

Report of the

**EXPERT CONSULTATION ON INTERNATIONAL GUIDELINES FOR
BYCATCH MANAGEMENT AND REDUCTION OF DISCARDS**

Rome, 30 November–3 December 2009



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PREPARATION OF THIS DOCUMENT

This is the report of the Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards adopted on 3 December 2009 in Rome, Italy.

FAO.

Report of the Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards. Rome, 30 November–3 December 2009.

FAO Fisheries and Aquaculture Report. No. 934. Rome, FAO. 2010. 28p.

ABSTRACT

This document contains the report of the Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards held in Rome, Italy, from 30 November to 3 December 2009. The Expert Consultation was convened to review an initial draft of the International Guidelines as called for by the FAO Committee on Fisheries at its twenty-eighth session in 2009. The Expert Consultation adopted a draft text containing International Guidelines to be forwarded on to a technical Consultation for review and finalization.

The Expert Consultation based its work on a preliminary text prepared by FAO. The Expert Consultation was hosted by FAO and funded by the Government of Norway and the FAO Regular Programme.

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OPENING OF THE MEETING AND ARRANGEMENTS FOR THE SESSION

1. The Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards was held in Rome, from 30 November to 3 December 2009.
2. The Expert Consultation was attended by fourteen Experts in their personal capacities and one Resource Person. A list of the Experts, Resource and Secretariat Persons is attached as Appendix B. The documents placed before the Expert Consultation are listed in Appendix C.
3. The Expert Consultation was hosted by FAO and funded by the Government of Norway and the FAO Regular Programme.
4. Mr Ichiro Nomura, Assistant Director-General FAO Fisheries Department, welcomed the participants and outlined the purpose of the Expert Consultation. Mr Nomura reminded participants of the resolutions and recommendations iterated by the FAO Committee on Fisheries (COFI) and the United Nations General Assembly (UNGA) regarding bycatch and discards. He summarized the work to be done at the Expert Consultation and wished participants well in their endeavours. Mr Nomura's Opening Statement is attached in Appendix D.
5. Mr Francis Chopin, the technical secretary, convened the Expert Consultation and welcomed the participants. Mr Chopin informed the participants of the overall process of developing the International Guidelines and called attention to the potential submission of the document to the twenty-ninth session of COFI.

ELECTION OF THE CHAIRPERSON

6. Mr Derek Staples was elected Chairperson of the Expert Consultation.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

7. The agenda, with minor changes proposed by the participants, is attached in Appendix A and was adopted by the participants.

REVIEW OF OBJECTIVES OF THE EXPERT CONSULTATION

8. Mr Francis Chopin reviewed the objectives of the Expert Consultation and the process through which the International Guidelines will be developed. He reminded the participants that the report will be submitted to a Technical Consultation in late 2010.

REVIEW OF DOCUMENTS

9. Mr Petri Suuronen gave a brief overview of the preliminary text of the International Guidelines and how it was compiled.

REVIEW OF THE INTERNATIONAL GUIDELINES

10. The preliminary text of the International Guidelines was introduced and the overall structure was discussed. This focused on the need for actionable, user-friendly guidelines that will assist states and regional fisheries management organizations (RFMOs) in meeting objectives set out by COFI and the UNGA.
11. The Expert Consultation reviewed the preliminary text and developed a draft text containing the International Guidelines. This draft text as adopted by the participants is in Appendix E.

RECOMMENDATIONS

12. The Expert Consultation requested the Technical Consultation to consider the value of developing an FAO International Plan of Action for the Management of Bycatch and Reduction of Discards to achieve the provisions and measures contained within the Guidelines.

13. The Expert Consultation recommended that FAO consider preparing an information document on existing measures for bycatch management to be presented to the Technical Consultation.

14. The Expert Consultation noted that the following actions should be taken to improve the management of bycatch and reduce discards:

Quantify bycatch and discards

- Collate global figures for bycatch and discards.
- Track the status of bycatch and discards to monitor the effectiveness of management measures on a fishery-by-fishery and/or issue-by-issue basis.

Identify best practices

- Develop a comprehensive description of current mitigation measures for bycatch and discards (including their effectiveness, reasons for their applications, and quantification of their economic/social costs and benefits).
- Develop and maintain an online library of measures that have been applied to manage bycatch.
- Develop lists of problems and situations relating to bycatch management to which there are no current solutions.

Facilitate access to technical information and support

- Establish a 'virtual' group of Experts to provide support and update information on best practices.
- Strengthen partnering and build capacity through regional and/or international fora (e.g. the FAO/ICES joint working group).
- Provide technical assistance to developing countries in implementing the Guidelines.

Provide guidance in data collection

- Convene a workshop to describe, assess, streamline and provide guidance on methods that quantify and assess bycatch for different types of fisheries.
- Standardize and/or improve descriptions of methods and gears that identify the factors that affect bycatch.

Communication to the fisheries sector and the public

- Raise awareness of bycatch and discard issues to fishers and the general public via mainstream media.
- Develop a simplified version of the International Guidelines and best practice guidance for the fishing sector.
- Partner with international organizations to recognize and reward best practices for bycatch management.

15. Noting the importance of pre-catch losses and ghost fishing and that they are not covered by the International Guidelines, the Expert Consultation also requested FAO to bring to the attention of COFI the need for further work on these important impacts on fishing.

16. FAO will be tasked with all non-technical editing prior to publishing the draft text.

OTHER MATTERS

The Expert Consultation was informed that a revised version of the resource paper (EC: IGBMRD/2009/Inf.5 *Minimum requirements for effective monitoring and reporting of bycatch and discards*) replaced the version that had been prepared and circulated prior to the meeting.

ADOPTION OF THE REPORT

The report of the Expert Consultation was adopted on 3 December 2009.

APPENDIX A

Agenda

1. Election of chairperson and adoption of the agenda
2. Overview of the Expert Consultation Process (Secretariat)
3. Review of background information
4. Review of Draft Guidelines – Round table discussion of the Draft Guidelines
5. Review of Draft Guidelines – Working group discussions and drafting
6. Recommendations
7. Adoption of the report

APPENDIX B

List of participants

Chairperson

Derek Staples
Fishery Consultant
105 Beelong Street,
Macleay Island, QLD 4184
E-mail: derekstap@gmail.com
Telephone: + 61 7 34094461
Mobile: + 61 408 076746

Experts

Lisa Borges
Directorate-General
for Fisheries and Maritime Affairs
European Commission
J-79 02/76 – 1049 Rue Joseph II,
Jozef II-straat 79 Brussels, Belgium
E-mail: lisa.borges@ec.europa.eu
Telephone: + 32 2 299 6265
Fax: + 32 2 299 4802

Zhou Ying Qi
Professor
Shanghai Ocean University
China Fisheries Development
Strategy Study Center
334 Jungong Rd,
Shanghai 200090, P.R. China
E-mail: yqzhou@shou.edu.cn
Telephone: + 8621-61900307
Fax: + 8621-61900307

Jake Rice
National Senior Ecosystem Sciences Advisor
Ecosystem Science Directorate
Fisheries and Oceans Canada
200 Kent Street, 12th Floor,
Ottawa, Ontario K1A 0E6
E-mail: Jake.Rice@dfo-mpo.gc.ca
Telephone: + 613 990 0288
Fax: + 613 954 0807

Tatsuro Matsuoka
Professor, Dr Fish. Sci.
Faculty of Fisheries, Kagoshima University
Shimoarata 4-50-20,
Kagoshima, Japan
E-mail: matsuoka@fish.kagoshima-u-ac.jp
Telephone: + 099 286 4241
Fax: + 099 286 4015

Haider Ali Murad
Assistant Under Secretary
Deputy Director General for Fish Resources
Public Authority of Agriculture Affairs and Fish
Resources
PO Box 21422, Safat 13075, Kuwait
E-mail: drhmurad@yahoo.com;
drhmurad@paaf.gov.kw
Telephone: + 965 22254100; 965 66470017
Mobile: + 965 66470017
Fax: + 965 222544103

Miguel Angel Cisneros
Director
Instituto Nacional de la Pesca
Pitágoras, No. 1320 Col. Santa Cruz,
Atoyac, C.P. 03310
Deleg. Benito Juárez, México D.F.
E-mail: miguel.cisnero@inapesca.sagarpa.gob.mx
Telephone: 3871 9502
Fax: 3626 8421

Moses Maurihungirire
Director Resource Management
Ministry of Fisheries and Marine Resources
Private Bag 13355,
Windhoek, Namibia
E-mail: mmaurihungirire@mfmr.gov.na;
mmaurihungirire@gmail.com
Telephone: + 264 61 205 3114;
Mobile: + 264 81 129 3145
Fax: + 264 61 220 558

John Willy Valdemarsen
Consultant
Sandviksboder 1c, 5035 Bergen
TRG Eco Harvesting As
Fjordalléen 16, P O Box 1423, Vika,
NO 00115 Oslo, Norway
E-mail: jwv@ms-trygg.com
Mobile: + 47 46 94 00 89

Jonathan Dickson
Chief, Capture Fisheries Division
Bureau of Fisheries and Aquatic Resources
PCA Annex Bldg. Elliptical Road Diliman, 1100,
Quezon City, Philippines
E-mail: jod_bfar@yahoo.com
Telephone: + 632 929 4296
Mobile: + 0917 858 8404
Fax: + 632 929 4296

William Karp
Deputy Director for Science and Research
Alaska Fisheries Science Center
7600 Sand Point Way, Northeast
Seattle, Washington 98115
E-mail: bill.karp@noaa.gov
Telephone: + 1 206 526 4000
Fax: + 1 206 526 4004

Martin Hall
Head, Tuna-Dolphin Program, Ph.D.
Inter.-American Tropical Tuna Commission
8604 La Jolla Shores Dr.
La Jolla, CA 92037-1508,
United States of America
E-mail: mhall@iattc.org
Telephone: + 1 858 546 7044
Fax: + 1 858 546 7133

Robin Davies
Interim Leader, Bycatch Initiative
WWF International
Species & Marine Programmes
Avenue du Mont-Blanc
1196, Gland, Switzerland
E-mail: rdavies@wwfint.org
Telephone: + 41 22 364 9111
Direct: + 41 22 364 9010
Mobile: + 41 79 611 2635
Fax: + 41 22 364 0526

Gunnstein Bakke
Senior Legal Adviser Development Section
Directorate of Fisheries
Postboks 185, Sentrum
5804 Bergen, Norway
E-mail: bakke@fiskeridir.no
Telephone: + 47 991 05 452
Fax: + 47 55 23 8090

Secretariat resources

Richard Ferro
Sulven, Beaconhill Road,
Milltimber, Aberdeen, UK, AB13 0JR,
United Kingdom
Tel: +44 (0) 1224 861715
E-mail: theferrofamily@lineone.net

FAO Secretariat

Francis Chopin
Senior Fishery Industry Officer
Fishing Technology Service (FIIT)
FAO
Viale delle Terme di Caracalla
00153, Rome, Italy
E-mail: Francis.Chopin@fao.org
Telephone: + 39 06 57055257
Mobile: +39 348 7619737
Fax: + 39 06-57055188

Petri Suuronen
Fishery Industry Officer
Fishing Technology Service (FIIT)
FAO
Viale delle Terme di Caracalla
00153 Rome, Italy
E-mail: Petri.Suuronen@fao.org
Telephone: + 39 06-57055153
Fax: +39 06 57055188

Blaise Kuemlangan
Legal Officer
Development Law Service
FAO Legal Office
E-mail: blaise.kuemlangan@fao.org
Telephone: + 39 06 570 54080
Fax: + 39 06 570 54408

Simon Funge-Smith
Senior Fishery Officer
FAO Regional Office for Asia and the Pacific
Maliwan Mansion, 39 Phra Atit Road,
Bangkok 10200, Thailand
E-mail: simon.fungesmith@fao.org
Telephone: + 66 2 697 4149
Mobile: +66 84 120 1021
Fax: + 66 2 697 4445

Ye Yimin
Senior Fishery Resources Officer FIMF
FAO, Viale delle Terme di Caracala
00153, Rome, Italy
E-mail: Yimin.Ye@fao.org
Telephone: + 39 06 57054592

Steve Kennelly
Chief Scientist, Primary Industries,
Director, Cronulla Fisheries Research Centre of
Excellence, Industry & Investment NSW
202 Nicholson Parade, PO Box 21, Cronulla, NSW
2230, Australia
E-mail: steve.kennelly@industry.nsw.gov.au
Telephone: + 61 2 9527 8532
Mobile: + 0418 290 960
Fax: + 61 2 9527 8513

María Eugenia Escobar
Secretary FIRO
FAO, Viale delle Terme di Caracalla
00153, Rome, Italy
E-mail: mariaeugenia.escobar@fao.org
Telephone: + 39 06 5705 3736
Fax: + 39 06 57055188

APPENDIX C**List of documents**

EC:IGBMRD /2009/1	Provisional agenda
EC:IGBMRD /2009/2	Prospectus
EC:IGBMRD /2009/3	Preliminary text – <i>International Guidelines for bycatch management and reduction of discards</i>
EC:IGBMRD /2009/Inf.1	List of documents
EC:IGBMRD /2009/Inf.2	List of participants
EC:IGBMRD /2009/Inf.3	<i>Examples of definitions of bycatch and discards</i>
EC:IGBMRD /2009/Inf.4	<i>No discard fishery regime</i>
EC:IGBMRD /2009/Inf.5	<i>Minimum requirements for effective monitoring and reporting of bycatch and discards</i>
EC:IGBMRD /2009/Inf.6	<i>Discards in the world's marine fisheries</i> FTP 470

APPENDIX D

Opening statement
by
Ichiro Nomura
Assistant Director-General
FAO Fisheries and Aquaculture Department
Rome, Italy

Distinguished delegates, friends and colleagues:

On behalf of the Director-General of FAO, Mr Jacques Diouf, it gives me much pleasure to welcome you to this Expert Consultation to prepare a text titled “Draft International Guidelines for Bycatch Management and Reduction of Discards”.

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 before the Expert Consultation, we are all aware that bycatch and discards present not just one but many dilemmas for fisheries and those dependent on the resource as a source of food, income and livelihood. While the term discards is relatively easy to understand, and globally recognized as a waste of resources, the term bycatch and many related terms are less easy to characterize. Depending on your jurisdiction or ethical persuasion, bycatch may be defined as unintended, unused, inappropriate or unaccounted form of catch. Nevertheless, until and unless we are able to quantify and account for all significant sources of fishing induced mortality, we will not be in a position to ensure that fisheries are exploited in a responsible and long-term sustainable manner and consistent with an ecosystem approach to fisheries.

It is primarily for this reason that the Committee on Fisheries resolved to address the issue of bycatch management and reduction of discards. During its twenty-eighth session in March 2009 COFI requested FAO to develop International Guidelines for Bycatch Management and Reduction of Discards through the Expert Consultation and Technical Consultation process.

The main objective of this Expert Consultation is to elaborate a draft text of International Guidelines as called for by COFI. 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 fisheries and all jurisdictions.

We must not forget that the people who will use these Guidelines and those who must comply with the requirements contained therein will not be lawyers and barristers of the court.

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.

I also wish to recall briefly that, in keeping with FAO practice for an Expert Consultation of this nature, the report of the meeting will be essentially an administrative one with the text of the Draft Technical Guidelines attached in order to advise the Director General on the matters under discussion.

Last but not least, I would like to acknowledge the financial support provided by the Government of Norway for this meeting.

I wish you well for a fruitful and successful meeting and hope that your time in Rome will provide you with an opportunity to see this beautiful city.

Thank you very much.

Ichiro Nomura

APPENDIX E

**DRAFT INTERNATIONAL GUIDELINES ON BYCATCH MANAGEMENT
AND REDUCTION OF DISCARDS**

ACRONYMS AND ABBREVIATIONS

COFI	FAO Committee on Fisheries
EAF	ecosystem approach to fisheries
FAO	Food and Agriculture Organization of the United Nations
IPOA	FAO International Plan of Action
RFMO/As	regional fisheries management organizations and arrangements
IUU	illegal, unreported and unregulated (fishing)
MCS	monitoring, control and surveillance
NGO	Non-governmental Organization
The Code	1995 FAO Code of Conduct for Responsible Fisheries
VMS	vessel monitoring system
UNGA	United Nations General Assembly
1982 UN Convention	United Nations Convention on the Law of the Sea of 10 December 1982
1995 UN Fish Stocks Agreement	Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks

PREAMBLE

1. The FAO Code of Conduct for Responsible Fisheries (hereafter termed “the Code”) calls for the sustainable use of aquatic ecosystems and requires that fishing be conducted with due regard for the environment. The Code also promotes the maintenance, safeguarding and conservation of the biodiversity of ecosystems by minimizing the impacts of fisheries on non-target species and the system in general. However, despite the Code’s endorsement by all FAO Members in 1995, there is growing concern that excessive bycatch and discarding are threatening the long-term sustainability of many fisheries, resulting in decreased food security, and adversely affecting the livelihoods of millions of fishers and fish workers that depend on fish resources. Bycatch and discarding also has significant broader impacts on ecosystem dynamics and biodiversity.

2. Calls for action on bycatch and discards have been raised at the United Nations General Assembly (UNGA). At the sixty-third session of the UNGA, states, sub-regional and regional fisheries management organizations and arrangements (RFMO/As) and other relevant international organizations were urged to reduce or eliminate bycatch, catch by lost or abandoned gear, discards and post-harvest losses, as well as to support studies and research that will reduce or eliminate bycatch of juvenile fish. A/RES/63/112 also encouraged states to consider the development of standards for reducing or eliminating discards, i.e. the development of an international plan of action (IPOA), to be considered by the Food and Agriculture Organization of the United Nations (FAO) at its 28th session of its Committee on Fisheries (COFI).¹

3. Past efforts taken by FAO to address these issues have included the development of International Plans of Action for seabirds and sharks² and Guidelines to reduce sea turtle mortality in fishing operations³. However, problems persist with the high levels of unwanted and often unreported bycatch and discards in many fisheries around the world, including the capture of ecologically important species and juveniles of economically valuable species. Total global bycatch is difficult to quantify because of incomplete information and because it is defined differently by different countries. Nevertheless, in 2004, FAO estimated that global discards from fishing (a subset of bycatch under any definition) was approximately 7 million tonnes⁴. However, issues other than the actual tonnages of bycatch and discards are also important to consider – such as the mortalities of rare, endangered or vulnerable species, and the socio-economic impacts of utilizing bycatch instead of decreasing its capture.

4. At the twenty-eighth session of COFI in 2009, FAO reported on bycatch and discards and reiterated the concern that, in poorly managed fisheries, unreported and unregulated (i) landings of bycatch, (ii) discards, and (iii) pre-catch losses are issues of major concern⁵. To respond to this concern, COFI agreed that FAO should develop International Guidelines on Bycatch Management and Reduction of Discards through the process of an Expert Consultation followed by a Technical Consultation.⁶

5. Accordingly, FAO organized an Expert Consultation to develop “International Guidelines on Bycatch Management and Reduction of Discards” held from 30 November to 3 December 2009, at FAO in Rome, Italy. The main output of the Expert Consultation was a draft text of the International Guidelines and a meeting report which are to be submitted for consideration to a FAO Technical Consultation on International Guidelines for Bycatch Management and Reduction of Discards, convened at FAO, Rome, in 2010.

¹ A/RES/63/112 Sustainable Fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments

² International Plan of Action for reducing incidental catch of seabirds in longline fisheries. International Plan of Action for the conservation and management of sharks. International Plan of Action for the management of fishing capacity. Rome, FAO. 1999. 26pp.

³ FAO. 2009. *Guidelines to reduce sea turtle mortality in fishing operations*. Rome, FAO. 128 pp.

⁴ Kelleher, K. *Discards in the world’s marine fisheries. An update*. FAO Fisheries Technical Paper. No. 470. Rome, FAO. 2005. 131pp.

⁵ COFI/2009/6 *Combating illegal, unreported and unregulated fishing, including through a legally binding instrument on port state measures and the establishment of a global record of fishing vessels*.

⁶ *Report of the Twenty-eighth Session of the Committee on Fisheries* (2–6 March 2009) CL 136/2

6. Bycatch management and reduction of discards, as addressed by these Guidelines, are components of overall fisheries management systems and should be undertaken according to the principles and operational guidance recommended by the Code and the Ecosystem Approach to Fisheries (EAF). This should also take into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions.

7. It is intended that the Guidelines be developed, interpreted and applied in conformity with the relevant rules of international law, as reflected in the United Nations Convention on the Law of the Sea of 10 December 1982 (1982 UN Convention)⁷. Nothing in these Guidelines prejudices the rights, jurisdiction and duties of nations under the international Law of the Sea as reflected in the 1982 UN Convention.

8. The Guidelines are to be interpreted and applied in conformity and accordance with bycatch related IPOAs and guidelines prepared by FAO.

SCOPE AND PRINCIPLES

Bycatch and discards

9. Developing a standard international definition of bycatch is difficult because of variations in how bycatch has been, and continues to be defined nationally, regionally and from fishery to fishery. Furthermore, ambiguities exist in the meanings of various bycatch-related terms.

10. There are many definitions of bycatch, but all of them can be generally summarized as covering one or all of the following: “*Catch that a fisher did not intend to catch, did not want to catch, did not choose to use, or which should not be caught for whatever reason*”.

11. Regardless of how bycatch is defined, the unreported elements of catch and bycatch can be significant for some fisheries. Accordingly, these elements may be aggravating factors to overfishing and pose a serious risk to the effective management of fisheries. Bycatch is of concern when it comprises a significant proportion of the capture in a specific fishery, or when, across all fisheries, it comprises a large proportion of the catch in a fishery. A useful tool for understanding how bycatch relates to sources of fishing mortality is the Generalized Catch Concept Model (see Annex A).

12. Discards are the portion of the catch which is not retained. Most fishing gears cannot selectively catch only the fish species, non-fish species and sizes that are wanted by fishers or that they are allowed to take. Therefore, a proportion of the catch will be thrown away, dumped or slipped and hence unused. Discarding occurs for a wide range of reasons (see Annex B). Discards may be alive or dead.

13. Fishing can impact ecosystems in ways that responsible fisheries should strive to minimize. This includes pre-catch mortalities and ghost fishing, as well as the impact on habitats and food webs. Some countries include a number of these consequences in their legal definitions of bycatch, others do not. The International Guidelines do not include these effects in its definition of bycatch. Additional measures will be necessary to address these other effects of fishing (some of which are briefly discussed in the section Other Impacts of Fishing – Pre-catch Losses and Ghost Fishing). However, in implementing the measures in the Guidelines, care should be taken to avoid increasing these other consequences of fishing.

A bycatch framework

14. A framework for guidance on managing bycatch based on the principle that fisheries should have management plans should include clear objectives which are consistent with the FAO Code of Conduct for Responsible Fisheries and its implementation in accordance with the ecosystem approach to fisheries.

15. For the purposes of this framework, the expression “Total capture by the gear” or “capture” refers to all catch that encounters the fishing gear, gets caught and is harmed or killed. Three choices

⁷ References in these Guidelines to the 1982 UN Convention, the 1995 UN Fish Stocks Agreement and other international treaties do not prejudice the position of any state with respect to signature, ratification or accession to those instruments.

are available to fishers for this capture: retain it; release it alive; or discard it dead (or injured to the point where death is inevitable).

16. For fisheries having a management plan, bycatch is considered to be a portion of the capture that is inconsistent with the goals of that management plan, or is designated as bycatch in the plan. In fisheries where management plans do not exist, or are not implemented, bycatch is considered to be the portion of the capture that is not rationally utilized⁸, or the species and/or sizes of a species that cannot sustain exploitation.

17. Bycatch (as defined in paragraph 10 above) includes discards and the incidental capture of species not intended for use.

18. The types of bycatch (see Annex C for examples) covered by this framework include:

- ecologically important species; species with reduced abundance which are important as food for dependent predators or otherwise associated species;
- juveniles of economically valuable species. The harvesting of juveniles may be considered a sub-optimal use of the resource and is sometimes considered as inappropriate capture, especially if it is excessive and clearly causes negative impact although the juveniles may be retained and utilized;
- all species and sizes not specifically targeted in a fishery. In these fisheries, the management objective is usually to reduce the bycatch that is likely to be discarded. However, in some fisheries the value of a portion of the bycatch may be important to the fishery, therefore the utilized part of the bycatch should be covered by an appropriate management plan;
- in tropical and subtropical fisheries, where a wide range of organisms are harvested with little or no intended selectivity, bycatch is often mixed with other, more desirable species and contributes significantly to the income. The objectives of bycatch management and any mitigation measures applied should occur in the context of the overall management of the fishery;
- the incidental capture of organisms for which there is no intended use. Some of these species may be endangered or subject to specific conservation measures.

Purpose of the International Guidelines

19. The proposed International Guidelines for Bycatch Management and Reduction of Discards have been developed in order to assist nations and RFMO/As in implementing the Code, the ecosystem approach to fisheries and UNGA Resolution 63/112, paragraphs 75–79, for the specific purpose of managing bycatch and reducing discards of organisms.

20. The objectives of the Guidelines are to promote responsible fisheries by:

- providing guidance on measures that contribute towards more effective management of bycatch and to reducing discards;
- minimizing the capture of species, sizes or sexes that are not going to be used rationally;
- minimizing the mortality of organisms that are captured by fishing gear but are not used; and
- improving the reporting and accounting of all of the components of the total catch.

BACKGROUND – BYCATCH PROBLEMS AND CHALLENGES FOR THEIR MANAGEMENT

21. Bycatch can result from a complex interaction of ecological, technical, legal and economic drivers. Decisions regarding mitigation measures should be based on an adequate analysis of the underlying problems before solutions are implemented.

⁸ Used rationally means that the utilization is ecologically, economically and socially sustainable and is in accordance with the principles of the Code of Conduct for Responsible Fisheries.

Population and ecosystem effects

22. The most obvious and direct effect of bycatch is the discard, mortality and wastage of organisms that, if left alone, would add to subsequent populations of those species and their reproductive potential.

23. Depending on the fishing method, intensity of fishing and features of the ecosystem being fished, bycatch can have a number of direct and indirect effects on the structure, diversity and productivity of the ecosystem. These effects need to be considered when developing mitigation measures.

24. Although the effects on ecosystems will be specific to a particular fishery, the major types of ecosystem impacts of bycatch include:

- increasing mortality on species or sizes of species taken as bycatch. This is of particular concern when the mortality is unsustainable, the risk of which is likely to be highest if the species is long-lived, late maturing, has low fecundity, or can sustain only low rates of fishing mortality;
- reducing the abundances of predators and/or important prey items;
- catching benthic invertebrates, which comprise part of the structural habitat of the seafloor, as well as forming part of the food web;
- discarding, which may provide food for marine scavenger populations that can thereby multiply and become an increasingly serious competitor or predator on other species in the ecosystem. Discarding may also boost the nutrient return to the seabed and alter productivity and, in some cases, the oxygen regime of the seafloor community, particularly in deep-sea or otherwise naturally nutrient-poor ecosystems

Data and information

25. Throughout the world, data on fisheries are often inadequate (usually because of a lack of resources). To effectively manage bycatch, it is important that sufficient information be available concerning fishing gears, fishing operations and the total removal of fish (including bycatches and discards).

26. In some regions and fisheries, unreported bycatches are known to be significant and caused by a variety of factors, including ineffective or non-existent reporting, or deliberate misreporting of catches.

27. Data on catch and bycatch reported in an aggregated form (such as "not elsewhere included" ("nei")) may preclude a complete analysis and characterization of bycatch for a particular species, stock, population, or fishery, as well as decisions on the selection of mitigation measures.

28. The reliability of assessments of stocks, fisheries and ecosystems is weakened by incomplete information on total removals. Uncertain estimation of fishing mortalities, unreported catches and bycatches may result in less reliable assessments and may contribute to poor management decisions and overfishing.

Monitoring, Control and Surveillance (MCS)

29. The effectiveness of some bycatch management measures requires substantial at-sea monitoring to obtain reliable catch information and to monitor compliance.

30. Control and surveillance at sea may be costly in terms of both human and financial resources. In all cases, monitoring and surveillance resources should be compatible with the goals of the management plan. States that lack the resources and expertise for at sea MCS may need to rely on self-enforcement through co-management and/or community-based management systems.

31. Multiple tools may be necessary to reach the necessary level of control and surveillance in order to monitor the compliance or effectiveness of a bycatch management measure, as well as the available technologies and frameworks. If several approaches are equally effective for achieving the desired level of control and surveillance, the most cost-effective alternative should be chosen.

Socio-economic implications of bycatch

32. A significant proportion of the world's bycatch is comprised of juveniles of economically valuable species that, if left to grow to maturity, would produce higher yields and larger economic gains.
33. Wherever fisheries interact, bycatch and discarding in one fishery can reduce catches and revenue in another, and lead to conflict.
34. Catching and handling bycatch can be costly for fisheries and reduce harvesting efficiency. Bycatch reduction can reduce these costs and enhance the quality and value of the retained species.
35. The uptake and adoption of selective fishing techniques is often hampered by cost and fishers' limited awareness of, and access to, bycatch reduction methods. Costs associated with monitoring bycatches, improving fishing gears and training fishers in their use can be expensive for governments and/or fishers.
36. Public perceptions regarding bycatch and associated wastage in fisheries can contribute to negative public attitudes about fishers and cause significant social problems.
37. The short-term effects of introducing bycatch reduction measures could result in significant food shortages and economic losses – especially for communities that are heavily reliant on bycatch for nutrition. Similarly, bycatch reduction may cause significant and concomitant negative impacts if it is used as feeds in aquaculture or for other livestock.

Governance, management and legal challenges

38. Fisheries occur in dynamic ecosystems, so bycatch problems often change throughout time, requiring swift, adaptive responses in management.
39. Overcapacity, overfishing and IUU issues in many fisheries are significant contributors to bycatch problems.
40. Limitations in legal and institutional regimes to manage bycatch and reduce discards are significant challenges. Legal frameworks to control fishing operations and fishing gears are often inadequate or difficult to implement.
41. For shared fisheries, there is often a lack of consistency between states, and between states and RFMO/As in their objectives and measures for bycatch management.

Selective fishing

42. Most fishing gears are not perfectly selective. Therefore, it is inevitable that some unwanted species and sizes of fish and non-fish species will be captured, especially when combined with spatial and temporal changes in species composition and age structure.
43. Although improved gear selectivity can address many bycatch issues, because of insufficient expertise and facilities there is often a lack of safe, effective and practical alternatives
44. If a fishing method's selectivity is inherently poor, bycatch can be reduced by substituting a more selective fishing method. Factors affecting such a substitution can include: (i) lower efficiency of the new method, (ii) fishers' reluctance to change, (iii) a lack of economic incentives, (iv) a need for food security (in some cases, daily survival), and (v) the compatibility, cost and safe use of the new methods.
45. When developing and implementing more selective fishing gears, researchers and managers need to avoid causing serious adverse effects on the genetic diversity of the exploited populations resulting from the removal of specific sizes, sexes and/or ages.

BYCATCH MANAGEMENT PLANS

46. A bycatch management plan is a framework of objectives and actions to manage bycatch and reduce discards. Bycatch management plans can either stand alone, or be incorporated into an overall ecosystem/fisheries management plan.

47. States and RFMO/As should develop, adopt and implement bycatch management plans for all fisheries that require bycatch management actions, as well as ensure that these plans are consistent with the Code and include the objectives for the rational use of catch, management of bycatch and reduction of discards. These bycatch management plans should contain strategies, standards and measures directed at managing bycatch and reducing discards in conjunction with other management plans aimed at controlling overall fishing effort.

48. In the development of bycatch management plans, nations and RFMO/As should identify the fisheries where bycatch and discarding occurs and spell out the requirements for management actions. Such assessments should include, *inter alia*:

- information on the type(s) of fishing conducted or considered, as well as vessels and gear types, fishing areas, fishing effort, the duration of fishing, target and bycatch species and their sizes, together with threatened, endangered or protected species;
- risk assessments to identify the specific nature and extent of bycatch problems in the fishery, and to determine which impacts are most likely to be significant; and
- a review of the effectiveness of existing, ongoing and future initiatives to minimize the identified bycatch problems.

49. States and RFMO/As should ensure that bycatch management plans include best practices for bycatch management to be developed in cooperation with the relevant stakeholders. These best practices should, *inter alia*:

- identify current bycatch problem(s);
- review the social and economic context, drivers and objectives that cause the bycatch problem(s);
- list and justify quantifiable and verifiable long-term management objectives;
- develop measures tailored to the characteristics of each fishery in accordance with the management objectives;
- ensure the collaboration of fishers, scientists, resource managers, non-governmental organizations (NGOs) and other relevant stakeholders;
- maximize the live release of fish or non-fish species that are not intended to be retained;
- rationally utilize the bycatch that continues to be captured under these measures;
- encourage collaborative research between countries with fisheries that overlap or have similar bycatch management problems;
- support controlled trials that investigate the effectiveness of single and combined mitigation measures under commercial fishing conditions;
- provide incentives for fishers to become full partners in developing, testing and evaluating the performance of potential bycatch management measures; and
- promote and raise the awareness of actions to manage bycatch, as well as to reduce discards and their outcomes to the relevant stakeholders and general public.

50. As part of the development of bycatch management plans, states and RFMO/As should:

- establish appropriate and reliable monitoring and assessment techniques to determine the effects of bycatch on fisheries resources, as well as evaluate and refine the performance of bycatch management measures;
- prioritize (based on risk assessments), develop and implement standardized and consistent data collection procedures and protocols, including the use of observers, standardized logbooks, vessel monitoring systems and survey methodologies for monitoring bycatch and discards, both at sea and at points of landing;
- ensure that data collection programs include socio-economic surveys on, *inter alia*, the value of landings and employment in harvesting sectors and the social and economic impacts of regulatory measures; and
- consider the use of national and regional training programmes for fishers, resource managers and scientific observers to improve bycatch identification, data collection and reporting.

51. Bycatch management often needs different types of data from many sources, thus improved integrated systems are required to aggregate, manage and analyse this data.

52. When fisheries are multi-species and multi-gear in nature, reporting the full species composition of catches may not be practical. Accordingly, alternative methods such as reporting on indicator vessels/trips/species/areas may be necessary as a proxy measure.

MEASURES TO MANAGE BYCATCH AND DISCARDS

Fisheries Management tools

53. A range of tools are available to fisheries managers to manage bycatch and reduce discards, including:

- Fishing capacity and effort controls;
- improving the design and use of fishing gear;
- spatial and temporal closures; and
- limits on bycatches.

54. The performance of different measures to manage bycatch varies among fisheries as well as the costs associated with their effective implementation. Using several measures in concert may increase their overall effectiveness.

55. Even though some measures may operate autonomously (e.g. bycatch reduction devices) in many cases, the behaviour of fishers will determine the success or failure of the measures. Therefore, all of the measures require the full co-operation and involvement of the industry at all stages of their implementation, as well as effective MCS.

Fishing capacity and effort controls

56. Controlling effort in a fishery can be an effective tool to reduce bycatch when effort is reduced in those areas, and whenever significant quantities of bycatch occur.

57. Capacity controls seek to limit the total size of a fishing fleet. Reducing the overall capacity should reduce the level of unwanted bycatch within a fishery, provided it is implemented in accordance with the IPOA-Capacity⁹.

58. If controls on fishing capacity and effort are used to address bycatch issues, they should be targeted at the fishery causing the issue. Excess capacity and effort excluded from one fishery/area/time should not lead to increased capacity and effort, and therefore bycatch, in other fisheries/areas/times.

59. The allocation of fishing rights can provide an effective framework in which to implement capacity and effort controls, however consequences for bycatch management require specific bycatch mitigation measures in the allocation system.

Improving the design and use of fishing gear

60. Bycatch can be managed and discards reduced by improving the selectivity of fishing gear. Measures that have been found to be effective and that should be considered include:

- changing the design, rigging and deployment of fishing gear (e.g. mesh size, hook size);
- installing Bycatch Reduction Devices (e.g. Turtle Excluder Devices, sorting grids, square mesh panels);
- using operational techniques during fishing to reduce encounters with bycatch (e.g. the Backdown Manoeuvre during purse-seining, tori lines on longlines);

⁹ International Plan of Action for reducing incidental catch of seabirds in longline fisheries. International Plan of Action for the conservation and management of sharks. International Plan of Action for the management of fishing capacity. Rome, FAO. 1999. 26pp.

- using equipment, practices and handling techniques that increase the probability of survival of released catches; and
- substituting a gear or practice with an alternative to reduce bycatch.

61. Gear-based regulations should be prepared to ensure that they are practical, enforceable, effective and compatible with other measures, such as minimum legal landing sizes. Any adverse unintended effects should be known and acceptable.

Spatial and temporal measures

62. Various types of spatial and temporal closures can be used to manage bycatch, but the results can be complex and unforeseen – for example, the displacement of fishing effort into other fisheries. Closure decisions should therefore be based on the best available scientific information, and take into account any potential indirect and unintentional consequences.

63. Closures of nursery/spawning grounds or areas of special biological significance can reduce particularly important bycatch (e.g. juveniles, rare, endangered or vulnerable species, etc.). Such spatially-based measures may include: the creation of marine protected areas, marine parks, zones reserved for traditional fishing activities or for specific fishing gears, and/or areas where certain gears are prohibited (e.g. hook-and-line only, no-trawl areas, etc.).

64. “Adaptive” or “real-time” closures can be used to avoid bycatch species as they migrate or aggregate, as long as real-time information is available through, for example, Vessel Monitoring Systems.

65. When particular bycatch species are associated with particular habitats, position monitoring information can be combined with information on the location of habitats (where available) to avoid encounters. (e.g. guidelines exist for how such adverse impacts can be minimized in the deep sea¹⁰.)

66. Information-sharing among fishermen and managers is a very effective way to identify areas/times of high bycatch, and allow fishers to collectively avoid them.

Limits on bycatches

67. Individual and fleet-wide quotas on bycatch and “no-discard” regimes provide mechanisms to control bycatch, and whenever bycatch cannot be avoided, may permit the distribution of quotas to the most efficient fishers. These regimes can contribute to the reduction of bycatch by both direct limitations and by encouraging behavioural changes in fishers to avoid bycatch.

68. When implementing bycatch limits, consideration should be given to:

- the time required for fishers to adjust to any new restrictions;
- any complementary measures that may be necessary to make the new restrictions effective (e.g. gear substitution, reporting requirements, etc.);
- the type and level of monitoring (often at-sea) required to achieve adequate compliance; and
- the transferability of any bycatch quotas.

69. The “no-discard” regimes, where all individuals of certain species that are caught must be landed, provide an incentive to avoid catching unwanted organisms. As these regimes establish a particularly restrictive bycatch limit, they may require some flexibility in implementation given the unpredictable nature of most fishing operations.

Other measures to manage bycatch

70. In situations where bycatch must be released, techniques may need to be developed to maximize their survival after release.

¹⁰ International Guidelines for the Management of Deep-sea Fisheries in the High Seas; Directives Internationales sur la gestion de la pêche profonde en haute mer ; Directrices Internacionales para la ordenación de las pesquerías de aguas profundas en alta mar. Rome/Roma, FAO. 2009. 73pp.

Economic incentives for reducing bycatch

71. Many of the measures in these Guidelines can be implemented in ways that provide economic incentives for the better management of bycatch and the reduction of discards. Fishers are more likely to adopt fishing techniques that reduce bycatch if such measures improve their revenue, the quality of their catch, their operational efficiency and/or their safety.

72. Uptake of bycatch management measures will be enhanced when positive incentives are available. Encouraging the uptake of bycatch reduction measures can be facilitated by, for example, rewarding compliant fishers with preferential access to resources.

73. When bycatch mitigation requires modifications to vessels or equipment, the capacity of fishers to bear the extra costs must be considered. In many cases, some direct support may be necessary. It also may be possible to reduce costs by reducing taxes on imports and sales, fee waivers, reductions of export fees and tariffs for new equipment, etc.

74. Implementing bycatch quotas may have direct economic consequences because they limit the quantities that can be taken.

75. A strong economic incentive for solving bycatch problems may be the threat of limited access or even the closure of the fishery.

76. Market demand may encourage the harvesting of bycatch (e.g. as a source of low price food for human consumption, or feeds for aquaculture and other livestock). The development and availability of alternative products may reduce the demand for bycatch.

77. To satisfy consumer demands, markets are increasingly seeking to source fish from sustainable fisheries that meet the standards provided in the FAO International Guidelines on fisheries ecolabeling¹¹. Reducing or maintaining low bycatch levels is an important requirement to reach these standards.

Assessment and review of the effectiveness of bycatch management measures

78. A priori socio-economic assessments of the impacts of bycatch management measures should be carried out to identify the potential effects of their implementation and the support necessary to facilitate their uptake. Socio-economic assessments can also identify longer-term benefits of the implementation of bycatch management measures.

79. Transparent systems for the regular monitoring of the effectiveness of measures for bycatch management are important and should be assessed against overall management goals. Plans and management measures should be regularly and independently assessed and adjusted as required under an adaptive management regime.

MONITORING, CONTROL AND SURVEILLANCE (MCS)

80. Effective management of bycatch and reduction of discards is dependent on sufficient legal authority and institutional arrangements to:

- regulate the catch, effort and operational aspects of fishing that affect bycatch and discards (e.g. places and times of fishing, the gear used, etc.);
- report all relevant information related to bycatch and discards;
- inspect vessels and gear prior to the commencement of fishing operations; and
- monitor all relevant fishing operations, including catch handling on board the fishing vessel and landings at ports (e.g. the Port State Measures Agreement¹²).

¹¹ FAO. 2005. Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries; Directives pour l'étiquetage écologique du poisson et des produits des pêches de capture marines; Directrices para el ecoetiquetado de pescado y productos pesqueros de la pesca de captura marina. Rome/Roma. 90pp.

¹² CCLM88/8 Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing. FAO. 2009. 29pp.

81. States should establish and implement appropriate national policies, legal and institutional frameworks for effective monitoring, control and surveillance – including those accorded by RFMO/As – to ensure the consistency of measures throughout a region.

82. The participation of fishers in policy development, implementation and self-policing (e.g. through co-management and community-based management) can increase voluntary compliance and improve the enforcement of bycatch management measures, especially in states that lack the resources for conventional compliance systems.

RESEARCH AND DEVELOPMENT

83. States and RFMO/As should collate and share best practice methods for monitoring, estimating and managing bycatch, reducing discards, preparing the appropriate legislation, as well as coordinate effective communication and training.

84. Gear and method-based measures should be tested under commercial fishing conditions, using properly trained personnel and with the cooperation and collaboration of the fishing sector, from the initial stages of testing through to implementation.

85. States and RFMO/As should collaborate in assessing bycatch issues throughout the entire range of distribution of the species of concern.

86. In fisheries where bycatch is high, or where discarding occurs and effective measures for reduction are not available, countries and RFMO/As should develop alternative fishing methods that are practical, safe, effective, economically viable and environmentally friendly.

87. The costs associated with the implementation of measures to mitigate bycatch problems vary considerably. Prior to their implementation, states and RFMO/As should assess the socio-economic cost of each measure against their effectiveness, ease of implementation and likely uptake by fishing fleets.

88. States and RFMO/As should map habitats, distributions of bycatch and fishing effort to support spatial and temporal management measures.

89. Socio-economic studies of fishing communities will assist in facilitating the adoption of the new technologies and procedures to manage bycatch.

90. States, RFMO/As and fishing sectors that require additional resources to develop or implement research on bycatch should partner or collaborate with all the appropriate research providers and funding bodies, including private foundations.

AWARENESS RAISING, COMMUNICATION AND CAPACITY BUILDING

91. It is essential to raise the awareness of bycatch problems and the necessity of their resolution with fishers, governments, policy makers, special interest groups and the general public. Mechanisms that contribute to effective communication, cooperation and coordination among these stakeholders in the development and implementation of bycatch management measures are vital.

92. Bycatch mitigation solutions should be communicated to all of the relevant stakeholders by showcasing success stories in the mass media, award programs, seminars, videos and hand-outs.

93. Communication of bycatch solutions is particularly called for when bycatch problems have a high public profile. These issues are only finally resolved when the relevant solution is accepted by a concerned public.

94. Fisheries managers and policy makers require better training in bycatch and discard issues and their solutions in order to draft the necessary policies and legislation.

95. More and better trained fishing gear technologists are required, especially in regions that currently lack this expertise.

96. In most cases, fishers will avoid bycatch if doing so will not compromise their livelihoods. Nevertheless, nations need to take several specific steps in order to train and promote the cooperation and uptake of bycatch management measures, which include:

- coordinating and strengthening the activities and programs of fishers' cooperatives and similar organizations in order to manage bycatch and reduce discards;
- maintaining continuous communication with fishers on the causes and conditions that lead to bycatch, the evolution of bycatch reduction programs, the results of experiments and the status of species of interest;
- providing fishers with clear explanations of why it is necessary to reduce bycatches in their fisheries, the consequences of failing to do so, and the benefits of adopting bycatch management measures;
- incorporating fishers' opinions and suggestions on effective bycatch reduction measures; and
- providing fishers with adequate training in:
 - the use and maintenance of technology and practices that reduce bycatch;
 - techniques that allow them to develop their own solutions;
 - the handling, recovery and release of bycatch species captured alive; and with
 - communication techniques to allow their bycatch reduction work to be elucidated to appropriate target audiences.

GOVERNANCE FRAMEWORKS

97. Implicit in these Guidelines is the concept that, as a result of the highly interactive nature of fisheries managing bycatch requires the sound management of all the components of a fishery – not only the components that directly involve bycatch.

98. States, acting in their capacity as flag states, port states and coastal states, importing or exporting (market) states, or when exercising jurisdiction over their nationals, should contribute to the attainment of the objectives of bycatch management.

99. States should establish and implement national policies, as well as legal and institutional frameworks for the effective management of bycatch and the reduction of discards, including measures accorded by RFMO/As in which they participate. Governance and legal frameworks should enable, *inter alia*:

- the application of the ecosystem approach to fisheries;
- the use of the effective control of fishing capacity and reduction of effort, especially in fisheries where bycatch and discards are a significant issue;
- as appropriate, the implementation of co-management and community-based management of fisheries in order to better manage bycatch and reduce discards;
- the implementation of measures and actions in these Guidelines, including MCS and other international fisheries instruments in order to manage bycatch and reduce discards.

100. Institutional frameworks should:

- ensure that measures taken to manage bycatch and reduce discards are consistent with the Code and the general principles set out in the 1982 UN Convention and the 1995 UN Fish Stocks Agreement;
- adopt and implement measures necessary to ensure the conservation of bycatch:
 - in accordance with the precautionary approach, as reflected in Article 6 of the 1995 UN Fish Stock Agreement and set out in Article 6.5 and 7.5 of the 1995 FAO Code;
 - in accordance with an ecosystem approach to fisheries;
 - in conformity with the relevant rules of international law, in particular as reflected in the 1982 UN Convention;
 - in a manner consistent with other relevant international instruments; and
 - based on the best scientific and technical information available, taking into account fishers' knowledge.

- support *inter alia*:
 - the development and use of fishing gear to minimise bycatch and reduce discards;
 - capacity building for better management of bycatch and the reduction of discards including, where appropriate, participation in co-management and community-based management of fisheries.

101. States and RFMO/As should:

- If management plans are not in place, develop management plans for their fisheries consistent with the Code that include objectives for the rational use of catch, management of bycatch and reduction of discards;
- encourage the involvement of fishers in the development of measures to manage bycatch and reduce discards, recognizing the value of their knowledge and experience; and
- ensure that incentives to manage bycatch and reduce discards are sufficient to encourage the adoption of, and deter evasion of, management measures.

102. States should strengthen and build the capacity of existing RFMO/As to manage bycatch and reduce discards, incorporating the established principles of relevant international law and related instruments into the mandates of these organizations or arrangements.

103. When actions taken by states on bycatch management and reduction of discards would be more effective if also extended to areas under the jurisdiction of RFMO/As, the following should be considered to improve the effectiveness of such actions:

- Where their fisheries overlap, states should encourage RFMO/As and cooperating parties to adopt measures complementary to those contained in their bycatch management plans;
- Bycatch Experts should be included as observers or as members of state delegations to participate in scientific and technical meetings of RFMO/As that address bycatch (e.g. bycatch working groups, ecosystem working groups);
- Data collection and regulatory and enforcement regimes should be harmonized.

ADDITIONAL CONSIDERATIONS ON IMPLEMENTATION OF GUIDELINES

104. States and RFMO/As should collaborate to address common issues, such as the development of compatible standards, tools and information aimed at facilitating the implementation of the Guidelines.

105. States and RFMO/As should identify the emerging bycatch problems and ensure the adequate funding for developing innovative and rapid responses to address them.

106. States and RFMO/As should keep all stakeholders and the wider public well informed about progress in bycatch management.

107. Based on biennial reports from states and RFMO/As, FAO should review the progress made in the implementation of these Guidelines.

108. States and RFMO/As should collaborate through FAO and other relevant organizations to standardize monitoring and reporting procedures on bycatch and discards in fisheries and for fishing gears that are known to be problematic.

SPECIAL REQUIREMENTS OF DEVELOPING STATES

109. In the implementation of these Guidelines, states and RFMO/As should fully recognize the special requirements of developing states in relation to the management of bycatch in their fisheries. To this end, countries, RFMO/As, the United Nations system (including FAO, the United Nations Development Programme and the United Nations Environment Programme), other relevant international and regional inter-governmental and non-governmental organizations, and financial institutions should assist developing states in implementing these Guidelines.

110. Consideration should be given to enhancing the capacity of developing states to develop and manage bycatch and reduce discards in their fisheries through financial and technical assistance,

technology transfer, training and scientific cooperation, in conformity with international law and the Code.

111. FAO should give special consideration to providing technical assistance to developing states, including fostering international cooperation, as the needs arise, in areas such as:

- the development of effective Bycatch Management Plans;
- bycatch and discard monitoring and reporting;
- technical assistance in developing, adapting and implementing measures related to bycatch management;
- the development of policy and supporting legislation;
- the development of effective MCS;
- support to implement IPOA-IUU and IPOA-Capacity, IPOA-Sharks and IPOA-Seabirds, and
- other priority issues that result from the implementation of the Guidelines.

OTHER IMPACTS OF FISHING – PRE-CATCH LOSSES AND GHOST FISHING

112. In some fisheries, organism mortality may occur as a result of interacting with fishing gear without actually getting caught (termed “pre-catch losses”). Furthermore, lost, abandoned or otherwise discarded fishing gears may continue to cause mortalities (“ghost-fishing”).

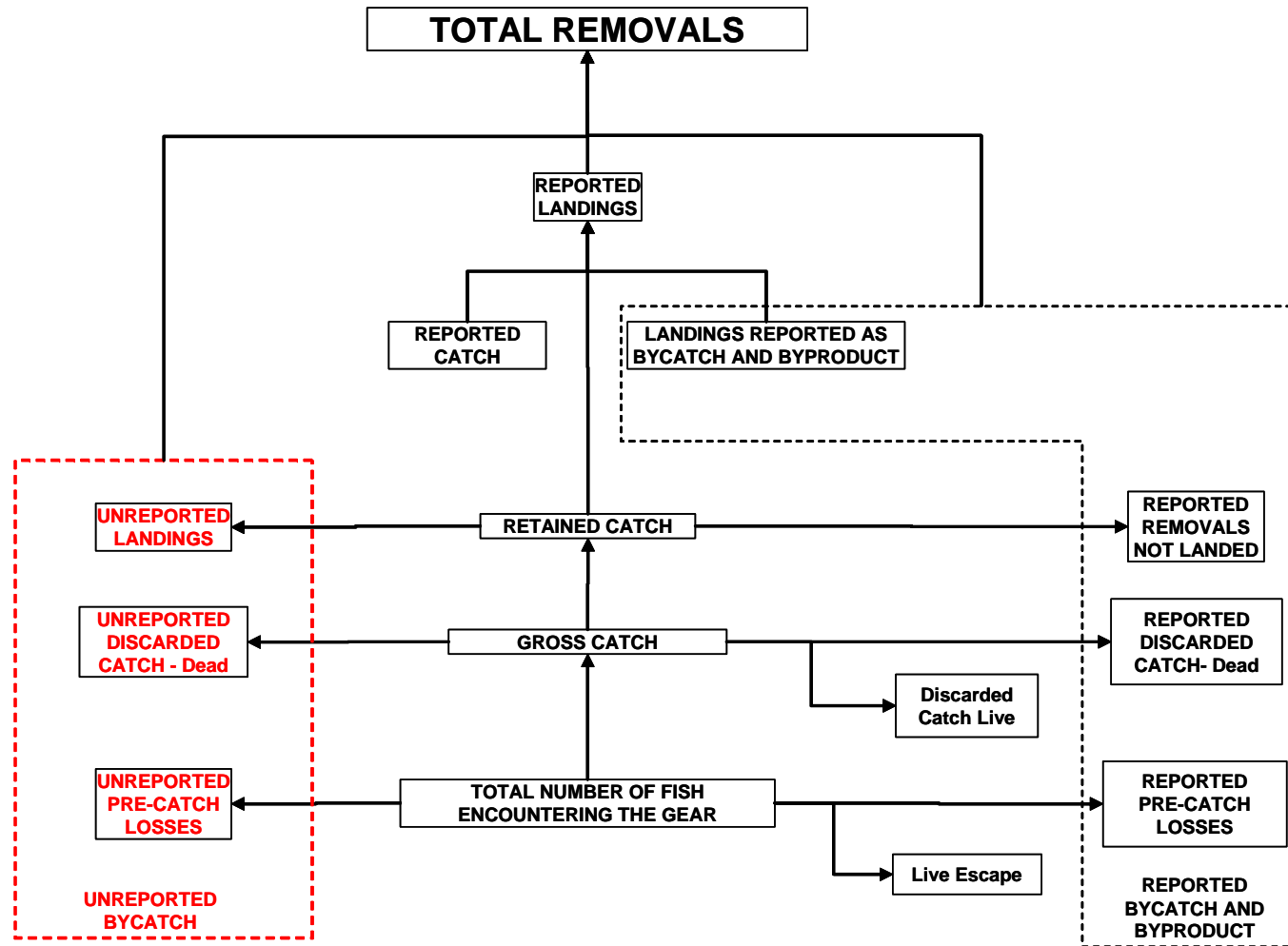
113. As these effects of fishing are a serious concern in many regions and fisheries, they should be considered in fisheries management plans. In some jurisdictions, these effects are included in formal definitions of the term “bycatch”, but they are not included in the definition of bycatch used in these Guidelines because: (i) the organisms are not actually caught; and (ii) different measures are required to assess and mitigate them than those required for bycatch. Pre-catch losses and ghost fishing impacts do, however, require focused attention and action.

114. Possible actions to assess and mitigate such impacts include *inter alia*:

- adopting objectives in fisheries management plans to minimize mortalities as a result of pre-catch losses and ghost-fishing;
- improving the scientific information on the magnitude and effects of pre-catch losses and ghost fishing so that these effects can be included in stock, fishery and ecosystem assessments; and
- developing technologies and measures that quantify and reduce the impacts associated with pre-catch losses and ghost fishing. These include methods that: (i) estimate pre-catch losses by different gears; (ii) identify the ownership of gears; (iii) reduce gear losses; (iv) aid in the retrieval of lost gears; and (v) extinguish the fishing power of lost gear that uses degradable materials.

ANNEX A

Generalized Catch Concept Model - modified from Annex B¹³.



¹³ www.fao.org/fishery/cwp/en. Coordinating Working Party on Fishery Statistics Handbook (CWP). The Handbook of fishery statistical standards is intended to cover the concepts, definitions and related matters as applied to fishery statistics by the international agencies of the CWP.

List of terms used in Annex A

Term	Description
Fish	Fish in this context refers to organisms that will be impacted during fishing and after encountered, including fish, shrimp, seabirds, marine mammals, turtles, live coral, jellyfish, etc.
Total removals	Total live weight of fish killed during the fishing operation
Gross catch	Total live weight of fish caught and available for further processing
Retained catch	The total weight of fish retained as a useful product
Reported catch	The portion of the retained catch that is reported as catch
Reported landings	The live weight of fish retained as a useful product and reported at the time of landing
Reported removals not landed	The live weight of fish, e.g. used as bait, consumed by the crew or spoiled in handling.
Landings reported as bycatch and byproduct	The live weight of fish caught incidentally during certain targeted fisheries, and reported as bycatch or byproduct
Unreported Landings	The live weight of fish not reported at the time of landing for whatever reason
Discarded catch – dead	The total weight of undersized, unsalable or otherwise undesirable whole fish discarded dead at the time of capture, or shortly afterwards.
Discarded catch – live	The total weight of undersized, unsalable or otherwise undesirable whole fish discarded live at the time of capture, or shortly afterwards
Pre-catch losses	The total weight of fish that die as a result of encountering the fishing vessel or fishing gear, but are not available for further processing. May be reported or unreported.
Live escape	The total weight of fish that encounter the fishing gear, but avoid or escape it and remain alive

ANNEX B

Causes of discards

NOTE: This table has been taken from FAO Fisheries Technical Paper No. 470. Rome, FAO. 2005. 131p. Although not fully deliberated by the Expert Consultation, it was agreed to include it as a useful guide to some of the causes of discarding.

A classification of causes of discards

Cause/parameter	Comment/examples/trends
Biological	
Species composition	High species diversity is likely to increase untargeted species harvested. Changes in the species composition in fisheries may increase or decrease discards and may be directly linked to overfishing. Changes in discarding practices are likely to be related to change in the proportion of target species
Year class	Large juvenile year class may increase discards
Exploitation status (overfishing)	Overfishing may result in a larger proportion of smaller fish in the catch and large discards of juveniles or fish under the MLS; low stock density of target species may lead to increased fishing effort and unwanted bycatch
Sex	Target is roe fish only, immature/male fish may be discarded
Poisonous/dangerous	For example, landings of <i>Lujanus bohar</i> are prohibited in Réunion; stingrays
Vessel characteristics	
Size of fish hold	Bycatch may occupy space designated for target species
Freezing capacity	Quality of more valuable target species may suffer; insufficient freezing capacity; different freezing duration for shrimp and bycatch, for example
Limited ice on board	Quality of target species may suffer if ice is used for bycatch
Catch quantity	If catches are large, then discards may be higher
Processing plant	Catches exceed capacity of plant (e.g. surimi plant, fishmeal plant). Small/very large sizes cannot be handled by filleting machines
Catch composition	Small sizes, damaged fish, impossible to sort (small pelagics)
Fishing operations	
Skipper	Payment mechanism, personal preferences, skills
Selectivity	Wide range of effects on target species and bycatch
Crew remuneration	Payments linked to bycatch recovery, or not
Trip length	Discards higher at start of long trip
Haul length	Discards may be higher if trawl haul time is long, because of damage to fish
Soak time	Discards higher with long soak time because of damage to fish, e.g. Celtic Sea French gillnets
Time of trip	Differences in fish behaviour day/night /tides, e.g. Nephrops North Sea; discards may be higher at the start of a trip
Fishing area	Some areas known to have high concentrations of juveniles/unmarketable fish/predators (line fisheries)/jellyfish
Fishing season	Restrictions often applied to avoid large unwanted catches of juveniles
At-sea transfer	Payment, theft of target catch
Gear	
Rigging of gear	May have a major influence in trawl and longline fisheries, e.g. chafers
BRDs	Major effect in some fisheries, e.g. in Norway, in NAFO, square mesh panels in Nephrops trawls, numerous Australian trawl fisheries
Hook/line type/bait	Related to mouth, feeding behaviour and fishing depth, e.g. tuna/shark
Mitigation measures	Assessment of effectiveness difficult because of low incidental catch rates
Selectivity	Gear characteristics may not be in harmony with regulations, e.g. MLS
Market	
No/poor market for bycatch	Common in many fisheries, e.g. Guianas shrimp, Mozambique shrimp. Uneconomical to freeze low-value bycatch
Damaged fish	For example, crushed in the codend, decomposed, shark damaged
Taboos, customs	Low or non-consumption of shark in Jamaica
Bycatch retention reduces value of target species	Use of crew time for sorting, reduced efficiency of freezers, cold store efficiency compromised
Highgrading	Common in many quota fisheries (e.g. EU, United States)
Poor economic performance	May result in retention of more bycatch to cover costs (marginal profitability). May also result in reduced fishing effort and reduced discards
Regulatory	
Licensing	Fishing licence may restrict catch/landings to certain species
Observer effect	Presence of observer may result in greater retention of bycatch, increased discards (e.g. if the observer is monitoring quotas), or increased reporting of discards
Highgrading/quotas	Common where quotas are strictly enforced
Target species as % of landings	May result in "discards" or disposal of non-target species after landing, i.e. bycatch retention only until landing and subsequent dumping, e.g. France
MLS	The less selective the gear the higher the discards
Bycatch quota	Requires effective enforcement, probably by observers and possibly retention of bycatch
Time/season	Effective in reducing bycatch and discard of juveniles
Level of enforcement	All regulatory discards are closely related to the level of enforcement or fishing community peer pressure

ANNEX C

Examples of how the bycatch framework referred to in the Section “Scope and principles paragraph 18” would be applied in various types of fisheries.

Notes:

- The fishery management plans referred to may include a bycatch management plan and should be consistent with the Code of Conduct for Responsible Fisheries and its implementation through the ecosystem approach to management.
- “Rational use” means the use is sustainable ecologically, economically and socially and in accordance with the principles of the Code of Conduct for Responsible Fisheries.

	Type of capture	Bycatch	Rationale	Management goal
1	Capture of species which the legal jurisdiction has designated as protected, endangered or threatened	Yes	These are individuals not intended to be taken, whether they are subsequently used or not, and whether they are released alive or not	Eliminate or minimize
2	Organisms that encountered a fishing gear, but escaped or were released alive as part of the fishing operation (e.g. during the back-down manoeuvre of purse-seines or through Bycatch Reduction Devices)	No	These organisms were released unharmed as part of the fishing operation, before being captured	Increase the effectiveness of the escape mechanism strategy
3	Organisms that encountered a fishing gear and were killed (or injured to the point where mortality was likely), but were not retained by the gear	No	This is pre-catch mortality, and not considered bycatch	Minimize
4	Organisms that were caught by a fishing gear and were killed (or injured to the point where mortality was likely), but released before landing on deck (e.g. sharks taken on a longline, injured, and cut off as the line is hauled back; slipped fish in pelagic fisheries)	Yes	Encountered the fishing gear and were not released alive as part of the fishing operation.	Minimize
5	Capture landed, marketed, and reported to a legitimate authority enforcing a fishery management plan (a “typical” commercial fishery)	No	Taken consistent with a fishery management plan and used rationally	Maintain a sustainable level
6	Capture landed and marketed, but no fishery management plan exists and catch used rationally (e.g. many tropical and sub-tropical fisheries)	No	No fishery management plan to regulate the catch, but catch used rationally	Maintain at a sustainable level
7	Capture discarded because of undesirable size, species, sex, etc., whether reported or not, and whether likely to survive or not (e.g. fisheries with high grading)	Yes	Catch not used rationally, whether covered by a fishery management plan or not	Minimize
8	Capture includes juveniles that are landed and reported, consistently with a fishery management plan, and used rationally	No	Landed consistent with a fishery management plan	Maintain at a sustainable level

	Type of capture	Bycatch	Rationale	Management goal
9	Capture includes juveniles that are either not allowed to be landed or, if landed, are not used rationally (e.g. due to poor size selectivity)	Yes	Not consistent with a fishery management plan and not used rationally	Minimize
10	Capture of species not permitted to a particular fleet, whether landed and marketed or not	Yes	Catch is not consistent with a fishery management plan	Minimize or change allocations among fleets
11	For a fleet that targets specific stocks, capture of other species/stocks that are landed, marketed, reported and managed under a management plan, even if for another fishery (e.g. many multi-species fisheries)	No	Catch is consistent with a fishery management plan	Maintain a sustainable level and rationalize allocations among fleets
12	For a fleet that targets specific populations, capture of other populations that are landed, marketed, and reported, but no management plan covers that species/stock	Yes	Catch is not consistent with a fishery management plan	Minimize or develop a management plan for the species/stock

This document contains the report of the Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards held in Rome, Italy, from 30 November to 3 December 2009. The Expert Consultation was convened to review an initial draft of the International Guidelines as called for by the FAO Committee on Fisheries at its twenty-eighth session in 2009. The Expert Consultation adopted a draft text containing the International Guidelines to be forwarded to a Technical Consultation for review and consideration.

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