prevention of conflict between gears; (vi) reduction of the risk of marine accidents and loss of life at sea; and (vii) facilitation of more effective management of fisheries (e.g., it may for some gear types contribute towards effort control).

BACKGROUND

3. The Eighteenth Session of the FAO Committee on Fisheries (COFI) held in Rome in 1989 noted the absence of international regulations, guidelines or common practices for the marking of fishing gear to determine ownership of fishing gear. It was further noted that the development of a standard for the marking of fishing gear would be of benefit to coastal States.

4. An FAO Expert Consultation on the Marking of Fishing Gear held in Canada on 14 -19 July 1991 presented[1] their findings (including the recommendations for the marking of the fishing gear[2]) to the Twentieth Session of COFI in March 1993. Some Members expressed their view that additional administrative burdens might accrue from the adoption of a common system for the marking of fishing gear. The Committee called for a further review of the draft recommendations for the Marking of Fishing Gear.

5. The 1994 FAO Expert Consultation on the Code of Conduct in relation to fishing operations included an agenda item on the marking of fishing gear. The Experts noted, *inter-alia*: (i) the necessity of reporting all lost gear in terms of numbers and location to national management entities; (ii) fishing industry and governments should consider efforts and means to recover ALDFG; and (iii) all fishing gear should be marked, as appropriate, in such a way so as to uniquely identify the ownership of the gear. Article 8.2.4 of the Code of Conduct (FAO 1995) states that fishing gear should be marked in accordance with national legislation in order that the owner of the gear can be identified and that gear marking requirements should take into account uniform and internationally recognizable gear marking systems.

6. More recently, several legally binding international instruments provide explicit requirements for the marking of fishing gear. For example, the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks[3], adopted in August 1995, includes as part of the duties of flag States the requirement for the marking of fishing vessels and fishing gear for identification in accordance with

[1] Report of the Expert Consultation on the Marking of Fishing Gear. *FAO Fisheries Report No. 485. FIIT/R485.* 1993. 42 p.
[2] Recommendations for the Marking of Fishing Gear. *Supplement to the Report of the Expert Consultation on the Marking of Fishing Gear. FAO Fisheries Report No. 485. Suppl. Rome, FAO, 1993. 48 p.*
[3] Agreement for the Implementation of the United Nations Convention on the Law of the Sea of December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, opened for signature 4 December 1995 (entered into force 11 December 2001), article 18.3(d).

uniform and internationally recognizable vessel and gear marking systems. Annex V of MARPOL 73/78[4] prohibits the disposal at sea of fishing gear made of synthetic material. The guidelines for the application of Annex V calls for fisheries managers to utilize fishing gear identification systems and encourages governments to consider the development of technology for more effective fishing gear identification. Furthermore, Annex B of the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing prescribes that inspectors shall examine the fishing gear to ensure that the markings correspond to those authorized for the vessel, a procedure that contributes to identifying illegal fishing gears.

7. Binding instruments are supplemented by voluntary instruments. For example, the FAO International Guidelines on Bycatch Management and Reduction of Discards (FAO 2011) calls on States and regional fisheries management organizations and arrangements (RFMO/As) to consider measures to address the impact of ghost fishing on living aquatic resources, including through actions for identification of gear ownership.

8. In addition, resolutions of the United Nations General Assembly (UNGA) are noteworthy. Since 2005 (A/RES/60/31, paragraphs 77 to 81), the UN General Assembly in its annual resolution on Sustainable Fisheries has called for action to address the issue of lost or abandoned fishing gear including through the collection of data on gear loss and its impacts, analysis of causes and solutions to gear loss, and the development and implementation of joint prevention and recovery programmes. In its most recent iteration the UN General Assembly resolution on Sustainable Fisheries (A/RES/70/75) calls for accelerated progress in regards to the above mentioned paragraphs and recommends action on the recommendations of the 2009 report by the United Nations Environment Programme and the Food and Agriculture Organization of the United Nations. The 2009 UNEP/FAO report on ALDFG[5] highlights action on gear marking as a key measure to prevent lost or abandoned fishing gear.

9. At the Thirty-first Session of COFI held in 2014 concern was expressed over the continued fishing by ALDFG and that greater attention should be paid by Members, regional fishery bodies (RFBs) and RFMOs to mitigate ALDFG impacts, noting that cost effective technologies and practices were available.

10. In response to the concerns described above, FAO convened an Expert Consultation on the Marking of Fishing Gear on 4-7 April 2016 at FAO Headquarters in Rome, Italy, with the purpose of developing guidelines to assist States, RFBs and RFMO/As, as well as the fishing sector in implementing the Code of Conduct for Responsible Fisheries by applying a system for the marking of fishing gear.

STATEMENT OF PURPOSE

11. These guidelines for the application of a system for the marking of fishing gear are a tool to contribute to sustainable fisheries and to improve the state of the marine environment by combatting ALDFG, and facilitating the identification and recovery of such gear. The guidelines may assist States in meeting their obligations under international law, including relevant international agreements and related governance frameworks, as well as contribute to improved safety at sea by reducing the hazard to navigation caused by ALDFG and helping to identify illegal, unreported and unregulated (IUU) fishing activities.

12. The purpose of these guidelines is to assist States and RFMO/As in developing and applying a system for the marking of fishing gear, that provide:

[4] The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).
[5] http://www.fao.org/docrep/011/i0620e/i0620e00.HTM

(i) practical means of locating and identifying the ownership of fishing gear;
(ii) guiding text on the development of appropriate marking systems;
(iii) a framework for undertaking risk assessment to identify the appropriateness or otherwise of implementing a system for marking fishing gear; and
(iv) a basis for the preparation of recommendations and regulations designed to minimize the abandonment and discarding of fishing gears.

13. These Guidelines take into account, *inter alia*, the following documents:

(i) The Code of Conduct for Responsible Fisheries;
(ii) The Report of the 1991 Expert Consultation on the Marking of Fishing Gear (FAO Fisheries Report No. 485, 1993);
(iii) The 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessel (the "Compliance Agreement") that provides for a system for the marking of fishing vessels;
(iv) The contents of Annex III (Proposed System for the Marking of Fishing Gear) and Annex IV (Proposal for the Application of a Standard System of Lights and Shapes for the Identification and Location of Fishing Gear) of the FAO Technical Guidelines for Responsible Fisheries. No.1. FAO (1996);
(v) MARPOL Annex V, which generally prohibits the discharge of all garbage into the sea, except as provided otherwise in regulations 4, 5, 6 and 7 of the Annex, which are related to food wastes, cargo residues, cleaning agents and additives and animal carcasses, as well as exceptions set out in regulation 7. Unless explicitly provided otherwise, MARPOL Annex V applies to all ships, which means all vessels of any type whatsoever, including fishing vessels, operating in the marine environment;
(vi) The 2003 FAO Technical Guidelines for Responsible Fisheries. Fisheries Management - 2. The Ecosystem Approach to Fisheries;
(vii) UNGA resolution 60/31, operational paragraphs 77-81, and UNGA resolution 70/75, operational paragraphs 174 and 175;
(viii) The 2009 FAO International Guidelines for the management of Deep-sea Fisheries in the High Seas;
(ix) The 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing;
(x) The 2011 FAO International Guidelines on Bycatch Management and Reduction of Discards;
(xi) The 2012 Guidelines for the implementation of MARPOL Annex V, adopted by IMO through resolution MEPC 219(63), as amended;
(xii) The IMO resolution A.1078(28) that invites governments concerned to implement the IMO Ship Identification Number Scheme; and
(xiii) Recommendations made by the Expert Consultation on the Marking of Fishing Gear held on 4-7 April 2016 in Rome.

14. The main text of these guidelines outlines the principles and considerations in developing a system for the marking of fishing gear. The Annexes provide some basic principles to be considered when preparing a risk assessment and technical specifications for gear marking.

15. These guidelines are to be interpreted and applied in conformity with the relevant rules of international law, as reflected in the United Nations Convention of the Law of the Sea of 10 December 1982 (1982 UN Convention). Nothing in these guidelines prejudices the rights, jurisdiction and duties of States under international law of the sea as reflected in the 1982 UN

Convention. In particular, nothing in these guidelines shall be construed to affect the right of States to adopt, maintain or expand more stringent requirements for the marking of fishing gear than those provided for in these guidelines, including such measures adopted pursuant to a decision of a RFMO/A.

SCOPE AND PRINCIPLES

16. These guidelines are voluntary and are intended to be global in scope. They apply to all fishing gear types used in fishing activities in all oceans, seas and inland waters.

17. A system of marking fishing gear should be put in place for all gear types unless the relevant authority deems otherwise, through risk assessment or other appropriate means. The level of complexity of the gear marking should be based upon the necessity and practicality of such a system.

18. A risk assessment can also facilitate prioritization of actions and guide additional phased mitigation approaches. These would be based on the level of severity and likelihood of potential impacts of different fisheries, using the best available information at the time of the assessment.

19. A system for the marking of fishing gear should be designed to take into account the practical requirements of the fishery to which it applies and the responsibilities of the States as flag, coastal, port and market States and, where appropriate, as members of RFBs and RFMO/As.

20. There should be an active, inclusive and informed participation of interested parties, including fishing communities, in the whole decision-making process for the development, implementation and regulation of a gear marking system in a transparent and open manner.

21. The system for the marking of fishing gear should:

(i) build on an assessment of risks associated with ALDFG so that gear marking actions are prioritized and proportional with the identified risks, and be designed to mitigate these risks effectively;
(ii) provide a simple, pragmatic, affordable and verifiable means of identifying the ownership and position of fishing gear, and its link with the vessel(s), or operator(s) undertaking the fishing operations;
(iii) to the extent possible, be compatible with related traceability and certification systems;
(iv) be supported by a monitoring process that ensures that the system is responsive to the changing conditions of all stakeholders;
(v) aid resource management systems and meet obligations of international conventions;
(vi) link, through any authorization to fish, to any vessel(s) or operator(s) engaged in fishing and related operations;
(vii) be consistent with MARPOL Annex V and associated guidelines, and contribute to implementing regulation 10.6 relating to reporting requirements; and
(viii) ensure employment of methods that do not pose an environmental risk, e.g. plastic pollution.

22. The system of marking of fishing gear should be set out in, or supported by, national and sub-national legislation, and regional legal frameworks as appropriate, without prejudice to existing measures that achieve the same effect.

23. Where the guidelines recommend that a particular mark be fitted on a fishing gear, or other marking specification be complied with, the relevant national authority, RFB or RFMO/A, as appropriate, may allow other mark or marking specification, provided it satisfies the minimum requirements set in these guidelines and further aids in the marking of gear.

24. The risk assessments referred to in this section should address the potential risks to navigation, safety and the environment, and the benefits of having an effective gear marking and reporting system established in a fishery. The criteria to be considered when preparing a risk assessment are set out in Annex A.

DEFINITIONS

25. For the purpose of these guidelines:

26. The term 'fishing gear' to be marked refers to:

(i) any physical device or part thereof or combination of items that may be placed on or in the water or on the seabed with the intended purpose of capturing or controlling for subsequent capture or harvesting, marine or fresh water organisms, in accordance with MARPOL Annex V; and
(ii) any other type of equipment likely to contribute to the capture of aquatic organisms whether or not it is used in association with a vessel.

27. The term "mark" is:

(i) an identifier, including the types described in Annex B.1, that allows the relevant authority to discern the party ultimately responsible for the deployment of the fishing gear; and / or
(ii) a means of providing an understanding of the location, scale and nature of fishing gear in the water.

28. The term "fish aggregating device" (FAD) refers to a permanent, semi-permanent or temporary structure or device made from any material and used over time to aggregate fish for subsequent capture. FADs can be either anchored or drifting.

29. The term "abandoned fishing gear" means fishing gear that is deliberately left at sea with no intention by fishers to retrieve it, for whatever reason.

30. The term "discarded fishing gear" means fishing gear that is deliberately thrown overboard or released without any intention for further control or recovery.

31. The term "lost fishing gear" means fishing gear that is accidentally lost at sea.

IMPLEMENTATION OF A GEAR MARKING SYSTEM

32. The relevant policy making authorities, with the participation of interested parties, should decide:

(i) on the use of a system, if applicable, for the marking of fishing gear;
(ii) the fisheries, fishing gears, vessels or areas to which the system applies to, and conditions for implementation, or the grant of exemptions from, the agreed system; and
(iii) reporting procedures, data storage, retrieval and information exchange.

33. States should cooperate, either bilaterally or through subregional or regional fishery bodies, including RFMO/As, as appropriate, on the establishment, implementation and harmonization of fishing gear marking schemes as deemed necessary and appropriate.

34. The system of marking of fishing gear should be designed to carry sufficient information to achieve its intended benefits as laid out in Paragraph 11. To this end, the system of marking of fishing gear should provide for the components, aspects, requirements and specifications set out in the guidelines, including:

(i) reporting of ALDFG;
(ii) reporting of fishing gear found;

(iii) recovery of ALDFG; and
(iv) where possible, the safe and environmentally sound disposal of unwanted gear.

35. The systems of the marking of fishing gear should be designed to make their implementation as feasible as possible to ensure their adoption.

36. Where the marking of fishing gear is required, it should be a condition of any authorization to fish. Where there is no authorization to fish required, a system of marking of fishing gear may be implemented as part of the fisheries management system when deemed both necessary and practical.

37. An owner (or authorized operator[6]) of fishing gear should be allocated a mark or other identifier that would apply to the relevant fishing gear and fishing implements so owned.

38. When the fishing gear is associated with a registered fishing vessel, if feasible, the mark allocated for the gear and implements should match the vessel registration details (e.g. the port letters and numbers or IMO number[7], if available).

39. The relevant authority may authorize the use of a common mark to a company, organization of fishers or similar entity, if it can be demonstrated that the fishing gear to be marked can be used by more than one group of users or vessels on a rotational or common pool basis. When feasible, such identification marks should be followed by an individual gear identifier, and the owner(s) should keep a log of the physical location of the gear.

40. In case of a mothership operation, the fishing gear carried by the catcher vessels may carry the fishing gear mark of the mothership.

41. Marks should be of a type and design approved by the competent authority and fitted in accordance with technical specifications in Annex B.2.

42. Such marks could be documented in the form of a fishing gear record or through a fishing licensing or authorization system. Information associated with the mark should be recorded and incorporated into the existing fishery licensing system, if applicable.

43. Further details of the different elements of gear marking are contained in Annex B and C as follows:

(i) examples of the type of gear marks to identify ownership and other information (Annex B.1);
(ii) recommendations with regard to where marks should be attached for the various fishing gear (Annex B.2); and
(iii) guidance for the marking of fishing gear to indicate position (Annex C).

CONTROL AND MONITORING

44. States, and regional and subregional fishery bodies, including RFMO/As, should ensure that control and enforcement of a system for the marking of fishing gear is an integral part of arrangements for the monitoring, control and surveillance of fisheries.

45. These arrangements should provide for the application of appropriate penalties or sanctions for non-compliance with the various requirements of the fishing gear marking system.

[6] The skipper/operator of the vessel, or person in charge of the vessel, if different from the owner, or gear operator where no vessel is used, should be considered to be acting for owner.
[7] According to the provisions of the resolution A.1078 (28) – IMO Ship Identification Number Scheme, adopted on 4 December 2013.

46. Inspections should be carried out by the relevant authority to verify that owners and operators mark their fishing gear as required.

47. Port State inspection of fishing gear should be conducted in accordance with the procedures set out in Annex B, paragraph e) of the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, including conditions in relation to marking of the fishing gear.

48. Relevant authorities, in developing mechanisms for the traceability of gear marks, should make appropriate provisions for loss, damage and replacement of individual marks. Where tags are used as a gear mark, in the event of a tag being lost, damaged or illegible, the owner should provide as soon as practicable to the relevant fisheries authority a declaration detailing the circumstances of the loss and requesting provision of new tag(s).

49. Deployed gear that is found without required marks should be reported to the relevant authority.

REPORTING OF ABANDONED, LOST OR OTHERWISE DISCARDED FISHING GEAR

50. Recalling the provisions of paragraphs 32 and 34 above, the reporting by fishing operators of the ALDFG to the relevant authority could be one of the conditions of the authorization to fish.

51. Relevant authorities should establish appropriate reporting regimes. Reports should be made to the flag State, and where appropriate, to the relevant authority that issued any relevant gear mark, and to the coastal State in whose jurisdiction the loss of the fishing gear occurred.

52. A record/register of fishing gear reported as being found, lost, abandoned, or otherwise disposed of[8] should be maintained by the relevant authority. This record/register should include details of:

(i) type and characteristics of the fishing gear;
(ii) any fishing gear mark(s) and other identifiers;
(iii) date, time, position of loss or retrieval, depth of water, etc.;
(iv) reason for loss (if known);
(v) weather conditions; and
(vi) any other relevant information including entrapment of endangered, threatened or protected species.

53. States should provide information about ALDFG available to relevant RFMO/As, other relevant organizations and entities, including stakeholders, as appropriate. Reciprocal arrangements should apply, as appropriate.

RECOVERY OF ABANDONED, LOST OR OTHERWISE DISCARDED FISHING GEAR

54. Every reasonable effort should be made by the owner/operator of the fishing gear to retrieve lost or abandoned fishing gear. In the event of failure of recovery, it should be reported through the agreed channels to the relevant authority, who should plan for, and implement, cost-effective arrangements for recovery of lost or abandoned fishing gears.

55. The recovery of lost, abandoned or otherwise discarded fishing gears should be undertaken with due regard to human safety and the subsequent damage such retrieval may have on the aquatic environment and habitat.

56. Priority should be given to the retrieval of gear that:

(i) presents a hazard to the navigation of surface and sub-surface vessels;
(ii) fouls on critical, vulnerable or otherwise sensitive habitats;

[8] Includes fishing gear sold or put ashore and destroyed.

(iii) poses an entanglement threat to marine wildlife;
(iv) becomes a hazard or impediment to fishing; or
(v) has the potential of ghost fishing.

57. ALDFG may be a danger to navigation; the owner of the gear concerned should immediately warn other vessels in the vicinity, as well as the relevant authority, giving details of the gear and its last known position. The relevant authority should use the most effective means to give a general warning to other vessels.

58. States are encouraged to develop communication frameworks to enable the recording and sharing of information on fishing gear loss, where necessary, in order to reduce loss and facilitate recovery of fishing gear. States are further encouraged to develop frameworks to assist fishing vessels in reporting the loss of gear to the flag State, and where appropriate, to the coastal State in whose jurisdiction the loss of the fishing gear occurred. Such frameworks should take into consideration implementation challenges in small scale and artisanal fisheries and recreational operations.

59. The relevant authority and the fishing industry should encourage owners of the fishing gear to have adequate equipment and training available to facilitate the recovery of ALDFG. Where possible, the owner and the relevant authority should collaborate to enhance recovery efforts. Owners (national or foreign) should be informed of gear recovered (where appropriately marked) so that they can collect the recovered gear for re-use or safe disposal.

60. Redundant and unusable gear should be disposed of responsibly on land. States should ensure the provision of adequate port reception facilities for the disposal of fishing gear in accordance with MARPOL Annex V.

COMMERCIAL TRACEABILITY OF FISHING GEAR MARKING

61. Gear manufacturers and suppliers should be encouraged to facilitate traceability across the supply chain, from production to use and subsequent disposal. Such traceability could include marking with manufacturer name, year of manufacture, type of product and production batch. These marking systems should be linked to standard record-keeping practices of commercial transactions. Retailers of fishing gear, if different from the manufacturer, should include these batch numbers in their record keeping.

62. Fishing companies, including associations promoting the interests of the fishing industry, should require their suppliers to operate in conformance with the present guidelines or applicable local legislation to the same effect.

63. Due consideration should be given to making compliance with these guidelines an integral part of assessments linked with sustainable seafood certification initiatives.

FISH AGGREGATING DEVICES

64. The authorization to fish using any form of FAD (anchored or drifting, single or multiple) should be made on the condition that they are marked, applying the same principles as other fishing gear.

65. For unattended FADs that are allowed to drift, in addition to the identifier mark, some means of providing real-time information on the location of the FAD, such as an electronic transponder, where practicable, should be provided. Location information should be provided in near real-time to the relevant authority for monitoring purposes.

66. In the design of a marking system for FADs, relevant authorities should clearly define when a FAD is considered lost, discarded or abandoned.

67. When FADs are lost or abandoned, the relevant authorities should be notified of the last known position for the FAD by the FAD operator.

68. Responsibility for the recovery of lost, abandoned or discarded FADs lies with the owner, in cooperation with relevant authorities with due regard to other conditions within the guidelines.

MARKING THE POSITION OF A GEAR IN THE WATER COLUMN

69. In order to protect fishers and their gear and to warn other vessels of the presence of deployed fishing gear, States should make provisions in national legislation for the adoption of a standard system of lights and shapes for the identification of fishing gear and for marking its position in the water.

70. States should make provisions for the inclusion of the details of the system in training programmes for fishers and other vessel operators.

71. Where the marking of fishing gear is required, the need to comply with a system of lights and shapes should be a condition of any authorization to fish. Where no authorization to fish is required, a system of marking and lighting of fishing gear may be implemented as part of the fisheries management system when deemed both necessary and practical.

72. Care should be taken that lights and shapes which indicate the position of fishing gear do not conflict with navigation marks or systems. The system should take into account:

(i) the provisions of the International Regulations for the Prevention of Collisions at Sea (COLREGS);
(ii) any local rules, including rules of navigation governing river, lake or coastal waters;
(iii) regulations pertaining to offshore structures; and
(iv) systems for the marking of fishing gear for the identification of ownership.

73. In addition to marks, suitable electronic devices such as beacons and transponders which automatically indicate their position by means of signals relayed through satellites or radio systems may be employed with the approval of any relevant authority. However, due regard should be given to the need and obligation of the relevant authority to ensure that such devices do not conflict with other similar devices employed for navigation and search and rescue purposes.

74. In a similar manner, the relevant authority should ensure that signals emitted by such devices fitted to fishing gear do not interfere with internationally allocated radio frequencies.

75. Further guidance in marking fishing gear so that its presence and extent in the aquatic environment is obvious to other vessels is provided in Annex C.

RESEARCH AND DEVELOPMENT

76. States, RFMO/As, and other interested parties, should, alone or in cooperation, conduct studies that would facilitate the development and adoption of new technologies and procedures related to the marking of fishing gear, including, *inter alia*, the monitoring and retrieving of ALDFG.

AWARENESS RAISING, COMMUNICATION AND CAPACITY DEVELOPMENT

77. States, RFMO/As, and other interested parties, should cooperate to identify and share best practices, collate and share information, as well as coordinate effective communication and training.

78. All parties should raise awareness of the problems caused by ALDFG and provide States, relevant stakeholders and the general public a clear purpose and rationale why it is necessary and beneficial to properly mark fishing gear.

79. Constraints to the effective implementation of a system for gear marking should be identified. Adequate education, training and other forms of capacity-development should be provided to fishers, relevant authorities and other interested parties to facilitate the implementation of the gear marking system.

80. States, RFMO/As and fishing sectors that require additional resources to develop or conduct capacity-development in gear marking should partner or collaborate with appropriate organizations, NGOs, commercial entities or other national governments in order to fully avail of the benefits of the system of gear marking, including, *inter alia*, the monitoring and retrieving of ALDFG.

SPECIAL REQUIREMENTS OF DEVELOPING STATES AND SMALL SCALE FISHERIES

81. Consideration should be given to enhancing the capacity of developing States to develop and adopt appropriate technology and knowledge in gear marking through financial and technical assistance and cooperation, technology transfer and training, in conformity with international law and FAO Code of Conduct for Responsible Fisheries and its related instruments.

82. States should give full recognition to the special requirements of developing States and small-scale fisheries in relation to their capacity to implement a system of gear marking consistent with these guidelines, including the assessment of risk and feasibility. States may, either directly or through international organizations including RFMO/As and other relevant partners, provide assistance to developing States in order to:

(i) enhance, and where necessary develop, adequate legal and regulatory frameworks for a system of gear marking;
(ii) strengthen the institutional arrangements and infrastructure needed to ensure effective implementation of a system of gear marking;
(iii) develop, implement and improve practical and effective control and monitoring systems; and
(iv) build institutional and human resource capacity.

83. Special requirements of least-developed and Small Island Developing States (SIDS) should be recognized. States may, either directly or through FAO, assess the special requirements of these States to implement these guidelines.

84. States may cooperate to establish appropriate funding mechanisms to assist developing States to implement these guidelines. These mechanisms may be directed specifically towards developing and enhancing the capacity of the States to implement these guidelines, and may include technical and financial assistance.

ADDITIONAL CONSIDERATIONS

85. FAO will, as and to the extent directed by its mandate, promote the use and collect relevant information on global implementation of these guidelines and report this information, as requested, to the FAO Committee on Fisheries.

ANNEXES

General

Annex A presents Risk Assessment Criteria to assist in determining the appropriateness or otherwise of implementing a system for marking fishing gear.

Annex B is comprised of two parts. The first part (Annex B.1) gives a brief description of the type of marks that are used or could be used to attach to the fishing gear to identify information such as the ownership of fishing gear. The second part (Annex B.2) gives recommendations with regard to where marks could be attached for the various fishing gears.

Annex C deals with the rules to be observed in marking fishing gear so its presence and extent is obvious to other seafarers.

ANNEX A

RISK ASSESSMENT CRITERIA TO ASSIST IN DETERMINING THE APPROPRIATENESS OR OTHERWISE OF IMPLEMENTING A SYSTEM FOR MARKING FISHING GEAR

Before a full risk assessment is undertaken, a simple yes/no assessment may be conducted based on the type of fishing gear and points of marking as suggested in Annex B.2 and the area of operation. This will allow simple small-scale methods, usually hand-held fishing gears, to be assessed without the need for a full risk assessment.

A risk assessment should be carried out to evaluate available data and information on both the fishery in which the gear is used and the ecological and economic characteristics in which the fishery is undertaken. Based on this information, an assessment should be conducted to determine the risk (i) of serious, unavoidable or irreversible ecological harm and (ii) to safety at sea associated with the current level of gear marking in the fishery in question.

The determination of risk levels involves four primary steps:

(i) Estimation of the consequence (impact) of the lack of a gear marking system and the fishery under consideration;
(ii) Estimation of the likelihood of occurrence (probability) of the identified impacts, occurring as a result of the lack of a gear marking system in the fishery under consideration;
(iii) Scoring of the risk; and
(iv) Categorization of the risk.

The specific criteria addressed in the risk assessment should be based on the specific fishery conditions under consideration. Notwithstanding, the scope of a risk assessment should include parameters influencing consequences and impacts including, *inter alia*:

(i) Ecological risks: Status of species impacted, habitats fished, vulnerability and fragility of the species and habitats where the fishery takes place and taking into account that ALDFG may drift large distances and settle in areas outside the fishery of concern, in areas beyond national jurisdiction or in another national jurisdiction;
(ii) Economic risks: Level of effort, the value of the fishery, economic nature of the fishery (subsistence, industrial) and the potential for IUU fishing);
(iii) Technological risks: Gear type, numbers of gears, numbers of vessels, method of operation;
(iv) Safety and Navigational risks;
(v) Social and cultural risks: Different users, language competencies, level of organization;
(vi) Availability of information and the quality of information; and
(vii) The synergies to be derived from harmonizing gear marking systems.

Determining a risk level requires defensible estimates of the consequences and likelihood. To be able to defend estimates, a clear rationale should be provided on how estimated levels were chosen, so that the process can be traced and verified. A clear rationale also provides a basis from which future assessments can be measured. The information, data and expert opinion collected and consolidated through the initial scoping exercise form the basis for that rationale, with additional information being provided where appropriate and necessary.

Further information to consider in the risk assessment process

Feasibility and affordability

In addition to the risk assessment, decisions should also be informed by an assessment of the feasibility of implementing a system for the marking of gear and of the related cost/benefit issues. Accordingly, the assessment could address the following basic questions:

(i) Is the technology associated with the system feasible, cost-effective and fit for the required purpose?
(ii) Will the technology mature over time?
(iii) Are there any technical barriers to integrating the capability within the current fishery system?
(iv) How would the gear marking system affect the efficiency of the fishery (i.e., reduced CPUE, added down time, associated costs, etc.)?
a) What measures would be necessary to assist the fleet into implementation of gear marking?
b) What resources would be available to ensure successful implementation?
(v) Does the gear marking system add potential hazards or interference to regular fishing activities?
(vi) Do the States in question have the administrative and economic capacity to implement and monitor the system?
(vii) What capacity building and/or funding needs should be considered (both in terms of administrations and fishery operators)?

Participation

Arrangements for conducting risk assessments and associated decisions should be carried out with balanced participation by independent technical experts and by representatives of interested parties in system development, revision and approval processes. Development of gear marking systems should, wherever possible, include representatives of fisheries management authorities, the fishing sector, the scientific community, and environmental groups, consumer associations, and any other relevant stakeholders.

Transparency

Risk assessments and associated decision making should be carried out in a transparent fashion and follow written rules of procedure. Once a risk assessment has been completed, it should be promptly published and where possible be accessible electronically by the public.

ANNEX B.1

TYPE OF GEAR MARKS FOR IDENTIFICATION

Introduction

This section gives a brief description of the type of marking identifiers that are used and could be used to attach to the fishing gear to provide information, such as the ownership of fishing gear, and which could be used in fisheries management, proof of ownership and in pollution control.

The type of mark

The actual method or device used to display or carry information set out in paragraph 24 in the Guidelines, hereinafter referred to as the "mark" or "marks", should to the extent possible be:

(i) cost-effective;
(ii) easily manufactured having regard to locally available materials;
(iii) easily integrated, printed, inscribed or embossed on the fishing gear, or attached or bonded to the fishing gear;
(iv) easily read or deciphered by persons engaged in fisheries monitoring and control, and in fisheries compliance in general;
(v) durable with a high reliability of remaining attached and readable;
(vi) for surface marks, to the extent possible, visible at a sufficient distance so as to allow the marks to be identified without physical contact with the fishing gear;
(vii) when the relevant authority inspects fishing gear on the surface or the gear is lifted to the surface, the required mark should be accessible, legible and attached in a manner that will ensure a safe inspection;
(viii) environmentally neutral to the marine environment and posing a minimal risk of becoming marine debris; and
(ix) minimal interference to the operation and performance of the fishing gear and capable of accepting a variety of printed, embossed or electronically stored data.

Examples of gear marks (identifiers)

Gear identification essentially entails the marking of fishing vessel or other details on fishing gear, thus allowing gear to be identified; both when fishing or potentially if it becomes an ALDFG. Various new technologies have been developed to address this as follows:

Electronic tagging, such as Radio Frequency Identification (RFID) identifiers, can be produced with reasonable costs and be embedded with large amounts of user-definable information. One limitation is the relative short reading distance that is dependent on the size and type of the device. In many cases, the gear will have to be hauled up in order to access RFID data, which is not desirable for inspection by control agencies.

Coded wire tags can be implanted into netting and scanned for identifying data when required.

Hand-held laser read bar coding is an easy and cheap method to produce and print onto "plastic" tags.

Colour coded ropes can be used to distinguish between categories of gear, for instance from fishers based in specific management areas, gears from different fishing companies and suppliers, and so forth. In some instances, a particular fishery has opted to obtain all of its nets in a specific colour, different to that of other nearby fisheries in order to easily identify its own nets.

Rogue yarn, or colour tracers, are yarns of different colour or otherwise visibly different from the rest, that can be built into multi-strand ropes and twines. As with colour coded rope, this method is suited for marking categories of gears rather than as unique identifiers of vessels and owners. Reliable interpretation of gears

based on rope coloration and rogue yarn requires establishment of agreed marking convention among authorities and operators in a given fisheries management region.

Internal marker tapes are narrow tapes made from common rope-making materials on which information can be printed on. Marker tapes can be integrated in braided and twisted ropes in a range of ways. The method is particularly useful for facilitating identification of parts of fishing gears where other marks have been lost.

Metal stamping is an inexpensive method for marking metal components of fishing gears with desired information. For instance, this method is used to mark fishing hooks with codes corresponding to vessel in certain longline fisheries. Metal stamping can be used in many situations, and like colour coding and rogue yarn, is a feasible method of marking batches or categories of gears.

Stamping or **banding** with inscribed identification can be secured around lines (e.g., leadlines, corklines, headropes, footropes) in multiple locations to increase probability of identifying ownership of portions of ALDFG or those entangled on marine animals when the entire gear is not available.

Radio surface transponders are a common feature in many large-scale fisheries with the satellite tracking of vessels for safety and MCS purposes, and the use of radio transponders on gear (as in marker buoys or floats) is becoming more readily available. The fitting of transponders to gear improves the ability to locate gear in the water. This is an added cost to the fisher and is therefore most likely to be used, or is already being used, by fishing operations where gear tends to be larger and more expensive than in small scale and artisanal fisheries.

Acoustic transponders which transmit acoustic signals at specific frequencies from transmitters connected to subsea structures, are used as markers and tracking- and location devices in marine industries. Other acoustic systems include long range cetacean deterrent (pinger) detection devices which have been developed to detect gillnets from vessels which possess hydrophone/receiver systems. This type of technology could potentially be applied to GMS (Groupe Spécial Mobile), with transmitters located for example at the bottom of surface floats or near the counter weight, and transmitted signals picked up by receivers on-board control and enforcement vessel.

Metal/steel tags – metal or steel tag-type marks with inscribed identification are low cost, can be attached to multiple gear types and components and may (depending on risk assessment) be acceptable to use in some cases. Similar marks made of plastic should not be used due to the environmental risk posed by plastic.

Additional considerations

In many cases, only portions of the full component of gear are lost, and therefore redundancy in gear marking is an important consideration. Achieving a balance of providing adequate identification information on different parts of the gear in case only parts of the total gear are recovered with associated cost and performance / handling implications is an issue that deserves attention. Seine, gillnet and other similar gear types could be identified on the corks (floats) at regular intervals along the cork line as a method that would minimize risk of an individual panel or piece of net being lost and unidentifiable. However, when seine and gill nets are lost, the most commonly recovered component is the cork line, leaving webbing, lead line and other components. Therefore, redundancy of marking on multiple gear components may be advised for certain gear types.

Identifiers could also be used to attach marks to fishing gear or its attachments (e.g. turtle excluder devices) that had been inspected and found to conform to the standards set by the fisheries authority.

Trawl doors and other equipment used in fishing operations should be marked with the vessel's registration or IMO number. Vessel's identifier can be welded in the case of steel otter boards, or carved in the case of wooden boards, on areas that it is less likely be obliterated due to abrasion. The steel and wooden beams used by beam trawlers can be marked in a similar fashion.

Integrating gear positioning into e-reporting and e-monitoring: one approach to improving gear marking and providing spatial information on the location of passive gear is using global positioning system (GPS) data

and integrating this into electronic reporting (e-reporting) and monitoring (e-monitoring) systems. This allows skippers to electronically mark the start and finish of passive gear shooting and potentially sharing this data with other marine users and control authorities. There are evident concerns of confidentiality, cost and software compatibility, but such reporting could solve issues of gear conflict over busy areas such as banks that might be targeted by both mobile and static fishers.

ANNEX B.2

SUGGESTED LOCATION OF MARKS IN RELATION TO GEAR TYPE

Gear Type	Points of Marking[9]	Comments[10]
SURROUNDING NETS e.g. Purse seines	1. At each end of the headline (floatline), and if applicable, incrementally along the leadline. 2. On the spar buoys and supplementary buoys if used. 3. On different netting panel, when practicable and applicable.	• *These nets are not lost often, and when lost, webbing may sink to bottom, potentially causing damage to reef systems or other habitat.* • *Surrounding nets are unlikely to be broken into smaller pieces.* • *Due to the size and cost of these nets, repairs are usually carried out on shore.* • *During the operation there is no significant hazard to navigation as the gear is near the vessel which displays the appropriate lights and shapes.*
SEINE NETS Beach Seines Boat Seines	1. At each end and on the floats of headline. 2. On the codend, if applicable. 3. On each main netting panel.	• *Beach seines usually are no significant danger to navigation as they are operated close to shore. They are unlikely to be lost at sea.* • *Boat seines, however, often cover a larger area of sea bed in initial stage of setting, therefore is liable to loss or damage on bottom obstructions.* • *Webbing panels may be buoyant and could present problems to navigations as well as through entanglement.*
TRAWLS		
Beam Trawls	1. Mark placed immediately behind each sled on the webbing. 2. A weld bead or carved mark on center of the main beam. 3. On the the ending bag or codend	• *Usually very ruggedly constructed, with relatively little net webbing.* • *Sometimes very heavily weighted with chain.*
Bottom Otter Trawls Bottom Pair Trawls Mid-water Otter Trawls	1. Mark on each major panel of webbing, especially the codend and bellies (see below the additional information on the marking of towed gears).	• *Bottom trawls in general sink and are no major hazard to navigation but may still potential hazard to fishing operations.* • *The webbing of mid-water trawl may float and may therefore be a major navigational hazard if lost.*

[9] These are general recommendations; the most suitable location of marking may largely differ depending on marking method and the specific gear design. The location where the mark is attached should facilitate a safe and effective inspection by the relevant authority.

[10] In the present version of Annex B.2, comments are added to stimulate discussion on the particular fishing gear's effect on the environment and on other relevant issues. In the final version, these comments can be removed if they are considered not necessary.

Mid-water Pair Trawls Otter Twin Trawls Separator trawls	2. Otter boards should be marked as described below. 3. Dropper weights, if applicable, should be marked. 4. Marking of central clumps (weights) in the case of twin and multi-rigs, when appropriate.	• *When gear is in contact with the bottom, it has a risk to lose netting panels and other components, and is liable to habitat damage.* • *Heavy weights used in midwater trawl on each lower wing end should be marked.*
DREDGES	1. On the webbing immediately behind the frame, when applicable. 2. A weld bead mark on center of the upper frame. 3. The towing beam, where used, should be marked with a weld bead mark.	• *Relatively small and largely made of steel.* • *Constitutes no risk to navigation and little pollution hazard.*
LIFT NETS	1. If single panel, one identity mark at the corner.	
FALLING GEAR Cast Nets Other falling gear	1. At the toe of ending bag or codend, if considered necessary. 2. Identity marks to be placed where applicable.	• *Mark must be very light and not adversely affect the performance of the gear.*
GILLNETS AND ENTANGLING NETS Set Gillnets Drifting Gillnets (Driftnets) Encircling Gillnets Fixed Gillnets (on stakes) Trammel Net Combined Gillnets-Trammel Nets Drift Trammel Nets Bottom drift nets	1. Mark at each end of the headline rope, and at suitable intervals along the headline, if longer than 200 m. 2. The mark may be inscribed also on floats of the headline, when applicable. 3. Incremental marking along the leadline, when applicable. 4. Marker buoys and flags should be marked.	• *Localized environmental pollution can occur when lost or discarded nets accumulate on beaches or oceanic convergences, or when "ghost fishing" occurs.* • *These nets can also constitute a navigational hazard to other fishers and users of the marine environment and should always be marked in accordance with the Guidelines.* • *The existence of these nets is only evident to other fishers and other users of the marine environment by the presence of marker buoys, which should be placed at each end and at suitable intermediate positions.* • *Some types of marks can catch the web and cause serious complications in deploying or retrieving gear.*
TRAPS & POTS		
Pound Nets Set nets Fyke Nets	1. Mark to be placed where there is easy access (e.g., top leader ends and at the pockets at the shore side of the leader, at the corner of the wings). 2. At the corner for each net panel or upper line at appropriate intervals, or at	• *Low risk of environmental pollution, but have been known to entrap marine megafauna.* • *Large pound nets may constitute a navigational hazard if set close to navigational fairways. In such a case, they should be fitted with lights and radar reflectors, or with any other appropriate surface markers.*

	some floats, when applicable.	• *Fyke nets are usually smaller and are set in shallow water or in rivers and in general do not constitute a major navigational hazard (except when close to navigational fairways) or pollution risk.*
Pots Creels Traps	1. Each individual trap and pot should be marked 2. Each float or marker buoy should be marked	• *A large variety of shape and sizes of traps and pots are in use and can be set individually or in series on a leader.* • *No navigational hazard if well marked.* • *Potential environmental impact in "ghost fishing".* • *Buoy lines may be a significant entanglement hazard for megafauna.*
Stow Nets	1. Marks at the center of each headline or upper frame 2. On the toe end of each netting bag.	• *Stow nets are usually set in very shallow water (10 to 15 m) and can constitute a navigational hazard close to navigational fairways.* • *In the case of a stow net used from a vessel, the vessel should show the lights and marks appropriate for an anchored vessel engaged in fishing.* • *These nets are of a relatively small size and do not constitute an environmental hazard.*
Barriers, Fences, Weirs, etc.	1. Marks to be placed where there is easy access (i.e. top leader ends and pockets).	• *Large barriers and fences may constitute a navigational hazard.*
HOOKS AND LINES (including jigging gears)		
Handlines and Pole lines (Hand operated) Handlines and Pole lines (Mechanized)	1. No marks recommended, but vessel marked for licensing reasons.	• *Constitutes no danger to navigation, very little risk of pollution.* • *Machines are normally marked with serial number which would be entered in the ships inventory*
Set Longlines Drifting Longlines Trotlines Vertical longlines Droplines	1. Marks should be on the longline at each end and at suitable intervals. 2. Floats and buoys should also be marked. 3. Radio or satellite buoys where appropriate or possible at each end and at intervals of 6-7 nm.	• *A longline can be made up of various units and may be up to 40 km in length.* • *Longlines set close to the surface constitute a navigational hazard to other users of the marine environment and should be marked in accordance with the Guidelines.* • *The existence of these longlines are only evident to other fishermen and users of the marine environment by the presence of marker buoys, which should be placed at each end and at intermediate positions.* • *To avoid gear conflict such as between trawlers and demersal longlines, where it is not feasible to*

		mark the presence of demersal lines throughout their extent, area based management or active communication between fishermen with different gears is essential to prevent frequent gear loss. • *If there is only marking every 500 m, then potentially up to 500 m sections of unmarked line could still be floating around the ocean.*
Trolling Lines		• *No marks required on the fishing gear, but the vessel should be marked.*
GRAPPLING AND WOUNDING GEAR Harpoons	1. Mark should not be close to the active part of the gear and should not be on the pole or handle.	• *One of the simplest of fishing gears, but has been used widely to avoid fisheries regulations, and was one of the first fishing gears to require marks by legislation for this reason.*
HARVESTING MACHINES (Pumps etc.)		• *Normally marked as part of the vessel's machinery.*
FISH AGGREGATION DEVICES	1. The mark indicating ownership of a FAD should be placed in a conspicuous position and attached to the buoy system 2. Webbing used as an aggregator should have the mark of the vessel embedded in it. 3. Radio or Satellite buoys marked and attached for both monitoring and tracking	• *The marking to indicate position should include flags, radar reflectors and lights as appropriate.* • *Tracking mechanisms could be mandatory to implement in FADs (in addition to identification tags).*

Additional recommendations for the marking of towed nets

To facilitate owner identification when a complete net or webbed section of a towed net (typically various types of trawls) is recovered, it is essential to have identification marks. These nets are often very large with numerous webbed or rope sections. However, completed nets generally do not have more than a few major components (panels). These components include wings, bellies, squares, side panels, lengthening or extension pieces and codend. These nets should be identified with a minimum of three marks as indicated below.

Wing end

Suggested point of marking

Marks should be located at the right upper wing end and should be attached to the head rope.

Suggested type of mark

Marks, with proper encoded information, should be attached to gear in a manner that will prevent tag from moving on net during regular handling of the gear.

Lower panel

As this part is highly vulnerable to damage or loss, one mark to identify ownership should be attached to this webbing panel. This is considered sufficient marking for the web sections of the net (excluding the codend), as reported accidental losses are usually lower panels or entire nets.

Suggested point of markings

Marks should be located at the posterior edge of the first belly, five meshes before the joining to the second belly, and near the center of the panel (at minimum).

Suggested type of marks

Marks must be abrasion-resistant and non-corrosive with encoded information. The type of mark used should not alter the webbing performance. The above noted marks are required for any types of towed gear (except dredge and lampara seine) where the netting is the principal material. This is the minimum requirement and does not include a codend mark.

Codend

Marking the codend meets a multi-purpose requirement to:

i. identify ownership (recovery of codend or net);
ii. serve as a conservation measure;
iii. provide an indication of certification; and
iv. provide identification during transfer operations.

Suggested point of marking

Marks should be on the anterior edge of the top panel, five meshes down from the joining, (lengthening piece to codend) attached to the lacing (selvedge) of the upper section of the codend.

Suggested type of mark

Mini or cable lock seal with proper encoded information.

ANNEX C

GUIDANCE FOR THE MARKING OF FISHING GEAR TO INDICATE POSITION

One of the key purpose of gear marking is to allow fishing vessels, control authorities and other maritime users to easily locate and therefore avoid fishing gear that has been deployed, especially where the responsible fishing vessel is absent. The key requirements for the marking of fishing gear are as follows:

i. Marking equipment (e.g. flags, lights, buoys, etc.) should be in a suitable size so as not to alter the fishing characteristics of the gear and affect handling on deck, with consequence for crew safety and vessel stability.
ii. Marking equipment should not be difficult and dangerous to deploy and retrieve.
iii. Radar reflectors should be designed without sharp edges. They should be effective and reliably detectable.
iv. Lighting should be powerful, robust, energy efficient and compact.
v. Marking need to be affordable in the context of the fishery involved.

Buoys, fitted with lights, radar reflectors and flags, increase the visibility of the spar buoy on the fishing gear to approaching vessels and assists them to navigate safely around the fishing gear. It also enables the owner to detect the marker at a greater distance. In addition, the cardinal system of shapes and lights would indicate the direction in which the passive gear is lying so that mobile gear vessel can fish in the vicinity without causing gear conflict which often cause loss of gear.

Nets and line that are set less than 2 m from the surface are considered to be a special navigational hazard to passing vessels, therefore they are subject to a more rigorous marking regime. For these fishing gears, spaces ("gates") should be left in the nets and line so that small vessels can pass safely through them particularly where there is high traffic density. These "gates" could be marked by two extremity markers, if practicable.

Buoys, lights, radar reflectors, flags and radio beacons used for marking fishing gear

Lights come in many shapes and sizes. For energy efficiency, the conventional lights should have a sensor which switches on the light automatically at dusk and then switches off at daylight, for example, using a Passive Infra-Red (PIR) sensor. High power strobe lights are commonly used but they are not readily available in all countries. The lights should be visible at a distance of two nautical miles and should not be confusable with lights specified for those required by vessels under the Collision Regulations or for navigational buoys, beacons or lighthouses.

LED lighting: light emitting diode (LED) lighting has been around for about 30 years, but major advances in brightness, power efficiency and form have been made over the last decade. LED lights are more energy efficient than conventional incandescent lights and very compact, making LEDs an obvious choice for marine lighting. Furthermore, they can be provided in a number of different colours (commonly red, green, white, yellow and blue), can be programmed to standard International Association of Marine Aids and Lighthouse Authorities (IALA) flash characters, as well as customized to new flash patterns. Depending upon their size, they can have a visible range of 1 nautical mile to over 12 nautical miles. They can be robust (e.g. rated as IP68 in terms of protection against water ingress) and maintenance free with service lives in excess of ten years. Power can be provided by batteries and/or solar power. Battery lives are from 3 - 5 years, so the devices potentially require no maintenance or additional cost during this period, providing major advantages over the alkaline battery powered basic lights.

Radar reflectors can be a good aid to increase the detection range of the spar buoy for vessels fitted with radar. This helps the fishing vessel to locate the gear and the passing vessels to avoid the gear. The radar reflectors should be light in weight so that they can be carried high on the spar. Wire types are recommended over solid types to decrease wind resistance. The radar reflectors may be the traditional octahedral shape or in a round shape.

Flags should be displayed to increase the visibility of the marker, but should be placed in a position that does not interfere with the visibility of the light at night. They should be in suitable size so as not to affect the spar buoys' ability to stand erect in strong winds. Water resistant materials are recommended so that they are light even when wet and would not affect the flag's ability to stand upright. The dimensions of the flag should be at least 25 x 35 cm and the distance between two flags on the spar (if more than one) shall be at least 10 cm. The flag colour should be such as to be visible at considerable distances; fluorescent colours or black are recommended.

Radio beacons are used to mark fishing gear which can be subsequently recovered by using a radio direction finding system. They can emit a coded signal so that in areas of high fishing concentration each buoy is discernable by its owners. Many merchant and navy vessels are now fitted with scanning receivers which can detect the signals transmitted by these beacons, thus alerting these passing vessels to the presence of fishing activity in the area. Such markers are good technical options, though their cost-effectiveness should be considered in each fishery.

Spar buoys shapes are varied and are often constructed with a plastic or aluminum pole. The pole is inserted through the center hole of an inflatable spar buoy which is inflated and thus holds the pole securely. A weight is fastened on to the base of the pole so that the pole stands upright. The size of the weight is dependent on the wind resistance of the flags and/or the radar reflectors on the other end and on the prevailing weather conditions. This type of spar buoy can be visible for up to three nautical miles to the naked eye and can be detected even further by radar if fitted with a radar reflector. Gear marking details should be marked on the buoy and on the flags, if required, with indelible marking ink for the monitoring and control purposes (see also CIR 404/2011; Article 11). Supplementary buoys are normally used in conjunction with spar buoys as the spar buoy is to act as a marker and not to support the fishing gear, sometimes however in small scale fishing gear used inshore the functions are combined in one buoy.

Satellite beacons, with the use of FADs as a fishing aid, should have both a spar buoy with flag and lights and a radio or satellite beacon attached to the specifications in these guidelines.

APPENDIX

MARKING THE POSITION OF A GEAR IN THE WATER COLUMN

The FAO 1996 Proposal for the Application of a **Standard System of Lights and Shapes for the Identification and Location of Fishing Gear**[11], was prepared on the basis of the Report of the 1991 Expert Consultation for the Marking of Fishing Gear (FAO Fisheries Report No. 485 and its Supplement) and the outcome of discussions at the International Maritime Organization (IMO). The content (without the gear drawings) of this 1996 Annex is the following[12]:

1. General Provisions

1.1. In order to protect fishers and their gear and to warn other mariners of the presence of deployed fishing gear, States should make provisions in national legislation for the adoption of a standard system of lights and shapes for the identification of fishing gear and for marking its position in the water.

1.2. States should make provisions for the inclusion of the details of the system in training programmes for fishers and mariners.

1.3. The need to comply with a system of lights and shapes related to fishing gear, fishing implements and fishing vessels should be in a condition of the authorization to fish.

2. Technical Provisions

2.1. The system should take into account:

a) the provisions of the International Regulations for the Prevention of Collisions at Sea (COLREGS);
b) any local rules, including rules of navigation governing river, lake or coastal fisheries;
c) regulations pertaining to offshore structures; and
d) systems for the marking of fishing gear for the identification of ownership.

2.2. Where practicable, all position indicators attached to fishing gear should:

a) be as conspicuous as possible in a clear daytime atmosphere from a distance of at least 2 nautical miles at sea level;
b) carry radar reflectors;
c) carry lights with characteristics which do not conflict with those of navigational marks and which would be visible on a clear night at a distance of at least 2 nautical miles; and
d) be fitted with a coloured flag or flags of fluorescent material, as an aid to daytime visibility.

2.3. Light and shapes should also indicate the direction and extent of set and drifting gear.

2.4. Electronic devices, such as transponders and radio beacons which automatically and continuously indicate their position by means of signals may be used in addition to the lights and shapes. Such devices, however, must not operate at frequencies that would conflict with other devices used for navigation and search and rescue purpose.

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[11] Annex IV (Proposal for the Application of a Standard System of Lights and Shapes for the Identification and Location of Fishing Gear) of the FAO Technical Guidelines for Responsible Fisheries. No.1. FAO (1996).

[12] This 1996 proposal may have to be updated due to the potential amendments made after 1996 to COLREGS. Furthermore, this appendix may not be part of the final guidelines. The 2016 Expert Consultation for the Marking of Fishing Gear recommended carrying forward the existing recommendations.

3. Application of a Standard System

3.1. An individual pot, trap, fyke net, stake net and other similar gear, should be marked with a buoy or other device at the surface to indicate its position. Gear set in series, such as a number of pots connected on line, should be marked at each end with a buoy.

3.2. Anchored or drifting fishing gear with the upper continuous edge of the gear at a depth of more than 2 metres below the surface should be marked in the following manner:

a) fishing gear set below the level of the sea and extending from an anchor or parent vessel, should be marked at both extremities by a spar buoy and at intermediate positions. The distance between the intermediate marks, and between the intermediate marks closest to the extremities and the extremity markers should not exceed one kilometre. In the case of fishing gear attached to a vessel, the extremity of the gear nearest to the vessel need not carry a marker;
b) for recognition in daytime, the westernmost end spar buoy of such gear extending horizontally in the sea should be fitted with two flags one above the other or one flag and a radar reflector. The end spar buoy at the most easterly extremity should be fitted with one flag or a radar reflector; and
c) for night time recognition, the most westerly end spar buoy should have two white lights one above the other, the most easterly end spar buoy to have one white light.

3.3. Fishing gear set within the upper two metres of the water column, and therefore a hazard to small transiting vessels, should be marked in the following manner:

a) for day time recognition, the extremities of the gear should have spar buoys carrying top marks consisting of two spherical shapes, one above the other at no more than one metre apart; the diameter of the upper of the two spheres to be smaller but no less than one half diameter of the lower one;
b) for night time recognition, the spar buoys placed at the extremity of the gear should have two yellow lights, one above the other at no less than one metre apart and of different characteristics to lights fitted to intermediate buoys;
c) gear extending more than one kilometre should have intermediate buoys placed at distances of not more than one kilometre; intermediate spar buoys should have one spherical shape for day time recognition and one yellow light for night time;
d) “gates” should be provided for the free passage of surface vessels. Each side of the gate should be marked by spar buoys; the closest intermediate float should not be more than 10 meters from these spar buoys; and
e) attended gear need not be marked at the extremity attached to a fishing vessel.

3.4. The dhan-buoy used with active gear, such as anchor seining, fly dragging and purse seining, should comply with the provisions as set out in paragraph 2.2.

3.5. Fish aggregating devices (FADs) should be marked in the same way as fishing gear and carry means to identify their position by day and night. As a minimum requirement, they should comply with the provisions set out in paragraph 2.2. The requirements of paragraph 2.4. should apply to the use of electronic devices fitted to FAD’s.

4. Technical Specifications

4.1. A spar buoy should meet the following requirements:

a) the pole of a spar buoy extending above the flotation buoy should have a height of at least 2 metres; the height of the spar buoy may be less than 2 metres if an administration is satisfied that the fishing gear so marked would not be a hazard to navigation;
b) where radar reflectors are required, they should be fitted at the top of the pole;

c) the size of flags should be less than 25 centimetres in height and 35 centimetres in width; when two flags are required, the distance between them should not be less than 10 centimetres; flags should be made of waterproof material in fluorescent colours;
d) lights should be attached to the pole in such a way that they will not be obscured by a flag;
e) for shapes that give the appearance of being spherical when viewed from a distance, provided for in paragraph 3.3 c) above, the lower of the spherical shapes and the shape, if only one is fitted, should have a diameter of not less than 30 centimetres, the upper shape should be smaller in diameter but not less than half that of the lower shape; and when two shapes are required, they should not be less than 10 centimetres apart; and
f) intermediate floats should have a diameter of not less than 50 centimetres[13].

4.2. Radar reflectors should be:

a) as light as possible;
b) octahedral in shape; and
c) of metal plate or wire mesh construction.

4.3. Lights should be visible at a distance of at least 2 nautical miles; and preferably of a type that are fitted with sensors that automatically switch the light on at dusk and off at daylight.

4.4. Radio Beacons may be of the type that can be attached to the pole of the spar buoy or FAD, if they are of the free floating type, they should be linked to the spar buoy.

[13] The competent authority should take into account locally available material for the construction of float and whereas most fishers use a spherical shape, in some parts of the world it is common practice to use pieces of wood bound together; the underlying principle is that they should be visible from a distance.

This document contains the report of the Expert Consultation on the Marking of Fishing Gear held in Rome, Italy, from 4 to 7 April 2016. The Consultation was convened by the Director-General of FAO to develop draft guidelines on the application of a system for the marking of fishing gear, to be submitted for consideration at the Thirty-second Session of the Committee on Fisheries (COFI) in 2016. The Consultation also made recommendations regarding further development of the draft guidelines.

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