



OCT 27 2010

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Final Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis for a Final Rule to Establish Identification and Certification Procedures for Nations under the High Seas Driftnet Fishing Moratorium Protection Act (RIN 0648-AV51)

LOCATION: Outside of the U.S. Exclusive Economic Zone

SUMMARY: This action would establish regulations for the Secretary of Commerce to certify nations whose vessels are engaged in illegal, unreported, or unregulated (IUU) fishing activity or bycatch of protected living marine resources. These regulations are procedural and administrative in nature.

RESPONSIBLE

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The environmental review process led us to conclude that this action will not have a significant impact on the environment. Therefore, an environmental impact statement was not prepared. A copy of the finding of no significant impact (FONSI), including the environmental assessment, is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the Responsible Official named above.

Sincerely,

for Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure



FINAL
ENVIRONMENTAL ASSESSMENT,
REGULATORY IMPACT REVIEW,
AND REGULATORY FLEXIBILITY ACT ANALYSIS
FOR A FINAL RULE
TO ESTABLISH IDENTIFICATION AND CERTIFICATION
PROCEDURES FOR NATIONS UNDER THE HIGH SEAS
DRIFTNET FISHING MORATORIUM PROTECTION ACT

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of International Affairs

September 2010

Final Rule to Identification and Certification Procedures for Nations under the High Seas Driftnet Fishing Moratorium Protection Act

Actions: Establish identification and certification procedures for nations whose vessels are engaged in illegal, unreported, or unregulated (IUU) fishing or bycatch of protected living marine resources.

Type of Statement: Final Environmental Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis

Lead Agency: National Marine Fisheries Service

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Abstract:

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, which was signed into law in January 2007, amends the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium Protection Act) to require actions be taken by the United States to address illegal, unreported, or unregulated (IUU) fishing and the bycatch of protected living marine resources (PLMRs). Specifically, the Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose vessels are engaged in IUU fishing or fishing activities that result in bycatch of PLMRs. The Moratorium Protection Act also requires the establishment of procedures to certify whether nations identified in the biennial report are taking appropriate corrective actions to address IUU fishing or bycatch of PLMRs by fishing vessels of that nation. Identified nations that do not receive a positive certification from the Secretary of Commerce could be subject to measures under the High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1826a), such as the denial of port privileges, prohibition on the importation of certain fish or fish products into the United States, or other measures.

This action would establish procedures for the Secretary of Commerce to certify nations whose vessels are engaged in IUU fishing activity or PLMR bycatch. Background information on the issues and a description of the alternatives being considered for this rulemaking are described in this environmental assessment.

ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), which was signed into law in January 2007, amends the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium Protection Act) to require actions be taken by the United States to strengthen international fishery management organizations and address illegal, unreported, or unregulated (IUU) fishing and bycatch of protected living marine resources. Specifically, the Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose vessels are engaged in IUU fishing or fishing that results in bycatch of protected living marine resources (PLMRs). The Moratorium Protection Act also requires the establishment of procedures to certify whether nations identified in the biennial report are taking appropriate corrective actions to address IUU fishing or bycatch of protected living marine resources by fishing vessels of that nation. Based upon the outcome of the certification procedures developed in this rulemaking, nations could be subject to import prohibitions and other measures under the authority provided in the High Seas Driftnet Fisheries Enforcement Act (Enforcement Act) if they are not positively certified by the Secretary of Commerce. Pursuant to the Moratorium Protection Act, NOAA's National Marine Fisheries Service (NMFS) is proposing to establish identification and certification procedures to address illegal, unreported, or unregulated (IUU) fishing activities and bycatch of PLMRs.

1.1 PURPOSE AND NEED

The proposed action is the establishment of procedures for the certification of nations whose vessels are identified as engaging in IUU fishing or bycatch of PLMRs. The purpose of the proposed action is to enhance existing U.S. authority related to compliance with international fisheries management and conservation agreements. The need for the proposed action is to comply with the Moratorium Protection Act, as amended by the MSRA. Congress, recognizing that the U.S. regulatory regime for fisheries management is regarded as one of the most stringent, amended the Moratorium Protection Act to strengthen the ability of international fishery management organizations and the United States to address IUU fishing and reduce the bycatch of PLMRs. These threats to sustainable fisheries worldwide have continued under existing law.

To address IUU fishing, Congress authorized measures under the Moratorium Protection Act to promote international cooperation to address IUU fishing and strengthen the ability of international fishery management organizations to combat harmful fishing practices. To protect certain vulnerable species of concern to the United States, the Moratorium Protection Act was amended to encourage the use of bycatch reduction methods in international fisheries that are comparable to methods used by U.S. fishermen. In addition, the Act called for the establishment of certification procedures as described above, and NMFS is proposing the promulgation of regulations to implement these provisions of the Moratorium Protection Act.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) was enacted in 1969 and requires consideration of environmental issues in federal agency planning and decision making. NEPA requires federal agencies to evaluate the impacts of major federal actions on the human environment. The procedural provisions of NEPA, which outline the responsibilities of federal agencies, are provided in the Council on Environmental Quality NEPA regulations, 40 CFR Parts 1500-1508. NOAA has published procedures for implementing NEPA in NOAA Administrative Order 216-6 (NAO 216-6). NAO 216-6 also reiterates Department of Commerce provisions of Executive Order 12114, Environmental Effects Abroad of major Federal Actions. This Environmental Assessment (EA) is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

Under NAO 216-6, the promulgation of regulations that are procedural and administrative in nature is subject to a categorical exclusion from the requirement to prepare an Environmental Assessment. However, NMFS decided to do an EA for this action in order to facilitate public involvement in the development of the proposed certification procedures. This EA provides the public with a context for reviewing the proposed certification action by exploring the impacts associated with IUU fishing and bycatch. NMFS published a proposed rule (74 Fed. Reg. 2019 (January 14, 2009)) for this action and solicited public comment on the rule and draft EA, regulatory impact review and initial regulatory flexibility analysis (IRFA) for 120 days. NMFS did not receive any public comment on the draft EA or IRFA.

1.3 BACKGROUND

To provide context for the proposed action, background information on IUU fishing, bycatch, and authorities provided in current domestic laws is summarized in this section. Note that environmental assessments and environmental impact statements on some aspects of bycatch have been prepared for other rule makings and are listed in Appendices to this EA. Additional information can be found in Appendices A - F in documents prepared as background for this proposal.

1.3.1 IUU Fishing

In general, IUU fishing is fishing that does not comply with national, regional or global fisheries conservation and management obligations. The term covers a wide variety of illicit fishing conduct within national jurisdictions, areas under the governance of international agreements, and regional or subregional areas subject to conservation and management measures promulgated by regional fisheries management organizations (RFMOs). Unregulated fishing may occur in international waters where no management authority or conservation measures are in place.

In 2001, the United Nations Food and Agriculture Organization (FAO) adopted the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU).¹ The aim of this voluntary instrument is to prevent, deter and eliminate IUU

¹ United Nations Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (hereinafter FAO IPOA-IUU). Other fishing-related IPOAs include those for Management of Fishing Capacity; Conservation and Management of Sharks; and Reduction

fishing by providing States with comprehensive, effective and transparent measures to address IUU fishing, including through appropriate RFMOs established in accordance with international law. To help implement the IPOA-IUU, the United States published its own National Plan of Action (see Appendix A).

The United States has taken a view in defining IUU fishing that is aimed both at improving compliance with international fishery management regimes and at enhancing fairness for the U.S. fleet. According to a Senate Report, the U.S. industry is disadvantaged when “other countries do not impose the same stringent regime on their fishing fleets, either within their EEZs [Exclusive Economic Zones] or on the high seas. . . . Even when agreements exist, implementation is slow, and management requirements are weak or ineffective in the face of economic pressures.”²

In the Moratorium Protection Act, Congress directed NMFS to publish a definition of IUU by April 12, 2007. The agency published a final rule articulating its decision to “publish the definition exactly as set forth in section 403 of MSRA” (new section 609(e)(3) of the Driftnet Moratorium Protection Act), although the agency reserves the possibility of revising the definition in the future.³ This definition of IUU fishing was published in the Federal Register on April 12, 2007 (72 Fed. Reg. 18404) and is codified at 50 CFR Part 300.

For purposes of the Moratorium Protection Act, “IUU fishing” is defined as fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is a party, including catch limits or quotas, capacity restrictions and bycatch reduction requirements; overfishing of fish stocks shared by the United States, for which there are no applicable international conservation or management measures or in areas with no applicable international fishery management organization or agreement that has adverse impacts on such stocks; and fishing activity that has an adverse impact on seamounts, hydrothermal vents, and cold water corals located beyond national jurisdiction, for which there are no applicable conservation or management measures or in areas with no applicable international fishery management organization or agreement.

1.3.2 Bycatch of Protected Living Marine Resources

The incidental catch, or bycatch, in fisheries is one of the greatest threats to marine mammals, sea turtles, and sharks. Thousands of these animals are killed each year through entanglement in

of Incidental Catch of Seabirds in Longline Fisheries. These IPOA's were developed as the COFI Members in 1997 found it necessary to have some form of international agreement in order to manage the issues concerned in compliance with the Code of Conduct for Responsible Fisheries. The most suitable instrument for each of the three texts were developed in the course of two intergovernmental meetings, open to all FAO Members, held in 1998. The IPOAs were adopted by the twenty-third Session of the FAO Committee on Fisheries in February 1999 and endorsed by the FAO Council at the session it held in November 2000. There is also an FAO Strategy on Improving Information on the Status and Trends of Capture Fisheries, endorsed in 2003.

http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=CCRF_prog.xml&xp_nav=2,3 (last visited April. 2, 2008).

² Senate Report 109-229, Report of the Committee on Commerce, Science and Transportation on S. 2012, Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2005. April 4, 2006.

³ Illegal, Unreported, or Unregulated Fishing. NMFS/NOAA. Final Rule. 72 Fed. Reg. 18404 at 18405 (April 12, 2007).

fishing gear, including gillnets, trawl nets, purse seines, and longlines. Progress on quantifying the scale of this mortality, identifying the magnitude of this threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances. Minimizing bycatch has become increasingly important for NMFS over the past several years. NMFS is also concerned with bycatch mortality, which is the mortality of the discarded catch of any living marine resource plus unobserved mortality due to a direct encounter with fishing gear. Assessing the amount and type of bycatch that occurs in marine fisheries is an essential component of NMFS' efforts to better quantify total fisheries-associated mortality in marine fisheries. The reduction of bycatch in marine fisheries is also a major component of several of NMFS' governing statutes, including the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA).

NMFS implemented several bycatch reduction regulations in 2006, undertook bycatch reduction technology research and has continued to monitor and document bycatch in fisheries of the United States. During 2006, the United States continued its efforts to secure international measures to reduce bycatch that are comparable to the standards and measures applicable to United States fishermen. Given the negative impacts of bycatch globally, the United States will continue efforts to secure international measures designed both to minimize bycatch and minimize the mortality resulting from unavoidable bycatch. Reports on NMFS activities to address bycatch are provided (see Appendix C).

Internationally, however, few RFMOs have bycatch reduction measures in place.⁴ In 2006, Congress recognized that high bycatch levels are a threat to sustainable fisheries worldwide. Noting that the absence of effective bycatch reduction strategies has both economic and conservation implications for U.S. industry and management, the Congress found "...a clear need to ensure other nations, particularly those that fish on shared or high seas stocks, adhere to conservation and management standards comparable to those adhered to by U.S. fishermen both in U.S. waters and on the high seas. As bycatch of endangered or protected species increases in international fisheries, additional restrictions placed on U.S. vessels under the Magnuson-Stevens Fishery Conservation and Management Act or other U.S. law both disadvantage U.S. fleets and fail to address the problem."⁵ To help reduce bycatch in international fisheries, the Moratorium Protection Act was amended by the MSRA to include provisions that encourage the use of new bycatch reduction methods comparable to methods used by U.S. fishermen in high seas fisheries, for protection of certain vulnerable species of concern to the United States, such as endangered sea turtles and marine mammals. The Secretary of Commerce and the Secretary of State are encouraged to provide assistance to nations or organizations in development and adoption of such gear and appropriate conservation and monitoring plans for PLMRs.

"Protected living marine resources" is defined in the Moratorium Protection Act as non-target fish, sea turtles, or marine mammals that are protected under United States law or international agreement, including the MMPA, ESA, the Shark Finning Prohibition Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); but they do not

⁴ See Appendices D and E for descriptions of bycatch measures for cetaceans and sharks, and discussion of sea turtle measures in text.

⁵ Senate Report, *supra* note 2 at 43.

include species, except sharks, that are managed under the MSA, the Atlantic Tunas Convention Act, or any international fishery management organization. See 16 U.S.C. 1826k.

1.3.3. Magnuson-Stevens Fishery Conservation and Management Reauthorization Act

In 2006, the Congress reauthorized the Magnuson-Stevens Fishery Conservation and Management Act, which governs how the United States manages fisheries within its Exclusive Economic Zone (EEZ). The reauthorization bill, titled the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA),⁶ directed substantial attention to fishing issues outside U.S. waters, particularly IUU fishing and bycatch in high seas fisheries. The international provisions of the MSRA are designed to “strengthen the ability of international fishery management organizations and the United States to ensure appropriate enforcement and compliance with conservation and management measures in high seas fisheries,” particularly with regard to IUU fishing, expanding fleets, and high bycatch levels.⁷

Section 207 of the MSRA authorizes the Secretary of Commerce to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.⁸ Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.⁹

Section 403 of the MSRA’s international provisions amends the Moratorium Protection Act¹⁰ by adding several new sections, including a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; and identification of nations whose vessels are engaged, or have been engaged at any point during the preceding 2 years, in IUU fishing.¹¹ The Act also requires the identification of nations whose fishing vessels are engaged, or have been engaged during the preceding calendar year, in fishing activities or practices resulting in bycatch of PLMRs beyond any national jurisdiction, or fishing activities or practices beyond the EEZ of the United States that result in bycatch of a PLMR that is shared by the United States, if the relevant organization has failed to implement measures to reduce such bycatch; the nation engaged in PLMR bycatch is not a party to a relevant organization; and the nation has not adopted a bycatch reduction program comparable to that of the United States, taking into account different conditions.¹² In cases where international fishery management organizations or the nation in question are unable to address IUU fishing or reduce the bycatch of PLMRs, amendments to the Moratorium Protection Act and the High Seas Driftnet Fisheries Enforcement Act (Enforcement Act) allow for denial of port privileges, import prohibitions, and other measures to enforce compliance.¹³ These provisions add to existing authority related to

⁶ 16 U.S.C. 1801-1882 (1976), P. L. 94-265, as amended by P.L. 109-479 (hereinafter MSRA).

⁷ Senate Report, supra note 2 at 12. For more on IUU fishing see Appendix A.

⁸ MSRA, supra note 6, at Sec. 401.

⁹ Id.

¹⁰ 16 U.S.C. 1826d-k (P.L. 104-43).

¹¹ MSRA, supra note 6, at Sec. 403.

¹² MSRA, supra note 6, at Sec. 403.

¹³ Id; supra note 11; 16 U.S.C. 1826a-c (P.L. 102-582).

compliance with international conservation agreements.¹⁴ The Secretary of Commerce determines whether a nation has taken appropriate corrective action in response to IUU fishing, gives the offending party notice and opportunity for comment, and then certifies to Congress whether it has provided documentary evidence of corrective action.¹⁵

Once nations have been identified as having vessels engaged in IUU fishing, there is a notification and consultation process. Subsequent to these processes, the Secretary of Commerce must certify whether the government of an identified nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether a nation provided documentary evidence that it has taken corrective action with respect to the offending activities of its fishing vessels identified in the report; or whether the relevant international fishery management organization has implemented measures that are effective in ending the IUU fishing by vessels of that nation. See 16 U.S.C. 1826(j)(d)(1).

A similar procedure is required for bycatch of PLMRs in international waters or a PLMR beyond the U.S. EEZ that is shared by the United States. After a process that gives the international community time to respond to notification of their identification, amend existing treaties or develop new instruments as appropriate, the Secretary of Commerce must certify whether the nation has provided documentary evidence of the adoption of a regulatory program governing the conservation of the PLMR that is comparable to that of the United States, taking into account different conditions, and which, in the case of pelagic longline fishing, includes mandatory use of circle hooks, careful handling and release equipment, and training and observer programs; and has established a management plan containing requirements that will assist in gathering species-specific data to support international stock assessments and conservation enforcement efforts for protected living marine resources. See 16 U.S.C. 1826(k)(c)(1).

If the Secretary does not positively certify that the government of the identified nation has taken appropriate corrective action, measures of the Enforcement Act may be applied with some exceptions. The Secretary of the Treasury is authorized to withhold or revoke the clearance of vessels of the identified nation and deny them entry into the navigable waters or any port of the United States; prohibit the importation of certain fish or fish products from that nation; and impose other economic sanctions if denial of clearance and import bans are not successful in stopping the violation.¹⁶

An alternative procedure allows for certification on a shipment-by-shipment or shipper-by-shipper basis of fish or fish products.¹⁷ Congress also called upon the Secretary of Commerce to provide assistance to nations or organizations to help them develop gear and management plans that will reduce their bycatch of PLMRs.¹⁸

¹⁴ See Appendix C for description of domestic law, especially Pelly and Packwood amendments, 22 U.S.C. 1978(a); 16 U.S.C. 1371(a).

¹⁵ MSRA, *supra* note 6, at Sec. 403.

¹⁶ *Id.*; *supra* note 11 at 16 U.S.C. 1826(j)(d)(3) and 16 U.S.C. 1826(k)(c)(5); 16 U.S.C. 1826a(a), (b)(3), and (b)(4).

¹⁷ *Id.* at Sec. 610(c)(5)

¹⁸ Senate Report, *supra* note 2 at 12.

1.3.4 Domestic laws related to IUU fishing

A listing of U.S. enforcement authorities that can be used to address IUU fishing is included in the National Plan of Action of the United States of America to Prevent, Deter and Eliminate Illegal, Unregulated and Unreported Fishing (see Appendix A). Notably, the MSRA and amendments to the Moratorium Protection Act are not the first attempts by the Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international management and conservation regimes. The recent provisions differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. Appendix B describes how the existing statutory framework was employed in earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast to the multilateral approach of the MSRA, in these earlier approaches, the United States sought to use unilateral trade sanctions to push compliance with provisions of international and domestic measures for the protection of whales, sea turtles and dolphins affected by fishing practices (see Appendix B).

1.3.5 Domestic laws related to bycatch

U.S. law and policy provide mechanisms for action to reduce bycatch of marine mammals and sea turtles in fishing operations. The MMPA, ESA, and the Magnuson-Stevens Fishery Conservation and Management Act provide policy statements, action mandates and research direction for U.S. actions related to the bycatch of protected species. The MMPA, and the MSRA also direct U.S. managers to work in the international arena to promote conservation of PLMRs such as marine mammals, sea turtles, and sharks.

The MMPA contains national and international sections that provide tools to address the bycatch of marine mammals. Serious injury and mortality of marine mammals incidental to commercial fishing operations is a primary threat to many marine mammal species. The MMPA states that marine mammal "species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part."¹⁹ In 1994, Congress amended the MMPA to address the incidental mortality and serious injury (bycatch) of marine mammals in U.S. commercial fisheries. MMPA section 118 established a system for classifying commercial fisheries according to their levels of marine mammal bycatch and created the take reduction plan (TRP) process to reduce that bycatch.²⁰

Internationally, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The international provisions of the MMPA provide the United States

¹⁹ 16 U.S.C. 1361(2).

²⁰ NMFS. June 1995a. Environmental Assessment of Proposed Regulations to Govern Interactions between Marine Mammals and Commercial Fishing Operations, under Section 118 of the Marine Mammal Protection Act. See also: NMFS. June 16, 1995b. Taking of Marine Mammals Incidental to Commercial Fishing Operations; Authorization for Commercial Fisheries; Proposed List of Fisheries. Federal Register Vol. 60, No. 116, p. 31666. See also: NMFS. August 30, 1995c. Taking of Marine Mammals Incidental to Commercial Fishing Operations; Authorization for Commercial Fisheries. Federal Register Vol. 60, No. 168, p. 45086.

with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal. Until recently, the United States has rarely applied these measures nor has it taken actions abroad to reduce marine mammal bycatch or to protect ecosystems. In 2006, NMFS Office of International Affairs developed an international action plan to begin to address marine mammal bycatch in fisheries (see Appendix E).

The ESA was enacted in 1973 to provide for the conservation of species “which are in danger of extinction throughout all or a significant portion of their range.”²¹ The ESA provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of CITES.

In addition, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.²²

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in an amendment to the ESA.²³ The statute requires the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. The import ban does not apply to nations that have adopted sea turtle protection programs comparable to that of the United States (i.e., require and enforce the use of turtle excluder devices (TEDs)) or to fishing nations where incidental capture does not present a threat to sea turtles (e.g., nations that fish in areas where sea turtles do not occur). The Department of State is the principal implementing agency of this law, while NMFS serves as technical advisor. Nations that seek to import shrimp into the United States must be certified to meet the requirements of P.L. 101-162 on an annual basis. State and NMFS inspect portions of a nation's shrimp trawl fleet for adequate use of TEDs. Approximately 40 countries are currently certified to export shrimp to the United States. Although most certifications are done on a national basis, State Department's certification guidelines allow for import of individual shipments of TED-harvested shrimp from uncertified countries.²⁴

²¹ 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.

²² 16 U.S.C. 1537.

²³ Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).

²⁴ Description of the State department's procedure and guidelines is available online at <http://www.state.gov/g/oes/ocns/>.

1.4 SCOPE OF ASSESSMENT

The scope of this assessment analyzes the establishment, via regulation, of certification procedures associated with IUU fishing and PLMR bycatch as required by the MSRA amendments to the Moratorium Protection Act.

NMFS certification procedures, once in place, would result in a list of nations whose fishing vessels would be subject to denial of entry into any place in the United States and its navigable waters if such nations do not receive a positive certification under the Moratorium Protection Act. Further, the Secretary of Commerce could recommend Presidential action to prohibit the importation of certain fish or fish products from such nation into the United States. This EA provides an overview of the port privilege denial process as additional information. It does not address Presidential actions.

This EA does not assess the process for identification of nations; however, information on identification is included here for context.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

As described in Section 1.0, the proposed action is to develop procedures for the certification of nations that have been identified as having vessels engaged in fishing in violation of conservation and management measures, overfishing of shared stocks, and/or fishing that has adverse impacts on bottom features. See discussion above and at 16 U.S.C. 1826j(e)(3). The proposed action is also to develop procedures for the certification of nations that have been identified as having vessels engaged in fishing activities on the high seas that result in bycatch of a PLMR, or fishing activity beyond the U.S. EEZ that result in bycatch of PLMRs shared by the United States.

The CEQ regulations implementing NEPA call for consideration of the proposed action and a range of alternatives to the proposed action. A range of alternatives includes analysis of reasonable alternatives and the rationale for alternatives that are eliminated from detailed study. To be considered reasonable, an alternative must meet the stated purpose of and need for the proposed action. Therefore, procedures for both IUU fishing and bycatch are required to meet the purpose and need.

The alternatives described in section 2.2. and 2.3 provide options for certification procedures for IUU fishing and bycatch separately. To meet the purpose and need, the NMFS decision will consist of the selection of one alternative for IUU fishing and one alternative for bycatch. The preferred alternatives for each are identified in section 2.2. and 2.3.

2.1 OTHER ACTIONS

The Moratorium Protection Act envisions a multilateral process to implement effective measures to end IUU fishing and eliminate or reduce the bycatch of PLMRs. It requires the identification of nations, notification of such identifications, and further consultation with nations that have been identified as engaging in IUU fishing or bycatch of PLMRs. In addition, the Act requires

establishment of certification procedures through rulemaking, and the alternatives considered here relate specifically to the certification procedures. The identification and other processes are means by which the United States will open discussion with other fishing nations regarding IUU fishing activity and the bycatch of PLMRs. Subsequent to these actions, the Act requires development of certification procedures by rulemaking, and NMFS included these processes in the rule for purposes of transparency, but these processes are not conducive to an alternatives analysis.

2.2 IUU ALTERNATIVES

2.2.1 Alternative I-1

No Action Alternative: NMFS would not develop any new procedures to address the certification of nations identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities. The no action alternative would leave in place existing procedures for certification of nations fishing illegally or in a manner that undermines international agreements to which the United States is a party. Hence, the no action alternative would retain NOAA's authority to take action under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act and other statutes discussed above. Failure to develop new procedures would not comply with 16 U.S.C. 1826j(d)(1), which states the Secretary shall establish a certification procedure.

2.2.2 Alternative I-2

Under Alternative I-2, which is the preferred alternative, the Secretary would provide a positive certification to a nation identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities, if the Secretary determines the nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether a nation such nation has taken corrective action against the offending vessels, or the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

2.2.3 Alternative I-3

Under this alternative, the Secretary would provide a positive certification to a nation identified the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities, if such nation has taken corrective action against the offending vessels, and the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

2.3 BYCATCH ALTERNATIVES

2.3.1 Alternative B-1

No action alternative: NMFS would not develop any new procedures to address certification of nations identified in the biennial report to Congress (called for in section 610(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding calendar year in bycatch of PLMRs. Under this alternative, the status quo, existing regulations would remain in place and activities under existing certification programs such as the International Dolphin Conservation Program Act (IDCPA) and Public Law 101-162 would continue.

2.3.2 Alternative B-2

Under Alternative B-2, which is the preferred alternative, to receive a positive certification from the Secretary of Commerce, nations identified in the biennial report to Congress (called for in section 610(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding calendar year in bycatch of PLMRs must provide documentary evidence of their adoption of a regulatory program governing the conservation of the PLMR that is comparable in effectiveness with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for the PLMR.

The certification is a two-step process. First, NMFS would establish a procedure whereby it would examine the bycatch reduction methods currently in use to determine if they are comparable to methods used by U.S. fishermen in high seas fisheries to protect PLMRs. In its certification decision, NOAA would evaluate whether the nation has measures in place that are comparable in effectiveness to those required in the United States to reduce PLMR bycatch. In the case of a U.S. fishery for which bycatch reduction measures are required (e.g. TEDs for trawls, pingers for gillnets, or time/area restrictions), the program would be judged as comparable if for example, a nation requires bycatch reduction measures such as gear modifications, time/area closures, and outreach and research program that are similar to the United States or achieve similar reduction in bycatch.

Among the different conditions the United States may take into account in determining whether measures are comparable are considerations such as oceanographic or environmental conditions, resource or capacity constraints, available technology, or socio-economic considerations. These are meant to be exemplary, not exhaustive, and do not constitute a set of standards. The most important consideration in evaluating comparability would be whether the nation is making progress in reducing bycatch of PLMRs in its fisheries and that its bycatch reduction measures are achieving similar outcomes to those of the United States.

The second step is for a nation to establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts.

2.3.3 Alternative B- 3

Under this alternative, identified nations must provide documentary evidence of the adoption of a regulatory program, by the identified nation **and** the relevant international organization for the

conservation and protection of the PLMRs or the international/regional fishery organization (and proof of the identified nation's participation with such organization) governing the conservation of the PLMRs, if such organization exists, that is comparable with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation efforts, including but not limited to enforcement efforts for PLMRs.

This alternative is similar to alternative 2 with the exception of the addition of documentary evidence of a nation's regulatory program from and proof of its participation in the relevant international organization. Nations would be required to substantiate that they have implemented domestically the conservation and management and bycatch reduction measures adopted by an RFMO for the conservation and protection of the PLMR; and demonstrate establishment of a management plan that will assist in the collection of species-specific information.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

2.4.1 Alternative Procedures Alternatives

The Moratorium Protection Act authorizes the establishment of alternative procedures for certification, on a shipment-by-shipment, shipper-by-shipper, or other basis of fish or fish products from a vessel of a harvesting nation not certified, if the Secretary determines that the vessel has not engaged in IUU fishing. In addition, the Moratorium Protection Act requires the establishment of alternative procedures for certification, on a shipment-by-shipment, shipper-by-shipper, or other basis of fish or fish products from a vessel of a nation not positively certified, if the Secretary determines the relevant fishing practices did not result in bycatch of PLMRs or were harvested using practices that are comparable to those of the United States, taking into account different conditions and which, in the case of pelagic longline fisheries, includes mandatory use of circle hooks, careful handling and release equipment, and training and observer programs; and includes the gathering of species-specific information.

Any certification on a shipment-by-shipment basis, shipper-by-shipper basis, or vessel-by-vessel basis would require real-time monitoring and verification procedures to document whether that vessel or shipment is complying with the conservation and management measures of a particular RFMO and has not engaged in IUU fishing and/or PLMR bycatch. For the most part, the procedure for identification and certification is a retrospective analysis of data to determine whether a nation's vessels have engaged in IUU fishing and/or PLMR bycatch. The current fishing practices of a vessel or a nation are not monitored and verified in real-time so as to confirm that the vessel has not violated any conservation and management measures adopted by that nation or the RFMO. The statute anticipates an iterative process whereby the United States is working with RFMOs and fishing nations to improve compliance, and requires notice to nations before action is taken. It would require at least two years of this consultative process before specific nations are identified. Until such time as RFMOs adopt monitoring and verification procedures that allow for real-time documentation of products caught in compliance with the conservation and management provisions of an RFMO, the implementation of these alternative procedures are unlikely, except on a case-by-case basis (e.g tuna tracking and

verification in the Eastern Tropical Pacific tuna purse seine fishery). Information provided during the comment period of the Advance Notice of Proposed Rulemaking for this action suggests that where individual vessels or shippers have been identified by an RFMO as engaging in fishing activity in violation of conservation and management measures of such organization, private sector importers, exporters, suppliers and other entities in the seafood business sector may take their own actions to avoid using identified IUU vessels or shipments from IUU shippers.

An analysis of the potential impacts associated with these Alternative Procedures is not presented in this document since there are no alternatives that would lend themselves to meaningful analysis. Additionally, an analysis of the impacts of these procedures was not conducted due to the agency's limited discretion in the requirements to develop such procedures for nations identified as having vessels engaged in PLMR bycatch.

2.4.2. Other Mechanisms for Positive Certification

Additional alternatives were considered that varied from the direction provided in the Moratorium Protection Act, but not analyzed further given the specificity of the statute regarding procedures that the agency must develop.

NMFS considered, but did not analyze further, a procedure that would result in positive certification for an identified nation whose vessels have been engaged in, or are engaging in, IUU fishing activities, in cases where only the relevant RFMO had taken action against the offending vessels.

NMFS considered, but did not analyze further, a bycatch certification procedure that would have required identified nations to provide documentary evidence of their adoption of a regulatory program governing the conservation of the PLMR that is comparable with that of the United States, taking into account different conditions, or establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for PLMRs.

The establishment of procedures via non-regulatory means, such as guidelines, was considered but eliminated from analysis because non-regulatory actions are not considered to provide sufficient authority for the Secretary of Commerce to fulfill the certification requirement of the Moratorium Protection Act.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

For purposes of the proposed action, the effect is to provide a procedure for the positive or negative certification of nations related to IUU fishing and PLMR bycatch. The proposed regulation also will implement responsibilities to strengthen existing U.S. authority related to international conservation agreements. As such, the proposed action in itself does not have a direct effect on the environment, as those effects are ascribed to the underlying international agreements and their associated governing authorities. However, to provide the public with context for assessing the proposed alternative IUU and bycatch certification procedures, it is

useful to provide a broad overview of the environment and resources addressed by the Moratorium Protection Act.

CEQ regulations on NEPA call for an assessment of the affected environment commensurate with the impacts of a proposed action on that environment so that analyses are succinct and focused on the resources that are most likely to be affected. In this case, certification itself does not have an environmental impact. Further, the outcome of subsequent decisions are outside of NOAA's authority and conjectural in the case of Presidential actions to be taken against nations that receive a negative certification. In addition, the imposition of trade-related measures could cause a nation's vessels to shift from importation into the U.S. market into another market. For these reasons, the affected environment is speculative. However, in this instance, the agency believes a broad description of the affected environment is helpful to provide a context for public participation in the review and comment on the proposed regulatory actions.

The Moratorium Protection Act directs the Secretary of Commerce to certify nations that have been identified as having vessels engaged in IUU fishing. For purposes of IUU fishing, the affected environment includes the U.S. EEZ, transboundary areas where the United States shares stocks with other nations, ocean areas governed by agreements to which the United States is party, and areas of high seas where the United States and other fishing nations harvest highly migratory stocks.

The Moratorium Protection Act also directs the Secretary of Commerce to certify nations that have been identified as having vessels engaged in fishing activities or practices on the high seas that result in bycatch of a PLMR or fishing activities beyond the U.S. EEZ that result in bycatch of PLMRs that are shared by the United States. PLMRs are defined in Section 610(e). For purposes of bycatch of PLMRs, the affected environment includes transboundary areas where the United States shares PLMRs with other nations, and high seas areas where PLMRs occur.

In a 2002 report on high seas and deep-water fisheries, FAO describes the oceanic environment as "the marine water portion that extends over the continental slope and the abyssal plain."²⁵ This area is likely to lie beyond the EEZs of nations and may range in depth from 200 to 10,000 meters. Five depth zones comprise the oceanic environment: epipelagic, mesopelagic, bathypelagic, abyssopelagic, and hadalpelagic. The deep waters below the epipelagic zone do not receive sufficient light to contribute to primary production, but do provide nutrients that contribute to upwelling, which in turn creates high productivity.

In an analysis of 50 years of data from the FAO, species living in the oceanic region were classified as either epipelagic or deep-water (inhabiting the meso- and bathypelagic zones). Though the FAO study was used to examine trends in catches of these species, the classification is useful for purposes of this analysis because the species groups that fall within the epipelagic and deep-water regions are most likely to be the species that are fished in high seas areas. The epipelagic species include tunas, bonitos, billfishes, sharks, rays, chimaeras, krill, squid, cuttlefish, and octopus. The deep-water species include cod, hakes, haddocks, demersal fish such as grenadiers and lanternfish, sharks, rays, chimaeras, crabs, lobsters, shrimps and prawns.

²⁵ L. Garibaldi and L. Limongelli. Trends in oceanic captures and clustering of large marine ecosystems. FAO Fisheries Technical Paper. No. 435. Rome, FAO. 2002, at 2.

Figure 1 shows the EEZs of the world. The areas outside the shaded zones are high seas. The fisheries of the world occur in both the shaded and unshaded areas. The lines delineate FAO Statistical Areas. Figure 2 shows the numbered FAO statistical areas.

The requirements of the Moratorium Protection Act are directed at addressing global fishing activity, primarily in international waters. ...²⁶ NOAA's NEPA policy "has been, and continues to be, that the scope of its analysis will be to consider the impacts of actions on the marine environment both within and beyond the U.S. Exclusive Economic Zone."²⁷

The analysis that follows therefore includes in the discussion of affected environment areas of the Atlantic and Pacific adjacent to the U.S. EEZ in those oceans, and areas of international waters where the United States has an identified interest under the provisions of the Moratorium Protection Act. The analysis will not address fishing activity within the EEZs of other nations or fishing activity on international waters where the United States does not have an interest under the provisions of the Moratorium Protection Act.

²⁶ See, EO 12144, 1979, *Environmental Defense Fund v Massey*, 986 F. 2d 528 (D.C. Cir. 1993).

²⁷ NOAA NEPA Handbook, NOAA AO 216

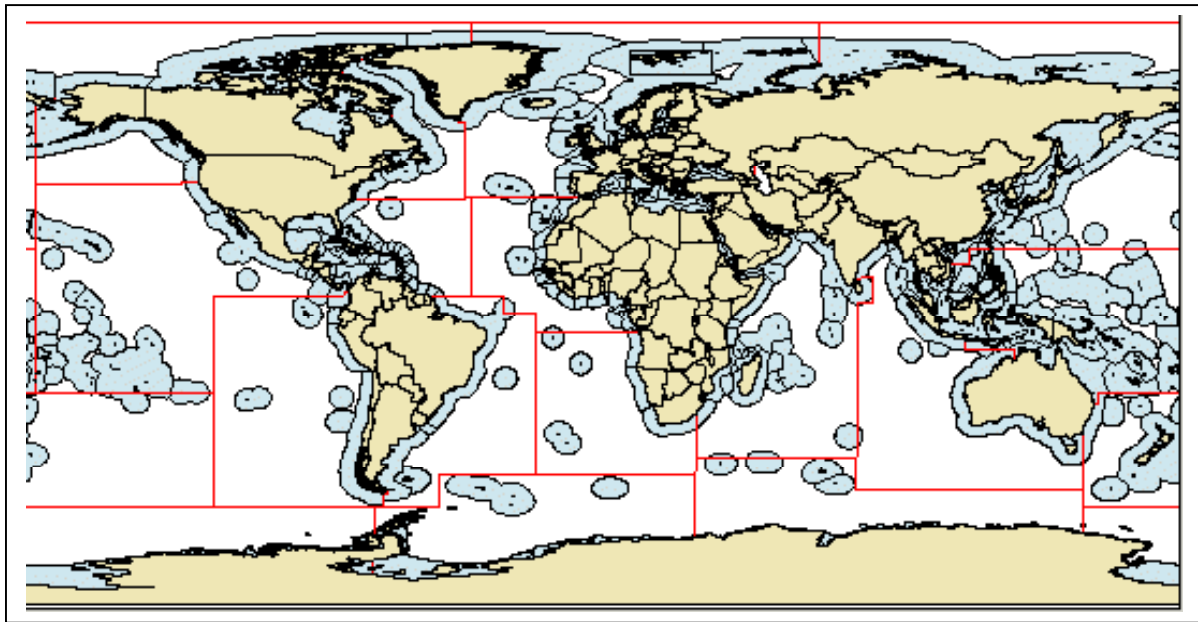


Figure 1. EEZs of the world. Source: The Sea Around Us. {<http://www.seaaroundus.org/>}

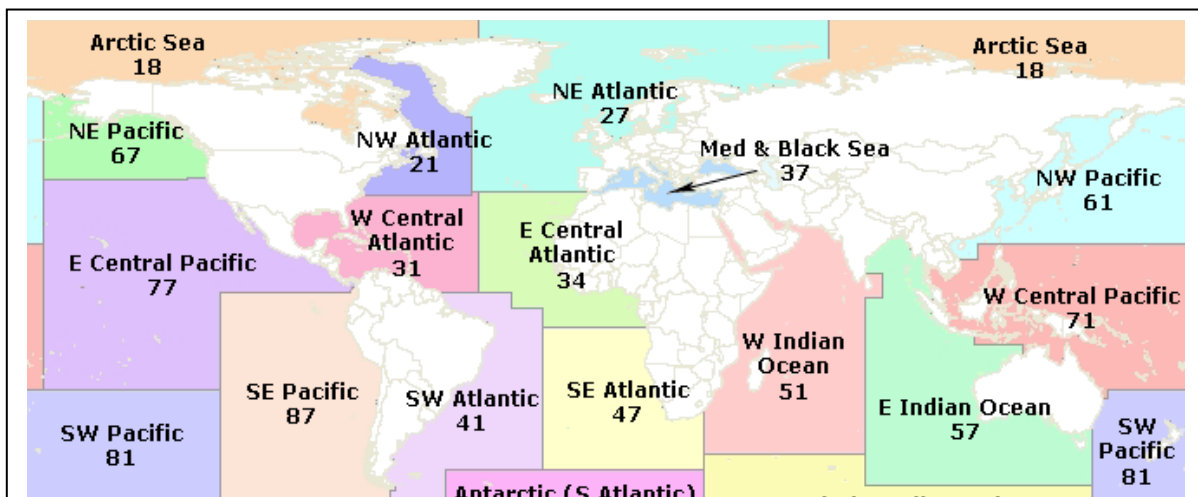


Figure 2. FAO Statistical Areas. Source: The Sea Around Us. {<http://www.seaaroundus.org/>}

3.1 PHYSICAL ENVIRONMENT

3.1.1. High Seas

The Pacific Ocean is the world's largest body of water and covers about one third of Earth's surface (approximately 69 million square miles). From north to south, it is more than 9,000 miles long; from east to west, the Pacific Ocean is nearly 12,000 miles wide (on the Equator). The Pacific Ocean contains several large seas including: on its western margin, the Celebes Sea, Coral Sea, Japan Sea, Philippine Sea, Sea of Okhotsk, South China Sea, and the Tasman Sea; in the north, the Bearing Sea; and, in the east, the Sea of Cortez.

The Hawaiian Archipelago and the Marianas Archipelago, which include Guam and Commonwealth of the Northern Mariana Islands (CNMI), lie in the North Pacific subtropical gyre while American Samoa lies in the South Pacific subtropical gyre. These subtropical gyres rotate clockwise in the Northern Hemisphere and counter clockwise in the Southern Hemisphere in response to tradewind and westerly wind forcing. Imbedded in this mean flow are an abundance of mesoscale eddies created from wind and current interactions with bathymetry. These eddies, which can rotate either clockwise or counter clockwise, have important biological impacts. Eddies create vertical fluxes, with regions of divergence (upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling) where the thermocline deepens. North and south of the Hawaiian islands are frontal zones that also provide important habitat for pelagic fish and thus are targeted by fishers. To the north of the Hawaiian and Marianas Archipelagoes, and also to the south of American Samoa, lie the subtropical frontal zones consisting of several convergent fronts located along latitudes 25°-40° N. and S. often referred to as the Transition Zones. To the south of the Hawaiian and Marianas Archipelagoes, and to the north of American Samoa, spanning latitudes 15° N-15° S lies the equatorial current system consisting of alternating east and west zonal flows with adjacent fronts.

Significant sources of interannual physical and biological variation are the *El Niño* and *La Niña* events. During an *El Niño* the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll. A *La Niña* event exhibits the opposite conditions. During an *El Niño* the purse seine fishery for skipjack tuna shifts over 1,000 km from the western to the central equatorial Pacific in response to physical and biological impacts. Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean basin. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts (Polovina, 1996; Polovina et al. 1995).

The oceanic fronts with varying physical parameters such as temperature, salinity, chlorophyll and sea surface height attract swordfish, tunas, seabirds, sharks, and sea turtles. Oceanic pelagic fish such as skipjack and yellowfin tuna, and blue marlin inhabit the warm surface waters; whereas albacore, bigeye tuna, striped marlin and swordfish prefer the cooler more temperate waters. Tunas are commonly most concentrated near islands and seamounts that create

divergences and convergences which concentrated forage fish. Frontal zones are also likely migratory pathways for loggerhead sea turtles.

The Atlantic contains major oceanographic features such as currents, temperature gradients, eddies, and fronts that occur on a large scale and may influence the distribution patterns of many oceanic species. The distribution of marine species along the Atlantic seaboard may be strongly influenced by currents, the warm Gulf Stream in the middle and south portions of the region, and generally by the combination of high summer and low winter temperatures. The Gulf Stream produces meanders, filaments, and warm and cold core rings that significantly affect the physical oceanography of the continental shelf and slope. These features tend to aggregate both predators and prey, and are frequently targeted by commercial fishing vessels. This western boundary current has its origins in the tropical Atlantic Ocean (*i.e.*, the Caribbean Sea). The Gulf Stream system is made up of the Yucatan Current that enters the Gulf of Mexico through the Yucatan Straits; the Loop Current which is the Yucatan Current after it separates from Campeche Bank and penetrates the Gulf of Mexico in a clockwise flowing loop; the Florida Current, as it travels through the Straits of Florida and along the continental slope into the South Atlantic Bight; and the Antilles Current as it follows the continental slope (Bahamian Bank) northeast to Cape Hatteras. From Cape Hatteras it leaves the slope environment and flows into the deeper waters of the Atlantic Ocean.

The Atlantic includes a diverse spectrum of aquatic species of commercial, recreational, and ecological importance. The distribution of marine species along the Atlantic seaboard is strongly affected by the cold Labrador Current in the northern part, the warm Gulf Stream in the middle and southern portions of the region, and generally by the combination of high summer and low winter temperatures. For many species Cape Hatteras forms a strong zoogeographic boundary between the Mid- and South Atlantic areas, while the Cape Cod/Nantucket Island area is a somewhat weaker zoogeographic boundary in the north.

Pelagic *Sargassum* in the Atlantic supports a diverse assemblage of marine organisms including fungi, micro- and macro-epiphytes, sea turtles, numerous marine birds, at least 145 species of invertebrates, and over 100 species of fishes. The fishes associated with pelagic *Sargassum* include juveniles as well as adults, including large pelagic adult fishes. Swordfish and billfish are among the fishes that can be found associated with *Sargassum*. The *Sargassum* community, consisting of the floating *Sargassum* (associated with other algae, sessile and free-moving invertebrates, and finfish) is important to some epipelagic predators such as wahoo and dolphin. The *Sargassum* community provides food and shelter from predation for juvenile and adult fish, and may have other functions such as habitat for fish eggs and larvae.

3.1.2 Areas adjacent to U.S. EEZ with shared PLMRs

Figure 3 shows U.S. EEZ areas. These waters are adjacent to the EEZs of Russia, Canada, Mexico and Cuba, and to those of numerous island nations in the Pacific. The United States shares transboundary PLMRs such as salmon, marine mammals, sea turtles and sharks in all of these areas. The EEZ of the United States and adjacent high seas areas are included in FAO areas 21, 31, 61, 67, and 77.



Figure 3. U.S. EEZ. Source: NOAA Photo Library.

3.1.3 Habitat areas of special concern located beyond national jurisdiction

3.1.3.1 Seamounts

Seamounts are undersea mountains, mostly of volcanic origin, which rise steeply from the sea bottom to below sea level (Rogers 1994). On seamounts and surrounding banks, species composition is closely related to depth. Deep-slope fisheries typically occur in the 100 to 500-meter depth range. A rapid decrease in species richness typically occurs between 200 and 400 meters deep, and most fishes observed there are associated with hard substrates, holes, ledges, or caves (Chave and Mundy 1994). Site fidelity is considered to be less important for deep-water species of serranids, and lutjanids tend to form loose aggregations. Adult deep-water species are believed to not normally migrate between isolated seamounts.

Seamounts have complex effects on ocean circulation. One effect, known as the Taylor column, relates to eddies trapped over seamounts to form quasi-closed circulations. It is hypothesized that this helps retain pelagic larvae around seamounts and maintain the local fish population. Although evidence for retention of larvae over seamounts is sparse (Boehlert and Mundy 1993), endemism has been reported for a number of fish and invertebrate species at seamounts (Rogers 1994). Wilson and Kaufman (1987) concluded that seamount species are dominated by those on nearby shelf areas, and that seamounts act as stepping stones for transoceanic dispersal. Snappers and groupers both produce pelagic eggs and larvae, which tend to be most abundant over deep reef slope waters, while larvae of *Etelis* snappers are generally found in oceanic waters. It appears that populations of snappers and groupers on seamounts rely on inputs of larvae from external sources.

3.1.3.2 Hydrothermal vents

Although most of the deep seabed is homogenous and low in productivity, there are hot spots teeming with life. In areas of volcanic activity such as the mid-oceanic ridge, thermal vents exist that spew hot water loaded with various metals and dissolved sulfide. Bacteria found in these areas are able to make energy from the sulfide (chemotrophs), and are considered primary producers. A variety of organisms either feed on these bacteria directly. Others contain the bacteria in special organs within their bodies called “trophosomes.” Types of organisms found near these thermal vents include crabs, limpets, tubeworms, and bivalves (Levington 1995). Although these deepwater ecosystems are not particularly vulnerable to fisheries, policy makers have noted that the deep sea is one of the last unregulated areas of the oceans.

3.1.3.3 Cold water corals

Although the existence of cold water corals is already known for several hundreds of years, it is only since the 1990s that scientists started to realize study the ocean’s large coral reef structures in the cold and dark depths. The individual cold water reefs are usually smaller than tropical reef, but the total surface area of all cold water reefs combined may be equal or even larger than the combined tropical reefs.

Cold water corals have been found in many parts of the world’s oceans and they occur in all oceans and at all latitudes, opposed to the warm water corals that only occur around the equator between 30° N and S. Cold water corals can live in waters with a temperature of 4-13°C and are found at depths between several tens of meters up to 3 km. Unlike tropical corals, cold water corals lack photosymbiotic algae in their tissue. However they feed by catching particles out of the surrounding seawater with their tentacles.

Compared to the about 800 species of reef building warm water corals, the number of primary species of cold water corals is limited to six. *Lophelia* is found throughout the world's oceans, except in the polar regions, and it is the dominant deepwater colonial coral in the North Atlantic. It is a true hard coral formed by a colony of individual coral polyps, which produce a calcium carbonate skeleton. It feeds by catching food from the surrounding water. *Lophelia* reefs grow at the rate of about 1 mm in height per year. The highest reefs found so far have been measured at an impressive 35 m, at Sula Ridge off the Norwegian coast. Fragments taken from this reef have been dated as being 8500 years old, which is just after the end of the last Ice Age. Just like warm water reefs, cold water reefs are also inhabited by many species of other animals such as sponges, bivalves, snails, worms, starfish, sea urchins, shrimps, crabs, and fish. A wide variety of animals grow on the coral itself, including sponges, bryozoans, hydroids, and other coral species.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Marine Mammals

Marine mammals are incidentally caught in high seas purse-seine, longline, driftnet, and trawl fisheries in the Atlantic and the Pacific. As an example of the potential for interactions over vast areas, Figure 4 shows the location of longline fisheries for tuna and billfish. Marine mammals occur in all those areas. However, accurate abundance and bycatch estimates for marine

mammals are lacking, making any quantitative analysis almost impossible. The qualitative data from RFMOs and national sources provides sufficient information to discuss only those species of marine mammals that have a documented interaction with high seas fisheries. The discussion below uses documentation from RFMOs and national sources.

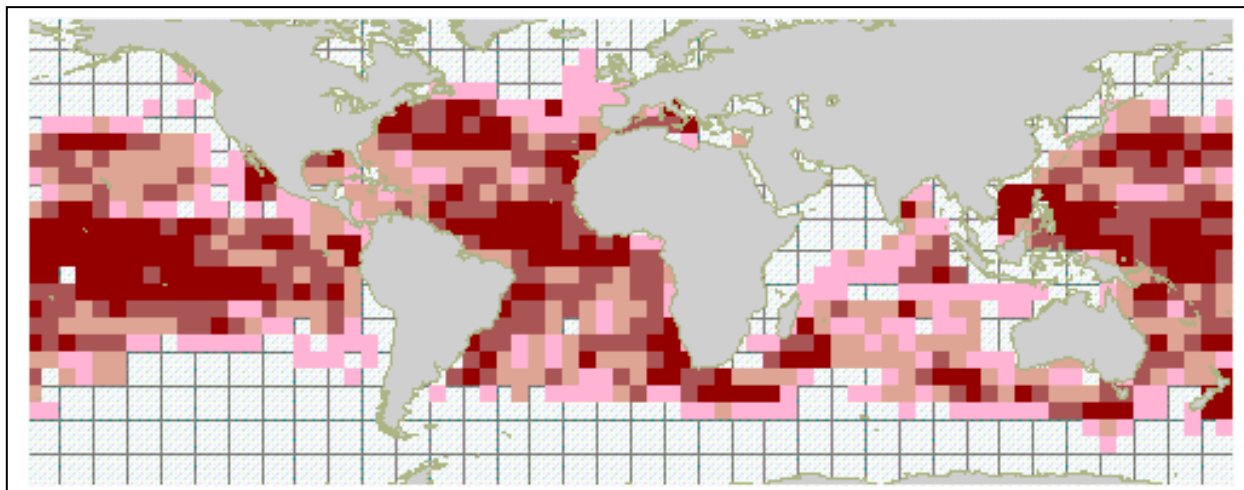


Figure 4. Longline fisheries for tuna and billfish. Source: FAO Atlas of Tuna and Billfish Catches. Mapping application available online at <http://www.fao.org/fishery/geoinfo/applications>

3.2.1.1 Pacific

In the Eastern Tropical Pacific (ETP), offshore stocks of spotted dolphins (*Stenella attenuata*) are most frequently associated with tunas and have historically been set on by tuna purse seiners. Spinner dolphins (*Stenella longirostris*; eastern and whitebelly stocks) also occur in mixed herds with spotted dolphins and are often set upon by purse seiners. The common dolphin (*Delphinus delphis*) is another species that has been targeted for sets by purse seiners, although sets on this species are less frequent than on spotted and spinner dolphins. Four other dolphin species that are sometimes found in association with tunas include striped (*Stenella coeruleoalba*), rough-toothed (*Steno bredanensis*), bottlenose (*Tursiops truncatus*), and Fraser's (*Lagenodelphis hosei*) dolphins (NRC, 1992).

Endangered species of cetacean that have been observed in the Western Pacific include the humpback whale, sperm whale, blue whale, fin whale and sei whale. In addition, one endangered pinniped, the Hawaiian monk seal, occurs in the region. There is little evidence that dolphin-associated sets are made by purse seiners in the Western and Central Pacific Ocean (WCPO) area. There are a few records of Risso's dolphins, pilot whales being encircled during log sets in some areas. Sei whale and whale shark (not a mammal) sets are more common in equatorial areas, but these very large animals are usually released unharmed. Marine mammals may occasionally be entangled in longline gear, but there appear to be few examples of actual hooking by longline gear. False killer whales and pilot whales are frequently associated with depredation of longline bait and catch.

The following is a summary of the status of the cetacean stocks that interact to the greatest degree with the tuna purse seine fishery operating in the ETP.

Pantropical Spotted Dolphin (Stenella attenuata)

There are three recognized stocks of spotted dolphin in the ETP: northeastern offshore, western/southern offshore, and coastal. Spotted dolphins range from 1.6 to 2.6 m in length and weigh up to 100 kg, depending on the stock involved (Dizon et al. 1994). The northeastern and western/southern offshore stocks are relatively smaller, have smaller teeth, and are, on average, less spotted than the coastal stock. Distinctions between the northeastern and the western/southern offshore stocks have been made on the basis of external morphology and skull measurements. Spotted dolphins are extremely gregarious. The offshore stocks are often found in aggregations of more than several hundred animals, frequently in mixed herds with spinner dolphins. The coastal stock of spotted dolphin is usually encountered in herds of less than 100 animals (NMFS, 1991). The northeastern offshore and coastal stocks interact most frequently with the ETP tuna purse seine fishery. These two spotted dolphin stocks are described in greater detail below.

Northeastern offshore stock

The northeastern offshore stock of spotted dolphin is distributed north of the equator above 5°N and west to 120°W (Wade, 1993). On average, individuals in the northeastern offshore stock are larger than those of the western/southern form and smaller than the coastal form (NMFS, 1991). Given a small cetacean's life history characteristics (e.g., sexual maturity at 10 years or more and mature females give birth approximately every 3 years), it is generally expected that maximum population growth rate for this population is 4 percent per year (Reilly and Barlow, 1986); however, few observed data from any cetacean population exist to support this theoretical maximum. The northeastern offshore spotted dolphin population abundance has been estimated at 736, 737 (CV = 0.15) (Gerrodette et al. 2005). Between 2000 and 2006, the total annual fishing mortality for northeastern spotted dolphins for both the United States and the foreign fleets ranged between 147 and 592 animals, with an average of 328 (IATTC 2007). In 1993, NMFS determined that the stock was below its maximum net productivity level and designated it as a depleted stock under the MMPA (58 FR 58285, November 1, 1993). The stock has no special status under the ESA.

Coastal stock

The coastal spotted dolphin ranges from south of the equator to the Gulf of California, approximately 28°N latitude, and is normally found in waters within 50 km of the coast. The stock occurs continuously along the Mexican, Central American, and South American coasts to well south of the equator. Individuals in this stock are larger and more robust than those in other stocks and their light-colored spotting is so extensive that it is sometimes referred to as a "silver-back" (NMFS, 1991). The average abundance estimate is 149,393 (CV = 0.27) (Gerrodette et al. 2005). Estimates of fishery-caused mortality for coastal spotted dolphins are considered less reliable than for other stocks because of the difficulty in separating the offshore and coastal forms, and because of the low level of fishing effort in nearshore waters (NMFS, 1991). The coastal spotted dolphin has been designated as depleted under the MMPA since 1980 (45 FR 72178 (October 31, 1980)). This stock has no special status under the ESA.

Western-southern stock

The western-southern stock is distributed south of the equator. The abundance has been estimated at 627,863 (CV = 0.31) (Gerrodette et al. 2005). In the eastern tropical Pacific, spotted dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of western/southern spotted dolphins ranged between 99 and 1,044 animals, with an average of 383 (IATTC 2007).

Spinner dolphin (Stenella longirostris)

There are four recognized stocks of spinner dolphins in the ETP: northern whitebelly, southern whitebelly, eastern, and Central American (or Costa Rican). Due to the high degree of overlap in distribution between the northern and southern whitebelly spinner dolphin stocks, it has been suggested that northern and southern whitebelly stocks be combined into a single management unit. Spinner dolphins often occur in very large herds, and are often found mixed with spotted dolphins. The whitebelly and eastern stocks are most affected by the tuna purse seine fishery (NMFS, 1991).

Spinner dolphins reach a length of 1.5-2.2 m, although the size varies among the stocks. The Central American spinner is the longest, reaching a length of 2 m or more, while the eastern spinner dolphin is the smallest. The spinner dolphin name is derived from its habit of leaping clear of the water and spinning on its longitudinal axis, rotating as much as seven times in one leap (NMFS, 1991).

Eastern spinner dolphin

Eastern spinner dolphins are, on average, about 3-4 cm smaller than the whitebelly spinner dolphins (NMFS, 1991). The abundance estimate for the eastern stock of spinner dolphin is approximately 616,662 (CV = 0.22) (Gerrodette et al. 2005). The total fishing mortality of eastern spinner dolphins from 2000-2006 ranged from 155 to 469 per year, averaging approximately 299 animals per year (IATTC, 2007). The eastern stock of spinner dolphin was designated as depleted under the MMPA in 1993 (58 FR 45066, August 26, 1993). This stock has no special status under the ESA.

Whitebelly spinner dolphin

The abundance estimate for the whitebelly stock of spinner dolphin is approximately 441,711 (CV = 0.45) (Gerrodette et al. 2005). The total fishing mortality of whitebelly spinner dolphins from 2000-2006 ranged between 115 and 372 animals, with an average of 211 (IATTC, 2007). This stock has no special status under the MMPA or the ESA.

Other marine mammals

Data reported by Wade and Gerrodette (1993) from cruises conducted between 1986 and 1990, and the most recent ship surveys (1998, 1999, and 2000) provide the most comprehensive information regarding abundance and distribution of marine mammals in the ETP that may

interact with the tuna purse seine fishery. In addition to the cetacean species described previously, the species that were sighted with the greatest frequency during the 1986-1990 cruises were the bottlenose dolphin (*Tursiops truncatus*), long- and short-finned pilot whales (*Globicephala* sp.), Risso's dolphin (*Grampus griseus*), sperm whale (*Physeter macrocephalus*), beaked whale (family Ziphiidae), and Bryde's whale (*Balaenoptera edeni*) (Wade and Gerrodette, 1993).

The blue whale (*B. musculus*), sei whale (*B. borealis*), fin whale (*B. physalus*), southern right whale (*Eubalaena australis*), and humpback whale (*Megaptera novaeangliae*) have also been sighted in the ETP. These species are all listed as endangered under the ESA.

Pinnipeds have also been sighted in the ETP, but they have not been known to interact regularly with tuna purse seines. Pinniped species seen, usually one or two at a time, include the California sea lion (*Zalophus californianus*), northern fur seal (*Callorhinus ursinus*) and the northern elephant seal (*Mirounga angustirostris*). The northern fur seal is categorized as depleted under the MMPA. These other pinniped species have no special status under the MMPA or ESA.

3.2.1.2 Atlantic

In the Atlantic marine mammals interact with pelagic longline, purse-seine and trawl fisheries. Again the stock status of pelagic marine mammals is poorly documented, as is the bycatch. Of the marine mammals that are hooked by pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released.

Table 1 lists bycatch species recorded as caught by any major tuna fishery in the Atlantic and Mediterranean. Note that the lists are qualitative and are not indicative of quantity or mortality. Thus, the presence of a species in the lists neither implies that it is caught in significant quantities nor that individuals that are caught necessarily die.

Table 1. Marine Mammal Bycatch in Atlantic and Mediterranean tuna fisheries.

Scientific names	Common name	LL	GILL	PS	HARP	TRAP	OTHER
Key: LL, longline; GILL, gillnet; PS, purse seine; HARP, harpoon; TRAP, traps and pots.							
<i>Balaenoptera acutorostrata</i>	Minke whale		X	X		X	
<i>Balaenoptera borealis</i>	Sei whale			X			
<i>Balaenoptera edeni</i>	Bryde's whale			X			
<i>Balaenoptera physalus</i>	Fin whale	X	X	X	X		
<i>Delphinus delphis</i>	Common dolphin		X	X			
<i>Eubalaena glacialis</i>	Northern right whale		X				
<i>Globicephala macrorhynchus</i>	Shortfin pilot whale			X			
<i>Globicephala melas</i>	Pilot whale	X	X		X	X	
<i>Grampus griseus</i>	Risso's dolphin	X	X		X		
<i>Kogia breviceps</i>	Pygmy sperm whale		X				
<i>Lagenorhynchus acutus</i>	Atlantic whiteside dolphin		X				
<i>Megaptera novaeangliae</i>	Humpback whale		X				
<i>Mesoplodon spp</i>	Beaked whale		X				
<i>Orcinus orca</i>	Killer whale		X			X	
<i>Phocoena phocoena</i>	Harbor porpoise		X				
<i>Physeter macrocephalus</i>	Sperm whale		X	X	X		
<i>Pseudorca crassidens</i>	False killer whale			X			
<i>Stenella attenuata</i>	Pantropical spotted dolphin			X			
<i>Stenella clymene</i>	Shortsnouted spinner dolphin			X			
<i>Stenella coeruleoalba</i>	Striped dolphin	X	X	X	X	X	
<i>Stenella frontalis</i>	Atlantic spotted dolphin		X				
<i>Stenella longirostris</i>	Spinner dolphin			X			
<i>Stenella plagiodon</i>	Atlantic spotted dolphin		X				
<i>Steno bredanensis</i>	Rough-toothed dolphin			X			
<i>Tursiops truncatus</i>	Bottlenose dolphin	X	X	X	X		
<i>Ziphius cavirostris</i>	Goosebeaked whale	X	X		X		

The following is a summary of the status of the marine mammal stocks that interact to the greatest degree with the longline fisheries in the Atlantic.

Pilot Whales

Long-finned pilot whales are distributed world wide in cold temperate waters in both the Northern (North Atlantic) and Southern Hemispheres. In the North Atlantic, the species is broadly distributed and thought to occur from 40° to 75°N in the eastern North Atlantic and from 35° to 65°N in the western North Atlantic (Abend and Smith 1999). Short-finned pilot whales are also distributed world wide in warm temperate and tropical waters. The two species are difficult to differentiate therefore, in many cases, reference is made to the combined species, *Globicephala* spp. Due to this difficulty, the exact species' boundaries for short-finned and long-finned pilot whales in the western Atlantic have not been clearly defined (Payne and Heinemann 1993, Bernard and Reilly 1999).

Long-finned pilot whales were found on the continental shelf and especially along the shelf break while short-finned pilot whales were present on the shelf, along the shelf edge and in deeper water east of the shelf break. The greatest area of overlap in distribution of the two

species seems to be confined to an area along the shelf edge between 38°N and 40°N in the Mid-Atlantic Bight, where long-finned pilot whales are present in winter and summer and short-finned pilot whales are present at least in summer.

Population structure for neither long-finned nor short-finned pilot whales in the North Atlantic is well known. For short-finned pilot whales, there is no available information on whether the North Atlantic stock is subdivided into smaller populations. Several studies on long-finned pilot whales suggest the existence of two or more demographically independent populations in the North Atlantic (Bloch and Lastein 1993; Fullard et al. 2000) as well as population differentiation across the Atlantic as well.

The total number of pilot whales off the eastern United States and Canadian Atlantic coast is unknown, (Waring *et al.* 2006) but the best available estimate for *Globicephala* spp. in the U.S. EEZ is 31,139 (Coefficient of Variation, or CV=0.27) (Waring et al. 2006; Wade and Angliss 1997).

Risso's Dolphin

Risso's dolphins occur world wide in warm temperate and tropical waters roughly between 60°N and 60°S, and records of the species in the western North Atlantic range from Greenland south, including the Gulf of Mexico (Kruse et al. 1999). In the U.S. Atlantic EEZ, the species is most commonly seen in the mid-Atlantic Bight shelf edge year round and is rarely seen in the Gulf of Maine (Waring et al. 2004). Risso's dolphins are pelagic, preferring waters along the continental shelf edge and deeper, as well as areas of submerged relief such as seamounts and canyons (Kruse et al. 1999). There is no information available on population structure for this species. Total numbers of Risso's dolphins off the U.S. or Canadian Atlantic coast are unknown, although eight estimates from selected regions of the habitat do exist for select time periods (Waring et al. 2006). Sightings of Risso's dolphins are almost exclusively in the continental shelf edge and continental slope areas. The best available estimate for Risso's dolphins in the U.S. EEZ is the sum of the estimates from the summer 2004 U.S. Atlantic surveys, 20,479 (CV =0.59), where the estimate from the northern U.S. Atlantic is 15,053 (CV =0.78), and from the southern U.S. Atlantic is 5,426 (CV =0.540) (Waring et al. 2006). This joint estimate is the most recent available, and the surveys have the most complete coverage of the species' habitat. The minimum population estimate for the western North Atlantic Risso's dolphin is 12,920.

A previous survey of Risso's dolphins in the western Atlantic Ocean was conducted during the summer of 1998. The best estimate for Risso's dolphins that came out of the 1998 survey was 29,110 (CV = 0.29, Waring et al. 2004). The estimate for the northern U.S. Atlantic was 18,631 (CV = 0.35), while the estimate from the southern U.S. Atlantic was 10,479 (CV = 0.51). The abundance estimate from the 1998 surveys for Risso's dolphins was higher than that for the 2004 surveys, in particular for the southern U.S. component of those surveys. There were fewer Risso's dolphin sightings, particularly off the coast of Georgia and northern Florida, in the 2004 surveys despite a similar amount of survey effort in this region. It is possible that environmental variability or other factors are responsible for the apparent differences in the spatial distribution and abundance of Risso's dolphins.

3.2.2 Sea Turtles

Numerous gear types have been implicated in takes of sea turtles along the Atlantic, Gulf of Mexico, and Pacific coasts. Data available on the extent of sea turtle interactions by gear type, area, and season are poor for the high seas fisheries. Nonetheless, certain types of gear are more prone to incidentally capturing sea turtles than others, depending on the way the gear is fished and the time and area within which it is fished. Fisheries that use trawls, gillnets, seines, pound nets, traps, pots, dredges, longlines, and hook and line, for example, are potential sources of sea turtle incidental entanglement. However, bycatch rates for these fisheries are lacking and more information is needed on potential sea turtle interactions in these gear types/fisheries to better evaluate them.

All sea turtles that occur in U.S. waters are listed as either endangered or threatened under the ESA. The Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) are listed as endangered. Loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and olive ridley (*Lepidochelys olivacea*) sea turtles are listed as threatened, except for breeding colony populations of green turtles in Florida and on the Pacific coast of Mexico and breeding colony populations of olive ridleys on the Pacific coast of Mexico, which are listed as endangered. These five species of sea turtles are highly migratory or have a highly migratory phase in their life history (NMFS 2001).

3.2.2.1 Pacific

In the ETP tuna purse seine fishery, sea turtles are killed or injured incidental to fishing operations. The tendency for turtles to associate with flotsam in the open ocean make them more likely to be involved with sets on logs, floating objects, and fish aggregating devices. Furthermore, turtles may also be captured in other types of sets if the area being fished has a high turtle density, such as the nearshore waters of southern Mexico, Costa Rica, and Panama (Fox 1990) and oceanographic fronts. Absolute abundance estimates are not available for sea turtles, but observer information provide some data on the at-sea distribution and abundance of turtles in the ETP. Observers from the Inter-American-Tropical-Tuna-Commission (IATTC) record sea turtle encounters, entanglements and mortalities in the ETP tuna purse seine fishery. IATTC data from 1993 to 2002 indicate that sea turtle mortality in the U.S. tuna purse seine fishery was highest in floating object sets, with the olive ridley being the species most often taken (IATTC 2004). The data indicate that for the period 1993 to 2002, the mean annual mortality of sea turtles was more than twice as high in floating object sets (83) than either dolphin sets (17) or school sets (36); sets on floating objects resulted in the highest per set rate of annual turtle mortality over the same period (0.02) as compared with dolphin (0.002) and school (0.007) sets (IATTC 2004). Between 1993 and 2002 the mean annual turtle mortality in the ETP tuna purse seine fishery was approximately 136 individuals, ranging from a high of 172 turtles in 1999 to a low of 46 turtles in 2002 (IATTC, 2004). More recent data indicate that the average turtle mortality between 2003 and 2006 was approximately 5 (IATTC 2007b). Between 1993 and 2002, olive ridleys comprised the majority of turtle mortalities in all sets (60.6 percent), with greens (8 percent), loggerheads (1.4 percent) and unidentified species (29 percent) rounding out the total (IATTC 2004). Approximately one hawksbill mortality occurs each year in the fishery. One fishery-related leatherback mortality occurred between 1993 and 2002 (in 1994). Between

1997 and 2002, over 88 percent of all turtles incidentally taken during fishing operations observed by IATTC observers were released unharmed (IATTC 2004).

In the WCPO, sea turtles are caught in longline and purse seine fisheries. Brogan (2002) estimates that there are 2,182 marine turtle encounters per year in the WCPO longline, of which an estimated 500–600 are expected to result in mortality. This estimate, however, is expected to have wide confidence intervals since observer coverage has been very low (<1%). Brogan (2002) estimates that sea turtle encounters in the purse seine fishery are more prevalent in the western areas of the WCPO, with the main factor affecting marine turtle encounters in the WCPO purse seine fishery being set type. Animal associated, drifting log, and anchored fish aggregating device (FAD) sets have the highest incidence of sea turtle encounters, compared to drifting FAD and sets on free-swimming schools (unassociated sets). Brogan (2002) estimates that there are 105 sea turtle encounters per year in the WCPO purse seine fishery with less than 20 of these encounters resulting in mortality. As with the WCPO longline fishery, this estimate has wide confidence intervals since observer coverage is less than 5%. Please refer to the Biological Opinion on the Operation of the Western Pacific Region's Pelagic Fisheries as Managed under the Pelagics FMP (NMFS 2004a) and the 2001 FEIS (NMFS 2001b) and 2004 Supplemental EIS prepared as part of the ongoing implementation of the Pelagics FMP for additional details on the life history, status, threats, and impacts to Pacific sea turtles.

3.2.2.2 Atlantic

In the Atlantic, leatherback and loggerhead sea turtles are the sea turtle species predominantly caught in the pelagic longline fishery. Turtles are caught throughout the range of the fishery (Gulf of Mexico, Caribbean, Atlantic Ocean from Florida to Maine, and outside the U.S. EEZ). In the U.S. pelagic longline fishery jeopardized estimated take levels for 2000 were 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001). In 2001 and 2002, NMFS closed a portion of the fishery and implemented stronger bycatch reduction measures. The estimated take levels outside of the closed area are 312 loggerhead and 1208 leatherback sea turtles for 2001 and 575 loggerhead and 962 leatherback sea turtles for 2002 (Garrison 2003).

The following is a list of bycatch species recorded as being ever caught by any major tuna fishery in the Atlantic/Mediterranean. Note that the lists are qualitative and are not indicative of quantity or mortality. Thus, the presence of a species in the lists does not imply that it is caught in significant quantities or that individuals that are caught necessarily die.

Table 2. Sea turtle bycatch in tuna fisheries.									
Scientific names	Common name	Code	LL	GILL	PS	HARP	TRAP	OTHER	
Key: LL, longline; GILL, gillnet; PS, purse seine; HARP, harpoon; TRAP, traps and pots.									
Caretta caretta	Loggerhead turtle	TTL	X	X	X		X	X	X
Chelonia mydas	Green turtle	TUG	X	X	X				
Dermochelys coriacea	Leatherback turtle	DKK	X	X	X		X		
Eretmochelys imbricata	Hawksbill turtle	TTH		X	X				
Lepidochelys kempii	Kemps Ridley turtle	LKY			X				

3.2.2.3 Sea Turtle Biology and Status

The following is a synopsis of the current state of knowledge on the distribution, abundance and activities that are known or thought to influence the survivorship of turtle species. General information about the biology and status of sea turtles can be found in the Recovery Plans for each species (available through the Office of Protected Resources, NMFS).

Leatherback Sea Turtles

Leatherback turtles (*Dermochelys coriacea*), the largest of the sea turtles with a shell length often exceeding 150 centimeters and front flippers proportionately larger than in other sea turtles. These flippers span 270 centimeters in an adult (NMFS and FWS 1998c). The leatherback is morphologically and physiologically distinct from other sea turtles, and it is thought that its streamlined body, with a smooth dermis-sheathed carapace and dorso-longitudinal ridges, may improve laminar flow. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Dutton et al. 1999). Leatherbacks commonly range farther north than other sea turtles, because of their ability to maintain warmer body temperatures over longer time periods and the widely dispersed nature of their primary food source, cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps) (NMFS and FWS 1998c, Eckert, 1993). Because of the low nutrient value of jellyfish and tunicates, it has been estimated that an adult leatherback would need to eat about 50 large jellyfish (equivalent to approximately 200 liters) per day to maintain its nutritional needs (Duron 1978); leatherback turtles may consume 20 to 30 percent of their body weight per day (Davenport and Balazs 1991).

Nesting occurs on beaches from 40° North to 35° South latitude (Sternberg, 1981) and no nesting occurs on U.S. beaches in the Pacific. There is no information on status and trends of leatherback sea turtles in nesting areas in the central and south Pacific islands, such as Papua New Guinea, Indonesia, and the Solomon Islands because systematic nesting surveys are lacking. Leatherback nesting also occurs in the Western Pacific in China, Southeast Asia, Indonesia, and Australia (NMFS and FWS 1998c).

The Pacific coast of Mexico is regarded as the most important leatherback breeding ground in the world with about 50 percent of the global population of female leatherbacks nesting there (NMFS and FWS 1998c). Pritchard (1982) estimated that 75,000 females nested annually in Michoacan, Guerrero, and Oaxaca, Mexico. Leatherbacks are in serious decline at all major Pacific basin rookeries (NMFS and FWS 1998c). In all areas where leatherback nesting has been documented, current nesting populations are reported to be well below abundance levels of several decades ago with Mexico documenting an approximate 90 percent decline in the number of leatherback nesters (Sarti et al. 1996). Although the reason for the leatherback decline is unclear, the collection of eggs and incidental catch in the former high seas driftnet fishery in the 1980s are most likely contributing factors (Sarti et al. 1996).

Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically 2 to 4 years (Spotila et al. 2000). The mean renesting interval of females on Playa Grande, Costa Rica, is believed to be 3.7 years, while in Mexico, 3 years was the typical

reported interval (NMFS 2004). Eastern Pacific migratory corridors exist along the western United States and west coasts of Mexico (Stinson 1984). In addition, recent information on leatherbacks tagged off the west coast of the United States has also revealed an important migratory corridor from central California to south of the Hawaiian Islands, leading to western Pacific nesting beaches. Aerial surveys in California, Oregon, and Washington have shown that most leatherbacks occur in slope waters, while fewer occur over the continental shelf (Eckert 1993). Leatherbacks are sometimes seen in coastal waters, but for the most part leatherback turtles lead a completely pelagic existence, foraging widely in temperate waters except during the nesting season when gravid females return to tropical beaches to lay eggs. Evidence suggests that adults migrate between temperate and tropical waters to optimize foraging and nesting (Eckert 1993). Males are rarely observed near nesting areas, and it has been proposed that mating most likely takes place outside of tropical waters, before females move to their nesting beaches (Eckert and Eckert 1988). Leatherbacks are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998). In a single year, a leatherback may swim more than 10,000 kilometers (Eckert 1998).

In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Genetic analyses of leatherbacks indicate, that within the Atlantic basin, there are three genetically different nesting populations: the St. Croix nesting population (U.S. Virgin Islands), the mainland nesting Caribbean population (Florida, Costa Rica, Suriname/French Guiana), and the Trinidad nesting population (Dutton et al. 1999). When the hatchlings leave the nesting beaches, they move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the sargassum areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert 1998).

The status of leatherbacks in the Atlantic is relatively unclear; however, increases in the number of nesting females have been noted at some sites in the Atlantic (Dutton et al. 1999). According to Spotila, the Western Atlantic population currently numbers between 15,000-18,800 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) have remained consistent with numbers reported by Spotila et al. in 1996. It is unknown whether the U.S. leatherback populations are stable, increasing, or declining, but it is certain that some nesting populations (e.g., St. John and St. Thomas, U.S. Virgin Islands) have been extirpated. The Turtle Expert Working Group (2007) estimated the population growth trends of six of the Atlantic nesting stocks (due to data constraints, trends for West Africa could not be estimated). Except for the Western Caribbean, these stocks appeared to be increasing. However, they cautioned that the trend estimates were based only on information of nesting females (one segment of the population). They also stated that “it must be stressed that the monitoring effort was improved over the last decade into several management units.” They suggested that more detailed studies are needed to obtain the intrinsic rate of population growth without relying on approximations based on nest counts from beach monitoring.

Loggerhead Sea Turtles

The loggerhead sea turtle (*Caretta caretta*) is characterized by a reddish brown, bony carapace, with a comparatively large head, up to 25 centimeters wide in some adults. Adults typically weigh between 80 and 150 kilograms, with average curved carapace length (CCL) measurements for adult females worldwide between 95 to 100 centimeters CCL (Dodd 1988) and adult males in Australia averaging around 97 centimeters CCL (Limpus 1985; Eckert 1993). Loggerheads less than 20 centimeters were estimated to be 3 years old or less, while those greater than 36 centimeters were estimated to be 6 years old or more. Age-specific growth rates for the first 10 years were estimated to be 4.2 cm/year (Zug et al. 1995).

The loggerhead is a circum-global species inhabiting continental shelves, bays, estuaries and lagoons in the subtropical, temperate and occasionally tropical waters (Eckert 1993). For their first years of life, loggerheads forage in open-ocean pelagic habitats. Juvenile and subadult loggerheads are omnivorous, foraging on pelagic crabs, molluscs, jellyfish, and algae captured at or near the surface (Eckert 1993). The large aggregations of juveniles off Baja California have been observed foraging on dense concentrations of the pelagic red crab *Pleuronocodes planipes* (Nichols et al. 1999). Data collected from stomach samples of turtles captured in North Pacific driftnets indicate a diet of gastropods (*Janthina* spp.), heteropods (*Carinaria* spp.), gooseneck barnacles (*Lepas* spp.), pelagic purple snails (*Janthina* spp.), medusae (*Vellela* spp.), and pyrosomas (tunicate zooids). Other common components include fish eggs, amphipods, and plastics (Parker et al. 2002). The maximum recorded diving depth for the loggerhead is 233 meters (see Eckert 1993).

In general, during the last 50 years, North Pacific loggerhead nesting populations have declined 50–90 percent (Kamezaki et al. 2003). In the South Pacific, long-term trend data indicate a 50 percent decline in nesting between the 1970s and 1989 due to incidental mortality of turtles in the coastal trawl fishery. Limpus (1982). In southern Great Barrier Reef waters, nesting loggerheads have declined approximately 8 percent per year since the mid-1980s (Heron Island), while the foraging ground population has declined 3 percent and comprised less than 40 adults by 1992. Researchers attribute the declines to recruitment failure due to fox predation of eggs in the 1960s and mortality of pelagic juveniles from incidental capture in longline fisheries since the 1970s (Chaloupka and Limpus 2001).

In the eastern Pacific, the largest known aggregations of loggerheads are of juveniles (mean shell length=60 cm) (Bartlett 1989) off the west coast of Baja California, Mexico, some 10,000–12,000 km from the nearest significant nesting beaches in Japan and Australia. Estimates of abundance of these foraging populations have been as high as 300,000 loggerheads (Pitman 1990; Bartlett 1989) and sightings are usually confined to the summer months in the eastern Pacific, peaking in July–September off southern California and southwestern Baja California, Mexico.

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. Scientists (TEWG 1998; TEWG 2000; NMFS SEFSC 2001) have identified five different nesting assemblages, referred to as nesting subpopulations, in the western North Atlantic. The subpopulations are: (1) a northern nesting subpopulation, occurring

from North Carolina to northeast Florida, about 29° N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29° N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (approximately 1,000 nests in 1998); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (approximately 200 nests per year). Natal homing to the nesting beach is believed to provide the genetic barrier between these nesting aggregations, preventing recolonization by turtles from other nesting beaches (NMFS and FWS 1998d).

Nesting data collected on index nesting beaches in the United States from 1989-1998 represent the best dataset available to estimate the population size of loggerhead sea turtles. Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually, with a mean of 73,751. Since a female often lays multiple nests in any one season, the average adult female population is estimated at 44,780 (based on an average of 4.1 nests per nesting female, (Murphy and Hopkins 1984) and of the number of adult females in the entire population based on an average remigration interval of 2.5 years; (Richardson et al. 1978). On average, 90.7 percent of these nests were of the south Florida subpopulation, 8.5 percent were from the northern subpopulation, and 0.8 percent were from the Florida Panhandle nest sites. Based on the above, between 1989 and 1998, there were an estimated 3,800 nesting females in the northern loggerhead subpopulation, and approximately 40,000 nesting females in the south Florida loggerhead subpopulation. The current status of this northern population based on number of loggerhead nests is declining. Recent analyses of nesting data from the Florida Index Nesting Beach Survey program from 1989 to 2005 demonstrate a significant declining trend in nesting (FWC 2006).

Green Sea Turtles

The genus *Chelonia* is generally regarded as comprising two distinct subspecies, the eastern Pacific (so-called “black turtle”, *C. m. agassizii*), which ranges from Baja California south to Peru and west to the Galapagos Islands, and the *C. m. mydas* in the rest of the range (NMFS and FWS 1998a). Green sea turtles (*Chelonia mydas*) have a smooth carapace with four pairs of lateral “scutes,” a single pair of prefrontal scales, and a lower jaw edge that is coarsely serrated. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed 1 meter in carapace length and 100 kilograms in body mass (NMFS and FWS 1998a). Green turtles grow slowly with an estimated age of sexual maturity ranging from 18 to 40 years (Balazs et al. 1992; NMFS and FWS 1998a; Eckert 1993).

Green sea turtles are a highly migratory species, nesting and feeding in tropical/subtropical regions. Their range is defined by a general preference for water temperature above 20° C. Green sea turtles live in pelagic habitats as post-hatchlings/juveniles, feeding at or near the ocean surface. Nonbreeding green sea turtles lead a pelagic existence 500 to 800 miles from shore, while breeding green sea turtles live primarily in bays and estuaries, and are rarely found in the open ocean (Eckert 1993). Most migration from rookeries to feeding grounds is via coastal waters, with females migrating to breed only once every 2 years or more (Bjorndal 1997).

Although most adult green sea turtles appear to have a nearly exclusively herbivorous diet, consisting primarily of seagrass and algae (Wetherall 1993), those along the east Pacific coast seem to have a more carnivorous diet consisting of a large percentage of mollusks and polychaetes, while fish and fish eggs, jellyfish, and amphipods made up a lesser percentage (Bjorndal 1997). Eastern Pacific green turtles (often reported as black turtles) travel more than 1,000 kilometers between foraging and nesting grounds. Green turtles have also been sighted 1,000 to 2,000 statute miles from shore (Eckert 1993) they frequent a north-south band from 15° N to 5° S along 90° W and an area between the Galapagos Islands and the Central American Coast (NMFS and FWS 1998a). Green sea turtles are the most commonly observed sea turtle on the U.S. Pacific coast, with 62 percent reported in a band from southern California and southward (NMFS and FWS 1998a). California stranding reports from 1990 to 1999 indicate that the green turtle is the second most commonly found stranded sea turtle (48 total, averaging 4.8 annually, NMFS 2004).

The underwater resting sites include coral recesses, undersides of ledges, and sand bottom areas that are relatively free of strong currents and disturbance from natural predators and humans. Foraging and resting areas for adults usually occur at depths greater than 10 meters, but probably not normally exceeding 40 meters. Available information indicates that the resting areas are in proximity to the feeding pastures. The maximum dive depth recorded for an adult green turtle was 110 meters (Berkson 1967), while subadult green turtles routinely dive to 20 meters for 9 to 23 minutes, with a maximum recorded dive of 66 minutes (Lutcavage et al. 1997).

In the Pacific, the only major (greater than 2,000 nesting females) populations of green turtles occur in Australia and Malaysia with smaller colonies in the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993) and six small colonies on islands at French Frigate Shoals, a long atoll situated in the middle of the Hawaiian Archipelago (Balazs et al. 1995). Ninety to 95 percent of the nesting and breeding activity occurs at the French Frigate Shoals, and at least 50 percent of that nesting takes place on East Island, a 12-acre island. Since the mid-1980s data suggest that the Hawaiian green sea turtle (Balazs and Chaloupka 2004; Bjorndal et al. 2000) stock is on the way to recovery following 25 years of protection. This increase is attributed to increased female survivorship since the harvesting of turtles was prohibited in addition to the cessation of habitat damage at the nesting beaches since the early 1950s (Balazs and Chaloupka 2004).

The primary green turtle nesting grounds in the eastern Pacific are located in Michoacán, Mexico, and the Galapagos Islands, Ecuador. Green turtles were widespread and abundant prior to commercial exploitation and uncontrolled subsistence harvest of nesters and eggs. More than 165,000 turtles were harvested from 1965 to 1977 in the Mexican Pacific and in the early 1970s nearly 100,000 eggs per night were collected from these nesting beaches. As a result the nesting population at Michoacán (Colola and Maruata beaches) has decreased significantly since 1981 (Alvarado and Delgado, 2003). In the 1990s, the number of eggs poached dropped to 60-100 per night, or about 800-1,000 turtles per year but recovery is still slow.

In the Atlantic, green sea turtles use mid-Atlantic and northern areas of the western Atlantic Ocean as important summer developmental habitat. Green turtles are found in estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds.

Green sea turtles using northern waters during the summer must return to warmer waters when water temperatures drop, or face the risk of cold stunning. In the continental United States, green turtle nesting occurs on the Atlantic and Gulf of Mexico coasts of Florida (Meylan et al. 1995). Since 1989, the pattern of green turtle nesting shows biennial peaks in abundance and a generally positive trend, perhaps due to increased protective legislation throughout the Caribbean (Meylan et al. 1995). Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). For the years 1979 through 2004, the number of nests deposited annually ranged from less than 100 to over 9,000 (Florida Fish and Wildlife Research Institute, unpublished data: <http://research.myfwc.com/services>).

Hawksbill Sea Turtles

Hawksbill sea turtles (*Eretmochelys imbricate*) are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS and FWS 1998b). The largest remaining concentrations of nesting hawksbills occur on remote oceanic islands of Australia and the Indian Ocean. Within the Pacific United States, hawksbills nest on the main Hawaiian islands, American Samoa, Republic of Palau, and the Federated States of Micronesia. The principal foraging areas in Hawaii occur along the north shores of Hawaii, Maui, and Molokai. Hawksbills have the potential for long-range migrations, and there is some inter-island dispersal between foraging areas and nesting beaches in Hawaii. Along the far western and southeastern Pacific, hawksbill turtles nest on the islands and mainland of Southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands (McKeown 1977), and Australia (Limpus 1982).

The hawksbill turtle is relatively uncommon in the waters of the continental United States. Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America; however, hawksbills are also found in south Florida and Texas. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands.

Hawksbills have a relatively unique diet of sponges (Meylan 1985, 1988) but also consume bryozoans, coelenterates, and mollusks. In the Caribbean, hawksbill turtles are selective spongivores, preferring particular sponge species to others (Dam and Diez 1997b). The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Foraging dive durations are often a function of turtle size, with larger turtles diving deeper and longer. In the northern Caribbean, foraging dives were made only during the day and dive durations ranged from 19 to 26 minutes at depths of 8–10 meters. At night, resting dives ranged from 35 to 47 minutes in duration (Dam and Diez 1997a).

As a hawksbill turtle grows from a juvenile to an adult, the turtle switches foraging behaviors from pelagic surface feeding to benthic reef feeding (Limpus 1992). Within the Great Barrier Reef of Australia, hawksbills move from a pelagic existence to a “neritic” life on the reef at a minimum CCL of 35 centimeters. The maturing turtle establishes foraging territory and will remain in this territory until it is displaced (Limpus 1992). As with other sea turtles, hawksbills

will make long reproductive migrations between foraging and nesting areas but otherwise they remain within coastal reef habitats (Meylan 1999).

In the Pacific, the hawksbill turtle is rapidly approaching extinction primarily due to the harvesting of the species for its meat, eggs and shell, as well as the destruction of nesting habitat by human occupation and disruption (NMFS and FWS 1998b). Along the eastern Pacific Rim, hawksbill turtles were common to abundant in the 1930s (Cliffton et al. 1982). By the 1990s, the hawksbill turtle was rare to absent in most localities where it was once abundant (Cliffton et al. 1982). Hawksbill populations have been heavily impacted by direct harvest for the tortoiseshell trade. Today, they are threatened by loss of habitat and other human activities including incidental capture in fisheries. Global populations have declined by 80% over the last century. However, recent assessments of nesting data in the wider Caribbean indicate increases in the number of nests at several key nesting beaches (IUCN 2002).

Olive Ridley Sea Turtles

Olive ridley turtles (*Lepidochelys olivacea*) are olive or grayish green above, with a greenish white underpart, and adults are moderately sexually dimorphic (NMFS and FWS 1998e). Olive ridleys are highly pelagic (Plotkin 1994) and appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. In a 3-year study of communities associated with floating objects in the eastern tropical Pacific, Arenas et al. (1992) found that 75 percent of sea turtles encountered were olive ridleys. Flotsam may provide the turtles with food, shelter, and/or orientation cues in an otherwise featureless landscape. It is possible that young turtles move offshore and occupy areas of surface-current convergences to find food and shelter among aggregated floating objects until they are large enough to recruit to the nearshore benthic feeding grounds of the adults, similar to the juvenile loggerheads mentioned previously.

While it is true that olive ridleys generally have a tropical range, individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000). The postnesting migration routes of olive ridleys, traversed thousands of kilometers of deep oceanic waters ranging from Mexico to Peru and more than 3,000 kilometers out into the central Pacific (Plotkin 1994). Stranding records from 1990 to 1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (NMFS 2004).

The olive ridley turtle is omnivorous, feeding on a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and sea grass (Marquez 1990). Olive ridley turtles also forage at great depths, as a turtle was sighted foraging for crabs at a depth of 300 meters (Eckert et al. 1986). The average dive lengths for adult females and males are reported to be 54.3 and 28.5 minutes, respectively (Plotkin 1994, in Lutcavage and Lutz 1997). Declines in olive ridley populations have been documented in Playa Nancite, Costa Rica; however, other nesting populations along the Pacific coast of Mexico and Costa Rica appear to be stable or increasing, after an initial large decline due to harvesting of adults. Historically, an estimated 10-million olive ridleys inhabited the waters in the eastern Pacific off Mexico (Cliffton et al. 1982; NMFS and FWS 1998e). However, human-induced mortality led to declines in this population. Beginning in the 1960s, and lasting over the next 15 years, several million adult olive ridleys were harvested by Mexico for commercial trade with Europe and Japan (NMFS and FWS

1998e). Olive ridley eggs are considered a delicacy, and egg harvest is considered one of the major causes for its decline. Fisheries for olive ridley turtles were also established in Ecuador during the 1960s and 1970s to supply Europe with leather (Green and Ortiz-Crespo 1982). In the Indian Ocean, Gahirmatha Beach in India may have once support the largest nesting population of olive ridleys; however, this population continues to be threatened by nearshore trawl fisheries. Direct harvest of adults and eggs, incidental capture in commercial fisheries, and loss of nesting habits are the main threats to the olive ridley's recovery.

Kemp's Ridley

The Kemp's ridley (*Lepidochelys kempii*) is the most endangered and has declined to the lowest population level of all the world's sea turtle species. Kemp's ridleys nest primarily on Rancho Nuevo in Tamaulipas, Mexico, where nesting females emerge synchronously during the day to nest in aggregations known as arribadas. The majority of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals, but the population has been drastically reduced from these historical numbers. Recent data (TEWG 1998, 2000) indicate that the Kemp's ridley population may be in the early stage of recovery. Nesting data, estimated number of adults, and percentage of first time nesters have all increased from lows experienced in the 1970s and 1980s. From 1985 to 1999, the number of nests observed at Rancho Nuevo increased at a mean rate of 11.3 percent per year. Data from nests at Rancho Nuevo, North Camp and South Camp, Mexico, have indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and 702 nests in 1985, then increased to produce 1,940 nests in 1995, about 3,400 nests in 1999, 4,457 nests in 2003 (TEWG 1998, 2000). Estimates of adult abundance show similar trends from an estimate of 9,600 in 1966 to 1,050 in 1985 and 3,000 in 1995. The proportion of neophyte, or first time nesters, has also increased from 6 to 28 percent from 1981 to 1989 and from 23 to 41 percent from 1990 to 1994 (TEWG 1998, 2000). Scientists project that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan – of 10,000 nesters by the year 2020.

Subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast; however, at least some juveniles will travel northward as water temperatures warm to feed in productive coastal waters of Georgia through New England (Pritchard 1969). Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the United States Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 16 inches in carapace length, and weighing less than 44 pounds (Pritchard 1969). Next to loggerheads, they are the second most abundant sea turtle in mid-Atlantic waters, arriving in these areas typically during late May and June (Pritchard 1969). In the Chesapeake Bay, where the summer population of Kemp's ridley sea turtles is estimated to be 211 to 1,083 turtles, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985). Post-pelagic ridleys feed primarily on crabs, consuming a variety of species; mollusks, shrimp, and fish are consumed less frequently.

3.2.4 Sharks

Sharks are cartilaginous fish, belonging to the subclass *Elasmobranchi*. Table 1 of Appendix D lists sharks identified by NMFS as PLMRs for purposes of MSRA.²⁸ Table 2 of Appendix D shows distribution of sharks and types of fisheries with which they have bycatch interactions. Many oceanic fisheries target sharks, but these species also are taken as bycatch in directed fisheries for tuna, swordfish, and other fish. In general, the bycatch of sharks taken in longline and other fisheries targeting tunas and swordfish is the best understood. By contrast, relatively little is known about the bycatch, status, and biology of sharks from deep-water fisheries. Many species of deep-water sharks are listed as Data Deficient on the IUCN Red List,²⁹ yet they are known to be highly vulnerable to exploitation because of life history constraints of slow growth and very low productivity. At the same time, there are also fewer management measures in place for species taken in deep-water fisheries, and deep ocean sharks are among the species for which catches have been continuously increasing.³⁰

3.2.4.1 Shark Biology and Status

Deepwater sharks are species that tend to be restricted to or spend most of their time below 200 m depth, on the continental slope or beyond. The deepwater sharks under consideration here include species of dogfish sharks (Squalidae), gulper sharks (Centrophridae), lanternsharks (Etmopteridae), sleeper sharks (Somniosidae) and catsharks (Scyliorhinidae). Among these groupings, the life history traits and conservation status of the deepwater chondrichthyans are the most poorly known. For example, age and growth estimates are only available for 31 of the 581 described deepwater cartilaginous fishes.

Deepwater species are among the least productive of the cartilaginous fishes. This is due to slower growth and late maturity, in part as a result of their cold water environment, which also limits available food resources. Most sharks and rays are highly vulnerable to exploitation but the deepwater species are even more so: recovery from depletion may take decades, if not centuries. It has also been noted that the intrinsic rebound potential (i.e., the ability of a population to rebound from fishing pressure) of deepsea sharks, which are among the lowest for all chondrichthyans assessed, decline with depth. Where life history data are lacking, maximum depth could serve as a potential indicator of the ability of a species to withstand fishing pressure. As most deepwater species are taken as bycatch, catch and discard data are incomplete, underreported, and complicated by taxonomic uncertainties, precluding reliable estimates of global catch and mortality. Where data are available, fishing has quickly and severely depleted

²⁸ Based on the literature review provided in Appendix D, three species have been added to the PLMR list: Pelagic thresher shark (*Alopias pelagicus*), Tope, school or soupfin shark (*Galeorhinus galeus*), and Salmon shark (*Lamna ditropis*). Not added but recommended for consideration is the Crocodile shark (taken in ICCAT bycatch). Table 2 of Appendix D clarifies nomenclature.

²⁹ IUCN (2006) 2006 IUCN Red List of Threatened Species. Available online at www.iucnredlist.org, accessed December 2, 2007.

³⁰ Garibaldi, L.; Limongelli, L. *Trends in oceanic captures and clustering of large marine ecosystems*. FAO Technical Paper. No. 435. Rome, FAO. 2002. p. 21

deepwater shark populations, often in less than 20 years.³¹ Silky sharks and other sharks of the family Carcharhinidae are reported in catches in the Indian Ocean.³²

Nursery areas have not been identified for deepwater sharks, precluding the use of area closures as a tool to protect reproductive females. Movements and migration patterns for most species are poorly known.

Table 3 of Appendix D shows the distribution of sharks by FAO Statistical Area. Table 4 of Appendix D provides a synopsis of the current state of knowledge on the conservation status and trends of sharks. General information about the biology and status of sharks can be found in the FAO World Catalogue of Sharks³³ and in species profiles prepared by the IUCN Shark Specialist Group.³⁴

The status of three species of shark—blue shark, shortfin mako, and porbeagle—is of particular concern because of bycatch. The following is a summary of information on stock status for these species. Information on other species is provided in Appendix D.

Blue shark

Blue sharks are caught in longlines, gillnets, handlines, rod and reel, trawls, trolls, and harpoons in the Atlantic Ocean, Gulf of Mexico, and Caribbean but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.³⁵ Total catch is probably underestimated due to misreporting of bycatches as well as the inadequate reporting of fisheries landing data. ICCAT reported nominal annual catches reach 36,895 metric tons in 1997. Average estimated landings from 1981 to 2004 are 13,347 metric tons. There are uncertainties regarding the stock status of both North and South Atlantic blue sharks due to the lack of data and uncertainties related to life history parameters of the species. For both North and South Atlantic blue shark the current biomass appears to be above the biomass at MSY. In the Mediterranean, there is an absolute dominance of juvenile blue sharks in recent Mediterranean catches.³⁶

Shortfin mako

Shortfin mako are caught in longlines, gillnets, handlines, rod and reel, trawls, trolls, and harpoons, in the Atlantic Ocean, Gulf of Mexico, and Caribbean, but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.³⁷ Total catch is probably underestimated due to misreporting of bycatches as well as inadequate reporting of fisheries landing statistics. ICCAT reported nominal annual catches reach 6,275 metric tons in 2003. Average estimated landings from 1981 to 2004 total 2,336 metric tons. The stock status of both

³¹ Kyne, P.M. and C.A. Simpfendorfer (2007) *A Collation and Summarization of Available Data on Deepwater Chondrichthyans: Biodiversity, Life History and Fisheries*. Report of the IUCN Shark Specialist Group. Available online at: www.flmnh.ufl.edu/fish/organizations/ssg/deepchondreport.pdf

³² FAO, supra note 26 at 21-22.

³³ Compagno, L.J.V. (1984) *Sharks of the World*. FAO Species Catalogue, Vol. 4. FAO, Rome. 655 pp.

³⁴ Fowler, S. L., Cavanagh, R. D., Camhi, M., Burgess, G. H., Cailliet, G. M., Fordham, S. V., Simpfendorfer, C. A. and Musick, J. A. (2005) *Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes*. IUCN/SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK, 461 pp.

³⁵ ICCAT, 2005

³⁶ de la Serna et al., 2002; Megalofonou et al., (2005).

³⁷ ICCAT, supra note 36.

North and South Atlantic shortfin mako is uncertain since the available data are uninformative and there are uncertainties about the life history parameters of the species. The North Atlantic shortfin mako has historically experienced some level of stock depletion as suggested by the historical trend in catch per unit effort (CPUE). It is possible that the current stock is below biomass at MSY in the North Atlantic as trends in CPUE suggest depletions of fifty percent or more could have occurred. The South Atlantic shortfin mako, may have decreased since 1971, but the magnitude of decline appears less than in the North Atlantic. The current biomass may be above the biomass at MSY, but due to the lack of a clear signal from the catch rates, a wider variety of historical stock trends is possible. The range of possibilities includes no depletion to levels close to biomass at MSY, indicating the stock may currently be fully exploited. In the Mediterranean, there is an absolute dominance of juvenile shortfin makos in the recent Mediterranean catches.³⁸

Porbeagle

Porbeagle are caught in a variety of gears in the Atlantic Ocean, including surface longlines, pelagic and bottom trawls, gillnets and handlines but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.³⁹ Total catch is probably underestimated due to misreporting of bycatch as well as the probably inadequate reporting of several fisheries. ICCAT reported nominal annual catches reached 2,676 metric tons in 1994. Average estimated landings from 1980 to 2004 are 1,290 metric tons.

3.2.4.2 Shark management and bycatch measures

Management measures for shark species are summarized in Appendix D, and include management plans for highly migratory species in the United States, catch prohibitions by several RFMOs, and protection measures under international wildlife agreements. These measures are summarized in Tables 5 and 6 of Appendix D. Very few fishery management plans include requirements to report or avoid bycatch of sharks, though many contain a prohibition on finning and promote live release of sharks taken incidentally. Currently, however, none have implemented catch limits on sharks (except NAFO for thorny skates) to ensure their sustainable exploitation. Also, none have yet drafted a Plan of Action in accordance with FAO's voluntary International Plan of Action — Sharks. The limited information exists on shark bycatch has been compiled from IATTC, ICCAT, NAFO and WCPFC data bases. Information from ICCAT is summarized in Table 7 of Appendix D.

In the eastern Pacific, four species of sharks interact with and are caught incidentally in the ETP tuna purse seine fishery. The most commonly bycaught shark species include blacktip sharks (*Carcharhinus brachyurus*), silky sharks (*C. obscurus*), whitetip sharks (*C. longimanus*), and hammerhead sharks (Sphyrnidae family). The average estimated number of sharks and rays caught by the ETP tuna purse seine fishery annually, 1995 to 2001, was 55,276 fish (IATTC, 2002b). The majority (76.7 percent) of these were taken in sets on floating objects.⁴⁰ The silky shark (*Carcharhinus falciformis*), oceanic whitetip shark (*C. longimanus*), and the blue shark

³⁸ De la Serna et al., supra note 37.

³⁹ ICCAT, supra note 36.

⁴⁰ IATTC, 2002b.

(*Prionace glauca*) are also taken in pelagic longline fisheries in the ETP, and are believed to be taken in artisanal fisheries in many countries around the ETP.

Data for the silky and whitetip shark from purse seine sets on floating objects, schools sets and dolphin sets all show a clear decreasing trend since 1994. The implications of these decreasing trends are unclear, because the stock structure of both shark species in the Pacific Ocean is unknown. Scientists believe that the silky shark is more abundant near land than in the open ocean; however, longline and purse seine CPUE data suggest a widespread distribution across the Pacific. The oceanic whitetip shark is believed to be widely distributed in tropical waters. Observers estimate that 43 percent of sharks caught by tuna purse seine vessels arrive on deck alive. The principal causes of death were adverse conditions in the net resulting from the concentration of the catch, oxygen deprivation, stress, and the pressure to which the species are subjected in the brailer. It appears that certain species are more resistant than others to adverse conditions in the net, and are therefore more likely to survive being sacked up and the pressure in the brailer; an example is the oceanic whitetip shark (*Carcharhinus longimanus*). In 2006, IATTC observers estimated that most of the 22,527 sharks that arrived on deck (91 percent of those involved in sets arrive on deck) were either dead or die soon after being brought aboard. In the western Pacific, pelagic sharks are a common bycatch of the WCPO longline and purse seine fisheries, but very few data have been collected at the species level to enable insights into their distribution and abundance. Observer data indicate that at least 16 elasmobranch species have been observed bycaught in the longline fishery and at least 10 species have been observed bycaught in the purse seine fishery. The blue shark (*Prionace glauca*) is the most commonly caught species during commercial longline operations in the western Pacific. As many as 150,000 blue sharks are captured per year, but the 1.6 blue shark per 1,000 hooks catch rate is significantly less than the catch rate of 10.4 blue shark per 1,000 hooks calculated for the southern bluefin tuna (*Thunnus maccoyii*) fishery off the southeast coast of Australia.⁴¹

Additionally, in the WCPO longline fisheries, silky shark are caught at about half the rate of blue shark, and oceanic whitetip shark are taken at about one quarter the rate of the blue shark. Blue sharks are the species most associated with finning. From 1992 to 1998 there was a dramatic increase in the numbers of blue sharks finned by the Hawaii-based longline fishery; from 977 sharks in 1992 to 58,444 sharks in 1998.⁴² These trends have decreased with domestic and international prohibitions on shark finning. The fate of other shark species may depend on their economic value. For example, the trunk of the silky shark, which is retained in 45.8 percent of observed catches, is apparently more valuable than the trunk of blue shark, which is only retained in only 5.4 percent of observed catches. Williams (1997) reports that vessels retain sharks for consumption by the crew, and as food for live bait.

The predominant shark species caught in the WCPO purse seine fishery are the silky shark and the oceanic whitetip shark.⁴³ However, observer data often does not identify individual shark species and hence the shark species breakdown in the purse seine fishery is less clear than in the longline fishery. Only a very small percentage of the purse seine catch is made up of shark (around 0.15 percent by weight, according to observer data), which is a much lower rate per

⁴¹ (Stevens 1992; Williams 1997)

⁴² (McCoy and Ishihara, 1999).

⁴³ (Williams 1997).

operation than for longline gear. The breakdown of shark species taken in the WCPO purse seine fishery is somewhat different than the shark species taken in the eastern Pacific Ocean (EPO) purse seine tuna fishery.⁴⁴ For example, no blacktip sharks (*Carcharhinus limbatus*) were caught in the WCPO purse seine fisheries, but this species is one of the four most commonly encountered shark species in the ETP purse seine fishery. The catch rate for sharks, in general, appears to be higher in the ETP than in the WCPO purse seine fishery.

3.2.5. Shared Fish Stocks

Analyses of the FAO catch database of species classified as oceanic (epipelagic and deep water species that occur principally on the high seas) reveal that catches of oceanic species have almost tripled since 1976 from 3 million tons to 8.5 million tons in 2000. The United States manages numerous stocks of highly migratory species and U.S. fishermen share these stocks with fleets of other nations who fish them on the high seas. Capture fisheries directed at high seas and deep water species have been among the fastest growing fisheries worldwide. In 2004, four of the top 10 species by landings were oceanic: skipjack tuna, yellowfin tuna, blue whiting and largehead hairtail—the latter two deep-water species. Table 3 lists fish species that spend all or some part of their life in high seas areas and are managed or shared by the United States. Both epipelagic and deep-water species are listed.

⁴⁴ (Hall and Williams 1998).

Table 3. U.S. high seas or shared stocks. Source: Fisheries of the U.S. 2006.

Species or Stock	Shortfin mako shark
Atlantic bigeye tuna	Finetooth shark
North Atlantic albacore	Sharks (nei)
West Atlantic bluefin tuna	Pacific halibut
Atlantic yellowfin tuna	Chinook salmon
Eastern Pacific yellowfin tuna	Coho salmon
Pacific bigeye tuna	Chum salmon
Central Western Pac yellowfin tuna	Sockeye salmon
Skipjack tuna	Pink salmon
Little tunny	Atlantic Salmon
Bonito	Short finned squid
Atlantic blue marlin	Flying squid
Atlantic white marlin	Long-finned squid
West Atlantic sailfish	Pacific loligo
Spearfish	Silver whiting
Atlantic swordfish	Red whiting
Dolphinfish	Cusk
Dusky shark	Atlantic pomfret/Atlantic saury
Porbeagle shark	Lingcod
Sandbar shark	Central Bering Sea Pollock

3.3 GEAR TYPES

3.3.1 Purse seines

Purse seines are large nets that encircle the target species. Depending on the size of vessels, nets generally vary from 1/4 mile to one mile in circumference, and from 300 to 700 ft in depth. The webbing is the main component of the purse seine and is generally made from nylon dipped in tar for added strength and longevity. Mesh size is predominantly 4 1/4 inch (in) (10.77 cm) stretched, but can be as large as 8 in (20.30 cm) at the bottom of the seine. During deployment of gear, the net forms a circular wall of webbing around the school of fish. The net must be deep enough to reduce the likelihood of fish escaping underneath, and the encircling must be done rapidly enough to prevent the fish from escaping before the bottom is secured (“pursed”) shut. A set is initiated when a skiff is released from the stern of the purse seiner, anchoring one end of the seine. The targeted fish are contained in a vertical cylinder of webbing after the seine vessel encircles the targeted school and rejoins the skiff. The bottom of the net is then pursed by hauling the cable that is threaded through rings on the bottom of the net. After the net is pursed, it is retrieved until the diameter of the net compass and the volume of water inside the net decreases to a point when, in both space and time, fish are sufficiently concentrated that they can be hydraulically scooped (“brailed”) into wells onboard the vessel.

In the ETP, for reasons still not fully understood, yellowfin tuna over 55 pounds are often found in association with schools of dolphin. Tuna fishermen have taken advantage of this association between yellowfin tuna and dolphins by using the more easily detected dolphin schools to help find fish. “Dolphin sets” yield relatively large yellowfin tuna and result in low bycatch relative to other types of sets: log sets and school sets. In the western/central Pacific Ocean, Indian Ocean, and the Atlantic Ocean, the co-occurrence dolphins or other marine mammals and tuna is not as consistent as in the ETP. However there have been documented cases of purse-seiners encircling whales and dolphins in both the Atlantic and the western Pacific (see NOAA Tech Memo, 2008) Log sets (sets on tuna schools associated with floating logs or FADs) tend to yield relatively small, pre-reproductive yellowfin tuna or skipjack tuna (or a mixture of both tuna), together with a wide variety and large quantity of other biota, including sea turtles, sharks, billfish, other sportfish, and a variety of other small non-commercial tunas.

School sets (sets on tuna schools not associated with either floating objects or with dolphins) target free-swimming schools of yellowfin or mixed yellowfin and skipjack tuna that are generally moderately small, and result in relatively less bycatch than log sets. For more detailed descriptions of purse seine fishing see the Environmental Assessment/Regulatory Impact Review /Final Regulatory Flexibility Analysis for Regulations to Implement Vessel Assessment Resolutions of the Agreement on the International Dolphin Conservation Program And Capacity Resolutions of the Inter-American Tropical Tuna Commission.

3.3.2 Longlines

A longline system is made up of hook and line gear in which many branch lines, each with a baited hook, hang from a floating longline, or one suspended horizontally below the surface by buoys. Longlines can be set on the seabed, left to drift on the surface, or used at any other depth

in the water column. Depending on the location and the species targeted, longlines range from less than one nautical mile to more than 80 nautical miles. Pelagic longline gear is composed of several parts.

Pelagic longline fisheries in the Atlantic target swordfish, yellowfin tuna, or bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, pelagic sharks including mako, thresher, and porbeagle sharks, as well as several species of large coastal sharks. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target swordfish, tunas, or sharks, like other hook and line fisheries, it is a multispecies fishery. These fisheries are opportunistic, switching gear style and making subtle changes to the fishing configuration to target the best available economic opportunity of each individual trip. Longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by U.S. commercial fishermen, such as billfish.

When targeting swordfish, the lines generally are deployed at sunset and hauled in at sunrise to take advantage of the nocturnal near-surface feeding habits of swordfish. In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface, although vessels of the distant water fleet undertake extended trips include other phases of the lunar cycle. The number of hooks per set varies with line configuration and target catch. Other longlining fisheries include Pacific fisheries for tuna and billfish, bottom longlining for halibut and cod, longlining for reef fish such as snappers and groupers, and deepsea fisheries such as those for Patagonian toothfish. Effects of longlining are described in documents related to essential fish habitat for highly migratory species available online at <http://www.nmfs.noaa.gov/habitat/habitatprotection/profile/hms.htm> and <http://www.pcouncil.org/hms/hmsfmp.html>.

3.3.3. Driftnets

Driftnets are a type of gill net allowed to drift freely. They can be from one nautical mile to 40 miles in length. Depth typically ranges from 30 to 40 feet, but can reach 130 feet. The effects of driftnets on the marine environment are described in NOAA's reports to Congress pursuant to section 4004(a) of Driftnet Act, which calls for "reliable information on number and kinds of marine animals killed and retrieved, discarded or lost by foreign vessels involved in driftnet fishing."⁴⁵ Driftnet gear is used in fisheries that target squid, shark, swordfish, salmon and tuna, among others.

3.3.4. Trawls

Trawls are funnel-shaped nets towed through water. The net is wide at the mouth and tapers back to a narrow cod end that collects the catch. The average bottom trawl opening is 40 to 60 feet wide and 8 to 10 feet tall. Larger ships, such as those used in Bering Sea pollock or many of the

⁴⁵ 16 U.S.C.A. § 1822. See also, NOAA. 2006 Report of the Secretary of Commerce to the Congress concerning U.S. actions taken on foreign large-scale high seas driftnet fishing. August, 2007.

world's whiting fisheries, tow trawls that are larger. Bottom trawlers usually tow their nets at 1 to 2 knots on or above the ocean floor. Fishermen tow mid-water trawls faster to catch faster-swimming schooling fish. Trawls can be designed to catch particular groups of fish through adaptations to the mesh size of the net. Trawl nets have a large metal trawl door that acts like a foil in the water pulling the net open when the net is deployed. Some have a heavy weighted bottom line with wheels to help the net move along the seafloor. The nets are usually hauled aboard on a ramp located at the stern end of the boat with the help of heavy-duty winches. Examples of fish captured in trawl nets in fisheries around the world include hoki, orange roughy, shrimp, rockfish, herring, cod, hake and many others.

3.3.5. Other

Other types of fishing gear include troll lines, gill nets, pots, traps, and dredges. Descriptions of these gears and their effects on the environment are described in numerous agency and scientific publications⁴⁶ and on an informational website. See <http://www.nmfs.noaa.gov/fishwatch/fishinggears.htm>.

3.4. ECONOMIC ENVIRONMENT

3.4.1 U.S. Consumption Trends

This report relies on discussion included in a larger report commissioned by NMFS pertaining to fisheries trade, seafood demand, and the examination of trade measures. This report is available in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008).

The United States ranks third in total consumption of seafood, behind China and Japan, and 72nd in per capita consumption (FUS 2006). Per capita consumption has gone up since 1929 from 11.8 pounds to 16.5 pounds annually. In 2006, Americans consumed 6.5 pounds of fresh and frozen fish and 5.8 pounds of fresh or frozen shellfish. The three most popular products are shrimp, canned tuna, and salmon. Shrimp, in all product forms, is the single most popular species consumed by Americans. In 2006, Americans set a record for shrimp consumption at 4.4lb per person per year, an increase of 0.3lb from 2005 and up over a pound since 2000. Canned tuna is the second most popular product at 2.9 lb per person per year, which is down 0.2lb from 2005 consumption levels. Generally, consumption of canned tuna has been falling since its peak in 1990. Also falling is the consumption of seafood sticks and portions, with American consumers purchasing 0.9lb per person in 2006, which is unchanged since 2005 but down from its peak at 2.0lb per person in 1980. Instead, Americans are eating more fresh seafood with consumption of fillets and steaks up to 5.2lb per person from 5.0lb in 2005, which is a new record. Since 2000, American consumers are buying 1.6lb more per person each year. In particular, tilapia consumption is rapidly rising. It is now the sixth most consumed species and, by far, growing the fastest in terms of market share.

⁴⁶ See for example, list of scientific publications related to the effects of fishing gear on habitat, available online at http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/fish_manage_f.htm, or in descriptions of gear effects in marine mammal bycatch documented by take reduction teams, available online at <http://www.nmfs.noaa.gov/pr/interactions/trt/teams.htm>

With decreasing consumption, nominal prices are falling: canned tuna has dropped from \$2.55/lb in 1980 to \$1.78/lb in 2004 (Kirkley 2006). Overall, the majority of price reductions are driven by increased imports from China, Thailand, and Vietnam, particularly for aquaculture shrimp and finfish produced at very low cost. Although seafood is still a relatively expensive protein source, due to these decreases in nominal prices, increases in relative income, and increasing importance of non-price factors, U.S. demand for seafood has increased.

Worldwide, the United States is the sixth largest harvester of seafood, when comparing nation's whose primary production is from capture fisheries (Glitnir 2007). U.S. production represents 3.6% of global seafood production with 89% from capture fisheries. By volume, the top five landed species in the United States are Alaskan pollock (35%), menhaden (13%), salmon (9%), hakes (6%), and cod (6%). The most valuable species group is shellfish, however with landings of \$2.1 billion in 2005. The top five most valuable species are lobster (\$438 million), scallops (\$434 million), crab (\$413 million), shrimp (\$407 million), and salmon (\$331 million) in 2005. By state, Alaska dominates with \$1.3 billion in landed value followed by Massachusetts (\$425 million), Maine (\$392 million), Louisiana (\$253 million), Washington (\$207 million), and Texas (\$172 million) in 2005.

With regard to processing, the United States processes \$7.5 billion in seafood in 2005. Fresh and frozen product accounts for 79% of total processing value. The top three most valuable processed product classes include processing of fillets and steaks (\$1.1 billion), sticks and portions (\$397 million), and breaded shrimp (\$276). Alaskan pollock accounts for 62% of the fillet and steak value. Fish sticks and portions are growing again in share after declines.

Two-thirds of U.S. seafood consumption occurs away from home, in restaurants or other foodservice outlets, while one-third is consumed at home (Glitnir 2007). These proportions hold whether looking at volume or value. Independent full and limited service restaurants account for approximately 50% of sales away from home. Both independent and chain restaurants are aggressively promoting fresh seafood to drive traffic and overall sales. At home consumption is currently dominated by shrimp, canned tuna, and salmon purchases. Demographic trends are expected to change consumption patterns with increasing consumption in the future, particularly across stronger tasting fish not historically consumed in the United States. New trends in value added packaging, foil pouches, ready-to-eat meals, etc., are expected to increase consumption. Finally, health, safety, and environmental concerns are increasingly important for U.S. consumers. As a result, it is expected that labels will play an increasingly important role in future seafood consumption decisions.

3.4.2 Balance of Trade

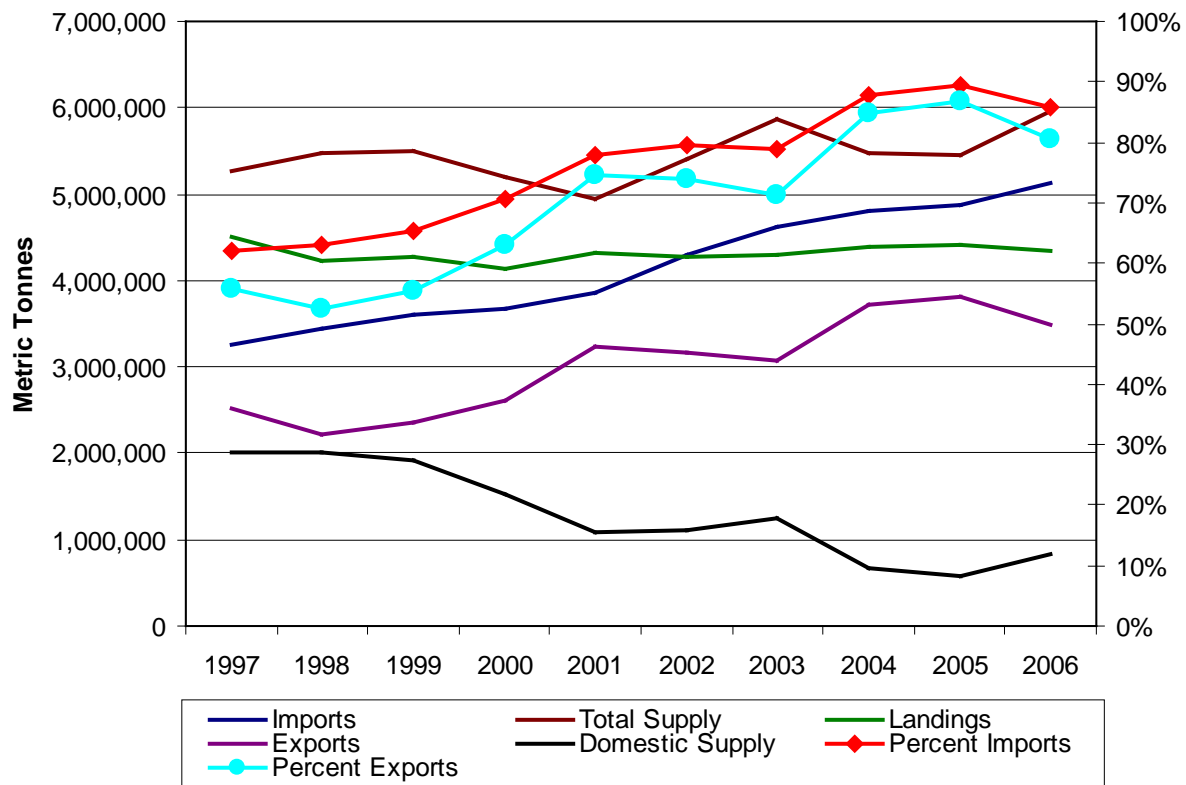
NMFS uses the U.S. Census trade data as the official record of import trade. Census data is largely based on Customs and Border Protection (CBP) form 7501 (referred to as CBP 7501) as modified by additional data sources. Information regarding import volume and value will therefore be based on Census data unless otherwise noted. CBP 7501 data will be utilized when discussing import carriers and importers. With respect to Census import data, there are a number of caveats. First, country of origin is not necessarily the country of harvest, but the country where the product was last substantially altered or processed. Additionally, because country of origin is entered onto CBP 7501 forms as a numeric code there is the potential for misidentification of the country of origin. Unfortunately, there is no consistent data source across all species that allows tracking back to country of harvest. NMFS maintains several

statistical documents that require tracking of chain of custody for toothfish (*Dissostichus eleginoides* and *Dissostichus mawsoni*), bigeye tuna (*Thunnus obesus*), southern bluefin tuna (*Thunnus maccoyii*), northern bluefin tuna (*Thunnus thynnus*), and swordfish (*Xiphias gladius*). With the exception of the toothfish statistical document, the statistical documents listed above capture only a small portion of the imports identified in the Census and CBP data. As a result, all further results here are based on the Census or CBP data.

American Samoa and Guam, although U.S. territories, do not fall within U.S. Customs jurisdiction and, as such, neither the CBP data nor the Census data contains landings or transshipments occurring in either location. The Nicholson Act generally bars foreign vessels from landing fish in most U.S. ports. Other than some limited landings of albacore tuna (*Thunnus alalunga*) by Canadian vessels on the West Coast, American Samoa and Guam are the only U.S. ports that allow direct landings by foreign fishing vessels. In fact, much of the product entering American Samoa and Guam are landings directly from domestic and foreign fishing vessels, making it different than the mainland importation of foreign fishery products. Because there are only two canneries in American Samoa, data-sharing must be treated differently than Customs data (which can be provided in aggregate form) to protect the confidentiality of this data. To avoid any confidentiality problems, American Samoan landings will be reported with the other U.S. canneries in the Cannery section below. Because mainland canneries are included in the U.S. Census importation data reported here, imports of fresh/frozen tuna product is not additive across the charts presented using the tuna species group and the cannery receipts presented later.

U.S. seafood markets rely heavily on imports. Imports of seafood have risen rapidly increasing from 62% of domestic harvest in 1997 to 86% in 2006, Figure 5. Landings have stayed relatively stable since 1997, falling slightly from 4.5 million metric tons to 4.3 million metric tons. Since 1997 domestic supply, or landings minus exports, has fallen by more than half; from just over 2.0 million metric tons to under 850,000 metric tons in 2006. The increasing wedge between domestic supply and landings has been due to exports increasing 72% since 1997.

Figure 5. Volume of Imports, Exports, Domestic Supply and Total Supply 1997 – 2006.



The United States trades with many nations. Table 4 lists the top 20 U.S. import partners ranked by volume and also by value imported. Table 4 uses actual product weight which is less than the round weight used in Figure 6. When ranked by value, the top three import partners with the United States are Canada, China, and Thailand. When ranked by volume, the top three import partners with the United States are China, Thailand and Canada suggesting that we trade relatively higher valued products with Canada than either China or Thailand. Our imports from Canada are the most diverse. The top three imported Canadian products are salmon (24.1%), snow crab (11.4%), and groundfish (9.3%). The top three imported Chinese products are tilapia (21.7%), groundfish (21%), and shrimp (11.9%). The top three imported products from Thailand are shrimp (53.4%), canned tuna (29.1%), and sauces derived or prepared from fish (3.9%). Imports of groundfish include cod, haddock, hake, whiting, pollock, and generic groundfish, but do not include fish sticks and other breaded fish products likely made with whitefish. As a result, groundfish totals are likely underestimates.

Table 4. Top Twenty U.S. Import Partners Ranked by Volume and Value.

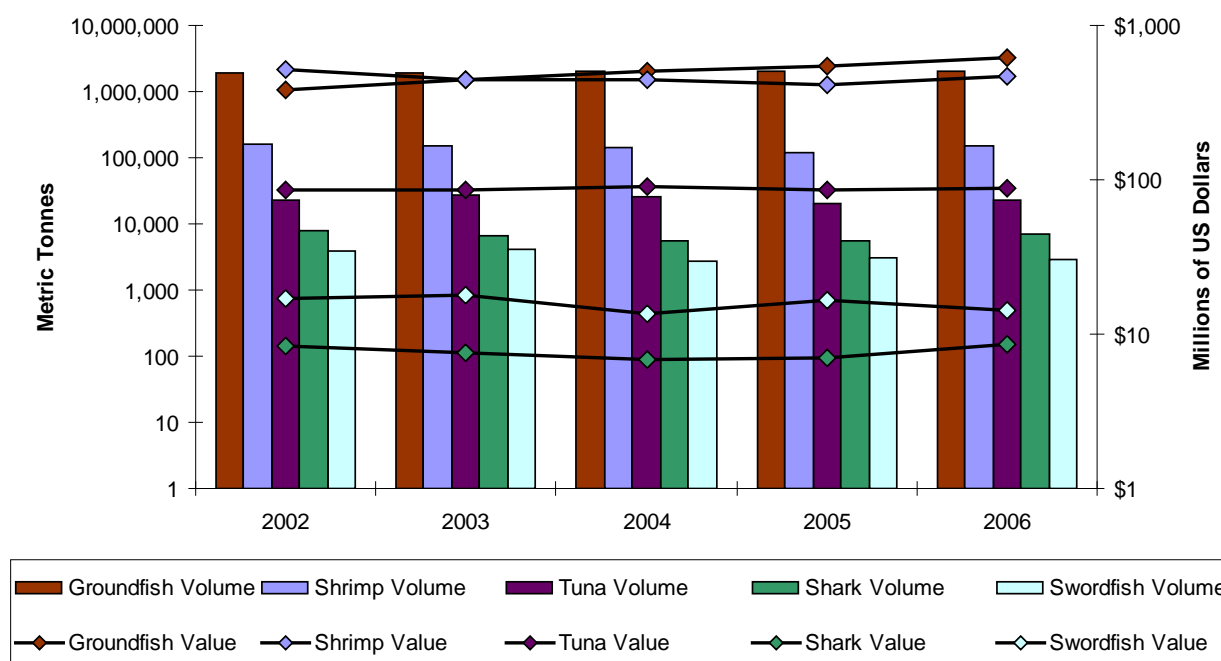
Top Twenty Trading Partners by Value Imported			Top Twenty Trading Partners by Volume Imported		
Origin Country	Metric Tons	Millions of USD	Origin Country	Metric Tons	Millions of USD
CANADA	354,131	\$2,224,058,631	CHINA	579,908	\$2,097,223,734
CHINA	579,908	\$2,097,223,734	THAILAND	362,987	\$1,813,569,359
THAILAND	362,987	\$1,813,569,359	CANADA	354,131	\$2,224,058,631
CHILE	145,561	\$975,621,533	CHILE	145,561	\$975,621,533
INDONESIA	120,829	\$785,275,697	INDONESIA	120,829	\$785,275,697
VIET NAM	94,199	\$653,845,687	ECUADOR	111,822	\$571,411,412
ECUADOR	111,822	\$571,411,412	MEXICO	95,541	\$476,964,022
MEXICO	95,541	\$476,964,022	VIET NAM	94,199	\$653,845,687
RUSSIAN FEDERATION	36,227	\$375,284,915	PHILIPPINES	77,679	\$273,220,142
INDIA	48,583	\$323,810,098	INDIA	48,583	\$323,810,098
PHILIPPINES	77,679	\$273,220,142	RUSSIAN FEDERATION	36,227	\$375,284,915
JAPAN	22,537	\$213,912,667	ARGENTINA	31,747	\$93,975,759
BANGLADESH	20,536	\$192,865,767	NORWAY	27,702	\$157,447,595
MALAYSIA	26,945	\$165,341,231	NEW ZEALAND	27,081	\$130,144,903
NORWAY	27,702	\$157,447,595	MALAYSIA	26,945	\$165,341,231
HONDURAS	18,682	\$146,191,632	PERU	25,567	\$63,414,085
ICELAND	23,283	\$139,888,413	ICELAND	23,283	\$139,888,413
NEW ZEALAND	27,081	\$130,144,903	JAPAN	22,537	\$213,912,667
BRAZIL	15,290	\$129,939,788	BANGLADESH	20,536	\$192,865,767
PANAMA	16,758	\$104,737,328	HONDURAS	18,682	\$146,191,632

While the United States imports 86% of the seafood consumed domestically, it exports 80% of its domestic harvest. When ranked by volume, Japan, China, and Canada are the top three trading partners respectively. By volume, the top three exports to Japan are groundfish, salmon and Atka mackerel respectively. By volume, the top three exports to China are flatfish, fish/shellfish meal unfit for human consumption, and groundfish respectively. By volume, the top three exports to Canada are salmon, groundfish and lobster respectively. The groundfish category is a composite of all whitefish species and is dominated by Alaskan pollock. When ranked value, Canada moves into the second slot ahead of China, suggesting that Canada imports higher valued products than China. By value, the top three exports to Japan are groundfish, salmon, and sablefish respectively. By value, the top three exports to Canada are lobster, salmon, and flatfish respectively. By value, the top three exports to China are salmon, groundfish, and flatfish respectively.

As one would expect, higher valued products are exported. Export values include value added during processing. In 2001, export value rose to meet falling landed value and surpassed landed value in 2005. In 1997 55.6% of all landings were exported and by 2006 that percentage had increased to 80.6% of all landings are exported. While the top landed species were described above, the top three exports by volume are groundfish, salmon, and fish and shellfish meal unfit for human consumption. Groundfish exports are dominated by Alaskan pollock and salmon exports are dominated by wild Alaska salmon, making Alaska a very important player in the export arena. By value, the top two exported products are still groundfish and salmon, but third place is now lobster from New England. Groundfish completely dominates exports overall with almost three times the volume and just over two times the value of salmon exports.

Figure 6 details the volume and value of domestic shrimp, tuna, groundfish, shark, and swordfish landings. Toothfish, an Antarctic species, is not landed in the United States. Of the species groups, groundfish is by far the most landed by value or volume with 2.1 million metric tons worth \$614 million. This group is lead by landings of Alaskan pollock with 1.5 million metric tons worth \$329.9 million. Pacific hake is the second most landed groundfish species with 258,759 metric tons worth \$35.2 million. As a note, orange roughy, also included in the groundfish group, is not harvested by U.S. fishermen. Shrimp is the second most landed group with 152,632 metric tons worth \$466 million. When compared to groundfish, clearly shrimp is a much higher valued product. White shrimp rank first in volume and value with 65,468 metric tons and \$220.3 million dollars followed closely by brown shrimp with 65,290 metric tons and \$183.1 million dollars. Tuna, the second most landed group, is lead by albacore landings of 13,133 metric tons with a value of \$25 million dollars with 23 metric tons landed by the U.S. distant water fleet. The second most landed tuna species is bigeye tuna with a volume of 5,093 metric tons and a value of \$37.8 million dollars. Shark landings, a relatively low value product, are dominated by spiny dogfish landings with a volume of 2,927 metric tons and a value of \$1.5 million dollars. Sandbar shark volume is 936 metric tons, the second most landed shark species by volume, and has a value of \$681,860 dollars. When ranked by value, the second most landed species is unspecified shark with a volume of 740 metric tons and a value of \$4.2 million dollars.

Figure 6. Volume and Value of Landings by Group.

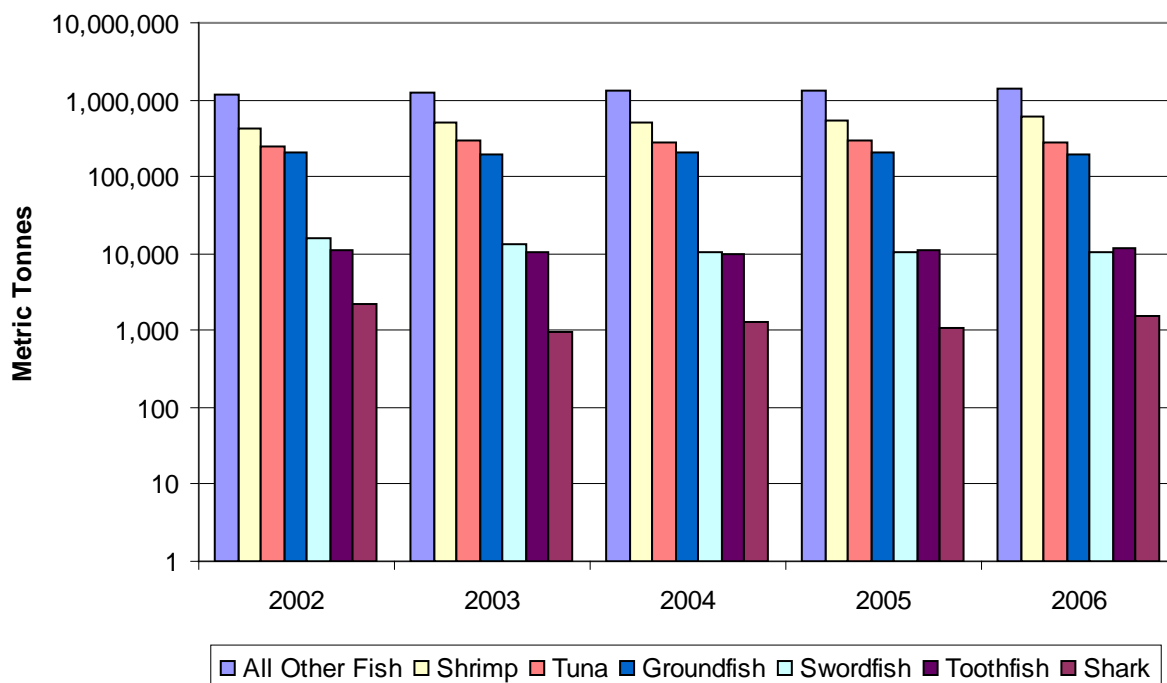


Over the last ten years, imports have grown from 62% of total U.S. consumption to 86% of U.S. consumption, driven by increasing costs in U.S. fisheries, decreasing import prices, and increases in consumer demand for seafood products in general. Import value increased from \$7.8 billion in 1997 to \$13.5 billion in 2006, an increase of 73%.

Figure 7 contains the volume of imports by species groups and Figure 8 contains the value of imports by species groups. The “All Other Fish” species grouping represents all other species not included in the

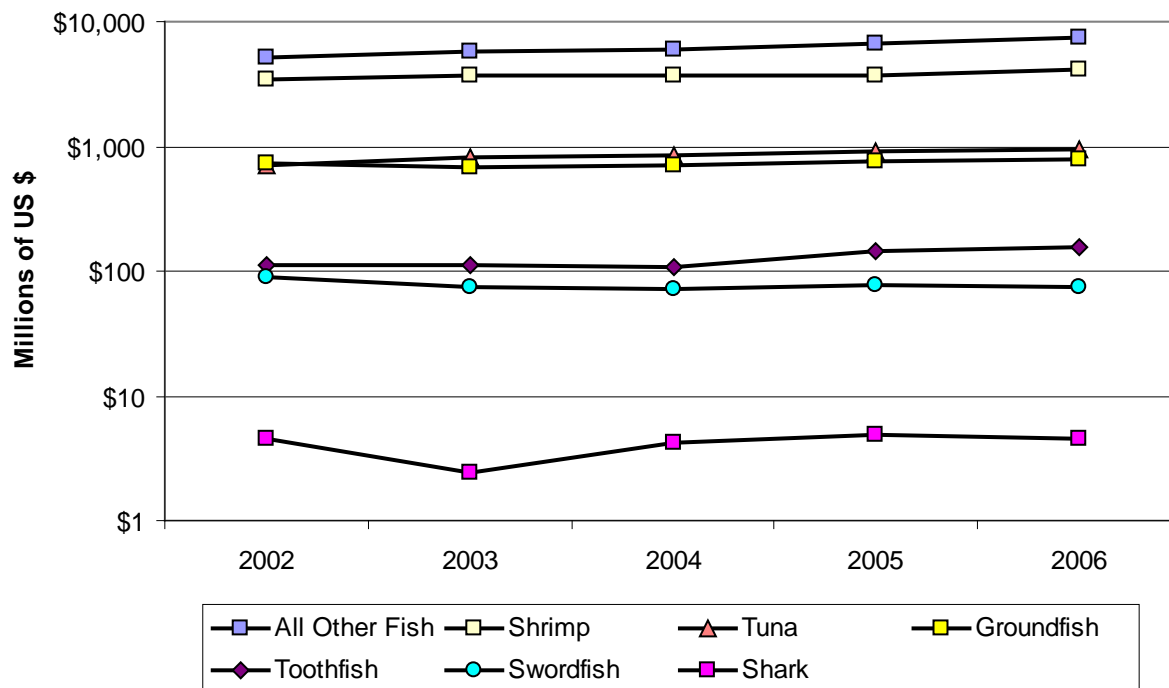
groupings defined above. This group ranks highest with 1.4 million metric tons in 2006. Upon more detailed examination of this group, the top two imports by volume are salmon (221,591 metric tons) and tilapia (158,254 metric tons). The salmon in this group is almost exclusively farmed Atlantic salmon. When ranked by value, the top two species imported within the “All Other Fish” group include salmon (\$1.5 billion dollars) and marine fish not specially provided for (NSPF) (\$614.9 million dollars). It is likely that this category of marine fish NSPF includes a fair amount of groundfish, increasing this group’s prevalence in the rankings. However, it is impossible to know what is exactly included in this grouping.

Figure 7. Volume of Imports by Species Group.



The United States imports 590,299 metric tons of shrimp valued at \$4.1 billion dollars. When the “All Other Fish” group is broken out by species, shrimp is far and away the most imported and most valuable single species to the United States. Tuna is also an important import species group with 2006 import volume at 275,829 metric tons and value at \$935 million dollars. Tuna outranks groundfish by volume but fails to surpass salmon as the most valuable grouping behind shrimp. The majority of tuna imported into this country is canned product. The single most imported groundfish species is pollock at 80,348 metric tons worth \$167.5 million and followed by cod at 62,867 metric tons valued at \$362.8 million. Clearly, cod is a higher valued product than pollock. While more toothfish (11,422 metric tons) was imported than swordfish (10,334 metric tons) in 2006, this has not always been the case. Swordfish imports have declined by 34% since 1997 while toothfish imports have increased by 206%. Shark is the least imported of any species group with 1,153 metric tons and \$4.5 million dollars of imports. Further detail about individual species groups including product forms, origin and other trade details can be found in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008).

Figure 8. Value of Imports by Group.



3.4.3 South Pacific Territories – Guam and American Samoa

In 1953, the U.S. Customs allowed direct landings by foreign vessels into American Samoa and Guam also granting these two territories duty free access to U.S. markets. There are two canneries in American Samoa: Chicken of the Sea and Starkist. The Chicken of the Sea facility was formerly owned by Van Camp, but is currently owned by Thai Union, the world's second largest tuna processor (Campling et al, 2007). They are the world leader in supplying food service and catering sectors. Chicken of the Sea alone has 15% market share in this sector, but when combined with Thai Union processing their market share in food service and catering rises to 60% worldwide. The Chicken of the Sea plant averages \$708 million in sales annually (Campling et al, 2007).

Starkist is a subsidiary of Del Monte. The Starkist brand is a U.S. market lead in canned lightmeat tuna and also the U.S. market leader in foil pouch tuna. Currently Starkist sales average \$596 million annually (Campling et al. 2007). Both plants have been increasing capacity to can loins as a way to reduce labor costs. Processing round tuna is relatively labor intensive. Bumble Bee's two U.S. canneries have transitioned to processing only loins because of rising labor costs in Puerto Rico and California where their plants are located.

All U.S. canneries voluntarily supply all their tuna purchase receipts, including volume and country of origin, to NMFS, but these receipts do not include price data. Because there are only two firms operating in American Samoa, it violates confidentiality restrictions to display the volume and origin of tuna brought to these two canneries. It is possible however to aggregate all cannery receipts and that data is displayed in the tuna imports section below.

As discussed earlier, Guam, like American Samoa, does not fall within the jurisdiction of U.S. Customs can allow landings of fish by foreign fleets. Transshipments in Guam are not included in either the CBP or the Census data. Guam operates as a major transshipment point for Asian distant water longline fleets. Starting in 1989, this transshipment port has become an important port for the Taiwanese and Japanese longline fleets, transshipping fresh fish for the Japanese market.

Table 5. Annual Port Calls, Vessels and Landings Volume by Species.

Origin Country	Year	Port Calls	Vessels	Bigeye	Yellowfin	Albacore	Swordfish	Other	Total
TAIWAN	2000	548	153	1,523.2	2,383.9	1.7	31.2	413.0	4,353.1
	2001	622	149	2,339.3	2,445.5	0.0	42.8	567.2	5,394.8
	2002	433	123	1,383.4	1,254.5	0.0	67.3	403.3	3,108.5
	2003	356	99	1,178.0	1,021.6	0.0	42.4	286.7	2,528.6
	2004	221	65	735.6	449.4	0.0	2.2	89.2	1,276.4
	2005	40	18	156.0	122.2	0.0	0.0	13.5	291.7
	2006	147	49	760.1	437.5	0.0	0.3	22.5	1,220.4
JAPAN	2000	621	70	4,196.3	2,400.7	194.0	94.6	399.1	7,284.7
	2001	590	68	3,612.1	3,217.6	48.2	77.3	263.6	7,218.8
	2002	441	67	2,493.2	1,736.7	28.6	68.0	193.9	4,520.4
	2003	422	55	2,216.7	1,735.9	129.9	46.4	284.5	4,413.3
	2004	471	48	2,663.0	1,852.4	72.4	61.1	301.6	4,950.4
	2005	446	49	2,461.5	2,451.9	91.1	53.1	311.0	5,368.5
	2006	392	44	2,689.3	1,940.7	94.9	51.6	314.3	5,090.7

Table 5 displays the annual port calls of fish at the Guam transshipment facility. The majority, 99%, of the landings in Guam are from Taiwanese and Japanese longline boats with the remainder coming from a few South Korean vessels (Hamm, 2007). The landings from South Korean flagged vessels cannot be listed because it involves less than three vessels. Since there are only three vessels, it would be a violation of confidentiality restrictions to share the landings of these vessels. The Japanese fleet lands the most fish and increasing so over the last few years. In every year for both fleets, the majority of the landings are bigeye tuna followed by yellowfin tuna.

The size of the Japanese fleet is declining; falling from its peak of 106 vessels in 1989 to 44 vessels in 2006. The number of trips has also been declining. From 1989 the number of Taiwanese vessels increased dramatically up from 118 to 364 at their peak in 1996. The Taiwanese fleet has retracted to 49 boats in 2006. While the number of vessels calling in Guam has decreased, the level of landings reported by the Secretariat of the Pacific Community have not fallen significantly suggesting that these fleets may be using other transshipping points closer to the fishing grounds in the Federated States of Micronesia.

Fish landed in Guam are graded into sashimi grade fish and rejects. The sashimi grade fish are air freighted out of Guam to Japan. Some of the rejected fish is retained for local consumption in Guam and the rest is put into containers and shipped to canneries. For Japanese caught bigeye, the annual average quality rejection rate was 6.04%. For Taiwanese caught bigeye, the annual average rejection rate was 7.1%. Typically, larger fish make the grade more frequently, so the rejected fish are generally

smaller. Even though yellowfin landings have been declining, the rejection rate for yellowfin has been increasing for both fleets with the current average annual rejection rate at 20.3% for the Japanese and 33.5% for the Taiwanese.

Currently rejected fish are purchased and stored frozen until a shipping container can be filled. These fish then sold to foreign canneries and transported via container ships. Unfortunately for this analysis, the Guam Bureau of Statistics and Plans (BSP) does not track the flag of the carrier vessel transporting the rejected fish nor does it track the destination of these fish. Additionally, Guam BSP only publishes total import value by broad product types and does not publish information on carrier flag or carrier type.

3.4.4 U.S. Harvesters

Table 6, adapted from Fisheries of the United States (FUS) of 2006, shows the contribution to the U.S. gross domestic product of the various sectors of the seafood industry in this country. Overall consumers and industrial purchasers of fish meal and oil spent \$69.5 billion on seafood products, including imported product. These expenditures generated a contribution to Gross Domestic Product (GDP) of \$35.1 billion across the U.S. industry including harvesters, primary wholesaling, processing, secondary wholesaling, and retail trade. According to FUS, U.S. consumers spent \$46.6 billion in restaurant purchases of seafood and \$22.7 billion in purchases at market for at home consumption generating \$21 billion and \$3.6 billion in GDP, respectively. The harvesting sector generated \$2.5 billion in contributions to GDP on sales of \$3.8 billion. Finally, all wholesaling and processing activity contributed \$7.9 billion to GDP.

The exact number of vessels, harvesters, and related business is available in some limited fisheries in the United States, however no U.S. wide total exists. Aggregate landings are discussed above in Section 3.4.2. In 2006, ten species made up 74% of total landings by volume including: walleye pollock, Atlantic menhaden (industrial), Pacific hake, Pacific cod, Atlantic herring, sockeye salmon, pink salmon, yellowfin sole, pacific sardine, and blue crab respectively. It is a different story with regards to value. The top ten species make up 58% of total value including: American lobster, sea scallop, walleye pollock, white shrimp, Pacific halibut, Pacific cod, brown shrimp, sockeye salmon, Dungeness crab, and sablefish. The majority of these seafood products are fresh or frozen, 5% are canned, 1.2% are cured, and 17% go to the reduction plants.

Table 6. Contribution to GDP from US Seafood Production (FUS 2006).

Sector	Purchase of Inputs	Total Mark- Up	Value Added	Sales	Offshore Fleet & Exports
Thousands of Dollars					
Domestic Harvest:					
Edible	-	\$3,846,654	\$2,452,982	\$3,846,654	-
Industrial	-	\$66,235	\$40,003	\$66,235	-
Harvest Not Landed in US	-	\$61,151	\$61,036	\$61,151	\$61,151
Unprocessed Imports	\$5,492,720	-	-	\$5,492,720	-
Unprocessed Exports	-	-	-	-	\$1,433,578
Primary Wholesale and Processing	\$7,972,031	\$7,044,931	\$4,240,579	\$15,016,963	-
Processed Imports	\$8,092,095	-	-	\$8,092,095	-
Processed Exports	-	-	-	-	\$2,346,916
Secondary Wholesale and Processing					
Edible	\$20,566,638	\$12,897,359	\$3,616,876	\$33,463,996	-
Industrial	\$195,504	\$122,601	\$34,382	\$318,104	-
Retail Food Service	\$16,486,093	\$30,071,639	\$20,987,914	\$46,557,732	-
Retail Stores	\$16,977,904	\$5,674,403	\$3,644,756	\$22,652,306	-
Total Contribution to GDP			\$32,903,889		
Total Consumer Expenditures and Wholesale Purchases of Industrial Products				\$65,158,590	

Because the AS canneries play a large role in the harvest and importation of tunas, the U.S. distant water fleet (DWF), which feed the canneries, is discussed in greater detail. The U.S. DWF used to be a captive fleet to the AS canneries, but that is changing. American Samoa provides infrastructure to the DWF and fuel purchases by the DWF total around \$18 million a year (Campling et al. 2007). In 1985, there were 90 vessels in the US DWF, but the fleet shrank to 14 vessels in 2006. Over the last year, however four new vessels have been added bringing the fleet total to 18 vessels with a total hold capacity of 21,192 metric tons. On average, each vessel has a capacity of 1,177 metric tons (Fanning 2007).

The recent increase in fleet size is due to several factors. As tuna stocks decline, prices have been rising, encouraging new entrants. Additionally, the United States has extended the Andean Trade Promotion and Drug Eradication Act (ATPDEA) into 2008. Under the ATPDEA, a U.S. vessel can land tuna in American Samoa and have it transshipped to the Starkist cannery in Ecuador. The cannery in Ecuador produces foil pouch tuna products that, if produced with U.S. fish, are exempt from the import duties on canned tuna faced by the rest of the world. This is the same privilege that American Samoa has enjoyed for years. Currently, Ecuador is able to pay a higher price for tuna because their labor costs are lower and they are producing a higher valued product. Along the same lines, the United States is currently negotiating a free trade agreement (FTA) with Thailand that would give U.S. origin fish duty free access to Thai tuna processors. This could open up a new market for the U.S. DWF. Finally there may be may

be low cost financing programs available in the near future to improve existing boats and build new boats (Campling et al. 2007).

Another important issue is that a switch from selling to the canneries to transshipping product has increased the reliance on tuna catch from other nations in the cannery input stream. Increasingly, tuna used is being brought into American Samoa on carrier vessels instead of fishing vessels, which adds shipping costs thereby increasing input costs to the canneries. Unfortunately, the cannery receipts do not detail whether the fish delivered to the canneries are sourced from a fishing vessel or a cargo vessel.

Table 7 details the catch of the DWF by the purse seine boats and all other gear types. The purse seine fleets target skipjack tuna, but because they fish primarily around fish aggregating devices (FADs) they also catch bigeye and yellowfin. All other gear types are dominated by troll gear catching mostly albacore. All of the albacore harvest is transshipped to Ecuador (Fanning 2007). In fact, the majority of the DWF landings, at least since 2001 have been transshipped to Ecuador. Neither the cannery receipts nor the landings data contain value information. Campling et al. (2007) estimate the U.S. DWF fleets value was \$632 million in 2001.

Table 7. U.S. Distant Water Fleet Catch and Disposition.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
Purse Seine Catch (metric tons)					
2001	0	6,176	85,539	24,143	115,858
2002	0	4,889	88,535	27,191	120,615
2003	0	4,470	62,907	20,079	87,456
2004	0	5,031	47,896	14,492	67,419
All Other Gear Catch (metric tons)					
2001	3,400	2,644	769	1,853	8,666
2002	1,862	4,982	529	1,179	8,552
2003	2,098	3,855	744	1,521	8,218
2004	1,316	4,702	660	1,412	8,090
US Cannery Receipts (metric tons)					
2001	0	2	20	33	55
2002	0	0	0	0	0
2003	49	26	201	51	326
2004	143	45	281	3	472
2005	275	0	20	0	296
2006	23	0	0	0	23
Transshipments (metric tons)					
2001	3,400	8,818	86,288	25,963	124,470
2002	1,862	9,871	89,064	28,370	129,167
2003	2,049	8,299	63,451	21,550	95,349
2004	1,173	9,688	48,275	15,901	75,037

Overall, as illustrated by the information presented, the U.S. seafood industry is in the midst of challenging times. While domestic landings have generally been on the decline, the industry faces declining prices as lower priced foreign imports increasingly enter the market. Partly because of the lower prices for imports, consumers are buying more imported product reducing sales of domestically caught fish. Earnings are also in decline due to a number of factors. Energy prices have risen, driving

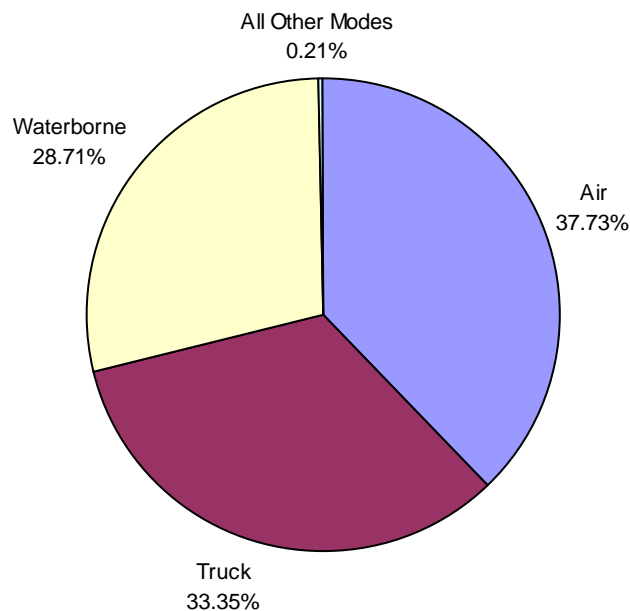
processing costs up and driving fuel dependent harvesting costs up as well. Additionally, labor costs are higher for the United States than for most U.S. import partners. In addition to the rising competition from wild caught imports, the United States faces strong competition from foreign aquaculture, which is much more prevalent outside of the United States. Finally coastal development pressure and a shrinking commercial harvesting sector have led to the conversion of the seafood infrastructure into other types of development.

In this era of challenges, it may be possible for the U.S. industry to increase domestic availability to offset a loss in imports. It would, however, be difficult for the industry to ramp up production even if harvests could be increase, at least in the short term. It might be possible to increase aquaculture production, but that is not without its own set of regulatory and infrastructure hurdles. Because the United States exports more than 80% of its landings, it would be possible for increased U.S. demand to be met by selling domestic product that would have been exported. A portion of these exports leave the country for processing only to return as imports. While it is not possible to estimate the amount of U.S. exports that return as processed product, it is expected the majority of U.S. imports did not originate in the United States.

3.4.5 Transportation

Imported seafood is transported into this country in a variety of modes detailed in Figure 9. The most frequently used mode, particularly for high value fresh product, is air transportation with 37.73% of the volume. That is followed by truck transportation with 33.35% of the volume imported. Across all species of fish, the waterborne mode is the third most used transportation mode transporting 28.71% of seafood imports. Finally all other modes, including mail and rail, account for less than one percent of all imports (0.21%).

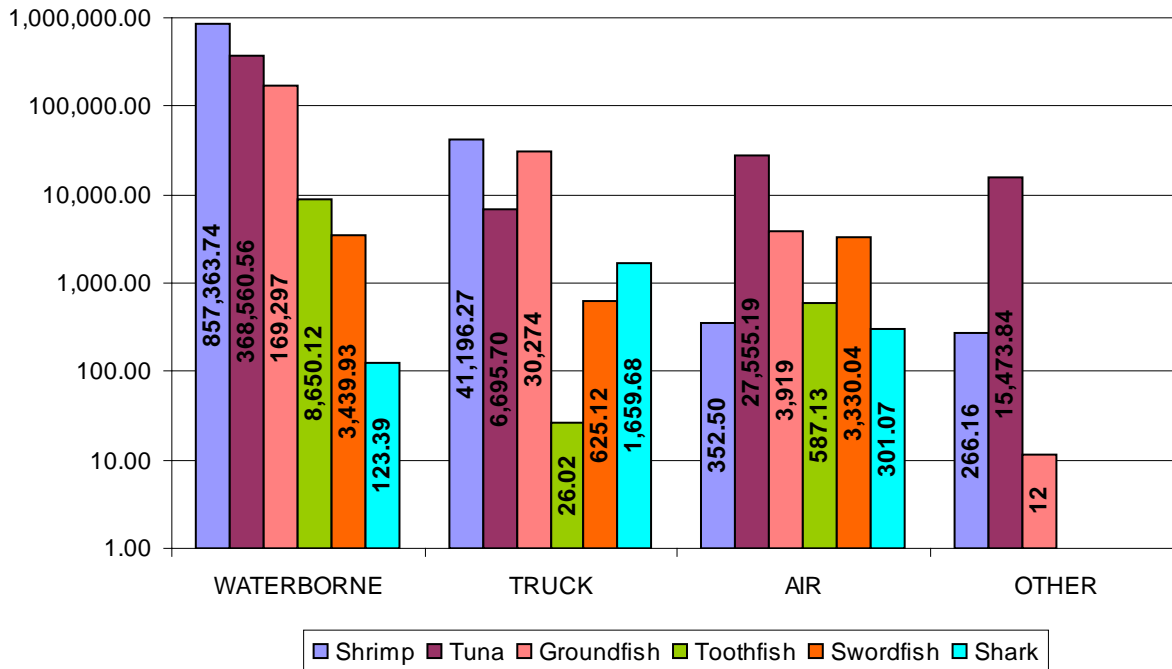
Figure 9. Seafood Import Transportation Mode by Percentage of Total Volume, 2006.



It is a much different story for the six species groups in this report, shown in Figure 10. Based on 2006 import data, the vast majority of these products, 92.7% by volume, is coming into this country via the waterborne mode followed by the truck mode at 3.8%, the air mode at 2.4%, and finally the “other modes” at 1.2%. The waterborne mode is dominated by shrimp imports at 857,364 metric tons followed by tuna at 368,561 metric tons, made up mostly of canned tuna. The higher valued product is coming to this country via air or truck modes due to the relative speed of transport for these modes when compared to waterborne transport. Taking tuna as an example, the average price of all tuna products in 2006 by mode are as follows: \$6.89/kg via air, \$4.86/kg via truck, and \$3.13/kg via waterborne transportation. Shrimp imports tell a similar story with the average price by mode as follows: \$10.25/kg via air, \$8.54/kg via truck, and \$4.37/kg via waterborne transportation. Groundfish prices by mode follow the same pattern; \$3.48/kg via waterborne, \$4.00/kg via truck, and \$8.28 via air.

For swordfish, this pattern begins to break down with the average price for all swordfish products as follows: \$7.91/kg via waterborne, \$5.69/kg via truck, and \$7.55/kg via air. Shark imports, in contrast to other species, follow the reverse pattern with the highest value product shipped in the waterborne mode. Shark product price by mode are as follows: \$12.06/kg via waterborne, \$2.68/kg via truck, and \$8.33/kg via air. This pattern is driven by dried shark fins, a high value but non-perishable product well suited for the waterborne mode. Toothfish, a high value perishable product also follows this reverse pattern with the following prices by mode: \$16.36/kg via waterborne, \$1.92/kg via truck, and \$14.34/kg via air.

Figure 10. Volume by Transportation Mode Across the Six Species Group, 2006.



Within waterborne transportation, there are two transportation options; container ships and general cargo vessels. The bulk of the seafood traffic into the United States is in the containerized mode with 99.5% by volume. The remaining 0.5% is transported in the general cargo mode. Over 16 million containers arrive in US ports each year, with 25% of all imports and 17% of all exports using containers (CBO, 2006). When ranked by value, fish and crustaceans rank 18th in containerized imported product value across all products imported through the containerized mode.

Port activity generates economic activity across many sectors including surface transportation, maritime services, cargo handling, federal/state/local governments, port authorities, importers/consignees, and the banking and insurance sectors. Maritime services include pilots, chandlers (food and other supplies), towing, bunkering (fuel), marine surveyors, and shipyard/marine construction. Cargo handling services include longshoremen, stevedoring, terminal operators, warehouse operators, and container leasing and repair.

While seafood is an important product in containerized imports when ranked by value, the volume of seafood on any one container ship is relatively low. According to the U.S. Maritime Administration (MARAD), which publishes annual volume estimates, the average volume of imports brought in during a port call in 2005 was 44,590 metric tons (MARAD 2007). Using the 2006 CBP data, the average volume of seafood per container ship call was 61 metric tons, or 0.14% seafood by volume for each port call. The minimum amount of seafood brought in on a container ship in 2006 was one kg and the maximum was 7,308 metric tons. Each containerized call hauls 5.9 different seafood products on average to slightly over two importers.

Table 8. Shipping Statistics for Waterborne Modes, 2006.

Statistic	Container Ship	Non-Container Ship
Average Capacity per Call	44,590.37 mt	25,101.33 mt
Total Seafood Import Volume, Product Weight	2,486,624.48 mt	13,611.05 mt
Average Seafood Volume per Call	60.92 mt	36.87 mt
Average Seafood Value per Call	\$308,065	\$133,948
Percent Seafood Volume per Call	0.14%	0.15%
Products per Call	5.86	1.91
Importers per Call	2.06	1.03

Non-containerized cargo shipping is a much smaller industry than containerized transport. MARAD estimates that the average annual volume of imports brought into the United States in this mode were 25,101 metric tons per call in 2005 (MARAD 2007). Using the 2006 CBP data, the average volume of seafood per non-container ship call was 37 metric tons, or 0.15% seafood by volume for each port call. The minimum amount of seafood brought in on a non-container ship in 2006 was one kg and the maximum was 455 metric tons. Additionally, each general cargo vessel hauls 1.9 different seafood products on average to slightly over one importer. Complicating matters for this rule, product on container vessels originate from multiple countries.

Table 9 looks at the types of fisheries products imported in each of the two waterborne modes. The non-container mode is dominated by groundfish. Within this category, it is mainly product imported from Canada and Asia into Massachusetts, Alaska, and Seattle. The second most important species for the non-containerized mode is albacore tuna coming into Oregon from Canada. By far the single most important species in containerized shipping is shrimp with 859,960 metric tons in 2007. Shrimp is followed by All Other Fish, tuna and then groundfish.

Table 9. Volume, Value and Number of shipments of Species Groupings by Waterborne Importation Mode, 2006.

Species Group	Waterborne Mode	Number of Shipments	Metric Tons	Dollars
All Other Fish	NON-CONTAINER	633	5,453	\$22,114,679
Groundfish	NON-CONTAINER	84	6,094	\$20,276,639
Shark	NON-CONTAINER	2	18	\$24,144
Shrimp	NON-CONTAINER	26	179	\$1,126,731
Swordfish	NON-CONTAINER	4	14	\$68,582
Tuna	NON-CONTAINER	34	409	\$913,710
All Other Fish	CONTAINER	92005	793,056	\$3,839,895,117
Groundfish	CONTAINER	10797	170,240	\$684,196,272
Shark	CONTAINER	37	108	\$1,460,401
Shrimp	CONTAINER	67837	859,960	\$3,765,872,942
Swordfish	CONTAINER	370	3,458	\$24,648,135
Toothfish	CONTAINER	464	8,773	\$143,710,339
Tuna	CONTAINER	21438	387,201	\$1,194,916,280

Unfortunately, the CBP data does not contain the flag of the vessels carrying these seafood imports. The CBP data does have the vessel names; however vessel names are not spelled consistently and therefore cannot be merged with other vessel databases. Table 10 lists the top 20 container flag states delivering imports to the United States (MARAD 2007). Panama leads the list, closely followed by Liberia. Table 11 lists the top 20 non-container flag states delivering imports to the United States. Panama also leads the non-containerized list also followed by China. Worldwide, the non-container fleet has far more flag states than the container fleet.

Table 10. Top 20 Container Flag States, 2006.

Flag of Registry	Number	Deadweight	TEU's	% by Number
Panama	588	25,324,473	1,860,833	18.60%
Liberia	537	22,974,787	1,739,966	16.98%
Germany	239	10,985,892	833,716	7.56%
Antigua & Barbadoes	233	4,919,372	372,653	7.37%
Singapore	194	5,455,688	381,804	6.14%
Cyprus	148	4,431,319	329,684	4.68%
Marshall Is.	148	4,890,448	376,358	4.68%
Hong Kong	112	5,168,320	392,092	3.54%
United Kingdom	112	5,105,053	396,702	3.54%
China P.R.	89	3,374,454	242,756	2.81%
Danish Int'l	77	5,723,825	408,198	2.44%
Bahamas	70	2,560,909	180,559	2.21%
United States	70	2,922,463	214,789	2.21%
Malta	49	1,316,427	86,968	1.55%
Greece	47	2,755,085	206,993	1.49%
South Korea	37	1,150,186	80,594	1.17%
Netherlands	32	1,353,138	99,537	1.01%
Taiwan	31	876,919	58,567	0.98%
Malaysia	28	755,362	51,545	0.89%
Italy	27	1,017,428	74,655	0.85%
All Others	294	9,400,862	673,284	9.30%

Table 11. Top 20 General Cargo Flags, 2006.

Flag of Registry	Number	Deadweight	% by number
Panama	253	3,724,322	16.66%
China P.R.	206	3,235,893	13.56%
St. Vincent & Grenadines	86	1,835,625	5.66%
Cyprus	75	1,323,717	4.94%
Liberia	73	1,117,662	4.81%
Bahamas	71	1,025,010	4.67%
Malta	65	1,056,839	4.28%
Netherlands	64	944,334	4.21%
Hong Kong	49	983,180	3.23%
Antigua & B.	41	577,059	2.70%
Marshall Is.	37	999,800	2.44%
Thailand	29	512,250	1.91%
Iran	27	566,486	1.78%

North Korea	25	376,589	1.65%
Singapore	23	464,092	1.51%
Philippines	21	415,386	1.38%
Vietnam	21	288,511	1.38%
Belize	19	292,168	1.25%
Russia	19	348,671	1.25%
Bangladesh	17	247,060	1.12%
All Others	297	4,439,599	19.55%

Table 12 details the revenue profiles and economic impacts per metric ton of cargo for container and non-container modes and their respective totals for an average container and non-container ship calls as derived from the MARAD Port Kit (MARAD 2000). A number of other port impacts studies were examined, as detailed in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008), but the MARAD estimates provide the best picture for both container and non-containerized imports. The model estimates were inflated using the consumer price index to 2006 dollars and converted to metric tons. The Port Kit shows that there are revenue and economic impact differences between containerized and non-containerized port calls. The MARAD Port Kit estimates will be used in the remainder of this report.

Table 12. Estimates of Revenue, Value Added, and Employment per Metric Ton for Container and Non-Container Transport Modes.

MARAD Port Kit	Value per Metric Ton	Total per Call
Containerized Mode		
Revenue	\$78.37	\$3,494,684
Output	\$269.74	\$12,027,864
Employment	0.002313	103
Income	\$81.71	\$3,643,335
Non-Containerized Mode		
Revenue	\$87.18	\$2,188,432
Output	\$326.82	\$8,203,500
Employment	0.003256	82
Income	\$106.82	\$2,681,375

Table 13 contains estimates of purse seine and longline fishing vessel expenditures and the economic impact of those expenditures. This information was taken from Hamnett and Pintz (1996). Hamnett and Pintz recognize that the surveys used to develop these expenditure profiles were taken during a period in the early 1990s when both the Guam transshipment industry and the American Samoan canneries were undergoing significant changes. These expenditure profiles were used to give an idea of the types of impacts that could be expected if fishing vessels from foreign nations (identified for having vessels engaged in IUU fishing and/or PLMR bycatch) failed to receive a positive certification from the Secretary of Commerce and were denied port privileges or if there were prohibitions on the importation of fisheries products into the United States from other countries. Due to the variation in expenditures between the various data sources, they developed a maximum expenditure and a low expenditure, representing upper and lower bounds, respectively. After adjusting for inflation, these expenditure profiles compare favorably with newer estimates by Kleiber (2002). Kleiber’s estimates per port call were \$358,150 and \$21,522 for purse seiners and longliners respectively, but were not broken down into

categories. Details regarding the use of Hamnett and Pintz (1996) to estimate current expenditures and impacts are detailed in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008).

Table 13. Fishing Vessel Expenditures and Economic Impacts per Port Call in Guam and American Samoa.

Expenditure Category	Maximum			Low		
	Purse Seiners	Longliners	Total	Purse Seiners	Longliners	Total
American Samoa						
Ship Fuel	\$281,851	\$22,206	\$304,057	\$247,687	\$22,206	\$269,893
Crew Shore Leave Expenditures	\$5,112	\$5,964	\$11,076	\$5,112	\$994	\$6,106
Ship Provisioning	\$6,390	\$5,254	\$11,644	\$6,390	\$3,834	\$10,224
Miscellaneous	\$6,106	\$7,242	\$13,348	\$0	\$0	\$0
Salt/Ice Purchases	\$12,780	\$142	\$12,922	\$2,272	\$142	\$2,414
Port and Other Infrastructure Fees	\$6,390	\$0	\$6,390	\$1,136	\$0	\$1,136
Total	\$318,629	\$40,808	\$359,437	\$262,597	\$27,176	\$289,773
Output	\$440,340	\$57,219	\$497,558	\$349,622	\$34,483	\$384,105
Income	1.666	0.411	2.076	1.074	0.121	1.195
Employment	\$65,377	\$12,987	\$78,364	\$44,398	\$4,981	\$49,379
Guam						
Ship Fuel	\$281,851	\$22,206	\$304,057	\$247,687	\$22,206	\$269,893
Crew Shore Leave Expenditures	\$23,146	\$5,964	\$29,110	\$12,212	\$4,118	\$16,330
Ship Provisioning	\$22,862	\$3,976	\$26,838	\$8,520	\$4,118	\$12,638
Miscellaneous	\$25,134	\$0	\$25,134	\$568	\$0	\$568
Salt/Ice Purchases	\$11,360	\$994	\$12,354	\$852	\$994	\$1,846
Port and Other Infrastructure Fees	\$5,680	\$0	\$5,680	\$5,680	\$0	\$5,680
Total	\$370,033	\$33,140	\$403,173	\$275,519	\$31,436	\$306,955
Output	\$513,070	\$43,122	\$556,192	\$368,522	\$40,738	\$409,260
Income	2.551	0.236	2.787	1.332	0.200	1.531
Employment	\$90,505	\$7,774	\$98,279	\$50,952	\$7,006	\$57,957

There is very little information regarding export destination or carrier flag that is publicly available. Commercially, PIERS data do give this level of detail on exports; however that data source was not considered necessary for purposes of this analysis. If seafood exports on container vessels follow the pattern of imports using container vessels, any individual shipment will be a very low proportion of all other goods on the container ship.

3.4.6 Processors, Wholesalers, and Importers Cannery Processing

The United States was the first nation with a cannery, and for many years it was the largest tuna canning nation (Campling et al. 2007). Currently, however, there are only four canneries in the United States and only one in the continental United States (near Los Angeles, California). One cannery is in the territory of Puerto Rico and the other two are in the territory of American Samoa. Overall, U.S. canneries employ 6,000 full-time employees. Of that total, the Puerto Rico and California canneries together employ between 800-900 employees and the balance is employed in American Samoa. Bumble Bee, owned by the Canadian firm Connors Brothers Income Fund, owns both the cannery in California and the cannery in Puerto Rico. Connor Brothers owns several other fish and other meat canning firms thereby dominating the North American canned protein market. Bumble Bee is the U.S. leader in

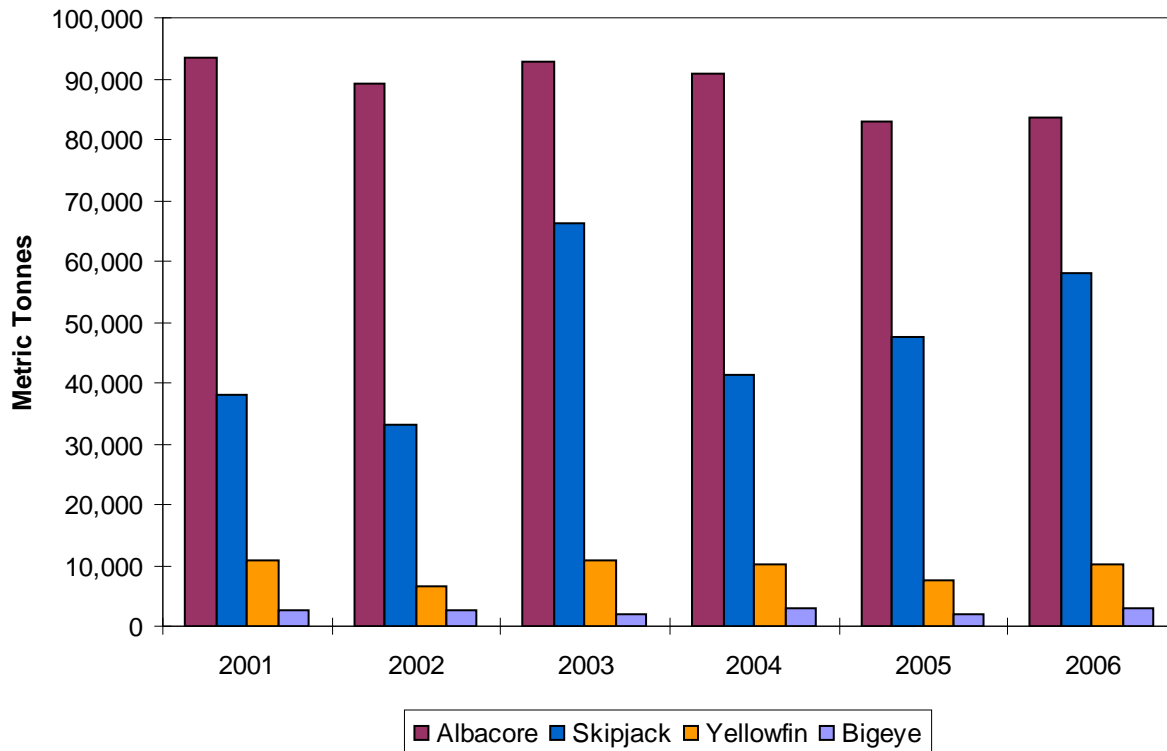
canned albacore and they also control 55-60% of the albacore consumed globally. The sales from these two plants topped \$714 million in 2005. Both plants produce only canned tuna. The California plant has the annual capacity of 40,000 metric tons of loins and the Puerto Rico plant has the annual capacity of 20,000 metric tons of loins. Both facilities process only frozen loins and do not process whole fish.

In contrast, the canneries in American Samoa predominately process tuna in the round. The Starkist plant has the capacity to process 10,000 metric tons of loins but its main production capacity is in round tuna with 125,000 metric tons of capacity (Campling et al. 2007). The Starkist plant produces mostly traditional canned tuna but also produces pet food and some tuna in a foil pouch. Chicken of the Sea, the other AS cannery, has the capacity to process 20,000 metric tons of loins and 90,000 metric tons of round tuna. Chicken of the Sea produces primarily traditional canned tuna and pet food.

Due to confidentiality restrictions, the product imported by each of these facilities cannot be broken out by facility. Since Bumble Bee plants are within the jurisdiction of U.S. Customs, products imported into their facilities are captured in the Census data presented above as well as the cannery receipts. (Canneries do not report prices or value.)

Figure 11 details the volume of cannery deliveries by species. The majority of the landings and imports in every year are albacore. Albacore purchases by canneries have stayed relatively stable for the last five years. Skipjack purchases by canneries have fluctuated somewhat and have been on the rise in recent years. This is attributable to the fleets focusing on FADs when setting their purse seines. The FAD fishery captures mostly skipjack with yellowfin and bigeye bycatch (Campling et al. 2007). Yellowfin and bigeye purchases by canneries are small in comparison to either skipjack or albacore purchases.

Figure 11. Volume of Cannery Receipts by Species.



The origin of the tuna purchased for use in the canneries is shown in Table 14. The U.S. distant water fleet numbers were covered in Section 3.4.4. Taiwan is the largest supplier to the canneries, by far, with 31% of the volume. Vanuatu is the second largest supplier to the canneries, with 19% of the volume and New Zealand is the third largest supplier, providing 13%. For the cannery in California and the cannery in Puerto Rico, all of the tuna is frozen loined product being delivered via container ships. These two canneries use mostly albacore. The American Samoan canneries purchase mostly tuna in the round, although they have begun to purchase and utilize loins. More and more tuna is coming into American Samoa in container ships and other carrier vessels after being transshipped.

Table 14. Cannery Receipts 2006.

Year	Origin Country	Metric Tons
2006	TAIWAN	47,702
2006	VANUATU	29,930
2006	NEW ZEALAND	19,820
2006	CHINA	8,623
2006	REPUBLIC OF KOREA	8,545
2006	FIJI ISLANDS	5,871
2006	INDONESIA	3,390
2006	MARSHALL ISLANDS	3,172
2006	WESTERN SAMOA	2,314
2006	SPAIN	2,042
2006	FEDERATED STATES OF MICRONESIA	2,041
2006	BOLIVIA	1,930
2006	COOK ISLANDS	1,720

2006	GUYANA	1,652
2006	ST VINCENT	1,537
2006	REPUBLIC OF GEORGIA	1,525
2006	SOUTH AFRICA	1,515
2006	JAPAN	1,297
2006	PANAMA	1,224
2006	ECUADOR	1,203

American Samoa is not within the jurisdiction of U.S. Customs. Therefore, outside of the cannery receipts presented in Table 14, little is known about the transport mode or the flag of the carriers bringing product into American Samoa. In the past, most of the product was brought on fishing vessels, but with less reliance on the U.S. DWF, more and more of the product is coming in on carrier vessels. There were no data on these carrier vessels available for this analysis. American Samoa requires fish to be transshipped in port, so smaller carriers that transship at sea are not likely to be delivering product to American Samoa. American Samoa does have a container port, so it is likely that some of their inputs are coming in on container ships.

In Guam, the vast majority of product is minimally processed and sent to Japanese markets. There are essentially only two flag states landing fish in Guam: Taiwan and Japan. In 2006 Taiwanese fishing vessels made 147 port calls averaging 8.3 metric tons per call and Japanese boats made 392 calls averaging 13 metric tons per Guam call. No data were available regarding the value of these landings or the cost structure of the transshipping industry making impacts of a denial unknown. If either of these nations was identified as having vessels engaged in IUU fishing and/or PLMR bycatch, received a negative certification, and experienced the denial of port privileges, the economic impacts to Guam could be relatively large.

For American Samoa, the cannery receipt data are confidential and not subject to disclosure. Additionally, value is not reported by the canneries. In general, far more flag states made port calls at the canneries than in Guam with 36 flags delivering product to American Samoa in 2006, not including American Samoan or U.S. fishing vessels. Average annual off loadings of tuna per flag state was 2,895 metric tons across all port calls with an annual minimum of 22 metric tons and an annual maximum of 33,679 metric tons in 2006. The number of calls each flag state made is unknown so the average rate of volume per call is unknown. If one of the countries that export a relatively large amount of tuna to American Samoa were to be negatively certified, the impacts to the American Samoan economy could be large if adequate supply substitution possibilities did not exist.

Non-Cannery Processing

Overall, seafood processing plants in the United States process 2.6 billion metric tons annually and generate about \$8.8 billion in revenue (Table 15). However, more and more processing is occurring overseas. It is projected that the market for value added products will grow and that much of this demand will be met by imports (Glitnir 2007). Value added products include ready to eat meals, breaded shrimp, and other items. Countervailing duties put in place for shrimp in January 2005 included only fresh shrimp and not breaded shrimp or other value added shrimp products. As a result, foreign producers have begun breeding shrimp and otherwise adding value overseas and the United States has been importing more of these value added products. Breaded shrimp imports were up 12.9% in 2006 and could increase in 2007.

Table 15. Processing Activity by Species Group 2006.

Group	Firms	Metric Tons	Revenue	Average Annual Employment	Employment per Firm
All Other Fish	155	1,237,423	\$4,109,097,714	9,321	60
Shark	18	848	\$4,492,464	1,007	56
Shrimp	109	191,832	\$1,352,565,642	8,156	75
Swordfish	55	1,919	\$27,275,143	2,611	47
Toothfish	10	62	\$1,463,514	228	23
Tuna	96	232,399	\$819,198,076	9,632	100
Groundfish	41	684,231	\$1,927,557,213	4,237	103
All Firms	931	2,604,776	\$8,748,261,732	30,652	33

Table 16 details the number of processing and wholesaling plants and their employment in the United States by state for 2006, as taken from FUS (2006). These annual estimates are taken by the Bureau of Labor Statistics for NAICS sector 3117 (seafood processors) and 42446 (seafood wholesalers). According to these data, a majority of U.S. processing firms (99%) are small entities with less than 500 employees. The canneries in American Samoa that employ thousands of cannery workers are considered exceptions.

Table 16. Employment and Number of Plants in Processing and Wholesaling by State (FUS 2006).

States	Processing		Wholesale		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
Alabama	41	2,008	20	276	61	2,284
Alaska	162	8,690	130	183	292	8,873
California	58	2,521	284	4,194	342	6,715
Connecticut	5	107	18	167	23	274
Delaware	(1)	(1)	(1)	(1)	(1)	(1)
District of Columbia	0	0	4	93	4	93
Florida	41	2,309	300	2,403	341	4,712
Georgia	8	560	30	412	38	972
Louisiana	74	1,932	126	661	200	2,593
Maine	37	823	175	897	212	1,720
Maryland	26	1,211	51	522	77	1,733
Massachusetts	59	2,440	187	2,309	246	4,749
Mississippi	33	3,510	32	104	65	3,614
New Hampshire	11	314	17	147	28	461
New Jersey	20	788	83	938	103	1,726
New York	21	445	257	1,896	278	2,341
North Carolina	31	827	68	670	99	1,497
Oregon	25	1,029	17	369	42	1,398
Pennsylvania	8	296	31	495	39	791
Rhode Island	10	265	33	183	43	448
South Carolina	(1)	(1)	16	116	16	116
Texas	26	1,525	77	825	103	2,350
Virginia	59	1,735	60	548	119	2,283
Washington	107	6,562	141	1,114	248	7,676
Inland States Total	69	3,910	208	2,435	277	6,345
Other Areas or States(2)	(1)	(1)	31	351	31	351

Total						
Grand Total	931	43,807	2,396	22,308	3,327	66,115

(1) Included with Inland States Total for confidentiality reason

(2) Includes American Samoa, Hawaii, and Puerto Rico

If there are three or less firms in a state, data cannot be reported to protect the confidentiality of proprietary information. Table 17 details the volume and value of seafood processed by state. Alaska processes the most seafood by weight and by volume. Alaska also has the most firms and the highest employment in processing. California processes the second most seafood by weight and value. California also has the second most employees working in processing with 3,628 employees and the most plants. While Florida and Alabama are tied for third in terms of the number of plants, they are much smaller plants in terms of the number of employees, volume, and value.

Table 17. Processing Plants Volume, and Value by State, 2006.

State	Metric Tons	Value (Dollars)
Alabama	18,540.4	\$126,164,352
Alaska	986,816.1	\$2,874,586,536
American Samoa	*	*
California	222,942.0	\$951,556,297
Connecticut	*	*
Delaware	*	*
Florida	41,065.8	\$307,018,595
Georgia	28,191.0	\$170,699,612
Hawaii	4,408.9	\$67,806,472
Louisiana	197,638.1	\$383,395,352
Maine	13,507.8	\$125,557,465
Maryland	17,360.2	\$107,271,570
Massachusetts	151,953.8	\$700,199,193
Minnesota	*	*
Mississippi	100,001.8	\$321,389,685
New Hampshire	*	*
New Jersey	48,996.1	\$109,253,076
New York	3,915.1	\$39,291,661
North Carolina	5,705.3	\$48,866,430
Oregon	33,726.4	\$111,867,501
Pennsylvania	110,141.8	\$144,902,788
Puerto Rico	*	*
Rhode Island	11,146.4	\$65,302,587
South Carolina	*	*
Texas	37,072.7	\$218,694,394
Virginia	92,562.3	\$246,941,772
Washington	143,722.6	\$537,617,733

*Confidential data.

For the purposes of this report, retail repackaging is not considered processing as most of this type of activity is handled directly by the retailer and involves very minimal trimming, cutting of whole fish for

the customer, and limited packaging of fish into smaller portions. There is no existing source of data that details how much of the import trade in seafood goes to retail repackaging versus more traditional processing. Instead, three methodologies were examined and details regarding those methodologies can be found in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008). None of the methods examined included landings to the canneries in American Samoa. Currently, most of the product being landed in American Samoa is gutted whole tuna. However a small amount of tuna loins are being used and as labor prices rise in American Samoa, the canneries may look towards purchasing only loins as do the other U.S. canneries.

To be able to analyze changes in the import product flow through the processing sector, the percentages of imports processed domestically were applied to product weight imported in 2006 across the various species groups. Additionally, the data were used to estimate the employees needed per metric ton and the value generated per metric ton. These estimates were applied to the volume of imports processed in 2006, as shown in Table 18. . Tuna processing was the largest activity by volume and the number of jobs supported. However, shrimp was the most important by value.

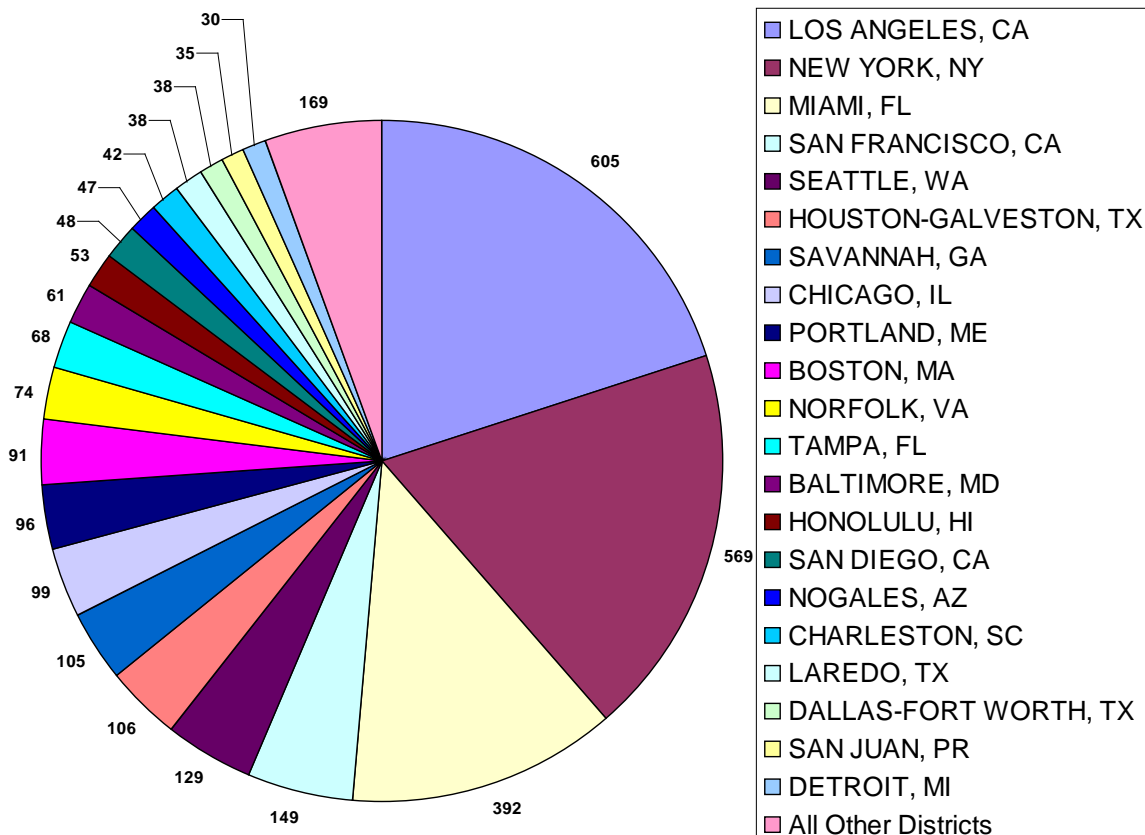
Table 18. Estimated Processing Volume, Value and Employment Supported by Imports in 2006.

Species Group	Percent Total Imports Processed Domestically	Metric Tons	Value (Dollars)	Employment Supported
Shark	15.83%	246	\$1,302,830	292
Shrimp	26.27%	155,094	\$1,093,531,437	6,594
Swordfish	14.60%	1,508	\$21,441,920	2,053
Toothfish	0.54%	62	\$1,463,514	228
Tuna	82.43%	227,376	\$801,494,539	9,424
Groundfish	37.91%	75,902	\$213,825,601	470
All Species	64.04%	1,601,272	\$5,377,945,690	180,067

Wholesalers/Importers

In 2006 there were 1,628 importers in the United States importing the six species groups used in this report: shark, shrimp, swordfish, tuna, toothfish, and groundfish. Figure 12 shows how many importers there are by customs district. However, just because a product came in to a customs district, doesn't mean it is staying there. Since there is no mechanism to track imports from the ship to the consumer, customs district of entry is as spatially explicit as the data will allow.

Figure 12. Number of Importers by Customs District, 2006.



Importers provide warehousing and inventory management for retailers. In that respect, they are very similar to wholesalers that might deal with imports, exports, and/or domestic landings. There are 2,396 seafood wholesalers in the United States. Florida contains the most wholesalers with 300, followed by California with 284, and, in third is New York with 257. This corresponds with the data presented in Figure 12. There is no doubt that some importers are included in the number of firms listed in Table 9, however, some retailers import product directly into their own warehouses and those retailers would not be included in this table. There are no data for wholesalers comparable to the data used to produce Tables 8, 9, 10, and 11. As a result, it is not possible to use available data to ascertain how many wholesalers deal with imports. Similarly, the volume, value, and jobs supported by imports within the wholesale sector across these species groups cannot be ascertained based on available information.

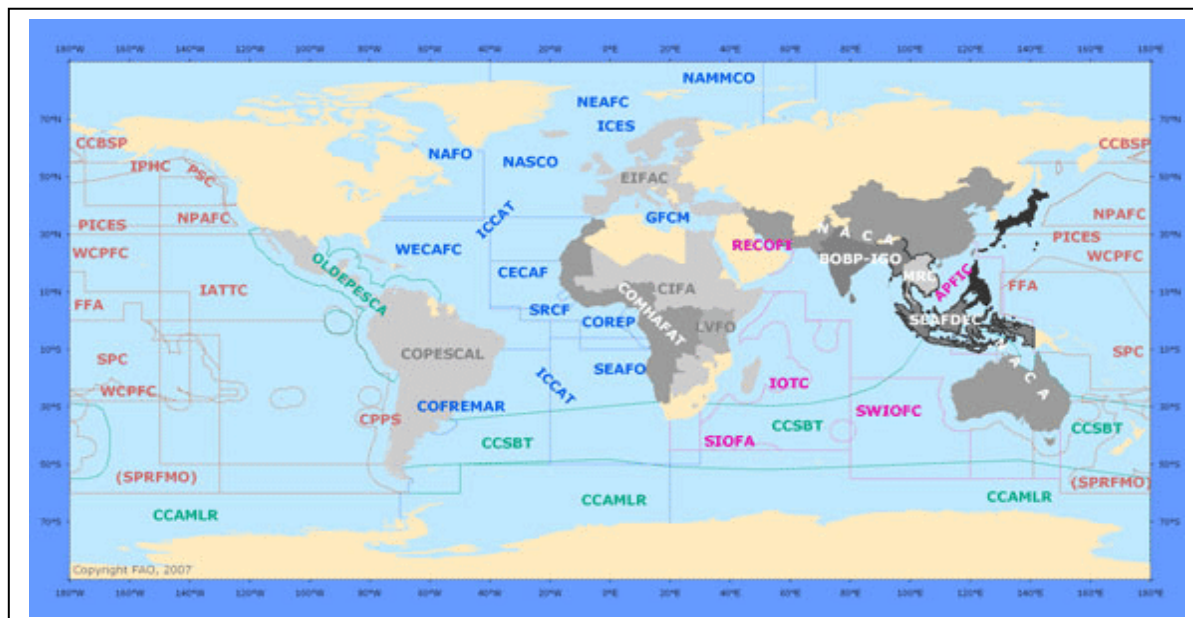
Using the average volume of seafood imports per containerized port call from Table 8 and applying the percent of species processed domestically from Table 18, 40 metric tons of containerized seafood are destined for additional processing and 21 metric tons are headed directly to retail. Similarly, for non-containerized port calls, 24 metric tons of non-containerized seafood imports are destined for additional processing and 12 metric tons are headed directly to retail. Each average port call represents 0.0024% or 0.0015% of all seafood imports for containerized and non-containerized cargo respectively. There is no existing data source that tracks retail purchase from the processor to the retailer. Additionally, there

is no existing data on retail seafood prices. As a result, it is impossible to calculate the impacts forward from a denied port call to processing, distribution, and wholesale of fish and fish products. Because such a small percentage of total imports are spread across multiple products, 5.86% and 1.91% for container and non-container port calls respectively, and multiple importers/processors, 2.06% and 1.03% for container and non-container port calls respectively, the change in product flow will be very small for the individual product/firm combination. As an example, the largest containerized shipment in 2006 weighed 7,308 metric tons, which still only represents 0.3% of all seafood imports. For non-containerized shipments, the largest seafood volume in 2006 was 0.018% of all imports. Therefore, unless port calls were denied for a relatively large number of vessels, businesses could simply source these relatively small amounts of product domestically or from other transportation modes such as air, truck, or rail. For consumers, such small changes in product flow are unlikely to change prices or availability. Therefore, no adverse impact is expected. Notably, these conclusions are based on average port calls and may over (or under) estimate the potential impacts if shipment is larger (or smaller) than average.

3.5 MANAGEMENT SETTING

International agreements concerning living marine resources of concern to NMFS are described in a 2008 report by the NMFS Office of International Affairs, the primary office responsible for implementing the certification procedures that are proposed and analyzed in this EA. The report is available at http://www.nmfs.noaa.gov/ia/docs/2008_International_Agreements.pdf. Analyses of agreements pertaining to marine mammals, sea turtles, sharks and IUU fishing are provided in memoranda to NOAA completed as background to this EA and included as Appendices B, C, D and E. A summary of the agreements to which the United States is party is available on the website of the NMFS Office of International Affairs at <http://www.nmfs.noaa.gov/ia/intlagree/>. The United States also holds consultations with a number of countries on a bilateral basis including Canada, Chile, China, European Union, Japan, Mexico, Russia, Taiwan and Vietnam and is a member of numerous RFMOs. The area of interest of these and other regional bodies are shown in Figure 13.

Figure 13. Jurisdiction of Regional Fishery Management Organizations. Source: FAO.



4.0 ENVIRONMENTAL IMPACTS

Below is an analysis of the environmental impacts of the action alternatives. A detailed cumulative impacts discussion has not been conducted because the proposed action has the effect of developing procedures that result in a certification process, rather than an action with a direct or indirect impact on the environment. Therefore, there is limited potential to incrementally contribute to cumulative impacts. The proposed action alternatives could, however, provide additional leverage to address IUU fishing and bycatch beyond what is available under existing authority.

4.0.1 Framework for Analysis of Impacts

Fishing around the globe has implications for the United States for many reasons, such as U.S. fishermen fish on the high seas, the United States shares fish stocks with other nations, fish targeted primarily within the U.S. EEZ may migrate out of it at times, U.S. fishermen compete with fleets of other nations that may not be bound by the same rules and standards, and fishing practices of vessels of other nations affect U.S. seafood markets and businesses. The United States is an importer, processor and consumer of seafood caught beyond our EEZ, and public concern about the sustainability of those products is widespread and growing. With regard to PLMRs, such as sea turtles, fleets from other nations are growing annually, and where these fleets fish without protective measures there is an increasing threat to these species. IUU fishing activity and PLMR bycatch undermine the ability of managers to maintain sustainable fisheries. In an effort to improve management domestically and around the world, the U.S. Congress passed the MSRA.

While policy makers and U.S. consumers are concerned generally about IUU fishing and PLMR bycatch, the law focuses on several specific aspects of these activities:

- fishing in violation of international agreements to which the United States is a party;
- overfishing or bycatch on the high seas or in international waters where no management agreement exists and where the United States shares the fish stocks or PLMRs;
- bycatch on high seas of PLMRs protected by international agreement to which the United States is a party; and
- fishing that harms seamounts, hydrothermal vents, cold water corals.

The certification procedures under MSRA result in a list of identified nations that are positively or negatively certified by the Secretary of Commerce. Fishing vessels of nations that do not receive a positive certification may be subject to the denial of port privileges and could be subject to Presidential action at the recommendation of the Secretary of Commerce. The certification procedures do not result in a specific sequence of ensuing actions affecting the human environment. However, in order to assist the public in understanding the potential actions and effects that might ensue, the analysis of proposed alternatives presented here examines the proposed certification procedures with respect to potential environmental and socio-economic effects in fisheries that meet specified criteria. This appropriately focuses the scope of the analysis to fisheries that are the subject of the MSRA and its certification procedures, though there may be additional IUU fishing or harmful bycatch of protected resources that are beyond this scope. The analysis does not examine fisheries that have bycatch or IUU activity within the

EEZ of the United States or the EEZ of another nation unless the bycatch activity affects a PLMR that is shared with the United States. The analysis does not examine IUU activity in areas under the jurisdiction of an agreement to which the United States is not a party, or in EEZs where the United States does not share a stock. To reach an understanding of PLMRs, fisheries, and areas the proposed alternatives would affect, what the speculative environmental consequences of the alternatives could be, and subsequently, how those effects would play out in U.S. markets, the analysis focuses in the following manner:

1. Eliminate examination of fisheries that occur entirely within the EEZs of other nations and do not affect stocks shared by the United States.
2. Eliminate examination of fisheries on high seas where there is no occurrence of fish stocks shared by United States.
3. Eliminate examination of fisheries in areas of RFMO or treaty jurisdiction where United States is not a party.
4. Eliminate examination of fisheries on high seas where no documented bycatch of PLMRs occurs or cannot be inferred because the gear has not been documented to have PLMR bycatch or there is no occurrence of PLMR species that are protected under United States or international treaty in the area of the fishery.

Of the fisheries that remain, the analysis examines a representative sample of fisheries that occur in regions where the United States has identified an interest (shared stock, party to RFMO, PLMR, bottom habitat features).

Since the proposed action is the establishment of procedures, this framework for the analysis appropriately makes no determination whether IUU fishing and/or PLMR bycatch is occurring in fisheries, flag nations, or regions, but rather establishes the process by which these fisheries, nations, or regions would be evaluated to determine if they meet the guidelines for the nexus of shared interest specified in the MSRA.

Using the FAO classification of epipelagic and deep-water species discussed above, one can examine species and fisheries that emerge as examples of the kind of fisheries that may be affected by the certification procedures called for in the MSRA. Table 19 provides a list of species the FAO has identified as epipelagic or deepwater and therefore likely to be caught on the high seas. Because these fisheries are exemplary only, the alternatives analysis that follows is qualitative, and suggestive of possible impacts that might result from the certification procedures, such as denial of port privileges and any possible prohibitions on imports of fish and fish products.

Table 19. Selected oceanic species likely to be caught on high seas. Source: FAO. Trends in oceanic captures.

Species	Fishery has had IUU reports	Fishery uses gear known to have bycatch	Fishery in jurisdiction of RFMO in which U.S. party	Fishery targets stock shared by U.S.	Fishery has bycatch of PLMR shared by U.S.
Billfish	X	X	X	x	x
Tuna	X	X	X	x	x
Sharks (epipelagic)		X	X	x	x
Squid	X	X	X	x	x
Cusk			X	x	
Blue whiting			X		
Ling			X	x	
Sablefish			X	x	
Grenadiers			X		
Redfish			X	x	
Toothfish	X		X		
Sharks (deepwater)		X	X	x	x
Royal red shrimp		X			

4.1 IUU CERTIFICATION PROCEDURE ALTERNATIVES ANALYSIS

4.1.1 Alternative I-1: No Action Alternative

NMFS would not develop any procedures to address certification of nations whose vessels are engaged, or have been engaged in IUU fishing activities. The no action alternative would leave in place existing procedures for the certification of nations fishing illegally or in a manner that undermines international agreements to which the United States is a party. The no action alternative would retain NOAA's authority to take action under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act and other statutes discussed above, as well as under international law. For example, contracting parties under the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) may restrict port access or impose unloading prohibitions on listed IUU vessels regardless of whether the fish or fish products being transported by the vessel were legally harvested. Under existing authority, the United States has been able to address IUU fishing to some extent. Examples of prior actions taken in fisheries of the type listed in Table 19 include notification of the potential to restrict port access to an IUU vessel identified by CCAMLR, seizure of a vessel engaged in large-scale driftnet fishing, and changes in documentation requirements for imports of bigeye tuna that were adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT). The United States has also used its authority under the Lacey Act to address IUU catches of tuna and imports of toothfish.

Failure to develop new procedures would not comply with 16 U.S.C. 1826j(d)(1), which states the Secretary of Commerce shall establish a certification procedure. If the United States fails to develop procedures for the certification of nations that are identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels engaged in IUU fishing, it is anticipated that compliance in implementing and enforcing recommendations in the fleets of other nations will not improve over the current status. Unchecked IUU fishing not only harms managed fisheries populations, but it undermines the management regime itself. Should this scenario result, the effectiveness of international management regimes for shared resources such as tuna, billfish and toothfish might not be as effective as they could be with the addition of a U.S. role as envisioned and required in the MSRA. In the absence of strong regional management bodies whose recommendations are enforced by members, IUU fishing could reach unsustainable levels.

4.1.2 Alternative I-2

Under this alternative, the Secretary of Commerce would provide positive certification for a nation identified in the biennial report to Congress called for in Section 609(a) of the Moratorium Protection Act as having vessels engaged in IUU fishing activities, if the Secretary determines the nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether such nation has taken corrective action against the offending vessels, or the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

In order to make a positive certification under this alternative, the Secretary may use one of two possible approaches: a national approach or an RFMO approach. The Secretary could determine that a nation whose vessels have been engaged in IUU fishing has taken action against the offending vessels flagged to such nation, or the Secretary could determine that the relevant RFMO has implemented effective measures to address the relevant IUU fishing activity.

This alternative would provide additional leverage to address IUU fishing beyond what is available under existing authority. It would provide a means for the United States to address IUU fishing that may not be available under current bilateral agreements. The procedure provided in Alternative 2 would enable the United States to elicit information from the nation about corrective actions such as sanctions, fines and penalties, enhanced monitoring, control and surveillance and other measures flag states are expected to take against vessels engaged in IUU fishing. Adoption of this alternative could potentially result in improvements in existing or future fishery management procedures via improved catch reporting, better compliance with allowed catch levels and future adoption of other management measures that are aimed at stopping overfishing on shared stocks. Considering the types of fisheries likely to be examined in this certification procedure, the alternative has the potential to deter illegal catches of toothfish, reduce catches of juvenile swordfish, and minimize overfishing of bigeye, yellowfin and bluefin tuna—all species that are or have been subject to overfishing.

With regard to unreported fishing, this alternative has the potential to increase catch information on species such as toothfish, tuna and sharks. Unregulated fishing for oceanic species such as

tuna, flying squid and sharks could occur in the Eastern Central Pacific (Area 77) and no management system exists for deepwater species such as blue whiting, deep water sablefish, deep water sharks, lanternfish, lightfish or grenadiers in the North Pacific's Area 61. Little is known about many deepwater species, but they are generally long-lived and late to mature, making them vulnerable to unregulated fishing pressure. Many deepwater shark species have been assessed as vulnerable. Development of management measures or a regional management authority would contribute to conservation of species such as thresher, silky, finetooth, sandbar and other sharks (See Table 4 of Appendix D for a listing of sharks by FAO area).

If the Secretary of Commerce were to use the approach provided in Alternative 2, the procedure to determine whether to issue a positive certification could also rely on evidence from the RFMO. Under the RFMO approach, the factors under consideration could include whether the RFMO requires actions such as mandatory reporting; exchange of information on vessels engaged in or supporting IUU fishing; records of authorized and IUU vessels in the area of competence; methods of compiling and using trade information to monitor IUU fishing; a range of specified monitoring, control and surveillance measures; boarding and inspection regimes; observer programs; market-related measures to prevent, deter, and eliminate trade in IUU product; and education and public awareness programs. The element of "effectiveness" evaluates whether the RFMO's measures are sufficient to warrant a positive certification for a member nation whose vessels have been engaged in IUU fishing. This element remains flexible to allow for development of new approaches and types of measures that have not yet been designed.

The potential environmental benefits of using a certification procedure at the RFMO level are similar to those described in the national approach. In addition, the RFMO approach has the effect of improving performance on a wider scale by other members of the RFMO, not just the nation with the vessels engaged in IUU fishing. Increased reporting and compilation of information on vessels, catch, effort and trade assists managers at the regional level in improving conservation and management measures for the fishery as a whole in addition to improving compliance by individual vessels. Using toothfish as an example, implementation by CCAMLR member nations of a set of stringent reporting and inspection tactics has resulted in dramatic declines in the amount of IUU toothfish catches, which had risen to unsustainable levels and far outstripped legal catches. It is reasonable to expect that similar reductions in illegal catches would occur under RFMO regimes that included some or all of the same kinds of measures.

4.1.3 Alternative I-3

Under this alternative, the Secretary of Commerce would provide positive certification for a nation identified in the biennial report called for in Section 609(a) of the Moratorium Protection Act as having vessels that are engaged, or have been engaged, in IUU fishing activities, if such nation has taken corrective action against the offending vessels, **and** the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

This alternative has the potential to be incrementally more beneficial than Alternative 2 because it combines the benefits of national and RFMO action. It combines the effectiveness of flag state action on the offending vessel with the regional scope of management organization actions throughout the fishery. The United States is a member of numerous RFMOs that keep lists of

IUU vessels, many of which are registered to nations that are not members of the RFMO. Alternative 3 would require the Secretary to assess both the measures taken by the flag state against its offending vessels and the measures the RFMO had in place to address IUU fishing, whether by members or non-members. In terms of consequences for the environment, this alternative has the potential to reduce unsustainable IUU fishing and contribute to the management of as yet unregulated fisheries on the high seas.

Table 20 shows the potential benefits to conservation and management of shared oceanic fish species by FAO areas where the United States shares high seas stocks. The species groupings combine individual listings of U.S. shared stocks shown in Table 3, above. Even though regional bodies exist in each of the areas, they do not deal with all the oceanic species, particularly deepwater species. In some cases, the relevant RFMO may not regulate catches of vulnerable species or take action for illegal or unreported catches. The incremental difference between Alternative 2 and Alternative 3 can be seen where there is an entry for implementing management for unregulated stocks. In the case of these species or stocks, Alternative 3 would potentially provide more opportunity to institute management than would Alternative 2. The species that would receive the most incremental benefit under Alternative 3 include sharks and unregulated deepwater species such as sauries, lanternfish, grenadiers and some species of hake. Tuna and billfish species of interest to the United States fall under the auspices of an RFMO with management measures and IUU provisions, so the improvement in conservation measures for those stocks could be in addressing illegal fishing (exceeding TACs, violating size limits, closures, etc.) and in improving catch reporting.

Table 20. Examples of potential environmental benefits under Alternatives I-2 and I-3.

Species	Area 21 (NAFO, ICCAT)	Area 31 (WECAFC, ICCAT)	Area 61 (CCBSP, NPAFC)	Area 67 (CCBSP, NPAFC, IPHC)	Area 77 (IATTC)
Billfish	IO, RO	IO, RO	N/A	N/A	IO, RO
Tuna	IO, RO	IO, RO	N/A	N/A	IO, RO
Sharks (epipelagic)	IO, RO, MO	IO, RO, MO	MO	MO	IO, RO
Squid	RO	RO	MO	MO	MO
Hakes	IO, RO	MO	N/A	IO, RO	MO
Ling	N/A	N/A	MO	IO, RO, MO	N/A
Sablefish	N/A	N/A	MO	IO, RO, MO	N/A
Grenadiers, lantern	MO	MO	MO	MO	MO
Salmon	IO, RO	N/A	IO, RO	IO, RO	N/A
Sharks (deepwater)	IO, RO, MO	MO	MO	MO	IO, RO

Key: address illegal catches of overfished stocks (IO), improve reporting for overfished or vulnerable stocks (RO), implement management for unregulated stocks (MO).

4.2 BYCATCH CERTIFICATION PROCEDURE ALTERNATIVES ANALYSIS

4.2.1 Alternative B-1: No Action

Marine Mammals

Under the Status Quo—No Action Alternative, there would be no substantial change in the potential for the U.S. to exert additional influence in the reduction of bycatch of marine mammals. With the exception of the International Dolphin Conservation Program administered by the IATTC in the ETP, no other RFMO has adopted marine mammal bycatch limits or has implemented an observer program to document the frequency of marine mammal bycatch in international waters. Under this alternative, the Secretary will continue to certify nations under the IDCPA.

Sea Turtles

Similarly, the U.S. influence on the bycatch reduction measures for sea turtles would remain relatively unchanged. The State Department and NMFS will continue to implement Public Law 101-162. NMFS and the Department of State will continue to inform nations about the new larger TED opening requirements. NMFS and Department of State representatives will continue to implement the International Bycatch Reduction Task Force's Plan of Action to: (1) implement the strategy to promote international agreements that reduce sea turtle bycatch in foreign longline fisheries, and (2) promote the implementation of the Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries and the FAO IPOA for the Conservation and Management of Sharks. NMFS would likely continue to support research to develop measures to reduce the incidental take, mortality, and serious injury of sea turtles in pelagic longline fisheries. NMFS would work cooperatively with other nations (including through establishment of international agreements) to share the results of gear research and to advance the adoption of technology and fishing practices that will reduce global sea turtle longline interactions.

NMFS will continue to provide information to longlining nations on the results of gear experiments that have been conducted with the U.S. fleet; disseminate educational and outreach materials that have been translated into multiple languages; conduct training workshops on safe handling and release practices; provide technical guidance and circle hooks for the development of research programs; and coordinate on longline gear experiments. NMFS will continue to partner with the Department of State's Bureau of Oceans, Environment and Science (OES) to develop and support scientific, technological, and environmental initiatives in longlining nations to expand the capacity of these nations to reduce bycatch of sea turtles in longline and trawl fisheries.

NMFS would continue to assist in the planning and/or execution of international and domestic workshops focusing on technology transfer and outreach relating to reduction of sea turtle bycatch in longline fisheries. These workshops should continue to focus on transfer of circle hook and bait technology to Latin American, Asian, and other countries that have longline fleets that interact with sea turtles. NMFS should continue to engage with Japan on Japanese-style

tuna hook experiments.

The Inter-American Convention for the Protection and Conservation of Sea Turtles in the Western Hemisphere, which entered into force in May 2001, establishes a comprehensive framework for international protection of sea turtles and their habitats, including specific provisions relating to the interaction of sea turtles in commercial fisheries. The conference of the Parties has already passed a resolution encouraging Parties to implement bycatch mitigation techniques outlined in the FAO guidelines to reduce sea turtle fisheries bycatch. The United States will continue to work with the other Parties to establish the framework, including a permanent Secretariat, for the Parties to carry out their Convention obligations.

Sharks

Shark finning is the practice of taking a shark, removing the fin or fins from it, and returning the remainder of the shark to the sea. The Shark Finning Prohibition Act of 2000 prohibited the practice of shark finning for any person under U.S. jurisdiction. The Act requires NMFS to promulgate regulations to implement the prohibitions of the Act, initiate discussion with other nations to develop international agreements on shark finning and data collection, and establish research programs.

Under this Alternative, NMFS would continue to implement this law and to track the importation and exportation of shark fins. NMFS would continue its bilateral discussions pertaining to the implementation of the Shark Finning Prohibition Act with Canada, Chile, the European Union, Japan, Morocco, Taiwan, and Russia. Emphasis of these bilateral discussions has been on the collection and exchange of information, including requests for data such as shark and shark fin landings, transshipping activities, and the value of trade. In addition, the United States continues to encourage other countries to implement the FAO International Plan of Action for the Conservation and Management of Sharks, by finalizing their own national plans of action. Additionally, the U.S. Government will continue to work within regional fishery management bodies to facilitate shark research, monitoring, and management initiatives, as appropriate. Possible avenues for the development of international initiatives supporting the conservation of sharks include a number of regional fishery management organizations.

In 2005, the import and export of shark fins continued. During 2005, imports of shark fins were entered through the following U.S. Customs and Border Protection districts: Los Angeles, New York City, San Francisco, Savannah, and Miami. In 2005, countries of origin in order of importance based on quantity were Philippines, Hong Kong, Brazil, Panama, Indonesia, Nicaragua, Australia, China, and Guatemala (See Table 10a of Appendix D). It should be noted that, due to the complexity of the shark fin trade, fins are not necessarily produced close to or even in the same country as those from which they are exported.

The vast majority of shark fins exported in 2005 were sent from the United States to Hong Kong, Denmark, China, and Canada, and small amounts were sent to Mexico and Portugal (Table 10b of Appendix D). The mean value per kilogram (kg) has been increasing since 2002, most notably in the Hong Kong market. Using data from Table 10a, mean values of dried shark fins for all countries combined increased from approximately \$28/kg in 2002 to approximately \$84/kg in 2003, down to \$52/kg in 2004 and back up to \$59/kg in 2005. Hong Kong's

significantly higher dollar value to quantity, as compared to shark fin trade with other countries, is associated with the higher quality demanded in Hong Kong's inelastic market, and historically high consumption patterns based on ethnic food consumption patterns.

Finally, under this alternative, NMFS would continue to undertake research to reduce shark bycatch including:

- Test the use of chemical deterrents to reduce shark bycatch;
- Explore the operational differences in the longline fishery that might reduce shark bycatch;
- Explore the efficacy of an experimental deep setting longline technique, which eliminates shallow hooks, to reduce epipelagic bycatch and maximize the catch of target species such as bigeye tuna; and
- Examine alternative measures (such as reduced soak time, restrictions on gear length, and fishing depth restrictions) in the shark bottom longline fishery to reduce mortality on prohibited sharks.

4.2.2 Alternative B-2

Marine Mammals

With the exception of the IATTC, documentation of marine mammal bycatch in high seas fisheries is lacking and bycatch mortality limits are virtually non-existent. The IATTC's Agreement on the International Dolphin Conservation Program (AIDCP) includes among its purposes to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphin; and to progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero. The Agreement applies to dolphins (family *Delphinidae*) associated with the yellowfin tuna fishery in the ETP—the principal species concerned are spotted and, to a lesser extent, common and spinner dolphins, although other species, including striped and bottlenose dolphins, are also relevant. A system of dolphin mortality limits (DMLs) is the principal means by which dolphin mortality is reduced under the agreement. These work by setting a basic objective of limiting total incidental dolphin mortality in the purse seine tuna fishery to no more than 5,000 individuals annually and using the basic approach of allocating DMLs to vessels. The Agreement establishes per-stock per-year dolphin mortality caps with the objective of achieving a limit of 0.1 percent of the minimum estimated abundance of stocks (N_{min}) from the year 2001 onwards (an objective which was achieved). The Agreement contains various provisions which require parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use. In addition to the DML system, the Agreement includes provisions for the establishment of a system for the tracking and verification of tuna harvested with and without mortality or serious injury of dolphins; the exchange of scientific research data collected by the parties pursuant to the Agreement; and the conduct of research for the purpose of seeking ecologically sound means of capturing large yellowfin tuna not in association with dolphins.

It is anticipated that Alternative B-2 would result in no change to the conservation measures of

this Agreement. The basis for judging whether a nation's regulatory program for implementation of the AIDCP is comparable to that of the US should be whether a nation has an affirmative finding. The affirmative finding process requires that the harvesting nation meet several conditions related to compliance with the AIDCP and the requirement and process are set forth in 50 CFR 216.24(f) and summarized below:

The Assistant Administrator determines whether to make an affirmative finding based upon documentary evidence provided by the government of the harvesting nation or by the IDCP and the IATTC. To make an affirmative finding, the Assistant Administrator must find that:

- (A) The harvesting nation participates in the IDCP and is either a member of the IATTC or has initiated all steps required of applicant nations to become a member of the IATTC;
- (B) The nation is meeting its obligations under the IDCP and its obligations of membership in the IATTC, including all financial obligations;
- (C) The nation did not exceed its annual total dolphin mortality allocation;
- (D) The nation did not exceed and prevented its fishery from exceeding the per-stock per-year individual stock quotas.

Implementation of Alternative B-2 in the ETP tuna fisheries could result in nations that have vessels engaged in marine mammal bycatch failing to receive a positive certification under the B-2 option from the Secretary of Commerce unless such nations can demonstrate adoption of a regulatory program for the affected marine mammal that is comparable in effectiveness with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for the PLMR. The vessels of such nation could be subject to the denial of port privileges unless the vessel is not engaged in IUU fishing.

The potential imposition of these measures could motivate such nations with vessels engaged in PLMR bycatch to implement better documentation of marine mammal bycatch in longline fisheries and improve compliance with the AIDCP, among other actions. The requirements for establishment of a management plan could lead to nations to develop FAO plans of action for marine mammals and could, for example, help the United States initiate and conduct marine mammal stock assessment research on stocks shared with other nations.

In other areas such as the Western Pacific and the Atlantic Ocean, especially off the coast of Africa, implementation of Alternative 2 could potentially result in programs to better document and monitor marine mammal/fisheries interactions. Again, it could result in identified nations developing management plans, possibly in the form of FAO plans of action to assess marine mammal population status and document marine mammal bycatch.

Sea Turtles

In addition to those activities already undertaken under Alternative 1, implementation of Alternative 2 could bolster those efforts and help motivate nations with PLMR bycatch to increase their regulatory oversight. Under Alternative 2, in order to receive a positive certification from the Secretary of Commerce, nations identified for having vessels engaged in sea turtle bycatch would be required to provide documentary evidence of a regulatory program

that implements TED requirements for shrimp trawl fisheries and the bycatch reduction requirements for purse seine fisheries targeting tuna and tuna-like species. Although the TED inspections and the actual implementation of Public Law 101-162 would remain relatively unchanged, pairing these existing requirements with these new procedures could result in greater oversight of and compliance by nations that incidentally drown sea turtles in trawl and purse seine fisheries.

Under Alternative 2, nations identified for having vessels engaged in sea turtle bycatch would be required to develop and implement a management plan for the conservation of sea turtles to receive a positive certification from the Secretary of Commerce. The development and execution of such an action plan could greatly benefit sea turtles through the combination of population assessments, documentation and mitigation of bycatch, and increased habitat protection. The bycatch information collected as part of an action plan would also assist nations in meeting the data collection and sharing requirements of the various sea turtle resolutions within the various RFMOs. The plan of action could provide the United States with a basis upon which to pursue joint research, technology transfers, and gear exchange or grant programs. All in all, Alternative 2 has the potential to reinforce and encourage the continuance of existing outreach and bycatch reduction efforts, and broaden the scope of the regulatory, research, and monitoring programs to meet the comparability standard set forth in the Moratorium Protection Act.

Sharks

Implementation of Alternative B-2 would require that each nation identified for having vessels engaged in the bycatch of sharks provide documentary evidence that it has adopted regulations to implement the prohibition on shark finning in order to receive a positive certification from the Secretary of Commerce. Implementation of Alternative 2 would require each nation that seeks a positive certification to establish and implement a management plan for the conservation and management of sharks. With regard to bycatch, the requirements of these resolutions to document bycatch, encourage the release of live sharks, and conduct research into the development of more selective gear provide the United States with a mechanism to work with nations to document and mitigate shark bycatch.

Alternative B-2 would be expected to increase the ability of the U.S. to influence global conservation for sharks. Through the certification procedures, the United States would call on identified nations that seek to import product into the United States to implement regulations to prohibit shark finning. The alternative would provide greater impetus for nations to finalize management plans, collect species-specific information, participate in stock assessments, and conduct research to reduce bycatch.

4.2.3 Alternative B-3

Under the implementation of Alternative 3, in order to receive positive certification, identified nations must provide documentary evidence of the adoption of a regulatory program, by the identified nation **and** the relevant international organization for the conservation and protection of the PLMRs or the international/regional fishery organization (and proof of the identified nation's participation with such organization) governing the conservation of the PLMRs that is comparable with that of the United States, taking into account different conditions, and establish

a management plan that will assist in species-specific data collection to support international stock assessments and conservation efforts, including but not limited to enforcement efforts for PLMRs. This alternative could strengthen the provisions, oversight, and compliance of bycatch reduction measures and management plans that are developed under Alternative 2. Specifically, this alternative requires that, to receive positive certification, the relevant RFMO provide documentary evidence that the nation has indeed adopted a regulatory program to reduce the bycatch of sea turtles, marine mammals, and sharks. Requiring that the RFMO provides this information for an identified nation to receive a positive certification should bring about greater oversight from the RFMO and would encourage nations and RFMOs to act collectively to reduce bycatch. Bycatch reduction measures that are adopted at the level of an RFMO would be expected to result in greater conservation of these highly migratory PLMRs, thereby increasing the influence of the U.S. in extending bycatch reduction to high seas fisheries and involving more nations in bycatch reduction efforts. Also, it is the RFMO that often has the observer programs that provide the level of monitoring necessary to both document bycatch and also to enforce bycatch reduction provisions that have been adopted through the RFMO. Finally, the RFMO structure would benefit greatly from management plans that are both coordinated with and support the efforts of the RFMO to collect stock assessment data for PLMRs. Alternative B-3 would encourage nations to collaborate both with the RFMO and other nations to conduct stock assessments and document bycatch levels in ways that will lead to greater cooperation.

5.0 SOCIOECONOMIC IMPACTS

This section addresses background and general information on the economic and socioeconomic considerations associated with IUU fishing and bycatch of PLMRs. The background discussion in Sections 5.0 through 5.4 provides a broad economic context. Similar to the broad overview of the affected environment provided in Chapter 3, it is not expected that this proposed rulemaking itself affects all of the economic factors presented in this section, rather an extensive background discussion is provided to assist with the context for how the proposed certification tools might contribute to the overarching effort to reduce IUU fishing and PLMR bycatch. Therefore, following the background discussions in section 5.0 through 5.4, the analysis of the socioeconomic impacts associated with the proposed alternatives for IUU fishing and bycatch reduction are more specifically addressed in sections 5.5 and 5.6, respectively.

As noted earlier, this analysis does not focus on trade sanctions, but does provide an analysis regarding potential denial of port privileges. Although the Secretary of Treasury has authority to deny port privileges under the Enforcement Act, NMFS chose to evaluate these impacts. The Enforcement Act states that denial of port privileges will be imposed upon failure of an identified nation to receive a positive certification from the Secretary of Commerce. In contrast, trade sanctions may only be applied if Presidential action is taken in response to recommendations by the Secretary of Commerce once an identified nation fails to receive a positive certification.

Because the process leading to certification determinations is consultative and will take several years, it is very difficult and may not be meaningful to estimate the benefits and costs of such determinations. The following analysis consists of a bounded analysis showing the highest potential impact of port privilege denial but recognizing that, due to the consultative nature of the process, actual impacts are expected to be much lower or non-existent. U.S. businesses are not being regulated by this rulemaking

as the entire regulatory burden is on foreign States. As such, no U.S. businesses are directly impacted by this rulemaking.

Through consultation and prior notification of imported product, domestic importers, wholesalers, and processors should have an opportunity to substitute negatively certified sources of fish and fish product, reducing or eliminating negative impacts to the U.S. economy. This substitution also has the effect of enhancing the positive impact of this proposed regulation.

The goal of this regulation is to fulfill requirements of the Moratorium Protection Act, enhance fishery resources, enhance conservation of PLMRs, and improve the economic returns of the U.S. fishing industry. As such the long term benefits will likely outweigh any short term costs.

While it is difficult to estimate the current economic damage stemming from IUU fishing and bycatch, it is understood that these activities reduce profits for legitimate producers, induce social costs on fishing communities, reduce food security, and create human rights abuses. As such, the United States stands to benefit from the reduction or cessation of these activities.

Reducing these activities involves increasing the cost of bycatch and IUU fishing. Since monitoring, control, and surveillance (MCS) measures can be costly, it may not be optimal to try and ensure complete compliance through MCS. Since some harvesting states are unable or unwilling to enforce IUU and bycatch rules, port and market state controls can provide an important, necessary, and cost effective tool to combat IUU and bycatch. The imposition of trade-related measures, encouragement of private initiatives, capacity building, and improving the knowledge of the full range of social costs associated with IUU fishing and bycatch can also reduce IUU fishing activities and bycatch in a cost effective way. These activities will increase benefits to U.S. industry and consumers in the long term.

5.1 Economics of IUU and Bycatch

Bycatch and IUU are closely related activities economically. Due to the clandestine nature of IUU fishing and bycatch, it is difficult to estimate the total IUU catch and bycatch and the economic impact of that catch as it moves through the processing, wholesaling, distribution and retail markets. With regards to volume of IUU harvest, worldwide estimates vary widely. Le Gallic (2007) states that up to 30% of total catch in many high value fisheries is from IUU activities. Additionally, in some fisheries, that number may climb to three times the legal allowed harvest in the fishery. Across the 2001-2002 season it was estimated that 18% of all tuna harvest, 39% of toothfish harvest and 20% of redfish harvest was from IUU activities. Clark (2006) states that 20% of Sub-Saharan catch stems from IUU activity. Across Indonesia, van Mulekom et al. (2006) estimate that 10% of regional production is from IUU activity. Andrew and Barnes (2004) estimate that up to 80% of the Indian Ocean toothfish harvest is IUU harvest. In 2002, 11,000 metric tons of toothfish was harvested from the Indian Ocean illegally, representing 45% of total toothfish catch worldwide. They also estimate that 25,000 metric tons of tuna is caught illegally every year. Roheim and Sutinen (2006) in their literature review found that 5-19% of worldwide harvest stems from IUU operations. Less is known about the value lost to bycatch.

In addition to IUU harvest of targeted species, IUU activity has bycatch impacts. One of the many drivers of IUU activity and bycatch is to enjoy the benefits of reduced fishing costs by not adhering to fishing regulations. That means that IUU fishers don't participate in bycatch reduction activities, as

those activities increase costs. The work of Andrew and Barnes (2004) supports claims that boats engaging in IUU fishing have high rates of cetacean bycatch.

In monetary terms, Clark (2006) estimates that the annual wholesale value of IUU harvests total \$3 billion U.S. dollars (USD) annually. In Indonesia, it has been estimated that the wholesale value of IUU harvest is \$1.4 to \$4 billion USD annually (van Mulekom et al. 2006). Griggs and Lutgen (2007) estimate that since the 1990's over 1 billion Australian dollars of toothfish, wholesale value, has been harvested illegally. Andrew and Barnes (2004) estimate that toothfish IUU vessels generate profits of \$4.5 - \$6 million USD per vessel per year. Roheim and Sutinen (2006) found in their review of the literature that IUU generates between \$2.4 – \$9.5 billion USD per year in wholesale value. Outside of these large regional or worldwide estimates, very little information exists on the value of IUU. As a matter of comparison, the total US harvest of seafood products was slightly over \$4 billion in 2006 and the US imported \$13.5 billion in 2006. Some of the value lost to IUU and bycatch could be captured by US industries if these activities were curtailed.

In a general sense, IUU fishing distorts competition, reduces the ability of legitimate fishers to stay in business, and imposes social costs on fishing communities (Le Gallic 2007). Andrew and Barnes (2004) and OECD (2005) list a number of economic effects generated by IUU fishing. IUU activity reduces the contribution of EEZ and high seas fishing fleets to a nation's GDP and reduces resource rents. If IUU fishing is occurring within a nation's EEZ, employment in fishing industries will be negatively impacted. Port revenues also fall under IUU fishing as IUU reduces the potential for local landing of fish and reduce the ability to generate added value for those products not landed in country.

Andrew and Barnes (2004) and OECD (2005) also state that IUU activity reduces landings fees and taxes. Less domestic landings translates into less tax revenue from landings. Fewer fish entering the processing chain means less income tax revenues from those businesses. IUU fishing reduces the economic activity across all other supporting shore side businesses reducing income tax revenues across those sectors as well. Because IUU fishers operate outside the law, they do not use technologies or techniques that reduce bycatch or habitat destruction. This has a direct and negative impact on the overall productivity of the resource which leads to reductions in legitimate fisher's revenues. IUU fishing also greatly increases management costs. All of these negative economic consequences have spill over or multiplier effects on U.S. economy through the industries that support commercial fishing, processing, wholesaling, distributing, and retailing of seafood products. Andrew and Barnes (2004) also discuss how bad publicity surrounding IUU fishing reduces consumer confidence in seafood. This erosion of confidence has the potential to reduce demand for legitimately caught fish from fisheries characterized as having problems with IUU fishing.

IUU fishing also induces negative social impacts. Both Andrew and Barnes (2004) and van Mulekom et al. (2006) state that for developing countries, IUU fishing can jeopardize food security. Along the same lines, IUU harvesters often conflict with local artisanal fleets. Whitlow (2004) focuses on the humanitarian problems associated with IUU fishing. IUU vessels can be crewed from impoverished countries in order to reduce costs. Whitlow found conditions that approached slavery including the use of bonded labor, poor nourishment, widespread injuries, and unhygienic conditions leading in many cases to illness, violence towards workers including restraining crew with chains or shackles, and unfair labor contracts. Additionally, because IUU boats operate outside the law, they ignore safety regulations and avoid inspections that increase costs. Also, due to the risk of vessel forfeiture, IUU boats are old

and decrepit, increasing safety risks. As a result, safety conditions on these boats often are ignored leading to greater injury and death.

This literature shows a biologic and economic downward spiral induced by IUU and bycatch activities. IUU fishing leads to non-attainment of management goals and results in unsustainable harvest levels (Sumaila et al. 2006, Doullman 2000). Evans (2000) develops the idea that under the precautionary approach to fisheries management, this downward spiral is exacerbated. Management is forced to be even more cautious in the light of under reporting of harvest, which leads to lower legal catch limits. Confidence in stock assessments is reduced, which indirectly pressures legal harvest limits to be lowered. Restricting the harvest of legal fishers to rebuild the fishery increases the level of IUU and bycatch activity, leading further down this spiral.

Essentially, the economic impacts induced by IUU fishing and bycatch stem from the fact that IUU fishing costs do not reflect the social costs of resource exploitation (Tokrisna 2000, OECD 2005, Hatcher 2004, Roheim and Sutinen 2006 and others). This lack of accounting of the full social costs leads to overexploitation as IUU caught fish are priced too cheaply making it difficult for legitimate fishers to compete in the market place. Hatcher (2004) states that IUU fishing is only a problem if it imposes a net social cost. A net social cost is likely as excessive fishing mortality over management set quotas damages stocks and reduces future returns. IUU fishing and bycatch damage non-target species such as seabirds, turtles, and cetaceans imposing further social costs.

The socioeconomic impacts of IUU and bycatch are particularly exacerbated as legitimate fishers are pushed out of the market. “Because of their lower operating costs, IUU fishers gain an unjust economic advantage over legitimate fishers (OECD 2005, p.13).” The quote could have correctly included bycatch along with IUU fishing. The OECD report goes further to say that the competition between legitimate and IUU fishers generates negative impacts on legitimate fishers and fishing communities through smaller catches, lower incomes, and lower employment. Following this idea of a downward spiral, these impacts are compounding and will likely be worse in the future as stocks become increasingly depleted. Ultimately, unchecked IUU fishing and bycatch will push legitimate fishers out of fisheries which will be particularly harmful to communities dependent on fishing. Agnew and Barnes (2004) echo these concerns and push the argument further. Global demand for seafood is increasing, as evidenced by the US data presented above, while supply is fixed or decreasing due to management constraints. This has the effect of pushing seafood prices up increasing the incentives for IUU fishing as IUU fishers tend to target the most valuable species (Hatcher 2004). This also has implications for bycatch through high-grading. As IUU increases, the presence of IUU boats in a fishery may act as a signal of lax enforcement further exacerbating the problem.

5.2 Economic Drivers of IUU Fishing

In order to address solutions to IUU fishing and bycatch, it is important to examine the incentives that drive fishers to fish illegally. As with all enterprises, the profit motive drives IUU fishing and discarding of catch (OECD 2005). Economic theory says criminals maximize their utility by balancing the costs of being caught with the benefits of stealing fish or throwing fish away (Sumaila et al. 2006). The more legal fishing is constrained by catch and effort limits (if demand for fish is unchanged or increasing) the greater the gains possible from IUU fishing, and the greater the motivation for fishermen

to participate in these activities. IUU fishing vessels do not generally pay for observers, licenses, access fees, data collection, or monitoring, which keeps their costs much lower than the legitimate operator.

Sumaila et al. (2006) made some observations on the determinants of IUU fishing. If the stock is robust, the probability of participation in IUU activities increases. The higher the catch per unit effort (CPUE), the easier it is to steal and avoid detection. Additionally, unless food security is a factor, the higher the price for the product, the more likely that cheating will exist. IUU fishers must balance these benefits against the costs, which include penalty costs, avoidance costs, and moral and social costs. If any of these costs rise, the likelihood of participation decreases. Detection likelihood is driven by the effectiveness and efficiency of enforcement, social acceptance of cheating, awareness of regulations, and level of private or nongovernmental organization (NGO) detection activities. Penalties increase costs directly and can include fines, forfeiture of boat, forfeiture of catch, and exclusion from the fishery. IUU fishers spend resources to avoid detection such as paying bribes to falsify documents, tampering with VMS, using transshipment vessels, etc. Finally, moral and social standing in the community can impact participation. In many communities, the true social cost of cheating is not understood by the community therefore reducing the moral or social cost of participating. These findings were echoed by Le Gallic (2007).

Additionally, IUU fishers face lower operating costs as they don't comply with safety rules, bycatch requirements, labor rules, or other regulations that legitimate operators face that increase costs. OECD (2005) also points to global overcapacity as a potential driver for IUU fishing. As catch and effort restrictions increase, the race to fish increases, which leads to investments in capacity over the social optimum. Legitimate fishers owning more capacity than they need to prosecute their quota may be induced to participate in IUU to keep that capacity employed.

5.3 Deterrents

Broadly characterized, deterrent measures seek to increase the costs of IUU and bycatch operations to the point where it is no longer profitable to participate in either activity. Le Gallic (2007) states that combating IUU fishing means changing the incentive structure facing IUU operators primarily through reducing revenues, increasing operating costs, and increasing capital costs. Hatcher (2004) concludes that IUU costs must be driven up to the point where it is no longer makes sense to invest in IUU capacity. Hatcher goes further to recommend that penalties should increase and MCS should increase to increase the probability of capture and decrease the ability to sell IUU product. FAO (2007) increases the scope of the argument saying that IUU fishing is complex and involves much more than just the fishers. It also encompasses processing, shipping, sale and distribution. Tracking fish is as important as on-water enforcement as much of the product is transhipped at sea, avoiding detection at first landing by the fishing vessel. Whitlow (2004) agrees with FAO and states the focus should definitely be broadened to include merchant vessels involved in transshipment, refuelling, and resupplying these IUU vessels. OECD (2005) recommends making IUU unprofitable by reducing revenues, reducing the value of catch, and increasing IUU costs. Full enforcement is not considered possible and is an incredibly expensive pursuit.

Clark (2006) found that most IUU activity is carried out by distant water fleets in the EEZs of other states in breach of access agreements. It is difficult for these states to control through enforcement alone as it is expensive to enforce large EEZs through the use of observers, VMS, aerial surveillance, and

blacklists. Additionally many of these states have inadequate infrastructures including overall low quality of national governance in developing countries and corruption leaving these states unable to properly enforce their own access rules. Even when the infrastructure exists, most states do not have the resources to enforce IUU fishing entirely on their own. Clark proposes that purchaser enforcement through various certifications schemes can reduce IUU efficiently and less expensively than traditional enforcement.

Sumaila et al. (2006) found that, in general, penalties are too low to effectively deter IUU fishing. Their research showed that on average penalties would have to increase 24 times higher than their current levels to act as sufficient deterrents. Currently, operators cover fines as just another operating expense if they cover them at all. The practice of hiding of beneficial interests and flags of non-compliance (FONCs) make it impossible to identify the responsible party. Also, boat profits typically exceed boat purchase prices annually, meaning that operators can afford to lose their boats and begin again next season with a new boat. They also found the current level of MCS is far too low to also serve as an effective deterrent. Additionally, there is currently near zero MCS on the high seas.

Because of the complexity, FAO (2007) states that effective control of IUU fishing requires a broad array of partners including: flag states, port states, market states, RFMOs, industry, NGOs, financial institutions, and consumers. Specifically, FAO indicates that developing countries often don't have the resources or the political will to enforce rules within their fishing grounds. Regarding flag, port, and harvest states FAO states that "A new emphasis on other tactics is needed to overcome the problems caused by those States which cannot or do not fulfill their responsibilities and obligations (FAO 2007, P.3)." These new tactics include MCS and management capacity building for flag/harvest/port states as well as increase use of sanctions and embargoes by port/market states. Specifically, the FAO report talks about the denial of port privileges to IUU fishing and transshipment vessels. Denial of port privileges cause vessels to search for a port that will allow offloading. This increased search time can dramatically increase costs as fuel costs dominate the operation of fishing or transshipment vessels.

While important, MSC is not the only tool for reducing IUU. Additionally, if US industries assist other countries with MSC and other measures for that matter, it will benefit the US economy. Given the size of national EEZs, monitoring fishing activity by air or by water is incredibly costly. Port/market state actions offer cost effective solutions and can include: denial of port access; prohibitions on landing, transshipment, and processing; seizure and forfeiture of catch; prohibit the use of port services; prohibiting the sale, trade, purchase, export, import of IUU fish; and initiating criminal, civil or administrative proceedings under national law. Tokrisna (2000) supports this idea that in the absence of effective flag/harvest state control, port/market state actions are an appropriate tools.

Vince (2007) acknowledges that fighting IUU is a challenge and Australia's and Indonesia's attempts to control IUU activity using MSC alone have been ineffective. They have developed many legal instruments which have not been uniformly enforced or have been subject to corruption. This result further argues for port/market state controls. Le Gallic (2007) also thinks that trade measures, such as embargoes, price premiums, documentation and labelling schemes, are important tools to combat IUU. Le Gallic (2007) points out that traditional harvest state and RFMO enforcement actions are not working as costs are too high, institutional constraints too high and the political will is lacking. He also recommends pursuing corporate structure reform to eliminate tax havens and shadow corporations, but acknowledges that corporate reform faces strong resistance outside of fishing.

OECD (2005) lists a number of other non-traditional IUU enforcement priorities including; banning imports, catch documentation schemes, education and promotion campaigns, encouraging non-participants to join RFMOs, increase monitoring, and listing banned vessels. The OECD states that trade sanctions and naming and shaming campaigns have high potential payoffs with relatively low costs. OECD (2006) takes these recommendations one step further. They recommend that trade measure should be applied to countries whose vessels are fishing illegally and not just the vessels. They also recommend, inter alia, naming and shaming campaigns and capacity building.

There is no silver bullet; it takes both local enforcement and pressure from market states to combat IUU and bycatch (Tokrisna 2000, Roheim and Sutinen 2006). Further gains in enforcement will be costly or impossible to achieve in the case of uncooperative flag states or corrupt harvest and flag states (Le Gallic, 2007). Compounding this problem is the fact that IUU fishing has become highly organized, making traditional bottom up enforcement less practical. Shutting down access to markets puts top-down pressure on flag states to control their fishing vessels or risk revenue losses. At the same time, constructive engagement and management capacity building encourages a bottom up approach. Constructive engagement and capacity building includes training data collectors, improving managements, human resource development, financial assistance, and technical assistance. Financial assistance and technical assistance are necessary conditions for success and this policy provides avenues for constructive engagement and capacity building. These types of activities can also capture benefits for U.S. industries involved in assistance programs.

5.4 Summary of Benefits of Port/Market State Controls

The United States restricts fishermen with regards to bycatch and IUU fishing, raising their costs and making them less competitive. If other nations continue to fish illegally at the same level, their costs are lower than US industry costs. This rulemaking will produce economic benefits in the United States by increasing costs for IUU fishers and fisheries with high bycatch, returning the United States to a more competitive footing. It is not possible to quantify many of these benefits. Potential benefits include use and non-use values for PLMRs, potential increased profits in the fishing industry through reduced reliance on imports and through capacity building activities, and reducing U.S. reliance on imports reduces the reliance on fossil fuels and reduces pollution.

Decreasing harm to PLMRs will produce positive economic values. While this EA does not quantify the increases possible with additional protection under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

In 1985, Hageman published a study looking at U.S. citizens' willingness to pay (WTP) to protect various marine mammals both for use and non-use. Hageman did not separate use and non-use values (Hageman 1985). He found that US citizens would be willing to pay \$54 to prevent a 92% population decline across all marine mammals. He also found people would be willing to pay \$36 to prevent losses of bottlenose dolphins and \$37 to prevent the loss of the Northern elephant seal. Samples and Hollyer (1990) found that people were willing to pay \$110 to \$182 to prevent the extinction of monk seals and

\$125 to \$142 to prevent the extinction of humpback whales. Both of their estimates include use as well as non-use values. Loomis and Larson (1994) found that people were willing to pay \$38 to increase humpback whale populations 50% and \$45 to increase their populations 100% for use, and \$25 for a 50% increase and \$28 for a 100% increase in the population for non-use. Finally, Whitehead (1991) found that people are willing to pay \$51 to reduce the risk of loggerhead turtle extinction to zero for the next 25 years, including use and non-use values. All values presented have been converted to 2007 dollars.

While some of these studies go outside the species identified as problematic bycatch species in this EA, it is likely that people hold some positive WTP for the species identified. This is reinforced by the loggerhead turtle and bottlenose dolphin estimates, both PLMRs identified in this report. As a result, any increased protection of the PLMRs identified in this report will increase the stream of benefits to the United States.

All of the alternatives, besides the no action alternatives will have the effect of raising the cost of imports, at least in the long run. Complying with increased regulations will increase harvester costs in countries found to be out of compliance or in countries trying to avoid falling out of compliance. Whether or not these compliance costs increase import prices enough to close the current gap between domestic prices and import prices remains to be seen. If the import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, U.S. commercial fishermen may benefit.

Currently U.S. fisheries are heavily regulated and there is very little room to increase domestic supply in most fisheries using harvest increases. Additionally, the U.S. imports seafood products grown in aquaculture facilities. Currently there are infrastructure and regulatory hurdles to overcome if the United States is to expand domestic aquaculture production. It is also possible that ending IUU fishing or high grading of transboundary stocks will increase the abundance of those stocks to a level that would allow increases in domestic harvests, increasing profits for commercial fishermen. This is particularly true for the tuna fisheries targeted by the DWF, salmon and sablefish fisheries on the West Coast, and groundfish fisheries on the East Coast. Also, increased stock sizes would also reduce harvesters' costs by reducing the effort needed to catch fish even without increasing allowable harvest limits.

The United States exports the majority of its landings (80%). While some of this seafood is exported for processing and brought back to this country as an import, it is likely that increases in demand for domestic fish, driven by rising import prices or sanctions, could be met by exporting less. This would be driven primarily by prices. Products that are exported not for processing but for consumption are generally exported because they fetch a higher price in the importing country. Again, compliance cost would need to drive import prices high enough that export prices looked relatively less attractive.

For commercial harvesters to become more profitable from this shift from imports to domestic production that is currently being exported, prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008). It is unknown whether the benefits to consumers from

increased protection of PLMRs or the ensuing reductions in pollution will outweigh these losses in consumer surplus.

Finally, constructive engagement with offending countries is the preferred pathway to meeting the goals and objectives of this rule. Much of this constructive engagement will involve increasing the capacity of foreign nations to manage their fisheries at level of conservation already maintained by the U.S. industry. As such, it is expected that U.S. industry could be instrumental in providing this capacity to foreign governments. U.S. industry may provide consulting services and sales of technology needed to meet the goals of this rule. Additionally, cooperative research exploring better technologies will provide income and jobs for commercial fishermen and related industries.

5.5 IUU Certification Procedure Alternatives Analysis

5.5.1 IUU Alternative I-1: No Action/Status Quo

Less effective international management regimes mean less sustainability across world fishery resources. Declining sustainability reduces economic benefits for US commercial fisherman and support industries such as processing, wholesaling, distribution, and retailing. Additionally, non-market benefits for the preservation of PLMRs will be lower as will benefits for reduced shipping that accrue if the US industry substitutes away from imports towards domestic supplies. As such, the no-action alternative will produce fewer benefits than either IUU alternative I-2 or I-3. That being said, the no action alternative will produce fewer indirect impacts on US industries as port privileges will be denied less frequently than under either IUU alternative I-2 or I-3.

5.5.2 IUU Alternative I-2

When other nations fish illegally, their costs are lower than U.S. industry costs. Alternative I-2 would produce economic benefits in the United States if identified nations seeking positive certification take corrective action or the relevant RFMO implements measures that are effective in ending the IUU fishing activities; these foreign actions would be expected to raise foreign harvesting costs to more closely reflect the full social cost of fish harvest. By raising the costs faced by IUU fishers, IUU fishing is reduced. Reduced IUU fishing, particularly across stocks that the U.S. fleet currently targets, provides indirect benefits to U.S. fleets in three ways. First, as stocks recover, catch per unit effort will increase, reducing U.S. fleet costs by reducing fishing time. Second, if stocks recover enough to allow increased quotas, U.S. fleets may be allowed to harvest more fish, also increasing benefits. Third, as costs rise for IUU fishers as a result of this alternative, the cost of imports will rise. Whether or not costs increase enough to close the current gap between domestic prices and import prices is not reasonable to assess at this time. If the import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, commercial fishermen and support industries will benefit. The first two benefits only accrue in fisheries currently prosecuted by the U.S. fleet that have an IUU component, however, the third benefit accrues to U.S. industries regardless of whether or not the US fleet targets stocks subject to current IUU fishing as long as U.S. demand for fish is met by more domestic production. While it is not likely that U.S. harvesters or aquaculture can increase production in the short term, currently the US exports 80% of its harvest and these exports could be kept in the U.S. market. It is impossible currently to quantitatively estimate these benefits as so little is known about the volume of current IUU harvests, and it is speculative to assess which nations might be identified and where corrective actions might be implemented by the nation or via the RMFO.

IUU fishers operate outside the law and, as such, IUU fishers do nothing to avoid bycatch of non-target fish or PLMRs. Evidence shows their bycatch levels are far above the legal fishers in the same fishery. Decreasing harm to PLMRs will produce positive economic values. While this EA does not quantify the increases possible with additional protection under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

Constructive engagement with offending countries is the preferred pathway to meeting the goals and objectives of this alternative. Much of this constructive engagement will involve increasing the capacity of foreign nations to manage their fisheries at level of conservation already maintained by the US industry. New reporting requirements, new or increased MCS activities, public awareness programs, observer programs, and other measures recommended for flag states to achieve compliance are all forms of capacity building for fisheries management. It is expected that U.S. industry will be instrumental in providing this capacity to foreign governments and RFMOs. Therefore, capacity building will yield benefits for US industries.

This alternative produces no direct negative economic impact on U.S. businesses as no U.S. businesses are targeted by this rulemaking. As a result, the focus is on indirect negative impacts. Due to the consultative nature of this proposed rulemaking it is unlikely that large numbers of vessels would be denied port privileges. It is even less likely that large container ships or large non-container ships would be denied port privileges, as the majority of their cargo is non-fishery products. Additionally, since a negative certification will be made with advance warning, shipping companies will not risk being turned away at port. Also, the U.S. Customs 24-hour advance manifest rule requires that no container be loaded without the advance clearance of U.S. Customs.

Furthermore, it is assumed that no cargo vessel will enter a U.S. port for the purpose of carrying exports out of the country. As a result, only positively certified flags will be in port to carry U.S. exports therefore having little impact on the export trade. As long as the number of positively certified carrier flag vessels is high relative to the negatively certified flag states, there will be no impact on export trade.

While it is unlikely that there will be any indirect economic impacts as the result of this rulemaking, it is possible that a vessel from a negatively certified state will be denied port privileges. This is particularly true for the U.S. territories Guam and American Samoa. For these ports, foreign fishing vessels are permitted to land fish. These vessels may be less informed of the impact of a negative certification against their flag state and/or may be less able to change the location of their landing.

Table 13 contains the economic impacts of a port call in Guam and American Samoa by a fishing vessel. These estimates include only the impacts on the ports and supporting industries. Impacts on wholesaling, processing, and retailing are detailed below. Because no data were available to determine the number of fishing vessels landing product versus container ships delivering product to the canneries, it is not currently feasible to know how many fishing vessels versus cargo ships might be impacted by this alternative. If a purse seiner was denied port privileges in American Samoa, revenues would be reduced between \$262,597 and \$318,629 per port call. With this reduction in revenues, each lost purse seiner port call supports between 1.2 and 1.7 jobs and generates between \$49,379 and \$65,377 in income. If port privileges were denied to a longliner, revenues would be reduced by between \$27,176 and \$40,808. This level of revenue supports between 0.1 and 0.4 jobs and produces between \$4,981 and \$12,987 in income. Data were unavailable to estimate producer surplus, however income impacts, while overstating producer surplus, can serve as a proxy.

For Guam, if a purse seiner is denied port privileges, revenues would be reduced between \$275,519 and \$370,033. This level of revenue supports between 1.3 and 2.6 jobs and produces between \$50,952 and \$90,505 in income. If a longliner is denied port privileges in Guam, between \$31,436 and \$33,140 in revenue would be lost. This level of revenue supports 0.2 jobs and produces \$7,006 - \$7,774 in income.

Because it is impossible to know which ports in the United States might be impacted under this rulemaking, U.S. national averages for port calls from Table 12 will be used.

No data on general cargo for American Samoa and Guam were available for this report. Therefore, it is assumed that the impacts would be the same in American Samoa or Guam as they would be for the U.S. national average port call. This assumption will result in an overestimate (underestimate) if the ships calling in either Guam or American Samoa are smaller (larger) than the U.S. national average. Additionally, because multipliers are generally lower for islands, the multipliers are overstated, therefore overestimating the income and employment impacts.

Using the average volume of seafood imports per containerized port call from Table 8 and applying the percent of all species processed domestically from Table 18, 40 metric tons of containerized seafood are destined for additional processing and 21 metric tons are headed directly to retail. Similarly for non-containerized port calls, 24 metric tons of non-containerized seafood imports are destined for additional processing and 12 metric tons are headed directly to retail. Each average port call represents 0.0024% or 0.0015% of all seafood imports for containerized and non-containerized cargo respectively. There is no existing data source that tracks retail purchase from the processor to the retailer. Additionally, there is no existing data source on retail seafood prices. As a result, it is impossible to calculate the impacts of this rulemaking forward from a denied port call.

Because such a small percentage of total imports are spread across multiple products, six and two for container and non-container port calls respectively, and multiple importers/processors, two and one for container and non-container port calls respectively, the change in product flow will be very small for any individual product/firm combination. Therefore, unless many port calls were denied, these businesses would simply source these very small amounts of product domestically or from other transportation modes such as air, truck, or rail. For consumers, such small changes in product flow are unlikely to change prices or availability thereby they are expected to have no negative impact on consumers.

These conclusions are based on average port calls, and, as such, may over (under) estimate the potential impacts if the shipment is larger (smaller) than average. As an example, the largest containerized shipment in 2006 weighed 7,308, which still only represents 0.3% of all seafood imports. For non-containerize shipments, the largest seafood volume in 2006 was 0.018% of all imports.

American Samoa and Guam also suffer from the inability to track landings or shipments to the consumer. For Guam, the vast majority of the product is minimally processed and sent to Japanese markets, and, therefore, there are no impacts on U.S. consumers. However, there are essentially only two flag states landing fish in Guam; Taiwan and Japan. In 2006, Taiwanese fishing vessels made 147 port calls averaging 8.3 metric tons per call and Japanese boats made 392 calls averaging 13 metric tons per Guam call. No data were available regarding the value of these landings or the cost structure of the transshipping industry making impacts of a denial unknown. However, if either Taiwan or Japan is negatively certified, the impacts could be large in Guam.

For American Samoa, the cannery receipt data are confidential. Additionally, value is not reported by the canneries. The cannery receipt data is by origin flag, and, in general, far more origin states made

port calls at the canneries than in Guam with 36 origin states delivering product to American Samoa in 2006, not including American Samoan or U.S fishing vessels. Average annual off loadings of tuna per origin state was 2,895 metric tons across all calls with an annual minimum for one state of 22 metric tons and an annual maximum for one state of 33,679 metric tons in 2006. The number of calls each flag state made is unknown so average volume per call is unknown. Additionally, the data do not exist to calculate any impacts to the canneries, and, even if data were available, that information would be confidential. Regardless, if one of the higher volume countries were to be negatively certified, the impacts to the American Samoan economy could be large if adequate supply substitution possibilities did not exist.

For commercial harvesters to become more profitable from this potential shift from imports to domestic production that is currently being exported, domestic prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008). It is unknown whether the benefits to consumers from increased preservation of PLMRs or the ensuing reductions in pollution will outweigh these losses in consumer surplus. However, if IUU fishing continues unchecked, sustainability will suffer, reducing global supplies of seafood, forcing prices up over the long term.

5.5.3 IUU Alternative I-3

Since this alternative requires both flag state and RFMO compliance, the economic benefits within the United States may potentially be greater while being the same in nature as Alternative I-2. This alternative has the potential to bring more stocks into sustainable RFMO management, increasing economic returns to U.S. industries as outlined in Alternative I-2. This alternative has the potential to raise foreign fishing costs higher than Alternative I-2.

Because the hurdle for positive certification is higher under this alternative, it is possible that costs will also be higher if this alternative results in more vessels being denied port privileges. However, it is impossible to determine if denials will be higher due to the consultative nature of the proposed certification process. Because the consultative process should result in few actual denials and because several parallel port state controls are already in place or being developed, the actual number of vessels denied port access may be no more or less than under Alternative I-2. Since this alternative could potentially increase foreign costs, consumer prices for imports may increase more than under Alternative I-2, resulting in a comparative reduction in consumer surplus. As a result, economic benefits under Alternative I-3 could potentially be higher whereas costs may be equal to or greater than costs under Alternative I-2.

5.6 Bycatch Certification Procedure Alternatives Socioeconomic Impact Analysis

5.6.1 Bycatch Alternative B-1: No Action/Status Quo

Continuation of the status quo means that the United States is not taking procedural action which increases the ability of the United States to influence the reduction of bycatch by foreign fisheries, thus exerting no change on the continued mortality for PLMRs including seabirds,

turtles, and marine mammals beyond those controls already available in existing international agreements. Additionally, the continued discards of non-target, non-protected species and high-grading of target species reduces overall stock sustainability, and declining sustainability reduces economic benefits for U.S. commercial fisherman and support industries such as processing, wholesaling, distribution, and retailing. Additionally, the ability to influence non-market benefits for the preservation of PLMRs will be lower than Alternative B-2 or B-3, as will effects for reduced shipping that might result if the U.S. industry substitutes away from imports towards domestic supplies. As such the no-action alternative could result in fewer economic benefits than either bycatch alternative B-2 or B-3. Because the proposed certification procedures are consultative in nature and may result in very few denial of port privileges, any difference between the alternatives in this respect is expected to be insignificant, however, the no action alternative may produce less indirect impacts on US industries as port privileges would be expected to be denied less frequently than under either bycatch alternative B-2 or B-3.

5.6.2 Bycatch Alternative B-2

U.S. fishermen face many regulations on bycatch. To avoid bycatch, the U.S. fleet changes fishing patterns, changes fishing gear, or utilizes other methods that all increase U.S. fleet operating costs. When other nations' fish without taking bycatch into account, their costs are lower allowing foreign harvesters to outcompete U.S. producers on price grounds. This alternative would produce economic benefits in the United States by raising foreign harvesting costs to more closely reflect the full social cost of fish harvest. Reduced bycatch, particularly across stocks that the U.S. fleet currently targets, provides benefits to U.S. fleets in three ways. First, as stocks recover, catch per unit effort will increase, reducing U.S. fleet costs by reducing fishing time. Second, if stocks recover enough to allow increased quotas, U.S. fleets may be allowed to harvest more fish, also increasing benefits. Third, as costs rise for foreign producers that use fish from fisheries with high bycatch, the cost of imports will rise. Again, these are benefits that may occur based on the proposed certification procedures, but they are not a definitive outcome of what actions foreign nations might take or what actions may be taken by the United States based on certification. Whether or not costs increase enough to close the current gap between domestic prices and import prices is too speculative to assess. If import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, commercial fishermen and support industries will benefit. The first two benefits only accrue in fisheries currently prosecuted by the U.S. fleet that have a bycatch component, however, the third benefit accrues to U.S. industries regardless of whether or not the U.S. fleet targets stocks subject to current foreign bycatch as long as U.S. demand for fish is met by more domestic production. While it is not likely that U.S. harvesters or aquaculture can increase production in the short term, currently the United States exports 80% of its harvest and it is possible that a higher percentage of these exports could be kept in the U.S. market. It is impossible currently to quantitatively estimate these benefits as so little is known about the volume of current bycatch.

Bycatch of non-target fish or PLMRs reduces benefits to U.S. society beyond the damage done to commercial ventures depending on sustainable fish stocks and, as such, measures to increase the U.S. influence on the reduction of PLMR bycatch can increase benefits. While this EA does not quantify the increases possible with additional U.S. influence on conservation under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are

non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

The economic analysis for bycatch Alternative B-2 mirrors the discussion of costs for IUU Alternative I-2. If more nations are subject to negative certifications under Alternative B-2 than under Alternative I-2, then costs to U.S. businesses will be higher than the costs discussed under Alternative I-2. In contrast, if fewer nations are subject to negative certifications under Alternative B-2 than under Alternative I-2, then costs to U.S. businesses will be lower than the costs discussed under Alternative I-2. Due to the proposed consultative nature of certification, it is impossible to know how many port calls might be denied under this alternative. Because the consultative process will give nations advance notice of negative certification, it is unlikely that port privileges will be denied on a large scale. Several parallel port state control measures are already in place, such as the 24-hour advance manifest rule, or are being designed, allowing flag states to know whether they will be granted port privileges before leaving their home port, further reducing any impact on US businesses. Additionally, long time scales give U.S. businesses the ability to change their input stream to avoid any potential impact.

For commercial harvesters to become more profitable from any shift from imports to domestic production that is currently being exported, prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in “Economic Analysis of International Fishery Trade Measures” (Gentner 2008). It is unknown whether the benefits to consumers from increased preservation of PLMRs will outweigh these losses in consumer surplus. However, if bycatch continues unchecked, sustainability will suffer, reducing global supplies of seafood, forcing prices up in the long term.

5.6.3 Bycatch Alternative B-3

Since this alternative requires both flag state and RFMO compliance, the benefits may be greater while being the same in nature as Alternative B-2. This alternative has the potential to bring more PLMR stocks into sustainable RFMO management, increasing economic returns to U.S. industries as outlined in Alternative B-2. This alternative has the potential to raise foreign fishing costs higher than alternative two, benefiting U.S. industry.

Because the hurdle for positive certification is higher under this alternative, it is possible that costs will also be higher if this alternative results in more vessels being denied port privileges. However, it is impossible to determine if denials will be higher due to the proposed consultative nature of this rulemaking. Because the consultative process will result in few actual denials and because several parallel port state controls are already in place or being developed, the actual number of vessels denied port access may be no more or less than under Alternative B-2. Since this alternative could increase foreign costs, consumer prices for imports may potentially increase more than under Alternative B-2, reducing consumer surplus more than this alternative. As a result, benefits under Alternative B-3 could be higher whereas costs may be equal to or greater than costs under Alternative B-2.

5.7 Environmental Justice

Pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the Council on Environmental Quality's (CEQ) Environmental Justice Guidance under NEPA identifies factors requiring consideration in evaluating whether environmental effects to minority populations and low-income populations are disproportionately high or adverse. Because the environmental effects of the alternatives are not considered adverse, environmental justice concerns are not raised by the proposed action.

6.0 SUMMARY SOCIOECONOMIC COMPARISON OF ALTERNATIVES

Due to the consultative nature of this rulemaking, it is unknown how many port calls might be affected by any alternative, besides the no action alternatives. Also, it is unlikely that any flag state would, once negatively certified, allow a ship to leave its home port if it were only to be denied access, lessening or eliminating negative economic consequences. Additionally, it is impossible to know how these impacts will be distributed spatially. Because importers, processors, and retailers can maintain input supplies by sourcing product from different transportation modes, different flag states, or potentially from domestic production, impacts outside the ports themselves will be small or non-existent. This conclusion is supported by a recent Congressional Budget Office report on much more significant port closures (CBO 2006). Table 21 summarizes potential benefits and costs from this rulemaking.

For many of the same reasons, potential benefits are difficult to quantify. US citizens hold positive use and non-use values for the preservation of PLMRs and all alternatives besides the no-action alternative will increase protection for these species. Commercial harvesters stand to potentially benefit under the IUU alternatives and the bycatch alternatives as imports of IUU product may be reduced and foreign nations are encouraged to use reduce and mitigate the adverse impacts of fishing on PLMRs by using practices and gear that are comparable to those used by U.S. fishermen. Additionally, for transboundary stocks, like salmon, sablefish, tuna, groundfish, and others, that are currently subject to IUU and currently targeted by domestic harvesters, revenues should increase as IUU fishing is curtailed. Also, industries that can support capacity building in countries targeted by this rulemaking will benefit. Finally, if this rulemaking reduces reliance on imports in general, less energy resources will be expended to obtain the nation's seafood needs.

6.1 Preferred Alternatives

Alternatives I-1 and B-1 are not feasible options since the establishment of certification procedures to address IUU fishing and PLMR bycatch is required under the Moratorium Protection Act, as amended by MSRA.

For a variety of reasons, NMFS has selected I-2 and B-2 as its preferred alternatives. First, these alternatives reflect the text of the Moratorium Protection Act's provisions on certification. Second, relative to Alternatives I-3 and B-3, these alternatives could result in fewer increases in foreign costs, resulting in less comparative reductions in consumer surplus. Third, because the consultative process will result in few actual denials and because several parallel port state controls are already in place or

being developed, the actual number of vessels denied port access may be no more or less than under Alternatives I-2 and B-2 relative to Alternatives I-3 and B-3.

6.2 Other NEPA Considerations

The proposed regulations would result in the development of a procedural regulation, and, as such, no unavoidable adverse impacts on the human environment are anticipated in association with the proposed action. Similarly, the proposed regulation would not result in any irretrievable or irreversible commitment of resources. The proposed action would not result in any short term uses or effects to the environment, thus there would be no adverse effects to the long-term productivity of the environment. Depending on the action by others that may ensue from the certification procedures, it is anticipated that the proposed procedures should benefit long-term productivity.

Table 21. Summary of Benefits and Costs by Alternative.

Alternative	Benefits		Costs
	Use Value	Non-Use Value	
IUU No Action Alternative One	No Additional Benefits		No Additional Costs
IUU Alternative Two			
Seabird Protection	Positive	Positive	
Turtle Protection	Positive	Positive	
Marine Mammal Protection	Positive	Positive	
Commercial Harvesters	Positive		
Seafood Processors	Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Positive		
Consumers	Positive	Positive	Negative
Reduced Energy Footprint	Positive		
IUU Alternative Three			
Seabird Protection	Higher Positive	Higher Positive	
Turtle Protection	Higher Positive	Higher Positive	
Marine Mammal Protection	Higher Positive	Higher Positive	
Commercial Harvesters	Higher Positive		
Seafood Processors	Higher Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Higher Positive		
Consumers	Higher Positive	Higher Positive	Higher Negative
Reduced Energy Footprint	Higher Positive		
Bycatch No Action Alternative One	No Additional Benefits		No Additional Costs
Bycatch Alternative Two			
Seabird Protection	Positive	Positive	
Turtle Protection	Positive	Positive	
Marine Mammal Protection	Positive	Positive	
Commercial Harvesters	Positive		
Seafood Processors	Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Positive		
Consumers	Positive	Positive	Negative
Reduced Energy Footprint	Positive		
Bycatch Alternative Three			
Seabird Protection	Higher Positive	Higher Positive	
Turtle Protection	Higher Positive	Higher Positive	
Marine Mammal Protection	Higher Positive	Higher Positive	
Commercial Harvesters	Higher Positive		
Seafood Processors	Higher Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Reduced Energy Footprint	Higher Positive		
Consumers	Higher Positive	Higher Positive	Higher Negative
Capacity Related Industries	Higher Positive		

Overall IUU alternative I-3 may produce more socioeconomic benefits than IUU Alternative I-2. Likewise for the bycatch alternatives, Alternative B-3 may produce more benefits than Alternative B-2. Due to the consultative nature of this rulemaking, it may be possible for the costs to be ameliorated by new port state controls, substituting different transportation modes, or substituting different products all together. As a result, it is difficult to know if costs will also be higher moving from the less restrictive IUU or bycatch Alternative B-2/I-2 to IUU or bycatch Alternative I-3/B-3.

7.0 REGULATORY IMPACT REVIEW

7.1 Description of the Management Objectives

Please see Section 1.3 of the Environmental Assessment for a description of the objectives of this rulemaking.

8.2 Description of the Industry

Please see Section 5.4 of the Environmental Assessment for a description of the industries that could be affected by this rulemaking.

7.3 Purpose and Need

Please see Section 1.1 of the Environmental Assessment for a description of the problem and the need for this rulemaking.

7.4 Description of Management Alternatives

Please see Section 2.0 for a summary of each IUU alternative and a summary of each bycatch alternative. Please see Sections 4.0, 5.0, and 6.0 for analyses of each alternative and its expected ecological, economic, and social impacts.

7.5 Economic Analysis of Expected Effects of Each Alternative Relative to the Baseline

No U.S. industry is directly affected by the rulemaking, although indirect effects may cause short term disruptions in the flow of seafood imports potentially impacting U.S. businesses. NMFS does not anticipate that national net benefits and costs would change significantly in the long term as a result of the implementation of the proposed alternatives. Section 5.0 summarizes the net economic benefits and costs of this rulemaking and includes Table 21 summarizes the possible net economic benefits and costs of each alternative.

7.6 Conclusion

Under E.O. 12866, a regulation is a “significant regulatory action” if it is likely to 1) have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public

health or safety, or State, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights, and obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order. NMFS indicated to the Office of Management and Budget (OMB) that it did not believe this action met the above criteria. However, OMB subsequently determined that this action was significant for the purposes of E.O. 12866. A summary of the expected net economic benefits and costs of the alternatives may be found in Table 21.

8.0 REGULATORY FLEXIBILITY ACT ANALYSIS

8.1 Description of the Reasons Why the Actions are Being Considered

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), which was signed into law in January 2007, amends the Moratorium Protection Act to require that actions be taken by the United States to strengthen international fishery management organizations and address IUU fishing and bycatch of PLMRs. The Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose fishing vessels are engaged in IUU fishing or fishing activities or practices that result in bycatch of PLMRs. The Moratorium Protection Act also requires the establishment of procedures to certify whether appropriate corrective actions have been taken to address IUU fishing or bycatch of PLMRs by fishing vessels of those nations. Identified nations that are not positively certified by the Secretary of Commerce could be subject to prohibitions on the importation of certain fisheries products into the United States and other measures, including limitations on port access, under the Enforcement Act.

The National Environmental Policy Act (NEPA) requires federal agencies to evaluate the impacts of federal actions on the human environment. It has been NOAA policy to prepare NEPA documents for actions that affect the marine environment within and beyond the U.S. Exclusive Economic Zone. NOAA Administrative Order 216-6 describes how the agency will comply with NEPA requirements. Although the regulatory action needed to develop certification procedures could be considered for applicability of one of the existing Categorical Exclusions (216-6.03c.3) addressing procedural regulations, the agency has determined that an EA is more appropriate for this action to provide the public with additional environmental information regarding the proposed action. For a complete description of the need for this action, please see Section 1.1.

8.2 Statement of the Objectives of, and Legal Basis for, the Rule

This action is under the authority of the High Seas Driftnet Fishing Moratorium Protection Act. The objective of the rule is to implement the Moratorium Protection Act and to ensure sustainable use of transboundary stocks, enhance the conservation and recovery of protected living marine resources by encouraging nations to work multilaterally, in cooperation with the United States, to implement conservation and management measures that reduce IUU fishing and bycatch of PLMRs. The Moratorium Protection Act envisions a multilateral process to implement effective measures to end IUU fishing and eliminate or reduce the bycatch of PLMRs. Congressional policy that informs the proposed rule encourages constructive engagement through regional fishery management organizations or bi-

lateral arrangements between the United States and other fishing nations. The certification procedure described in the proposed rule works in combination with identification, notification and consultation procedures described in the statute and the advanced notice of proposed rulemaking (ANPR). For a complete description of the need for this action, please see Section 1.3.

8.3 Description and Estimate of the Number of Small Entities to which the Proposed Rule Will Apply

See section 5.4 above.

This rule does not apply directly to any U.S. business small or otherwise as the rulemaking is aimed at foreign countries that harvest seafood.

The universe of indirectly affected industries includes the following: U.S. port activity and U.S. seafood harvesters, processors, wholesalers, and importers. Port activity generates economic activity across many sectors including surface transportation, maritime services, cargo handling, federal/state/local governments, port authorities, importers/consignees, and the banking and insurance sectors. Maritime services include pilots, chandlers (food and other supplies), towing, bunkering (fuel), marine surveyors, and shipyard/marine construction. Cargo handling services include longshoremen, stevedoring, terminal operators, warehouse operators, and container leasing and repair.

8.4 Description of the Projected Reporting, Record-Keeping, and Other Compliance Requirements of the Proposed Rule

This action contains new collection-of-information, reporting, record keeping, or other compliance requirements. To facilitate enforcement, nations that do not receive a positive certification may be required to submit documentation of admissibility along with fish or fish products not subject to the import restrictions that are offered for entry into the United States. In addition, those identified nations that do not receive a positive certification and wish to take advantage of the alternative procedures will be required to submit documentation of admissibility along with fish or fish products subject to the import restrictions that are offered for entry into the United States. NMFS is delaying the effective date of these requirements until it develops and submits a Paperwork Reduction Act package to OMB and receives OMB approval. After OMB approval is received, NMFS will publish the effective date for these sections in the Federal Register.

8.5 Relevant Federal Rules which may Duplicate, Overlap, or Conflict with the Proposed Rule

This action does not duplicate, overlap or conflict with any other Federal rules.

NMFS received public comments on the proposed rule, and made some revisions to the final rule to clarify provisions. A summary of public comments on the proposed rule and agency

responses is provided in the final rule. NMFS did not receive comments specifically on the initial regulatory flexibility analysis (IRFA) for this action or on issues related to the IRFA.

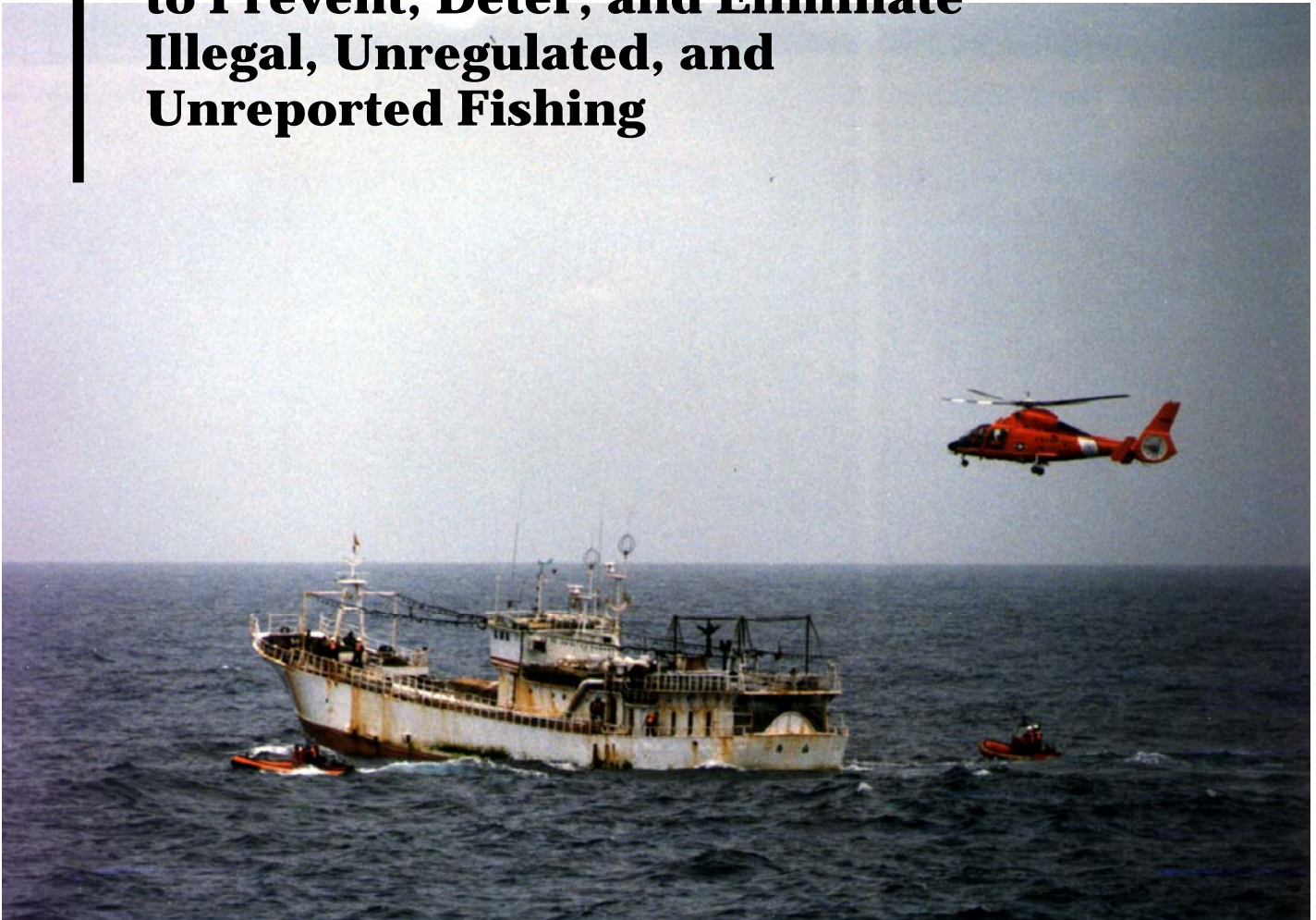
Although this action will not have significant economic impacts on a substantial number of small U.S. entities, NMFS decided to analyze different alternatives in the IRFA for the certification procedures in this rule. In order to meet the objectives of the Moratorium Protection Act and this final rule, NMFS cannot exempt small entities, change reporting requirements only for small entities, or use performance or design standards in lieu of the regulatory requirements in the rule.

As noted above, NMFS does not anticipate significant economic impacts from any of the alternatives analyzed. IUU Alternative I-3 may produce more socioeconomic benefits than IUU Alternative I-2. Likewise for the bycatch alternatives, Alternative B-3 may produce more benefits than Alternative B-2. Due to the consultative nature of this rulemaking, it may be possible for the costs to be ameliorated by new port state controls, substituting different transportation modes, or substituting different products all together. As a result, it is difficult to know if costs will also be higher moving from the less restrictive IUU Alternative I-2 or bycatch Alternative B-2 to IUU Alternative I-3 or bycatch Alternative B-3. Because Alternatives I-2 and B-2 most closely mirror the text of the Moratorium Protection Act, NMFS has decided to implement them in this final rule.

APPENDIX A

**NATIONAL PLAN OF ACTION OF THE UNITED STATES OF
AMERICA TO PREVENT, DETER, AND ELIMINATE
ILLEGAL, UNREGULATED, AND UNREPORTED FISHING**

National Plan of Action of the United States of America to Prevent, Deter, and Eliminate Illegal, Unregulated, and Unreported Fishing



Coordinated by the U.S. Department of State

**in conjunction with
the National Oceanic and Atmospheric Administration
the National Marine Fisheries Service
the U.S. Coast Guard
the Office of the U.S. Trade Representative
the U.S. Fish and Wildlife Service
and the U.S. Customs Service**

U.S. NATIONAL PLAN OF ACTION
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1 INTRODUCTION

The United States and other members of the international community have experienced a growing incidence of fishing activity that does not respect applicable laws and regulations, including fishing rules adopted at the national and international levels. Examples of such activity include reflagging of fishing vessels to evade controls, fishing in areas of national jurisdiction without authorization by the coastal State, failure to report (or misreporting) catches, etc. Such irresponsible fishing activity directly undermines efforts to manage fisheries properly and impedes progress toward the goal of sustainable fisheries.

The term “illegal, unreported and unregulated fishing” – or IUU fishing – has emerged to describe a wide range of such activity. IUU fishing can occur in all capture fisheries, whether they are conducted within areas under national jurisdiction or on the high seas. IUU fishing poses a direct and significant threat to effective conservation and management of fish stocks, causing multiple adverse consequences for fisheries and for the people who depend on them in the pursuit of their legitimate livelihoods.

Under the auspices of the Food and Agriculture Organization of the United Nations (FAO), a concerted effort was undertaken to develop a comprehensive “toolbox” of measures that States could take, both individually and collectively, to address the problems of IUU fishing. This effort culminated with the adoption in 2001 of the FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA).¹

As its title suggests, the objective of the IPOA is to prevent, deter and eliminate IUU fishing. The principles to guide the pursuit of this objective include: (1) broad participation and coordination among States, as well as representatives from industry, fishing communities and non-governmental organizations; (2) the phasing in of action to implement the IPOA on the earliest possible timetable; (3) the use of a comprehensive and integrated approach, so as to address all impacts of IUU fishing; (4) the maintenance of consistency with the conservation and long-term sustainable use of fish stocks and the protection of the environment; (5) transparency; and (6) non-discrimination in form or in fact against any State or its fishing vessels.

The IPOA is voluntary. However, like the FAO Code of Conduct For Responsible Fisheries, certain parts of the IPOA are based on relevant rules of international law, as reflected in the 1982 UN Convention on the Law of the Sea and other pertinent instruments. The IPOA also contains provisions that may be, or have already been, given binding effect by means of other legal instruments, including certain global, regional and sub-regional instruments.

The IPOA calls upon all States to develop and adopt national plans of action to achieve the objectives of the IPOA and to give full effect to its provisions as an integral part of their fisheries management programs and budgets.

¹ The text of the IPOA-IUU is available on the website of the FAO Fisheries Department: <http://www.fao.org/DOCREP/003/y1224e/y1224e00.HTM>.

The U.S. National Plan of Action is organized along the same lines as the IPOA, including sections on All State Responsibilities, Flag State Responsibilities, Coastal State Measures, Port State Measures, Internationally Agreed Market State Measures, Measures to be Implemented Through Regional Fisheries Management Organizations and Special Requirements of Developing States. Although IUU fishing may occur in all fisheries, this plan focuses on marine fisheries. As envisioned in the IPOA, the United States intends to review the implementation of this National Plan of Action at least every four years after its adoption.

2 OVERVIEW

IUU fishing poses a direct and significant threat to effective conservation and management of many fish stocks, causing multiple adverse consequences for fisheries and for the people who depend on them in the pursuit of their legitimate livelihoods.

By frustrating fishery management objectives, IUU fishing can contribute to the overfishing of fish stocks, impair efforts to rebuild such stocks, and, in principle, even lead to the collapse of a fishery. This, in turn, may result in lost economic and social opportunities, both short-term and long-term, and may diminish food security. Left unchecked, IUU fishing can significantly diminish the benefits of effective fisheries management.

Those who conduct IUU fishing are also unlikely to observe rules designed to protect the marine environment from the harmful effects of some fishing activity, including, for example, restrictions on the harvest of juvenile fish, gear restrictions established to minimize waste and bycatch of non-target species, and prohibitions on fishing in known spawning areas. To avoid detection, IUU fishers often violate certain basic safety requirements, such as keeping navigation lights lit at night, which puts other users of the oceans at risk. Operators of IUU vessels also tend to deny to crew members fundamental rights concerning the terms and conditions of their labor, including those concerning wages, safety standards and other living and working conditions. Other rules that can be flouted by IUU fishers include those associated with food safety and aquatic animal health, potentially putting consumers and fish populations at risk in IUU fish importing countries.

In addition to its detrimental economic, social, environmental and safety consequences, the unfairness of IUU fishing raises serious concerns. By definition, IUU fishing is either an expressly illegal activity or, at a minimum, an activity undertaken with little regard for applicable standards. IUU fishers gain an unjust advantage over legitimate fishers, i.e., those who operate in accordance with those standards. In this sense, IUU fishers are “free riders” who benefit unfairly from the sacrifices made by others for the sake of proper fisheries conservation and management. This situation undermines the morale of legitimate fishers and encourages them to disregard the rules as well. IUU fishing may promote additional IUU fishing, creating a downward cycle of management failure.

As this National Plan of Action demonstrates, the United States has been – and will continue to be – among the leaders of the international community in efforts to address IUU fishing. The United States contributed actively to the development of the IPOA and to measures

adopted in various regional fisheries management organizations (RFMOs) on this topic. At the national level, U.S. laws and regulations to combat IUU fishing are among the strongest, most comprehensive and best enforced in the world.

Still, much remains to be done to address problems of IUU fishing. Although the precise amount of IUU fishing is difficult to quantify, available evidence suggests that, as a worldwide phenomenon, it is increasing.

One inherent difficulty is the question of defining the terms “illegal fishing,” “unreported fishing,” and “unregulated fishing.” This National Plan of Action adopts the definition of these terms set forth in the IPOA:

- Illegal fishing refers to activities:
 - conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;
 - conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or
 - in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.
- Unreported fishing refers to fishing activities:
 - which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or
 - undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.
- Unregulated fishing refers to fishing activities:
 - in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or
 - in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law.

Notwithstanding the above, certain unregulated fishing may take place in a manner that is not in violation of applicable international law, and may not require the application of measures envisaged under the IPOA.

3 ALL STATE RESPONSIBILITIES

The United States is generally in compliance with relevant international rules and standards regarding the conservation and management of living marine resources. Although the United States is not a party to the 1982 United Nations Convention on the Law of the Sea, we regard its provisions relating to the conservation and management of living marine resources as reflecting customary international law.

The United States is party to most of the significant international agreements in this field. The United States was among the first to ratify 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 (the UN Fish Stocks Agreement), which entered into force on December 11, 2001. The United States has also deposited an instrument of acceptance of the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement), which has not yet entered into force. However, the United States has fully implemented the FAO Compliance Agreement since 1996. The United States has actively encouraged other States to become party to both instruments and to implement them fully.

In addition, the United States is party to many of the international agreements that have created RFMOs and, accordingly, is a member of many RFMOs.² In addition, the United States has made significant contributions to the development and implementation of many of the non-binding instruments in this field, including the FAO Code of Conduct for Responsible Fisheries, the FAO International Plans of Action on fisheries and UN General Assembly Resolution 46/215, which created a moratorium on the use of large-scale driftnets on the high seas.³

The United States intends to continue to take a proactive stance in the implementation of these international instruments and the development of any necessary new international instruments.

3.1 Legislation

A chart summarizing all relevant U.S. domestic legislation is annexed to this NPOA. The chart also includes proposals for new legislation or amendments to existing legislation that may

² For example, the United States is a member of the Inter-American Tropical Tuna Commission, the International Commission for the Conservation of Atlantic Tunas, the Northwest Atlantic Fisheries Organization, the North Pacific Anadromous Fish Commission, North Atlantic Salmon Conservation Organization, and the Commission for the Conservation of Antarctic Marine Living Resources, among others.

³ See www.nmfs.noaa.gov/sfa/international/index.htm

be necessary or desirable to implement the IPOA. Recommendation contained in this NPOA, particularly as they relate to possible changes in U.S. Law or the allocation of federal resources, will be considered in accordance with the Administration's overall program of management and budget and, as appropriate, with Congress.

3.2 State Control over Nationals

The IPOA calls upon each State to take measures to ensure that its nationals do not engage in or support IUU fishing. Relevant situations include (1) a national of one State owns or controls a fishing vessel registered in another State that engages in IUU fishing; (2) a national of one State is employed as a master or crew member of a fishing vessel registered in another State that engages in IUU fishing; and (3) nationals of one State knowingly import IUU-caught fish or fish products from another State.

The U.S. Lacey Act makes it unlawful for any person subject to U.S. jurisdiction to "import, export, transport, sell, receive, acquire, possess or purchase any fish ... taken, possessed or sold in violation of any ... foreign ... law, treaty or regulation."⁴ The United States has used the Lacey Act successfully to prosecute U.S. nationals who engage in certain forms of IUU fishing.⁵ Such prosecutions occur only where there is some "nexus" between the activity in question and the United States, e.g., where the fish or fish products are landed, brought, or introduced into any place subject to the jurisdiction of the United States.

The Lacey Act explicitly covers acts in violation of any treaty. Certain other U.S. laws also make it unlawful for U.S. nationals (and other persons subject to U.S. jurisdiction) to engage in fishing activity in violation of conservation and management measures adopted by RFMOs.⁶ It may be possible to strengthen the Lacey Act or the other fisheries-related statutes to broaden the available tools to even more effectively tackle fishing contrary to RFMO rules.

The United States could also improve its ability to identify U.S. nationals who own or control foreign fishing vessels that are engaged in IUU fishing. The International Network for the Cooperation and Coordination of Fisheries-Related Monitoring, Control, and Surveillance Activities (MCS Network)⁷ and other forms of international cooperation offer the most promising means for exchanging information that could lead to the identification of such persons.

⁴ 16 U.S.C. 3371 et seq. Note that the Lacey Act prohibitions do not apply to, inter alia, any activity regulated by a fishery management plan in effect under the Magnuson-Stevens Fishery Conservation and Management Act or certain highly-migratory fisheries (see § 3377).

⁵ A recent case, involving both foreign nationals and U.S. nationals who were illegally importing large quantities of Honduran spiny lobster into the United States, was prosecuted criminally under the Lacey Act and resulted in some of the longest jail terms ever given under that statute. (See *U.S. vs. McNabb, et. al.*)

⁶ See, e.g., Atlantic Tunas Convention Act (16 U.S.C. 971), North Pacific Anadromous Stocks Act of 1992 (Title VII of P.L. 102-567), etc.

⁷ See Section 3.6, "Acquisition, Storage, Dissemination of MCS Data," for additional information on the MCS Network.

Although a limited number of U.S. fishing vessels have reflagged in recent years, available evidence does not indicate that such vessels have engaged in any significant amount of IUU fishing. As a general matter, U.S. laws and regulations do not offer a direct means to prevent U.S. nationals from reflagging fishing vessels, but the American Fisheries Act of 1998 does prevent the return of large class fishing vessels to U.S. registry once they have been reflagged.⁸ The U.S. Government typically becomes aware of such transactions only after they have occurred.

3.3 Vessels without Nationality

The IPOA calls on States to take measures consistent with international law in relation to vessels without nationality that are involved in IUU fishing on the high seas. The system of rules established for the high seas, and international agreements managing the fishery resources found there, are meaningless unless vessels lawfully sail under the flag of a recognized state or entity. According to both international and U.S. law, all vessels must have a nationality. By defining “vessels subject to the jurisdiction of the United States” to include stateless vessels, whether those not properly flying the flag of any state or those assimilated to stateless status, U.S. law allows the United States to take enforcement action against vessels without nationality.

Two key pieces of legislation extend this general principle specifically to IUU fishing. First, under the Magnuson-Stevens Fishery Conservation and Management Act,⁹ the United States may seize and prosecute stateless vessels engaging in large-scale high seas driftnet fishing in contravention of UN General Assembly Resolution 46/215.¹⁰ The United States has exercised this authority on several occasions, most recently in 1999, by seizing the high seas driftnet vessel YING FA after the People’s Republic of China refuted its registration.

The High Seas Fishing Compliance Act¹¹ gives the United States even broader tools for acting against stateless IUU vessels. Under the Act, the United States can prosecute vessels without nationality found on the high seas violating any international conservation and management measure recognized by the United States.

The United States also supports efforts to prevent vessels from becoming stateless during their transfer to a new flag. With U.S. support, the International Maritime Organization approved Assembly Resolution 923 that urges the originating flag State to receive confirmation from the new flag State that the owners have completed all administrative procedures and that the vessel is ready to be registered with the new flag State before releasing the old registration.

⁸ 46 U.S.C. 12102(c)(6) addresses reflagging of certain vessels over 165 feet or 750 gross tons.

⁹ 16 U.S.C. 1801 et. seq. (hereinafter Magnuson-Stevens Act).

¹⁰ 16 U.S.C. 1857 (1)(M) prohibits the use of a “fishing vessel of the United States” to engage in large-scale driftnet fishing beyond the EEZ of any nation; once a stateless vessel is assimilated to U.S. nationality, it falls subject to this prohibition.

¹¹ 16 U.S.C. 5501.

3.4 Sanctions

The IPOA provides that sanctions should be of sufficient severity to effectively prevent, deter and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. The legislative chart at Appendix 1 summarizes the current levels of sanctions available under U.S. law for IUU fishing violations and includes recommendations to increase penalty levels or add permit sanctions where appropriate.

The United States apprehends and prosecutes foreign flag vessels that engage in IUU fishing within waters under the jurisdiction of the United States and through appropriate international authorities. The cases described below are examples of such sanctions.

In September 1994, the Honduran-flagged, Korean owned, F/V HAENG BOK #309 was determined to have made three incursions into the U.S. EEZ, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for a civil penalty of \$1.12m and the company was required to put Vessel Monitoring Systems (VMS) on their entire fleet of 19 longliners for a period of five years.

The Polish flag vessel ADMIRAL ARCISZEWSKI was detected fishing 1000 yards within the U.S. Exclusive Economic Zone (EEZ) on June 14, 1996. This was the vessel's second offense. The case was settled for \$750,000, plus \$10,276 for U.S. Coast Guard costs.

The South Korean flag vessel KUM KANG SAN was detected fishing 500 yards within the U.S. EEZ on September 6, 2000, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for \$300,000 plus \$16,415.29 in costs.

In July 1997, the unflagged F/V CAO YU #6025 was detected conducting large scale driftnet fishing, and the vessel failed to cooperate with the U.S. Coast Guard boarding attempts, resulting in a forced boarding of the vessel. The vessel was forfeited to the United States along with its entire catch of 120 mt of albacore tuna, for an estimated total loss to the unknown owner of \$435,000.

The South Korean flag vessel MAN JOEK was detected fishing 400 yards within the U.S. EEZ on November 10, 2001, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for \$250,000.

3.5 Economic Incentives

The IPOA provides that to the greatest extent possible under their domestic laws, States should not confer economic support including subsidies to companies, vessels, or persons involved in IUU fishing. The United States fishing industry is not subsidized to the extent of the fishing industries of other nations. The United States does maintain some modest loan guarantee and tax deferral programs, as well as some government support for applied research, which may convey some advantage to U.S. industry. These initiatives do not, in the view of the United States, contribute to IUU fishing.

3.6 Monitoring, Control and Surveillance

At the heart of the IPOA are its measures on monitoring, control, and surveillance (MCS). The IPOA calls for a comprehensive tracking of fishing activities, development of control schemes, vessel and owner documentation, implementation of VMS and observer programs, training of officials involved in MCS, meaningful and effective MCS operations, promotion of industry knowledge and cooperation, outreach to national judiciaries, establishment of systems for acquisition, storage, and dissemination of MCS data, consideration of privacy and confidentiality requirements, and implementation of internationally agreed procedures for boarding and inspection regimes, where applicable.

Planning and Funding MCS Activities

The IPOA calls upon all States to plan, fund and undertake MCS operations in a manner that will maximize their ability to prevent, deter, and eliminate IUU fishing. Within the U.S. Government, a number of federal agencies have responsibility for MCS functions, including the National Oceanic and Atmospheric Administration (NOAA), U.S. Coast Guard, Customs, the Immigration and Naturalization Service, the Fish and Wildlife Service, the Department of Justice, the Department of State, and others.

The United States has recently taken significant steps to update its fishery MCS program. Since 2000, the United States has more than doubled the budget for the National Marine Fisheries Service (NMFS) Office for Law Enforcement, expanding federal-state law enforcement partnerships and funding a national VMS program. This increased support has enhanced U.S. capacity to monitor fishing operations and landings, and to oversee the passage of fishery products through commerce at unprecedented levels.

Over the past twenty years, the U.S. Coast Guard's role in fisheries law enforcement has shifted from monitoring foreign fishing activity in waters under the jurisdiction of the United States to ensuring compliance by U.S. fishing vessels while minimizing illegal incursions of foreign vessels into U.S. waters.

Schemes for Access to Fishery Resources

The IPOA calls upon all States to develop and implement schemes for access to waters and resources, including authorization schemes for vessels. The U.S. Government, usually working in conjunction with the Regional Fisheries Management Councils established pursuant to the Magnuson-Stevens Act, evaluates the need to bring fisheries under federal management. Various management approaches, including many that utilize access limitations, are currently in effect. Over-utilization in many fisheries has resulted in the need to reduce fishing capacity.

Vessel and Gear Marking

All vessels and fixed gear being utilized in the U.S. commercial fishing industry are required to be marked so that they can be readily identified. Some examples of gear identification would include lobster trap tags, permit numbers on gear buoy markers, and requirements on placement and size of vessel identification numbers. There is no single standard method of marking gear or vessels since there are so many different types of vessels and gear use in the U.S. industry.

VMS

The IPOA encourages the use of Vessel Monitoring Systems (VMS), in accordance with the relevant national, regional or international standards, including the requirement for vessels under their jurisdiction to carry VMS aboard. VMS systems are proliferating worldwide. These systems provide outstanding compliance without intrusive at-sea boardings, enhance safety at sea, and provide new tools to managers for real time catch reporting. To date, NMFS's Office for Law Enforcement has actual or pending arrangements for the monitoring of nearly 2,500 fishing vessels in both domestic and international fisheries.

Domestically, the United States first used VMS in the Hawaiian pelagic longline fishery in 1994. VMS monitors approximately 130 longliners, deterring them from fishing in large closed areas established to reduce localized overfishing, and minimizing conflicts with endangered species. VMS is also required in certain fisheries in New England and Alaska. Currently NMFS and the U.S. Coast Guard are working on implementing a National Vessel Monitoring System (N-VMS). N-VMS will not require VMS on all vessels. It will, however, consolidate all VMS information into one database and promote near real-time transmission of this data to on-the-water assets.

Observer Programs

The IPOA also encourages use of observer programs. NMFS deploys approximately 500 observers who monitor more than 42,000 fishing days in more than 20 fisheries annually. Observers are generally used to collect data for monitoring catch, discards, and incidental takes of protected species such as marine mammals, seabirds and sea turtles. In some fisheries, observers may also be used to monitor compliance with regulations. Observers are, however, recruited as biological technicians to perform primary activities that are scientifically oriented. In any event, before observers could be given a broader role that included as a significant objective the monitoring of compliance with relevant rules, they would need to be given different training.

Training

The IPOA calls upon all States to provide training and education to all persons involved in MCS operations. The NMFS Office for Law Enforcement trains its officers and special agents at the Federal Law Enforcement Training Center. Required core training for all includes

satisfactory completion of the Marine Law Enforcement Training Program, NMFS Basic Training Program, and either Criminal Investigator Training Program (agents) or Natural Resource Police Training Program (officers). In addition to these core requirements, all commissioned personnel are required to participate in annual in-service training sessions. Training opportunities are also extended to state personnel.

In addition to the other training, NOAA's enforcement attorneys also meet at least once per year to receive specialized MCS training. Legal updates for attorneys and federal MCS personnel are done as needed. This is also done in the regions and on a nationwide basis. Periodic educational programs are held for the benefit of the Administrative Law Judges, federal prosecutors, and investigative personnel to help them better appreciate the issues involved in MCS.

The U.S. Coast Guard requires core training for all boarding officers and boarding team members that includes satisfactory completion of either a boarding officer or boarding team member course, or completion of personal qualification standards. To supplement these core requirements, the U.S. Coast Guard maintains and operates five regionally based fisheries training centers. These centers allow for the provision of vital and up-to-date fishery enforcement training to personnel of the U.S. Coast Guard and other fisheries enforcement agencies.

Industry Knowledge and Cooperation

The IPOA encourages all States to promote industry knowledge and understanding of the need for, and their cooperative participation in, MCS activities to prevent, deter, and eliminate IUU fishing and to undertake general programs to educate the general public about these issues. A variety of methods are used to provide outreach to industry to increase understanding of the requirements and need for them. This is done at trade shows, targeted educational sessions for industry groups, public affairs work, news releases, and with a toll-free number to report activities that merit investigation. The Fishery Management Councils maintain enforcement committees where MCS professionals and council members focus on enforcement activities and their integration into fisheries management plans and approaches.

In international negotiations where industry and public interest groups are stakeholders, U.S. delegations often include representatives from groups, allowing diverse interests to have a voice and participate firsthand in the process.

NOAA has also implemented direct outreach efforts in certain fisheries to educate fishermen on enforcement issues. In particular, the NMFS Office of Law Enforcement and the NOAA General Counsel for Enforcement and Litigation use the opportunity provided by federally mandated skipper education workshops.

Advisory groups representing relevant constituent interests generally support U.S. participation in a large number of regional fishery management organizations and arrangements. These groups have been active in identifying and addressing IUU fishing problems.

Judicial Systems

The IPOA encourages all States to promote knowledge and understanding of MCS issues within national judicial systems. NOAA has also been active in promoting and sharing information within national judicial systems as called for by the IPOA. A good example of sharing this type of information involves the first known case worldwide relying exclusively on VMS evidence to be decided by a court of law.¹² The decision and other information on the case were immediately shared with national representatives on the MCS Network and other interested countries and widely distributed on the Internet. As VMS proliferates, information sharing is essential, as judges around the globe will face similar issues within the context of their legal structures.

Acquisition, Storage, Dissemination of MCS Data

The International Monitoring, Control, and Surveillance Network for Fisheries-Related Activities (MCS Network) is a newly-established worldwide network of MCS professionals. Participating countries agree to cooperate and coordinate in the direct exchange of information and experiences. This includes a wide range of MCS-related data. The MCS Network is designed to support countries in satisfying their obligations from international agreements as well as in performing their domestic MCS functions. Terms of Reference, which provide the Network's basic structure, detail the types of information to be shared, including information called for by the FAO Compliance Agreement on vessels, permits and authorizations, catch and landing data as well as contact information, legal and legislative materials and other relevant information. This information resides in the MCS Network website which can be accessed at www.imcsnet.org. The United States is a founding member and believes this Network is a significant tool in the fight to reduce IUU fishing. Countries that are already members of the Network are actively involved in recruitment of additional countries, as a broad-base membership is desirable. An MCS conference is anticipated for late 2004.

Boarding and Inspection Schemes

The IPOA calls upon all States to ensure effective implementation of national and, where appropriate, internationally agreed boarding and inspection regimes consistent with international law. The U.S. Government participates actively in numerous international fisheries organizations and continually seeks to promote MCS mechanisms and regimes that are consistent with international as well as domestic laws.

The United States is already party to several international agreements that provide for the boarding and inspection of foreign vessels fishing on the high seas, under certain conditions and subject to certain limitations. Those regimes are the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, and a scheme established under the

¹² See NOAA case *In the Matter of Lobsters, Inc. and Mr. Lawrence M. Yacubian*.

auspices of the Northwest Atlantic Fisheries Organization. In addition, the United States is among those States that have signed the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, which provides for a similar scheme. Under the Magnuson-Stevens Act, the United States has full authority to board and inspect all vessels fishing in waters under the jurisdiction of the United States, as well U.S. vessels fishing on the high seas.

3.7 Publicity

The IPOA calls upon States to publicize widely, including through cooperation with other States, full details of IUU fishing and actions taken to eliminate it, in a manner consistent with any applicable confidentiality requirements. The United States will publicize the results of IUU fishing cases to include: countries involved, and in general for violations and resulting convictions in order to deter IUU violations and support compliance with international agreements and domestic fishing laws. This information will be distributed through a variety of means including posting on the websites of various federal agencies, including the U.S. Coast Guard and NOAA, and press releases to international and national media venues.

3.8 Cooperation between States

The IPOA calls upon States to coordinate their activities and to cooperate directly, and as appropriate through relevant regional fisheries management organizations, in preventing, deterring and eliminating IUU fishing.

Combating IUU fishing at the global level is very important, but efforts undertaken at the bilateral and regional level are often particularly effective. The United States has various bilateral cooperative enforcement agreements. In addition to more general arrangements such as mutual legal assistance treaties, which can be useful in fisheries cases, the United States maintains several fisheries-specific agreements. While most of these involve neighboring coastal States, and are discussed in greater detail in Section 5, several are worth noting here.

Since 1991, the United States has maintained a Memorandum of Understanding (MOU) with the People's Republic of China that facilitates joint enforcement of the high seas driftnet moratorium in the North Pacific. The MOU allows boarding of vessels of one Party suspected of large-scale high seas driftnet (HSDN) fishing by enforcement officials of the other Party. The MOU also provides for officials of the People's Republic of China to embark on U.S. Coast Guard cutters engaging in high seas driftnet patrols. For the last several years, in addition to deploying on cutters on an as-needed basis, PRC officials have taken part in U.S. Coast Guard fisheries law enforcement training in Kodiak, AK and in U.S. Coast Guard HSDN surveillance flights.

Since 1993, there has also been extensive multilateral cooperation in research and enforcement through the North Pacific Anadromous Fish Commission. This group has been instrumental in the near elimination of HSDN fishing in the North Pacific. Russia, Japan, the United States, and Canada are all party to this agreement. Since its inception, this Commission

has always shared information on enforcement efforts in this region, and this has culminated in the last several years with the creation of an enforcement coordinating body that meets before the major HSDN threat season to discuss lessons learned from the past year and to plan for the optimal utilization of limited patrol assets during the upcoming season. In addition to this meeting, members of the coordinating body maintain regular discussions during the season to share information regarding ongoing investigations and HSDN sightings.

Another initiative to promote cooperation in the North Pacific began in 2000. The North Pacific Heads of Coast Guard Agencies consists of heads of the Coast Guards or equivalent agencies from the United States, Russia, Japan, Canada, Korea, and the People's Republic of China. In less than three years, this has grown into a key forum to discuss issues of mutual interest, including maritime security, maritime smuggling, combined operations, and fisheries enforcement. In 2002, a fisheries working group was created. The group will develop best-practice guidelines for international fisheries enforcement and focus on operational partnering.

More recently, the American Institute in Taiwan and the Taipei Educational and Cultural Representative Office in the United States also concluded a Memorandum of Understanding on fisheries cooperation and aquaculture. Through this MOU, Taiwan agreed to be bound by the tenets of the 1995 UN Fish Stocks Agreement and the FAO Compliance Agreement, and to cooperate on implementation of the FAO Code of Conduct for Responsible Fisheries and all recent FAO International Plans of Action. This MOU is a significant action against IUU fishing, by providing a framework through which the world's sixth largest fishing fleet pledges to operate in keeping with international fisheries conservation and management rules.

The United States should look at expanding its use of mutually beneficial agreements of this nature to induce States who may be the source of IUU fishing to hew to international fisheries law and abide by global conservation and management regimes.

Recommendations:

- Consider increasing penalty levels or add permit sanctions where appropriate under Magnuson-Stevens Act, Lacey Act, and other fisheries legislation.
- Consider increasing implementation and use of VMS systems, including a U.S. National VMS System as soon as possible.
- Assess and develop additional nationwide policies with regard to appropriate utilization and release of VMS data.
- Coordinate with international partners to ensure VMS requirements put into place are consistent with regional and international standards.
- Consider providing increased observer coverage in previously unobserved fisheries or increase coverage to provide improved statistical validity.

- Investigate co-locating NMFS special agents at the U.S. Coast Guard fishery training centers to improve fisheries training.
- Pursue shiprider agreements and/or enforcement officer exchanges with critical fishing nations.
- Investigate exchange of enforcement technicians to facilitate data transfer.
- Fully participate in the International MCS Network to support NPOA objectives.
- Develop routine contact lists of law enforcement personnel authorized to exchange MCS information.
- Modernize NOAA's enforcement data tracking system.
- Consider strengthening measures available in the Lacey Act, Magnuson Stevens Act, and other fisheries legislation to prosecute fishing in violation of RFMO conservation and management measures.
- Publicize the results of IUU fishing cases.
- Consider broadening existing regional specialized, multi-discipline import task forces to monitor imports, to enhance the investigative capacity of the United States to track transactions in IUU-caught fish involving U.S. nationals.

4 FLAG STATE RESPONSIBILITIES

The United States is responsible under international law to control the fishing activities of U.S. flagged vessels. Control of fishing vessels can be implemented by: (1) fishing vessel registration; (2) record of fishing vessels; and (3) authorization to fish. The following sections discuss current and recommended actions to control U.S. flagged fishing vessels.

4.1 Fishing Vessel Registration

The IPOA-IUU calls upon each flag State to ensure, before it registers a fishing vessel (grants nationality to a vessel), that it can exercise its responsibility to ensure that the vessel does not engage in IUU fishing.

All vessels of five net tons or greater that are owned by a U.S. citizen or corporation are required by under U.S. law to be federally documented through the U.S. Coast Guard's National Vessel Documentation Center (NVDC) if the vessels are to be used in the fishery trade.¹³ Fishing vessels less than five net tons may not be federally documented, but are otherwise

¹³ 46 Code of Federal Regulations 67.7.

registered by individual states of the United States. Authorization for U.S. vessels to fish in U.S. federally managed fisheries or upon the high seas is a responsibility of NMFS.

The IPOA-IUU recommends that, where different governmental agencies are responsible for registering vessels and providing authorization to fish, those agencies should coordinate functions and improve communication. Currently, a system does not exist where NMFS shares information on a vessel's past fishing activity to the U.S. Coast Guard's NVDC as criteria for issuance of federal documentation or to individual states as criteria for state registration. However, Section 401 of the Magnuson-Stevens Act directs the Secretary of Commerce, in cooperation with several other officials and organizations, to "develop recommendations for implementation of a standardized fishing vessel registration and information management system on a regional basis." NMFS is developing a National Fishing Vessel Registration and Fisheries Information System, which would be a cooperative federal-state partnership.

The IPOA-IUU calls upon flag States to deter vessels from reflagging for the purposes of non-compliance with international conservation and management measures. Flag-hopping is characterized as the practice of repeated and rapid changes of a vessel's flag for the purposes of circumventing conservation and management measures or provisions adopted at a national, regional or global level or facilitating non-compliance with such measures or provisions. The NVDC requires proof of U.S. citizenship for the owner, proof that the vessel was built in the United States, and evidence of removal from the previous flag prior to issuing a federal document with fisheries endorsement. This review by NVDC prevents vessels from jumping flags repeatedly, and may provide the opportunity for review of historical flagging of vessels.

The IPOA calls upon all States involved in a chartering arrangement to take measures to ensure that chartered vessels do not engage in IUU fishing. Vessel owners and operators can often take advantage of chartering arrangements to engage in IUU fishing because the States involved in the arrangement may each believe that the other is primarily responsible for regulating the activity of such vessels.

The United States participates in a number of regional fishery management organizations that are developing rules to prevent vessels involved in chartering arrangements from being used for IUU fishing. The International Commission for the Conservation of Atlantic Tunas (ICCAT), for example, adopted measures to increase transparency of chartering arrangements and to formalize requirements for data reporting and control and enforcement. In the ICCAT context, U.S. regulations require U.S. vessels to receive permits from, and report catches to, NMFS. The United States has the authority to issue exempted fishing permits to certain U.S. vessels involved in chartering operations for ICCAT species and to link reporting requirements so that we could collect the same information that the foreign chartering partner receives.

The Northwest Atlantic Fisheries Organization (NAFO) has a pilot program allowing the use of national fishing privileges by chartered vessels flying the flag of another NAFO member. Catches made using such arrangements are assigned to the NAFO member that received the fishing privileges. All MCS responsibilities remain with the flag State.

Consideration should be given to a thorough review of U.S. permitting regulations with the Maritime Administration to ensure that they provide a sound basis for addressing all situations in which U.S. nationals or vessels are involved in chartering arrangements.

4.2 Record of Fishing Vessels

The IPOA-IUU calls upon each flag State to maintain a record of fishing vessels entitled to fly its flag. This provision covers both vessels authorized to fish on the high seas and authorized to fish in its EEZ. The United States already records all information suggested in the IPOA-IUU for federally documented fishing vessels, with the exception of photographs of the vessel at time of documentation and history of non-compliance of the vessel. For instance, the National Vessel Documentation Center database tracks ownership and encumbrances (mortgages, liens, etc.) for all fishing vessels. However, the United States does not maintain a central database of fishing vessels registered by individual states of the United States.

For details concerning the U.S. Coast Guard's National Vessel Documentation Center, please refer to Section 4.1, above.

4.3 Authorization to Fish

The IPOA calls upon flag States to adopt measures to ensure that no vessel be allowed to fish unless authorized. Many provisions of the Magnuson-Stevens Act and other fishery laws of the United States prohibit unauthorized fishing by both U.S. and foreign flag vessels in waters under the jurisdiction of the United States and provide for the basis for imposing penalties for such fishing.

Although the United States requires permits for most major commercial fisheries, we do not require permits in all its fisheries. In those domestic, federal fisheries where permits are required, there is no unified permitting or authorization scheme for domestic vessels. The schemes often use a multitude of different processes and eligibility criteria and have varying durations, which can result in confusion in the application and renewal processes. Violation history is checked, but is not a disqualification for future permits unless past penalties have not been paid. In fisheries where permits are required, U.S. vessels are required to have their permits on board.

The IPOA-IUU calls upon flag States to ensure that each of the vessels entitled to fly its flag fishing in waters outside its sovereignty or jurisdiction holds a valid authorization to fish issued by that flag State. Where a coastal State issues an authorization to fish to a vessel, that coastal State should ensure that no fishing in its waters occurs without an authorization to fish issued by the flag State of the vessel.

The United States has limited foreign fishing in its waters. Although the United States does not require flag-state authorization for foreign vessels fishing in waters under the jurisdiction of the United States, we do require observers and other measures to ensure

compliance. However, while the U.S. Government asks for a compliance history of foreign fishing vessels, responses are not investigated.

As noted above, the United States has implemented the FAO Compliance Agreement, requiring all U.S. vessels fishing on the high seas to possess a permit and conditioning such permits on observation of all internationally agreed conservation and management measures recognized by the United States. Permit holders are required to fish in accordance with the provisions of these agreements and U.S. regulations.¹⁴

The IPOA also calls upon flag States to ensure that their fishing, transport and support vessels do not support or engage in IUU fishing. Flag States should ensure that, to the greatest extent possible, all of their fishing, transport and support vessels involved in transshipment at sea have a prior authorization to transship issued by the Flag State, and report to them a variety of information relating to transshipments.

The IPOA calls upon coastal States to ensure that at-sea transshipment and processing of fish and fish products in coastal State waters are authorized by that coastal State, or conducted in conformity with appropriate management regulations.

The Magnuson-Stevens Act lays out a process for, and various prohibitions on, transshipment activities by both U.S. and foreign vessels. NMFS, however, does not completely regulate transport and support vessels. Transshipments between U.S. fisheries go largely unchecked, and are prohibited only in a few isolated fisheries.

In waters off Alaska, for example, U.S. catcher-processor vessels transship thousands of tons of processed fisheries products to foreign-flagged cargo vessels each year. Although these transshipments are limited to certain locations in internal waters, and must be reported afterwards, there is no prior authorization or notification required.

ICCAT rules allow at-sea transshipments to take place only between ICCAT members themselves or between ICCAT members and cooperating non-parties. U.S. regulations of highly migratory species do not allow U.S. vessels to participate in at-sea transshipments.

U.S. law generally prohibits foreign fishing vessels and carrier vessels that act as “mother ships” to fishing vessels at sea from landing their catch in U.S. ports. American Samoa, Guam, and the U.S. Virgin Islands are exempt from this law, so foreign cargo vessels that accept at-sea transshipments of fish species and foreign flagged fishing vessels can land product in these U.S. ports.

¹⁴ 50 Code of Federal Regulations 300.

Recommendations:

- Examine the possibility of linkages between the U.S. Coast Guard's registration process and NMFS's fishery permit process.
- Consider withholding issuance of documentation, registration and/or fishing permits to vessels that have a history of IUU fishing, unless change in ownership and control of the vessel has been verified.
- Consider establishment of a national registration process for small fishing vessels, less than five tons.
- Consider establishing a database of photographs for documented fishing vessels.
- Consider consolidating information on state-registered fishing vessels into a national database.
- Consider developing unified permitting and renewal scheme for U.S. vessels. Permits are issued differently in each of six different regional NMFS offices.
- More thoroughly investigate compliance history of foreign vessels applying to fish in waters under the jurisdiction of the United States.
- Improve logbook data requirements in accordance with paragraph 47.2 of the IPOA-IUU.
- Develop a mechanism to share violation histories on IUU vessels with other States.
- Review the existing process on transshipment activities and determine where improvements are possible, e.g., prior notification.

5 COASTAL STATE MEASURES

The IPOA calls upon coastal States to take measures to prevent, deter, and eliminate IUU fishing in waters under their national jurisdiction. Most issues relating to U.S. measures in this regard are covered in previous sections.

As part of its MCS program for regulating fishing activity in the U.S. EEZ, the United States requires VMS in a number of fisheries and is considering VMS requirements for additional fisheries. The U.S. Coast Guard and state enforcement officials routinely patrol the U.S. EEZ as well to monitor fishing activity, and the U.S. Coast Guard is the lead federal agency responsible for at-sea fisheries enforcement. Specially trained NMFS special agents and officers are also engaged in the detection of fishing violations.

No vessel may participate in a federally managed, commercial permitted fishery in waters under the jurisdiction of the United States without a valid authorization to fish. However, vessels may participate in some other fisheries in the United States without express

authorization, including certain open access fisheries and others that do not fall under the umbrella of a Federal or state fishery management plan.

U.S. law requires vessel operators to maintain logbooks for some but not all fisheries. In light of the fact that logbooks can offer important evidence relating to IUU fishing, consideration should be given to expanding the range of fisheries in which logbooks are required.

The IPOA calls upon coastal States to avoid licensing a vessel to fish in its waters with a history of IUU fishing.

As noted above, the United States requires express authorization to fish in most, but not all, federally managed fisheries. The existence of prior convictions for illegal fishing does not preclude an applicant from obtaining a permit. However, if a prior fine for such a violation is unpaid or if a permit sanction exists, the new permit will be denied until the prior penalty is paid or the permit sanction is served. Under the Magnuson-Stevens Act, the transfer of a vessel to a new owner does not extinguish the prior or existing permit sanctions, although the change in ownership may be taken into account in considering whether to issue a new permit.

U.S. vessels wishing to fish on the high seas must obtain a NMFS permit. NMFS checks for prior U.S. fisheries violations before issuing such permits. The existence of such violations is taken into account in determining whether to issue a permit, but is not an absolute bar.

5.1 Cooperation with Neighboring Coastal States

The United States is party to a number of bilateral and multilateral agreements designed to foster cooperation in fisheries enforcement. A U.S.-Canadian bilateral enforcement agreement, for example, calls for the imposition of equivalent penalties to be imposed on vessels of either State that fish illegally in waters of the other State. This has eliminated the need for “hot pursuit” and lengthy at-sea enforcement incidents along maritime boundaries on both the Atlantic and Pacific coasts of the U.S. and Canada. Annual meetings held pursuant to this agreement provide opportunities to share information about specific cases that have arisen and to discuss ways to improve coordination overall. U.S. and Canadian fisheries enforcement officials also meet regularly on a more informal basis to consider specific situations, including the handling of fisheries enforcement matters in sensitive boundary areas.

In general, the United States believes that its cooperation with Canada in combating IUU fishing in our respective waters has been quite successful. The one way in which such cooperation could and should be improved would be to resolve disputes involving the location of maritime boundaries in areas where fishing takes place, including in Dixon Entrance (between Southeast Alaska and British Columbia) and near Machias Seal Island (between Maine and New Brunswick).

The United States and Mexico also cooperate on fisheries enforcement matters, but do not yet have a formal agreement in this field. Fisheries enforcement officials share information regularly on an informal basis, particularly with respect to pending investigations concerning

alleged illegal fishing by vessels of one State in waters of the other State. The two States have also been attempting to make more routine the handling of cases involving small Mexican vessels (*lanchas*) operating in the Gulf of Mexico that cross into waters under the jurisdiction of the United States and fish illegally. An effort is also underway to develop a U.S.-Mexico fisheries enforcement agreement modeled on the U.S.-Canada and U.S.-Russia agreements.

The United States has engaged in ad hoc efforts to cooperate with neighboring coastal States in the Caribbean region on fisheries enforcement matters. Such efforts could be expanded and made more regular.

The United States and Russia have developed a broad and growing cooperative relationship on fisheries enforcement matters in the Bering Sea and North Pacific Ocean, under the umbrella of a 1988 Agreement on Mutual Fisheries Relations. Particular attention has focused in recent years in deterring and penalizing incursions by Russian and third-party vessels across the U.S.-Russia maritime boundary line in this region. Since 2002, two meetings of fisheries law experts have taken place between Russia and the United States. The United States is continuing to explore ways to strengthen this relationship even further.

5.2 Fishing by Foreign Vessels in Waters under the Jurisdiction of the United States

The Magnuson-Stevens Act provides the legal framework under which foreign fishing vessels may operate in the U.S. EEZ. Generally speaking, no foreign vessel may fish in the U.S. EEZ unless the flag State has concluded a “Governing International Fishery Agreement” (GIFA) with the United States.¹⁵ At the present time, only a small number of States have GIFAs in force with the United States.

Vessels of flag States that have GIFAs in force are eligible to receive allocations of surplus fish stocks for direct harvesting in the U.S. EEZ. Those vessels may also participate in certain types of “joint venture” fishing operations in partnership with U.S. companies. With the exception of 2001, there have been no surplus stocks available for direct harvesting by foreign vessels since the early 1990s. A small amount of “joint venture” fishing does take place each year.

GIFAs contain a number of provisions designed to prevent IUU fishing by foreign vessels operating in the U.S. EEZ, including mandatory reporting, use of observers and VMS in certain situations and a number of other controls. Given the low level of foreign fishing in the U.S. EEZ in recent years, and the high level of U.S. monitoring required of those operations, the United States is confident that no IUU fishing is taking place by foreign vessels authorized to fish in waters under the jurisdiction of the United States.

If unauthorized foreign fishing in waters under the jurisdiction of the United States is detected, the vessel will typically be seized and brought into a U.S. port where prosecution will

¹⁵ The Magnuson-Stevens Act contains a few limited exceptions to this rule. For example, a 1981 treaty between the United States and Canada permits vessels of each State fishing for albacore tuna to operate in the EEZ of the other State (Pacific Coast Albacore Tuna Vessels and Port Privileges, May 26, 1981, U.S.-Canada, 33 U.S.T. 615).

occur, including high monetary fines and possible vessel and catch seizure. In certain instances, the evidence of the violation will be given to the vessel's flag state so that it may prosecute the offense rather than U.S. authorities.

Recommendations:

- Pursue a fisheries enforcement agreement with Mexico.
- Consider expanding advance notice of arrival requirements to foreign fishing vessels seeking access to U.S. ports.

6 PORT STATE MEASURES

The IPOA calls upon States to regulate access to their ports in such a way as to prevent, deter and eliminate IUU fishing.¹⁶ U.S. law generally prohibits foreign vessels from landing or transshipping fish in U.S. ports. The primary exception to this rule concerns ports in U.S. territories in the Pacific Ocean.¹⁷ With respect to those ports, at least, the provisions of the IPOA are relevant to the United States.

The IPOA calls upon port States to require vessels seeking access to their ports to provide advance notice of entry into port, a copy of their authorization to fish and details of their fishing trip, in order to determine whether the vessel may have engaged in or supported IUU fishing.

The U.S. Coast Guard requires an Advanced Notice of Arrival (ANOA) 96 hours prior to entry into U.S. ports for all vessels greater than 300 gross tons. This requirement does not presently capture most fishing vessels, as they are usually less than 300 gross tons. It would be desirable to extend this requirement to cover fishing vessels, or at least to cover foreign fishing vessels seeking access to U.S. ports. Given that at least some foreign fishing vessels below 300 gross tons land or transship fish in U.S. ports, it would also be desirable to extend the ANOA system to cover them as well. Finally, it would be desirable to require all foreign fishing vessels seeking access to U.S. ports to provide a copy of their authorization to fish, details of their fishing trip and quantities of fish on board.

The United States does not currently require foreign fishing vessels seeking access to U.S. ports to have a logbook on board. A logbook helps establish where the vessel has been, and where and when it was fishing. This sort of evidence is critical in certain types of cases involving IUU fishing, especially in the absence of universal VMS requirements. Accordingly,

¹⁶ The IPOA generally considers "port access" to mean admission for foreign fishing vessels to ports or offshore terminals for the purpose of, *inter alia*, refueling, resupplying, transshipping and landing. The IPOA further notes that, in accordance with international law, a port State should grant port access to vessels for reasons of *force majeure* or distress or for rendering assistance to persons, ships or aircraft in danger or distress.

¹⁷ The 1981 U.S.-Canada treaty on albacore fishing allows Canadian vessels to land albacore tuna in certain designated U.S. ports in Washington and Oregon (Pacific Coast Albacore Tuna Vessels and Port Privileges, Annex B, May 26, 1981, U.S.-Canada, 33 U.S.T. 615).

the United States should consider adopting this requirement, so that the absence or destruction of a logbook will be a violation.

The IPOA calls upon each port State, where it has clear evidence that a vessel granted access to one of its ports has engaged in IUU fishing, not to allow the vessel to land or transship fish in its ports. The port State should also report the matter to the flag State of the vessel. Similarly, if inspection of a foreign vessel in port gives reasonable grounds to suspect that the vessel has engaged in or supported IUU fishing in areas beyond the jurisdiction of the port State, the port State should report the matter to the flag State and, where appropriate, to the relevant RFMO. In such circumstances, the port State may take additional action against the vessel with the consent of, or upon the request of, the flag State.

If the United States has sufficient evidence of IUU fishing in waters *within U.S. jurisdiction* by a foreign flag vessel and the vessel evades apprehension initially, the vessel would be arrested if it subsequently entered a U.S. port. The United States would notify the flag State. If the fisheries violation involved a stock that is within the purview of a RFMO, the United States might also inform the RFMO as well, depending on the circumstances.

If a foreign vessel is suspected of IUU fishing in waters *beyond U.S. jurisdiction* and subsequently seeks access to a U.S. port, the United States would first determine whether the elements of the Lacey Act have been met.¹⁸ If so, the United States would ask the other State(s) involved¹⁹ to investigate the matter and to see if they would support a U.S. prosecution. International cooperation through various means, such as the MCS Network and Interpol, may also come into play, as United States works with other States in documenting and prosecuting cases against IUU fishers who cross jurisdictional lines.

The United States generally informs flag States of the outcome of U.S. prosecutions in such cases. This information is typically passed through diplomatic channels.

The IPOA encourages port States to inspect foreign fishing vessels in their ports, to collect certain information in the course of such inspections and to share that information with the flag State and, where appropriate, a relevant RFMO.

NMFS boards some foreign vessels in U.S. ports to examine and verify fish landings, but the number of such inspections could be increased and the system for determining which vessels to inspect could be improved. Both actions would require additional resources.

In the field of marine safety, the U.S. Coast Guard administers a program that could serve as a model for a more robust system of targeting and boarding foreign fishing vessels in U.S. ports for the purpose of determining compliance with fisheries conservation regulations. The

¹⁸ As discussed above, the Lacey Act makes it unlawful for a person subject to U.S. jurisdiction (which would include a foreign fishing vessel in U.S. port) to have harvested or transported fish in violation of another State's law or in violation of a treaty.

¹⁹ Those other States would include the flag State and could include one or more coastal States, if there is evidence that the vessel engaged in IUU fishing in waters subject to the jurisdiction of other coastal States.

Port State Control program, which covers commercial vessels greater than 300 gross tons, begins with the ANOA. Upon receipt of an ANOA, the U.S. Coast Guard assesses the vessel's owner, flag, classification society, vessel type and history to determine their boarding priority. Vessels are assigned points in each of these categories and are boarded and inspected for compliance with vessel safety standards according to their priority. NMFS could develop a similar targeting system to determine which foreign fishing vessels are likely to have engaged in IUU fishing and therefore which ones should be a higher priority for inspection.

The IPOA calls upon States to establish and publicize a national strategy and procedures for port State control of vessels involved in fishing and related activities.

As discussed above, there are very few U.S. ports in which foreign vessels can land or transship fish. Accordingly, it may not be necessary for the United States to establish a "national" strategy and procedures for port State control in this context. However, it may be desirable for the United States to develop a more coordinated approach to ensure that foreign vessels do not land or transship IUU-caught fish in those ports that are open to them. A more coordinated approach would include extension of the ANOA requirements to cover such vessels and strengthening of the scheme for inspecting such vessels upon arrival in port.

Coordination among Port States

The IPOA suggests a number of ways in which port States might better coordinate their activities to combat IUU fishing.

The United States would certainly support efforts by port States to coordinate their activities in combating IUU fishing. However, because so few U.S. ports are open to foreign vessels for landing or transshipping fish, the involvement of the United States in such efforts may not be very great. One exception to this might involve the Central and Western Pacific region. Foreign vessels are permitted to land or transship fish in several U.S. ports in this region. The United States should actively promote the development of coordinated port State controls to combat IUU fishing in this region, including through the Central and Western Pacific Fisheries Commission that is in the process of being established.

Although the United States is not a major port State for fisheries in other regions, we are interested in pursuing the possibility of developing agreements for those regions on port State measures. Ideally, such agreements would involve members of any RFMO as well as non-members whose ports are known to be used for landing or transshipping fish regulated by the RFMO.

The United States believes that RFMOs could also formalize their co-operation on this issue. Such cooperation would be essential in areas where IUU fishing is the concern of two or more RFMOs. For example, the conservation and management of fish resources in the Atlantic Ocean is the responsibility of several RFMOs, which are already cooperating and exchanging information regarding IUU fishing in their respective convention areas. A comprehensive port

State system would mean that IUU fishing within the area of responsibility of one RFMO should trigger action by port States that are members of other RFMOs.

A regional system of port State measures could also entail common procedures for inspection, qualification requirements for inspection officers and agreed consequences for vessels found to be in non-compliance. Possible common elements could also include, in addition to denial of port access and/or landing and transshipment of catch, denial of requests for fishing access to coastal State waters and denial of requests for vessel registration.

Recommendations:

- Consider adopting requirement for foreign fishing vessels seeking access to U.S. ports to have a logbook on board.
- Strengthen the scheme for inspecting foreign vessels landing or transshipping fish upon arrival in port.
- Consider requiring all foreign fishing vessels seeking access to U.S. ports to provide a copy of their authorization to fish, details of their fishing trip, and quantities of fish on board.
- Support continued work in FAO on the development of binding agreements on port State measures as contained in the report of the Expert Consultation to Review Port State Measures to Combat Illegal, Unreported and Unregulated Fishing held in Rome in November 2002.

7 INTERNATIONALLY AGREED MARKET-RELATED MEASURES

The IPOA recognizes that the denial of market access to products harvested by IUU fishers can be an effective tool in combating IUU fishing, provided that such measures are agreed internationally and are implemented in accordance rules relating to international trade, particularly rules of the World Trade Organization.

As a matter of policy, the United States considers the use of trade restrictive measures to be an extraordinary action. When considered necessary, the United States prefers measures that are developed and implemented multilaterally over those that are developed or used unilaterally. In some situations, however, it may be necessary for a State to adopt trade restrictive measures on a unilateral basis, in accordance with WTO rules.

The United States recognizes that the most effective trade measures to combat IUU fishing are likely to be those that are developed and implemented under the auspices of multilateral organizations with well-defined conservation goals articulated as first principles. The United States has actively participated in the establishment of such measures (including import prohibitions, landing restrictions, and catch certification and trade documentation schemes) through our membership in various RFMOs. As discussed more fully below, the

United States believes that RFMOs should expand the use of such measures to combat IUU fishing. In addition, the trade tracking and certification mechanisms under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) offer another effective means to deter IUU fishing involving endangered or threatened marine species.

7.1 Catch Documentation and Certification Schemes through RFMOs

The United States fully implements a range of measures adopted for this purpose by RFMOs. For example, we prohibit the importation of certain tuna and tuna-like species from specific States in accordance with recommendations adopted by ICCAT. We also require imports of certain fish and fish products to be accompanied by documents mandated by RFMOs such as ICCAT and CCAMLR.

The IPOA calls upon States to cooperate, including through relevant global and regional fisheries management organizations, to adopt appropriate multilaterally agreed trade-related measures, consistent with the WTO, that may be necessary to prevent, deter and eliminate IUU fishing for specific fish stocks or species. Such measures may include documentation schemes and certification requirements.

The United States has taken the lead in promoting the use of catch documentation and certification schemes in a number of RFMOs such as CCAMLR, ICCAT, and the IATTC. CCAMLR and IATTC have adopted catch certification programs and ICCAT has adopted statistical document programs for several species. These programs are under continuous review in an effort to improve their effectiveness.

The IPOA provides that certification and documentation requirements should be standardized to the extent feasible, and electronic schemes developed where possible, to ensure their effectiveness, reduce opportunities for fraud, and avoid unnecessary burdens on trade.

The United States actively supports this goal and has been working with FAO, certain RFMOs and other States to achieve it. The United States considers the implementation of harmonized electronic catch certification and documentation schemes tailored to fit the needs and requirements of each RFMO to be the most effective way to accomplish this objective. For example, the United States is working with other members of CCAMLR is moving towards converting its documentation scheme for toothfish to an electronic format. Meanwhile, CCAMLR is developing ways to make its forms more efficient and comprehensive.

7.2 Consideration of General U.S. Certification Program for Fish and Fish Products

To combat IUU fishing more broadly, the United States might consider a certification requirement crafted in such a way so as not to be excessively burdensome to industry. Under such a scheme, all imports of fish or fish products would be considered legal if the flag State could certify that the fish has been harvested in accordance with their own fisheries management regime/requirement; or from an area governed by a RFMO or other regional body; or on the high seas in accordance with international standards. If, however, it has been harvested outside of

existing regulations, then it should not be certified as legal and appropriate action should be taken.

The IPOA calls on States to take steps to improve the transparency of their markets to allow the traceability of fish and fish products.

The U.S. seafood market is among the most transparent in the world. However, given the size of that market, it is difficult to conceive of a workable system that would allow people to trace every fish and fish product from the moment of its harvest until the moment of final sale. Still, it may be possible to allow for the tracking of additional fish and fish products through the U.S. market, including through the development of additional catch documentation schemes. Where feasible, of course, such schemes should be standardized.

7.3 Post-Harvest Practices: Law Enforcement, Education, and Outreach

The IPOA calls upon States to take measures to ensure that their importers, transshippers, buyers, consumers, equipment suppliers, bankers, insurers, other services suppliers and the public are aware of the detrimental effects of doing business with vessels identified as engaged in IUU fishing and should consider measures to deter such business. Such measures could include, to the extent possible under national law, legislation that makes it a violation to conduct such business or to trade in fish or fish products derived from IUU fishing. Similarly, the IPOA calls upon States to ensure that their fishers are aware of the detrimental effects of doing business with importers, transshippers, buyers, consumers, equipment suppliers, bankers, insurers and other services suppliers identified as doing business with vessels identified as engaged in IUU fishing.

As noted above, the U.S. Lacey Act makes it unlawful for persons subject to U.S. jurisdiction (which would include many persons involved in the transactions covered by this provision of the IPOA) to engage in many of these transactions if the fish or fish product was harvested in violation of another State's law or in violation of a treaty.

The United States has not provided "administrative guidance" to its fisheries sector in the way that some countries have done and is not likely to do so in the future. Furthermore, the use of so-called "black lists," especially those created unilaterally, raises issues of due process. However, it may be possible to implement the sort of public education and business restrictions envisioned by the IPOA through multilateral lists compiled by RFMOs. "White lists" are less problematic.

The United States could do more in terms of outreach and education. Consideration should be given how best to publicize information on offenders and to share information on illegal activity. Fish trade shows may provide additional opportunities to raise awareness of relevant U.S. industry representatives of the problems of doing business with IUU fishers. The United States Government could also work in partnership with industry organizations and the environmental community to the same end.

7.4 Trade Data Collection and Standardization of Certification Schemes

The IPOA calls upon States to work towards using the Harmonized Commodity Description and Coding System for fish and fisheries products in order to help promote the implementation of the IPOA. The United States is currently using this system.

In a number of instances unregulated and unreported fisheries are also unidentified fisheries. In this regard, the United States joined with other States in March 2002 at the FAO in developing a draft Strategy for the Improvement of Reporting on Status and Trends in Commercial Fisheries. One element of this draft strategy is to expand the customs codes into products and fisheries not currently covered by codes and then to expand the depth and breadth of FAO's reporting on these fisheries, such as those for sharks or coral reef species, that currently operate without any tracking of volumes and movement of trade. The United States is a supporter of this strategy and will work for its adoption and implementation at FAO.

7.5 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES provides another potential tool to combat IUU fishing. The United States has been a leader in encouraging closer cooperation between the FAO and CITES to improve the applicability of CITES provisions to commercial fisheries and supports the early development of an MOU between the two organizations to formalize cooperation.

For species listed on Appendix II of CITES, international trade is regulated but not banned. Before a significant number of commercially harvested fish species could be successfully listed on CITES Appendix II, a number of technical issues need to be resolved. The United States nevertheless believes that the listing of some commercially harvested fish species on Appendix II could help to prevent IUU fishing for those species. One example is queen conch, a species for which there is no multilateral mechanism yet in place to regulate its harvest. With respect to species covered by RFMOs, an Appendix II listing has the possibility to complement RFMO efforts through addressing issues such as non-member fishing (CITES currently has 160 parties) and through its potential for multilateral trade action on States found out of compliance with CITES provisions. CITES also has the ability to address IUU fishing for non-listed species through resolutions and discussion papers.

This proposed MOU between FAO and CITES should result in FAO discussing a number of these Appendix II technical issues and providing advice to CITES on their resolution. FAO-CITES cooperation should also facilitate the transfer of fisheries expertise to CITES Parties as they consider listing proposals for commercially exploited aquatic species. The United States would also like to see greater cooperation between FAO and CITES lead to increased law enforcement capacity from both organizations in line with the MCS provisions of the IPOA. As a tool for tracking trade and as a legally binding instrument, CITES Appendix II can be useful in accurately cataloguing and deterring IUU fishing. The United States thinks that CITES could be used under certain circumstances as an effective adjunct to traditional fisheries management.

regimes. CITES cannot replace fisheries management, but can be an effective tool to control and track and regulate trade.

7.6 Subsidies and IUU Fishing

The Johannesburg Plan of Implementation of the World Summit on Sustainable Development makes an explicit link between subsidies to the fishing sector and IUU fishing and calls upon States to eliminate those subsidies through the process currently underway in the WTO. A number of organizations including the WTO, OECD, FAO, and APEC are looking at subsidies, and the United States is actively participating within each of these to reduce harmful subsidies in the fisheries sector. In particular, the OECD Committee on Fisheries is initiating a new three-year work program that will look at the role of subsidies in IUU fishing.

Recommendations:

- RFMOs should expand the use of market-related measures to combat IUU fishing, including new import prohibitions, landing restrictions, and catch certification and trade documentation schemes.
- Consider whether other RFMOs might usefully adopt similar catch documentation or certification schemes similar to those in use in ICCAT, IATTC and CCAMLR.
- Work within RFMOs to ensure that any such new schemes are standardized, to the extent possible, to aid efficiency and transparency.
- Urge other governments, at the bilateral, regional and global levels, to take all steps necessary, consistent with international law, to prevent fish caught by IUU vessels being traded or imported into their territories.
- To fight IUU fishing more broadly, the United States might consider a general certification requirement for fish and fish products crafted in such a way so as not to be excessively burdensome
- Develop a plan, with the input of all stakeholders, on education and outreach to raise awareness with U.S. industry and the public on the consequences of doing business with IUU fishers.
- Consider expansion of specificity of customs codes used within the Harmonized Commodity Description and Coding System for stocks identified as being subject to significant IUU trade (e.g. sharks and coral reef fish species) and forwarding of any improved information on these stocks to FAO for inclusion in its reporting.
- Support adoption and implementation of the Draft Strategy for the Improvement of Reporting on Status and Trends in Commercial Fisheries at FAO as a tool to identify IUU fishing activities.

- Support the utilization of CITES as another vehicle to address IUU fishing, especially through the development of an MOU between FAO and CITES, and provide financial and technical assistance to its implementation.
- Urge the OECD, in its new three-year work program to follow up on the call in the WSSD Plan of Implementation to eliminate subsidies contributing to IUU fishing through identification of what subsidies are most likely to contribute to such activities.

8 IMPLEMENTATION OF IPOA THROUGH RFMOS

The IPOA calls upon States to ensure compliance with and enforcement of policies and measures having a bearing on IUU fishing that are adopted by any relevant RFMOs by which they are bound. States should cooperate in the establishment of such organizations in regions where none currently exist.

The United States is a member of numerous RFMOs and works actively to ensure that individuals and vessels subject to U.S. jurisdiction comply with measures adopted by those organizations. In addition, the United States was a leading force in the negotiation of new fisheries conservation and management agreements for highly migratory species in the central and western Pacific (WCPFC) and other fisheries resources in the Southeast Atlantic (SEAFO).

Some RFMOs have made great strides in recent years to address IUU fishing, several of which are discussed above. Other descriptions can be found on the websites of the various RFMOs or FAO publications.²⁰ The United States nevertheless believes that RFMOs can do more to combat IUU fishing. In the coming years, the United States will continue to pursue additional initiatives within the RFMOs of which it is a member to combat IUU more effectively. We believe that aggressive and appropriate guidelines have been set forth in the 1995 UN Fish Stocks Agreement. We believe that all RFMOs and their member nations should carefully consider the relevant provisions of this agreement and work towards prompt incorporation of these provisions into each of the world's RFMOs.

9 SPECIAL REQUIREMENTS OF DEVELOPING COUNTRIES

The United States strongly supports the call in the IPOA for States to cooperate to support training and capacity building to developing countries so that they can more fully meet their commitments under the IPOA and obligations under international law. The United States is involved in a number of multilateral programs designed to carry out this charge and will seek more opportunities in the future.

Working with FAO, the United States has been able to donate the initial funds for a project under FAO's FishCODE program, entitled "Support for the Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated

²⁰ See, e.g., FAO Technical Guidelines for Responsible Fisheries, *Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing* (2002).

Fishing (IUU Fishing).” FishCODE is a new approach to organizing extra-budgetary contributions to FAO designed to implement the 1995 FAO Code of Conduct for Responsible Fisheries and its associated international plans of action, including the IPOA on IUU fishing. Some of the initial funds provided by the United States have already been used to support the publication of FAO Guidelines on implementation of the IPOA. The remaining funds will be used to promote MCS capacity building activities, host a conference on flag of convenience and port of convenience issues, and promote regional cooperation in the Pacific through work with the Asia Pacific Economic Cooperation (APEC).

As a Party to the 1995 UN Fish Stocks Agreement, the United States is committed to meeting its obligations in Part VII of the Agreement to provide assistance to developing States. When fully implemented, Part VII provisions, calling for many of the same capacity building activities as those in the IPOA, will have a significant impact on IUU fishing activities in States Parties to the Agreement. To further implementation of Part VII, the United States joined with other States Parties, at an informal meeting held in New York, 30-31 July 2002, in calling for the establishment of a voluntary trust fund at the global level that will facilitate the implementation of the Agreement for developing States Parties. The 2003 UN General Assembly Resolution on the UN Fish Stocks Agreement commits the UN General Assembly to establish the fund and urges parties at their next informal consultations to develop detailed terms of reference for such a fund.

The United States has taken an active role in regional fora seeking to address the problem of IUU fishing and facilitate implementation of the IPOA. Meeting in Seoul, Korea in April 2002, Ministers of the 21 APEC economies jointly declared their intention to eliminate IUU fishing activities from the APEC region.

We are also working regionally and bilaterally to improve fisheries MCS activities. In April 2002, the United States conducted a fisheries enforcement workshop for States in the Western Indian Ocean Region. U.S. law enforcement officials conduct training activities on both a bilateral and regional basis that provide training on at sea enforcement, shore-based enforcement, and the development of legal regimes that contribute to capacity building in developing countries. For other activities undertaken by the United States specific to the recommendations in Paragraph 86, please see the relevant section of the NPOA.

One thing that has become clear in discussions in APEC, at the UN and elsewhere is that there are a number of activities underway to assist developing countries in meeting their global, regional, and bilateral fisheries obligations. These efforts can be duplicative and at the same time leave important activities unfinished. The United States commits to seek out opportunities to coordinate donor efforts to ensure the maximization of benefit from scarce assistance resources. Greater cooperation is needed if we are to effectively implement the ideas in paragraphs 85 and 86 of the IPOA.

In particular, the United States commits to work with the World Bank, the Global Environment Facility, other international financial institutions, and interested private sector donors, to increase donor funds in support of the IPOA. IUU fishers are a threat to the economic

development and food security of coastal communities. The United States believes that projects that include components for the reduction of IUU fishing activity will have direct consequences for long-term poverty alleviation in many developing countries.

Recommendations:

- Work with other States Parties to the UN Fish Stocks Agreement to establish a voluntary trust fund to support developing States Parties to the Agreement and provide a substantial initial contribution to the fund.
- Support efforts in RFMOs and on a bilateral basis to assist developing countries in meeting their fisheries obligations.
- Expand U.S. participation in regional and sub-regional fisheries organizations and arrangements based predominantly in developing countries (such as IOTC, WECAFC and CECAF) with the aim of identifying opportunities and synergies for new and ongoing cooperation activities.
- In support of the Seoul Oceans Declaration, the United States commits to develop a project proposal for the APEC Fisheries Working Group for funding in 2005 that will build capacity in developing economies.
- Conduct follow-up from East African Fisheries Enforcement Workshop and hold a second regional workshop for South East Asia and the Pacific Islands.
- Engage World Bank, Global Environment Facility, and other donor organizations to identify priority areas for new programs in fisheries and ensure that where projects are already in development, they will be developed according to sustainable fisheries practices.
- Within the context of zero nominal growth, seek a reallocation of FAO regular budgetary resources to the Fisheries Department to allow greater responsiveness and broader coverage from FAO in implementing the IPOA.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
1. Agricultural Marketing Act of 1946 (7 U.S.C. § 1621 - 1627)								
Consumer marketing statute.	Secretary of Agriculture is authorized to inspect, grade and certify agricultural products. §1622(9h). Secretary may cooperate with other branches of government in carrying out his duties. §1624.	None specified	U.S. interstate commerce jurisdiction (no geographic limitation specified).	All persons, natural and juridical (individual, partnership, corporation, association or any other legal entity subject to the laws of the U.S.), for misrepresentation of inspection.	\$1,000 or imprisonment for one year, or both.		Not clear how inspection under the Act relates to ability to deter/prevent IUU fishing under the IPOA.	It may be useful to apply a similar port inspection requirement to establish origin of all fish products being imported to/transported through the U.S., if such a requirement does not already exist under another statute.
2. American Fisheries Act of 1998 (Pub. Law 105 - 277)								
Fisheries regulation statute.	Forfeiture of all fish taken in violation of regulations. §212.	Pollock	Bering Sea and Aleutian Islands Management Area.	Owners of vessels holding an official fisheries endorsement (through agent or representative) for falsification or concealment of a material fact; false statement or representation with respect to the eligibility of the vessel.	\$130,000 for each day of fishing.	Amount of monetary penalty seems sufficient.	Eligibility requirements for a fishery endorsement: at least 75% of the aggregate interest in owner entities must be owned and controlled by citizens of the U.S. Does not apply to vessels engaged in fisheries in the EEZ under the authority of the Western Pacific Management Council established under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1852(a)(1)(H)) or to a purse seine vessel engaged in tuna fishing in the Pacific Ocean outside the U.S. EEZ or pursuant to the South Pacific Regional Fisheries Treaty. Particular attention shall be paid to enforcing the citizenship requirements for vessels measuring over 10 feet in registered length, especially in contexts of ownership/interest transfer and borrowing in all forms (specific exemptions addressed in the Act). 46 U.S.C. §	Consider non-monetary penalties, perhaps including loss or suspension of endorsement.

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							12102(c).	
3. Anadromous Fish Products Act (16 U.S.C. 1822 note, Section 801(f))								
Fish products import regulation statute.	Secretary of Treasury, pursuant to direction from the President and following certification by Secretary of Commerce, may direct that all unlawfully taken anadromous fish products brought into the U.S., or their monetary value be forfeited. §1978(e)(2). Secretary of Treasury is responsible for enforcement generally.	All anadromous stocks	U.S. interstate commerce jurisdiction (no geographic limitation specified).	All persons, natural or juridical engaging in unlawful import of illegally caught fish.	\$12,000 for first violation; \$27,000 for each subsequent violation.			It may be useful to incorporate port state provisions comparable to those contained in the IPOA (paras. 51-58) into the statute (requiring all vessels entering into a U.S. port to carry logs documenting where fish were caught), and appropriate enforcement authorization if such does not already exist.
4. Antarctic Marine Living Resources Convention Act of 1984 (16 U.S.C. 2431 - 2444)								
Treaty implementation statute (Convention for the Conservation of Antarctic Marine Living Resources).	Authorized officer may search any person, place, vehicle, vessel, etc. reasonably suspected of involvement in harvesting of marine living resources in violation of the Convention. Evidence, marine living resources, equipment and vessels so engaged may be seized and are subject to forfeiture. Enforcement rests jointly with the Secretary of Commerce and the Secretary of the Department in which the Coast Guard is operating.	All Antarctic marine living resources.	U.S. federal jurisdiction (over acts committed in Antarctic region).	Any person engaged in harvesting of marine living resources in Antarctica.	Civil: Up to \$6,000 for acts prohibited by §2435, and up to \$12,000 for acts knowingly committed. Criminal: Only for non-harvest violations – \$50,000 or imprisonment for up to 10 years, or both, for each “offense” committed - defined as violation of §2435 (4), (5), (6) or (7).	Monetary penalties seem too low.	The Secretary of State, with the concurrence of the Secretary of Commerce and the Director of the National Science Foundation, is authorized to decide on behalf of the U.S. whether to accept a conservation measure adopted by the commission and to notify the Commission of any such decision. 16 U.S.C. § 2434(a)(1). The Secretary of State, with the concurrence of the Secretary, the Director of the National Science Foundation and the Secretary of the department in which the Coast Guard is operating, is authorized to the establishment of a system of observation/inspection, and to interim arrangements pending establishment of such	Consider increasing monetary penalties from \$6K/\$12K to an amount that would have greater impact. Because few U.S. flag vessels are engaged in harvest of species regulated under the Act, the vast majority of species are imported into the U.S. Importers are permitted. Permit sanction should be considered for importers who import illegally-caught. Maximum penalty should be increased to \$200,000 if maximum penalty is increased under Magnuson-Stevens Act.

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							a system. 16 U.S.C. § 2434(b).	
6. Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5103(b))								
Fisheries conservation and management statute.	In the absence of an approved and implemented fisheries management plan under the Magnuson-Stevens Act, Secretary of Commerce may issue and enforce regulations to govern fishing in the EEZ in a manner consistent with a national coastal fisheries management plan and § 301 of the Magnuson Act.	All fisheries resources potentially within scope of Secretary's authority.	U.S. EEZ defined in the statute as extending from 3NM (extending from the seaward boundary of each of the coastal states) to 200NM from the baseline from which the territorial sea is measured. 16 U.S.C. § 5102(6).	All persons subject to liability provisions of Magnuson-Stevens Act.	Follows the regime in Sections 307-311 of the Magnuson-Stevens Act (16 U.S.C. §1857-61) regarding prohibited acts, civil penalties, criminal offenses, civil forfeitures, and enforcement.		Statute empowers the executive to comply with the IPOA in the U.S. EEZ.	Enforcement of the Atlantic Coastal Fisheries Cooperative Management Act follows the regime established by the Magnuson-Stevens Act.
7. Atlantic Salmon Convention Act of 1982 (16 U.S.C. 3601 - 3608)								
Treaty implementation statute (Convention for the Conservation of Salmon in the North Atlantic Ocean).	Any vessel used, and any fish (or the value thereof) taken or retained in any manner, in connection with or as the result of the commission of an act which is unlawful under this shall be subject to civil forfeiture under §310 of the Magnuson-Stevens Act (16 U.S.C. §1860). Enforcement rests with Secretary of Commerce, in cooperation with the Secretary of the Treasury and the Secretary of the Department in which the USCG is operating.	North Atlantic Salmon	U.S. federal jurisdiction (over acts committed in the Atlantic Ocean north of 36 degrees north latitude).	Any person, or any vessel, subject to the jurisdiction of the U.S. that conducts directed fishing for salmon in waters seaward of twelve miles from the baselines from which the breadths of territorial seas are measured in waters of the Atlantic Ocean north of 36 degrees north latitude; or violates any provision of the Convention or this chapter, or any regulation promulgated thereunder. § 3606(a).	Follows the civil penalty regime under §308 and §309 of the Magnuson-Stevens Act (16 U.S.C. § 1858 - 1859).			Effectively implements treaty provisions. Not clear, however, why additional restrictions on directed North Atlantic salmon fisheries within the U.S. territorial sea are not regulated.
8. Atlantic Striped Bass Conservation Act (16 U.S.C. 1851 note)								
Fisheries	Moratorium on fishing	Atlantic	U.S. federal	All persons subject to the	Violators of the		Atlantic Striped Bass	Moratorium applies only to

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conservation and management statute.	of Atlantic Striped Bass within state coastal waters if that state has failed to implement the conservation plan adopted by the Marine Fisheries Commission. This moratorium may be enforced through the use of all powers available to authorized officers under §311 (b) of the Magnuson-Stevens Act (16 U.S.C. § 1861(b)). Enforcement authority rests jointly with Secretaries of Commerce and Interior.	Striped Bass.	jurisdiction (Atlantic states, territories and possessions).	jurisdiction of the United States.	moratorium shall be subject to penalties set out under §308 of the Magnuson-Stevens Act (16 U.S.C. §1858) (The civil penalty shall not exceed \$130,000 for each violation. Each day of a continuing violation shall constitute a separate offense. The Secretary or his designee shall assess the amount of the penalty by written notice).		Conservation Act, formerly set out as a note here, was subsequently reclassified to sections 5151 to 5158 of this title (16 U.S.C. § 1851 note). This statute is implemented under the Atlantic Coastal Fisheries Cooperative Management Act.	waters subject to state jurisdiction (3NM). Not clear whether measures protecting Atlantic Striped bass within federal jurisdiction exist. Enforcement of the Atlantic Coastal Fisheries Cooperative Management Act follows the regime established by the Magnuson-Stevens Act.
9. Atlantic Tunas Convention Act of 1975 (16 U.S.C. 971 - 971k)								
Fisheries and import regulation statute; Treaty implementation statute (International Convention for the Conservation of Atlantic Tunas 1966).	Any person authorized to enforce the provisions of this chapter and the regulations issued thereunder may board any vessel subject to the jurisdiction of the U.S. and inspect such vessel and its catch. If such inspection results in the reasonable belief that the vessel or any person on board is engaging in operations in violation of this chapter, such person may be arrested.	Atlantic highly migratory species (defined by regulation or Magnuson Act §1802(20).		Any person in charge of a fishing vessel or any fishing vessel subject to the jurisdiction of the U.S. engaging in fishing in violation of any regulation adopted pursuant to section 971d of this title; or any person engaging in shipping, transport, purchase, sale, offer for sale, import, export, or having possession or control of any fish which he should have known were taken or retained contrary to the recommendation of the Commission made pursuant to article VIII of the Convention and adopted as regulations pursuant to § 971d.	Civil penalty up to \$130,000. Each day of a continuing violation shall constitute a separate offense. All fish taken or retained in violation of the Statute or regulations thereunder may be seized and disposed of pursuant to an order of a court of competent jurisdiction, or, if perishable, in a manner prescribed by regulation of the Secretary.		Enforcement may be reciprocal with other treaty parties except that, where any agreement provides for arrest or seizure of persons or vessels under U.S. jurisdiction, it shall also provide that the person or vessel arrested or seized shall be promptly handed over to a U.S. enforcement officer or another authorized U.S. official. § 971f(a).	Regulations implemented pursuant to the statute will determine effectiveness.

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10. Authorized Law Enforcement Activities (14 U.S.C. 89)								
Authorizes the USCG to go on board any vessel subject to the jurisdiction or operation of any law of the U.S.	Authorizes the USCG to make inquiries, examinations, inspections, searches, seizures, and arrests for the prevention, detection, and suppression of violations of laws of the U.S.	N/A	High seas and waters subject to the jurisdiction of the United States.					Continuing enforcement will have the effect of deterring IUU fishing.
11. Certificate of Legal Origin for Anadromous Fish Products (16 U.S.C. 1822 note)								
Use of "certificates of legal origin" by multilateral or bilateral agreement to ensure lawful harvest	Secretary of Commerce issues regulations to implement agreements with nations that import or export anadromous fish or fish products to prohibit international trade in anadromous fish or fish products unless they are accompanied by a valid certificate of legal origin attesting that the fish or fish product was lawfully harvested.	Anadromous Fish	Fish harvested within the waters of any nation having anadromous fish populations or on the high seas	Any nation trading in unlawfully taken anadromous fish; fisherman on U.S. vessels harvesting anadromous fish	Certification under the Pelly Amendment (22 U.S.C. § 1978) that can result in import prohibitions on States trading in unlawfully taken anadromous fish or anadromous fish products.	No provision for penalty to US fishers who harvest without certificates.	It is unclear from the face of the statute whether any agreements have been negotiated under the Act or whether the agencies have issued regulations implementing its provisions. Other and different penalty provisions or enforcement authorities may be part of the regulations or treaty provisions.	Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. It may be preferable to establish in agreements negotiated under the Act a multilateral tribunal or other means of adjudicating trade in non-certified fish.
12. Civil Asset Forfeiture Reform Act of 2000 (Pub. L. 106-185, 114 Stat. 202 (2000))								
Reforms civil forfeitures and puts in place greater protections for personal property.	Investigation reports must be completed and forwarded to NOAA General Counsel for Enforcement (GCEL) within 30 days from the date of seizure. In any case in which is not forwarded within 30 days from the seizure date, an explanation for the delay must be provided GCEL. After 50 days, the money <i>may</i> be returned to the respondent(s) if there is no reasonable explanation for the	N/A	N/A	N/A	N/A			To resolve outstanding issue regarding innocent owner defense, knowledge should be imputed to owners in violations involving possession under the doctrine of respondeat superior.

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	delay. Seized property or money <i>will</i> be returned in cases that are forwarded after 60 days. A claimant may file a claim at any time before the deadline set forth by the Agency.							
13. Communications Assistance for Law Enforcement Act (103 P.L. 414, 108 Stat. 4279, 47 U.S.C. 1001)								
Requires the cooperation of telecommunications carriers in the interception of wire, oral, or electronic communications.	Enforcement is by the federal court issuing the surveillance order under 18 U.S.C. §2516.	N/A	None specified.	Any telecommunications common carrier (47 U.S.C. §153) subject to the jurisdiction of the U.S. as well as any supplier of services or equipment (subject to the jurisdiction of the U.S.) that may be required to enable the compliance of the carrier.	Civil penalty up to \$10K per day or violation.	The civil penalty amounts provided seem sufficient.	Amends title 18 to make clear a telecommunications carrier's responsibility to cooperate in the interception of communications for law enforcement purposes.	U.S. law currently is sufficient in this area.
14. Crimes and Criminal Procedure, Wire and Electronic Communications and Interception of Oral Communications (18 U.S.C. 2510)								
Establishes procedure for obtaining judicial authorization to intercept wire, oral or electronic communications and establishes conditions on the use of such intercepted communications.	Authorizes the Attorney General or his/her designee to authorize application by a federal enforcement agency to a federal judge for authorization to conduct interception pursuant to a federal investigation.	N/A	Applies to all interstate or foreign communications as well as all communications affecting interstate or foreign commerce.	N/A	N/A			U.S. law currently is sufficient in this area.
15. Dolphin Protection Consumer Information Act (16 U.S.C. 1385)								
Consumer product labeling statute	Civil penalties, equitable relief	Tuna and Dolphins	The Eastern Tropical Pacific Ocean and other tuna fisheries in which an association between dolphins and tuna exists	Any producer, importer, exporter, distributor, or seller of any tuna product exported from or offered for sale in the U.S. Vessel captains, Designees of the Secretary,	1) up to \$10,000 per violation (according to 15 U.S.C. § 45); 2) Civil penalties not to exceed	\$10,000 penalty for first set of liable parties may not be sufficient to effectively prevent, deter	This Act appears to involve IUU fishing only to the extent that the liable parties are involved in internationally-banned activities, such as driftnet fishing on the	The Act could more fully provide for publicity of fishers, and associated corporate interests, that violate its provisions. See, IPOA, Para. 32. Statute does a good job of making liable parties throughout the

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				representatives of the Inter-American Tropical Tuna Commission, and authorized representatives of participating nations.	\$120,000.	and eliminate IUU fishing.	high seas, or fishing into contravention of the international Dolphin Conservation Program.	production and distribution chain.
16. Driftnet Impact Monitoring, Assessment and Control Act (16 U.S.C. 1822 note (Section 4001 et seq.))								
Research, exchange of information, and cooperative enforcement	Through the Secretary of State and in consultation with the Secretary of the Department in which the Coast Guard is operating, the Secretary of Commerce negotiates with foreign governments conducting, or authorizing its nationals to conduct, driftnet fishing that results in the taking of US marine resources in the high seas of the North Pacific Ocean, for the purpose of entering into agreements for effective enforcement of laws, regulations, and agreements applicable to the location, season, and other aspects of the operations of the foreign government's driftnet fishing vessels.	Fish, shellfish, marine mammals, seabirds, and other forms of marine life or waterfowl found in, or which breed within, areas subject to the jurisdiction of the U.S., including fish that spawn in the fresh or estuarine waters of the U.S.	The North Pacific Ocean, including the Bering Sea, outside the EEZ of any nation.	Driftnet fishers operating in the North Pacific.	If negotiations do not result in a satisfactory agreement, certification under the Pelly Amendment (22 U.S.C. § 1978) that can result in import prohibitions of fish products from the offending country for such duration as the President determines appropriate.	No specific provision for penalty to U.S. fishers who use driftnets irresponsibly.	It is unclear from the face of the statute whether any agreements have been negotiated under the Act or whether the agencies have issued regulations implementing its provisions. Other and different penalty provisions or enforcement authorities may be part of the regulations or treaty provisions.	Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. It would be preferable to establish in agreements negotiated under the Act a multilateral tribunal or other means of adjudicating disputes involving the use of driftnets.
17. Eastern Pacific Tuna Licensing Act of 1984 (16 U.S.C. 972 - 972h)								
Domestic implementation of multilateral conservation agreements	Civil penalties, search warrants, power of search without a warrant, arrest, seizure, forfeiture.	Certain "designated species of tuna," as defined at 16 U.S.C. § 972.	The "Agreement Area" of the Eastern Pacific, as defined at 16 U.S.C. § 972(2) (creating a perimeter using a set of longitudinal coordinates).	Any person subject to the jurisdiction of the U.S., or any vessel subject to the jurisdiction of the U.S. Any person in possession of the regulated species if taken in violation of the Act.	Civil monetary penalties up to \$130,000.	Penalty of \$6,000 seems unlikely to deter violations and seems low in view of the fundamental obstruction to effective	The Act provides that a fisher whose harvest has been seized may provide a bond or other stipulation for the value of the harvest so that he may sell the harvest on the market. The bond or stipulation must be approved by a	A loophole in the statute appears to be the ability of a fisher to refuse boarding by U.S. enforcement agents. The fisher may know that the on-board harvest is in violation of the Act and would carry a penalty of up to \$30,000. Not allowing the agents to board carries only

APPENDIX: TABLE OF U.S. ENFORCEMENT AUTHORITIES

Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
						enforcement of refusal to allow an inspection of a vessel.	judge of the district court.	a \$6,000 penalty, and the penalty is not increased for subsequent violations.
18. Electronic Signatures in Global and National Commerce Act (106 P.L. 229, 114 Stat. 264)								
Facilitates the use of electronic records and signatures in foreign commerce.	N/A	N/A	None specified.	N/A	N/A		It is difficult to see the direct relevance of this Act on IUU fishing except inasmuch as it might require the Secretary to accept reports in electronic form.	U.S. law currently is sufficient in this area.
19. Endangered Species Act of 1973 (16 U.S.C. 1531 - 1544)								
Conservation and protection of endangered and threatened species and their ecosystems; treaty implementation statute (Convention on International Trade in Endangered Species of Wild Fauna and Flora).	Enforcement tools include: reward for information leading to enforcement action; search and arrest warrants; power to inspect items during importation or exportation; power to arrest upon reasonable grounds if violation committed within presence or view; seizure; forfeiture of fish, wildlife, and plants possessed in violation of Act, forfeiture of equipment upon conviction (16 U.S.C. § 1540). Regulation of international trade in protected species pursuant to CITES.	Any threatened or endangered species, as defined at 16 U.S.C. §1532.	No geographic limitation (prohibitions on taking apply to the "territorial sea" and the "high seas," 16 U.S.C. § 1538(B-C)).	Any person subject to the jurisdiction of the U.S. who trades in, possesses or distributes protected species. Exceptions by permit for Alaska natives; provisions for re-introduction of protected species.	Civil Penalties: up to \$30,000. Criminal violations: up to \$100,000 or up to one year imprisonment (maximum not available for all violations). Revocation of permits, licenses and agreements also available.	Penalties may be insufficient to deter illegal taking of protected species unless coupled with other statutes.	The agencies are authorized to charge reasonable fees for permits, certificates, and the costs of seizing and holding fish forfeited under the chapter. This seems as though it should also be included under the other authorities. Also, the Act contains a provision allowing more strict provisions of the MMPA to take precedence. Such provisions might be useful in other statutes in which there are overlapping jurisdictions.	One hole may be that takings are prohibited on only the "territorial sea" and on the "high seas." This may exclude the area of the coastal sea between the end of the territorial sea, which UNCLOS establishes at 12 nm, and the boundary of the EEZ at 200 nm.
20. Fur Seal Act Amendments of 1983 (16 U.S.C. 1151 - 1175)								
Treaty implementation statute (Interim Convention on the Conservation of North Pacific Fur	Boarding and inspection authority in U.S. waters or the high seas; arrest, search, and seizure authority with reasonable cause to believe violation is occurring; extradition of seized vessel and	Northern Pacific Fur Seal	Northern Pacific Ocean, including the Bering, Okhotsk, and Japan Seas.	Any person or vessel subject to the jurisdiction of the U.S. for the taking, or activities connected with such taking, of fur seals in violation of the Act; also, for refusal to allow boarding and inspection by authorized	Criminal fines and imprisonment for knowing violations of the Act: up to \$20,000 and/or imprisonment	Penalties may be insufficient to deter illegal taking of protected species.	The Act authorizes Commerce, the Treasury, the Coast Guard, and even state officers to enforce its provision as federal law enforcement agents.	Consider increasing penalty amounts.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Seals, as amended).	arrested person; authority for enforcement agents to testify against violators in foreign judicial proceedings at the request of foreign authorities; forfeiture of U.S. vessel and fur seals if used or taken in violation of the Act; authorization to issue warrants for probable cause.			officials. Exceptions by permit for Alaska natives.	for up to one year. Civil penalties for violations: up to \$11,000 per violation.			
21. High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1362, 1371, 1852, 1862, 1826a-c, 1861 note, 46 U.S.C. app. 1707a, 2110 note)								
Implementa- tion of multilateral moratorium through denial of port privileges and trade sanctions levied on non- conforming nations	Secretary of Commerce Denial of port privileges, denial of entry to U.S. waters, and imposition of trade sanctions.	All species affected by large-scale high seas driftnet fishing. All fish and wildlife, or products of these species, exported by nations that engage in such fishing.	The high seas (area beyond the EEZ of any nation).	Large-scale driftnet fishers with vessels under the jurisdiction of the U.S. or fishers with vessels under the jurisdiction of nations found to be using large-scale driftnets on the high seas. The nationals of non- conforming nations may also be made unable to export fish and wildlife to the U.S.	Penalties include the denial of port privileges and the denial of entry into U.S. waters. Possibility of trade sanctions on non- conforming nations.	Neither civil nor criminal penalties can be imposed on foreign vessels that are denied entry into U.S. waters. Thus, under the current law, it appears difficult to conceive of how the penalties could be made harsher.	Title IV of the Act includes amendments to the Magnuson Act and the MMPA. Summaries of those provisions are not included here; they have been left for discussion in the context of those Acts. Title V of the Act involves the repeal of a recreational boat tax and the creation of an automated tariff filing and information system. These statutes appear unrelated to fisheries conservation and have not been summarized here.	16 U.S.C. § 1826a authorizes "additional sanctions" to be used if the first sanctions provoke retaliation or are insufficient. It is unclear how the additional sanctions provide any different/more penalty than those at § 1826a. A more effective penalty might authorize the seizure and forfeiture of large-scale, foreign driftnet boats that enter U.S. waters or ports. No such provision is currently included in this Act.
22. High Seas Fishing Compliance Act (16 U.S.C. 5501 - 5509)								
Treaty Implemen- tation statute (Agreement to Promote Compliance with Interna- tional Con- servation and Management Measures by Fishing Vessels on	Enforcement tools include: rebuttable presumption that all living marine resources found on board a seized vessel were taken or retained violation of the Act; coordination with other agencies; grant of exclusive jurisdiction to U.S. district courts; authority to arrest with	All living marine resources commercially exploited on the high seas.	The high seas (area beyond the EEZ of any nation).	Any person subject to the jurisdiction of the U.S. for fishing without a permit, fishing in contravention of conservation measures or permit conditions, obstructing justice, or possessing or trading any living marine resource taken in violation of the Act. The owner or operator of a vessel that has been used in the	Civil Penalties: A) Not to exceed \$115,000 per violation (with the vessel used in commission of the offense liable in rem); B) Revocation, suspension, denial, or imposition of	The penalty provisions seem entirely adequate as long as they are not circumvented through the discretionary issuance of "citations," which apparently	Permit sanctions attach to the vessel so that they continue in force even after sale. § 5507(b)(3). The Secretary is granted the authority to conduct hearings, including issue subpoenas, and provision is made for judicial review and the collection of penalties.	Care should be taken to ensure that, in the interest of expediency, citations do not come to replace monetary penalties.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
the High Seas)	reasonable cause with or, under certain circumstances, without a warrant; authority to board, search, and inspect any high seas fishing vessel; authority to sell any seized marine living resource as long as proceeds are deposited with the court; authority to execute any warrant; authority to exercise "any other lawful authority;" discretion to issue citations in lieu of other actions.			commission of the above acts, or any person who has not paid assessed penalties, fines, or fees for any permit issued under any U.S. fisheries resource statute. Prohibitions apply to stateless vessels assimilated to U.S. nationality.	additional conditions or restrictions of a permit under the Act; Criminal penalties available for violations involving obstruction of justice, and threatening or assaulting an officer.	carry no monetary penalty, under § 5506(d).		
23. Lacey Act Amendments of 1981 (16 U.S.C. 3371 - 3378)								
Use of trade and possession prohibitions to hamper black markets in protected species	Civil penalties; criminal fines; imprisonment; revocation of permit; forfeiture and seizure of vessel, including its fishing gear, furniture, appurtenances, stores, and cargo if possessed, retained, or used in violation of Act (other than an act for which a citation is a sufficient sanction); rebuttable presumption that all living marine resources found on board a seized vessel are taken or retained violation of the Act; provision for sharing of enforcement tools between agencies; grant of exclusive jurisdiction to the U.S. district courts; authority to arrest with reasonable cause; authority to board, search, and inspect any high seas fishing vessel ; authority to sell any seized marine living resource as long as	Any fish or wildlife species regulated under any U.S. law, treaty, or regulation, or any Indian tribal law, or any State or foreign law. Exceptions for fisheries in U.S. waters subject to a Fishery Management Plan under the Magnuson-Stevens Act.	No geographic limitation (but specifically including the high seas and other areas of the "special maritime and territorial jurisdiction of the U.S." as defined at 18 U.S.C. § 7).	Any natural or juridical person subject to the jurisdiction of the U.S. for: 1) trade (including the offer or provision, or acceptance of guiding, outfitting, or other services or a hunting or fishing license for consideration) in any subject species taken, possessed, transported, or sold in violation of federal law, Indian tribal law, or state laws if in interstate or foreign commerce; 2) to possess within the special maritime and territorial jurisdiction of the U.S. any fish, wildlife, or plant taken in violation of the same laws; 3) to import or export or transport in interstate commerce fish or wildlife unless the container has been properly marked; 4) to falsely identify any fish, wildlife, or plant traded in foreign or interstate commerce	Civil Penalties: For knowing violations of Sec. 1 or Sec. 4: Up to \$12,000 for each violation. Criminal Sanctions: up to \$20,000 and/or imprisonment for not more than 5 years. Suspension or revocation of license or permit also available.	Civil and criminal penalties available may be insufficient to deter IUU fishing, depending on the type of violation.		The Lacey Act may be underutilized at this time. Increased enforcement would have the effect of deterring IUU fishing.

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	proceeds are deposited with the court; authority to execute any warrant; authority to exercise "any other lawful authority;" discretion to issue citations in lieu of other actions.							
24. Law Enforcement as a Primary Duty (14 U.S.C. 2)								
Requires the USCG to enforce or assist in the enforcement of all applicable federal laws of the U.S.		N/A	High seas and waters subject to the jurisdiction of the United States.		N/A			Continuing enforcement will have the effect of deterring IUU fishing.
25. Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 - 1882)								
Fisheries conservation and management statute	The Secretary of Commerce is authorized to promulgate regulations implementing the Act and enforce the Act and any implementing regulations. The U.S. shall cooperate directly or through appropriate international organizations with those nations involved in fisheries for highly migratory species.	The fish off the coasts of the United States, the highly migratory species of the high seas, the species which dwell on or in the Continental Shelf, and the anadromous species which spawn in United States rivers or estuaries.	Within the EEZ and beyond the EEZ as to anadromous fish stocks and the fishery resources on the continental shelf.	There is a very broad range of prohibitions under the Act and any person subject to the laws of the U.S. comes within the scope of liability.	Civil penalties up to \$130,000.	Monetary penalties seem too low considering the depleted condition of many of the species managed under the Act. Higher monetary penalties are needed to serve as a more effective deterrent.		Consider increase of civil penalties to \$200,000.
26. Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 - 1407)								
Marine mammal and marine mammal products conservation.	The Secretary may, by agreement, use the resources of another federal agency to enforce the Act and may also designate officers and employees of a state or U.S. possession to enforce the Act,	Marine mammals, and marine mammal products.	The territorial sea of the U.S. Also areas referred to as Eastern Special Areas, in the article of agreement between the U.S. and the Union of the Soviet Socialist Republics on the	Any person or vessel subject, to the jurisdiction of the U.S. on high seas, or on lands. (Including any port or harbor) To take or import marine mammals or marine mammal products. Also any transport, purchase, sell, export, or offer to do	Civil penalty: \$11,000 - \$12,000. Criminal penalty (knowing violations): up to \$20,000 and/or imprisonment for not more	Civil monetary penalties are insufficient.		Increased penalties are necessary for the Act to serve as an effective deterrent.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
	allowing them to function as federal law enforcement agents for this purpose.		maritime boundary. U.S.C. 1362(15).	so of any marine mammal or marine mammal products.	than one year. Any person involved in unlawful importation may be made to abandon the mammal or product. 16 U.S.C. 13759(a)(1).			
27. National Marine Sanctuaries Act (16 U.S.C. 1431 - 1439)								
Regulation and conservation of national sanctuaries.	Secretary of Commerce must conduct enforcement activities to carry out the Act. A person authorized to enforce the Act may board, search, inspect or seize a vessel, equipment, stores and cargo suspected of being used to violate the Act, and seize unlawfully taken sanctuary resources.	Species that depend upon these marine areas to survive and propagate.	Those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the U.S. exercises jurisdiction, including the EEZ.	Any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the U.S. for an amount equal to the sum of: 1. The amount of response costs and damages resulting from the destruction, loss, or injury and, 2. Interest on that amount calculated in the manner described under section 2705 of title 33. Also any vessel used to destroy, cause loss, or injure any sanctuary, shall be liable for response costs and damages.	Any person who violates will receive a civil penalty between \$109,000 - \$119,000. 16 U.S.C 1437(c)(1)	Civil monetary penalties seem sufficient.		Presumably patrolling and monitoring for illegal activity within the sanctuaries has the effect of deterring IUU fishing, at least within those areas.
28. National Security Act of 1947 (50 U.S.C. 401)								
Provides a comprehensive, coordinated program for national security.	Authorizes intelligence agencies to assist federal enforcement agencies with the collection of information outside the U.S. regarding individuals who are non-U.S. persons.	N/A	Outside U.S.	N/A	N/A			U.S. law currently is sufficient in this area.
29. North Pacific Anadromous Stocks Act of 1992 (16 U.S.C. 5001 - 5012)								
Treaty implementation statute (Convention for the Conservation of Anadromous	The Secretary of Commerce is responsible for administering provisions of the convention, the Act and any regulations issued. With the	Fish of the particular Anadromous Stock of the North Pacific Ocean.	The waters of the North Pacific Ocean and its adjacent seas, north of 33 degrees North Latitude, beyond the EEZ.	Any person or fishing vessel subject to the jurisdiction of the U.S. to: fish for anadromous fish in the convention area; retain on board or fail to return immediately to the	Civil penalty: \$108,000-\$120,000. Each day of a continuing violation shall constitute a			Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Stocks in the North Pacific Ocean).	Secretary of Transportation, the Secretary is responsible for coordinating the participation of the U.S. in the commission.			sea any anadromous fish taken incidentally in a fishery directed at non-anadromous fish in the convention area. Ship, transport, offer for sale, sell, purchase etc, of any anadromous fish taken or retained in violation of the convention.	separate offense. Criminal penalty: a fine under title 18, or imprisonment for up to 10 year (for injury to an officer) months, or both.			
30. Northern Pacific Halibut Act of 1982 (16 U.S.C. 773 - 773k)								
Treaty implementation statute (Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and the Bering Sea).	Any fishing vessel used and any fish taken in connection with the commission of a prohibited act are subject to forfeiture to the U.S. upon application to the Attorney General. The Act is enforceable by the Secretary of Commerce and the Secretary of the department in which the Coast Guard is operating.	Halibut	The maritime areas off the West coast of the U.S. and Canada described in Article I of the convention, and the EEZ.	It is unlawful for a person to violate the convention or the act and regulations or to resist or interfere with an enforcement officer in the conduct of a search, inspection or lawful detention. It is also unlawful for a foreign fishing vessel to fish for halibut in the EEZ or special areas, unless authorized. Any vessel engaged in catching, processing or transporting fish in convention waters, or a vessel outfitted to engage in an activity described above, and a vessel in normal support of a vessel described above.	Civil penalty between \$27,500 - \$30,000. Each day of a continuing violation shall constitute a separate offense. Criminal penalty of not more than \$50,000 or imprisonment for not more than 6 months, or both. Other criminal penalties available for non-fishing violations.	Civil monetary penalties seem a bit low.		Consider increase in penalty amounts.
31. Northwest Atlantic Fisheries Convention Act of 1995 (16 U.S.C. 5601 - 5612)								
Treaty implementation statute (Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries)	The Secretary appoints up to three members of the general council and the commission. The Secretary of State and the Secretary must jointly establish a consultative committee to advise on issues related to the convention.	N/A	Northwest Atlantic Fisheries	Any person or vessel to: Violate a regulation under the act or a measure binding on the U.S. under the convention; refuse to permit an officer to board a vessel to conduct a search or inspection etc, which interfere with, or delay an arrest for violation of the Act.	Civil penalty: \$108,000 - \$120,000, and/or permit sanction. Violations of paragraph 2-4, or 6 of subsection (a) of 16 U.S.C. §5606 shall be punishable under 16 U.S.C. §1859(b).	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
32. Pacific Salmon Treaty Act of 1985 (16 U.S.C. 3631 - 3644)								
Treaty implementation statute (Treaty between the Government of the United States of America and the Government of Canada Concerning Pacific Salmon).	The U.S. Secretary of State is authorized to: receive and transmit reports and other communications of and, to the commission panel. The Secretary of Commerce shall inform the state.	Pacific Salmon	Between the U.S. and Canada, the U.S. and the EEZ.	Any person or vessel subject to the jurisdiction of the U.S. who violates the Act, its implementing regulations, or a Fraser River panel regulation. A vessel used in the commission of a prohibited act shall be subject to forfeiture.	Civil penalty up to \$130,000. Criminal penalties of up to \$200,000 or imprisonment of up to 10 years.	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.
33. Pelly Amendment to the Fisherman's Protective Act of 1967 (22 U.S.C. 1978)								
Implementation of bilateral and multilateral conservation programs through certification and trade sanctions on offending nations.	Secretary of Commerce monitors and investigates fishing activity by foreign nationals and certifies countries whose nationals' fisheries activities diminish the effectiveness of an international fishery conservation program. Secretary of the Treasury enforces compliance with import bans by U.S. nationals.	All stocks subject to an international fisheries conservation program.	All waters subject to an international fisheries conservation program.	President may direct the Secretary of the Treasury to prohibit importation into the United States of any products from the offending country for any duration as the President determines appropriate and to the extent that such prohibition is sanctioned by the WTO or multilateral trade agreements. It shall be unlawful for any person subject to the jurisdiction of the United States knowingly to bring or import into, or cause to be imported into, the United States any products prohibited by the Secretary of the Treasury pursuant to this section.	Trade sanctions on certified nations. Any person violating the provisions of this section shall be fined not more than \$10,000 for the first violation, and not more than \$25,000 for each subsequent violation. All products brought or imported into the United States in violation of this section, or the monetary value thereof, may be forfeited.	Unilateral trade sanction authority used only as a last resort. Civil penalties seem sufficient.		Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. A first step is to establish and utilize multilateral trade-based compliance regimes within each of the international fisheries conservation organizations and arrangements.
34. South Pacific Tuna Act of 1988 (16 U.S.C. 973-973r)								
Treaty implementation statute (Treaty on Fisheries between the Governments	An officer authorized by the secretary, or the secretary of the department in which the Coast Guard operates.	Tuna	All waters in the treaty area except, waters subject to U.S. jurisdiction in accordance with international law, waters within	Any person or vessel to violate the Act or any of its regulations; use a vessel for fishing in violation of an applicable national law; violate terms and conditions of a fishing	Civil penalties: \$290,000-\$325,000. Criminal penalties: \$50,000-\$100,000 and	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
of Certain Pacific Island States and the United States of America).			closed areas, and waters within limited areas closed to fishing.	arrangement entered into under the treaty.	imprisonment from 6 months to 10 years.			
35. Sponge Act (16 U.S.C. 781 et seq.)								
Conservation of commercial sea sponges (Inactive)	The Secretary and/or his or her designee is authorized to make arrests and seize vessels and sponges.	Sponges	Gulf of Mexico or the Straits of Florida outside of State territorial limits	Any citizen of the U.S., or person owing duty of obedience to the laws of the United States, or any boat or vessel of the United States, or person belonging to or on any such boat or vessel.	Monetary fine of not more than \$500. Such fine shall be a lien against the vessel or boat on which the offense is committed.	Penalty amounts seem too low to serve as effective deterrent.		Increased penalties should be considered if illegal harvest is adversely impacting the species.
36. Stopping Vessels (14 U.S.C. 637)								
Guidance on use of force	Authorizes the USCG to stop vessels, including the firing of a warning signal and disabling fire at a vessel that does not stop, from a CG vessel or aircraft, or a DoD vessel with CG LEDET personnel embarked.	N/A	High seas and waters subject to the jurisdiction of the U.S.		N/A			Continuing enforcement will have the effect of deterring IUU fishing.
37. Tuna Conventions Act of 1950 (16 U.S.C. 951 - 961)								
Treaty implementation statute (Convention for the Establishment of an Inter-American Tropical Tuna Commission and Convention for the Establishment of an International Commission for the Scientific	The joint responsibility of the U.S. Coast Guard, the Department of the Interior and the Bureau of Customs.	Tuna and related species	N/A – No specific location.	Any person who knowingly ships, transports, purchases, sells,... etc. fish taken or retained in violation of the Act; fails to make, keep, or furnish catch returns, or other reports as required.	Civil penalty up to \$130,000 (16 U.S.C. §957)	Monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Investigation of Tuna).								
38. Whaling Convention Act of 1949 (16 U.S.C. 916 - 916I)								
Treaty Implementation statute (International Convention for the Regulation of Whaling).	Authorized enforcement officer or employee of the Dept. of Commerce, Coast Guard, U.S. Marshall, etc.	Whales	None specified.	Any person, subject to U.S. jurisdiction to engage in whaling in violation of the convention.	Except as to violations of Sec. 916c(a)(3), fines up to \$10,000 or imprisonment of not more than one year or both.	Monetary penalty amounts may be too low.	Not sure how big of a problem IUU fishing is with regard to whales. Whaling is among the most highly regulated activities involving harvest of living marine resources. The greatest threat to many whale species may be accidental takes (e.g., vessel strikes) .	If illegal whaling is a problem, penalty amounts should be increased. If most illegal taking of whales is inadvertent, higher penalties might encourage greater care.

APPENDIX B

BACKGROUND PAPER ON IUU FISHING

Background Paper on IUU Fishing¹

For NOAA Fisheries, Office of International Affairs
December 2007

This paper reviews United States and international law and policy regarding illegal, unreported, unregulated fishing.

The United States and other members of the international community have become increasingly concerned about fishing activity that does not respect national or international laws and regulations. Whether fishing in closed areas, exceeding catch limits, failing or misreporting catches, or reflagging fishing vessels to evade rules of responsible fishing, these operations undermine the efforts of compliant nations to foster sustainable fishing.

The United States has contributed both to the development of international tools to combat IUU fishing and to measures adopted by various regional fisheries management organizations (RFMOs) on this topic. At the national level, U.S. laws and regulations to combat IUU fishing are among the strongest, most comprehensive, and best enforced in the world.

What is IUU Fishing?

In general, illegal, unreported, unregulated (IUU) fishing is fishing that does not comply with national, regional, or global fisheries conservation and management obligations. The term covers a wide variety of illicit fishing conduct within national jurisdictions, areas governed by international agreements, and regional or subregional areas subject to conservation and management measures promulgated by RFMOs. Unregulated fishing may occur in international waters where no management authority or conservation measures are in place.

The United Nations General Assembly has described IUU as “one of the greatest threats to marine ecosystems [which] continues to have serious and major implications for the conservation and management of ocean resources.”² The U.S. Congress has declared that IUU fishing “may harm the sustainability of living marine resources and disadvantage the United States fishing industry.”³

The term “IUU” was first coined during sessions at Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in 1997 because of fishing activities in the convention area that were not compliant with the convention, namely toothfish catches.⁴ Discussions referred to both illegal and

¹ Portions of this appendix were drawn from a chapter written by S. Iudicello on international fisheries in *Ocean and Coastal Law*, in press, and from a background paper on the IPOA-IUU prepared by E.C. Brickleyer, Aquatic Resources Conservation Group. Both documents are on file with the author.

² General Assembly A/RES/60/31 ¶33 (2006).

³ 16 U.S.C. § 1801(a)(12).

⁴ See *infra* notes x-y and accompanying text (discussing CCAMLR).

unreported fishing by parties to the agreement and illegal and unregulated fishing by non-parties.⁵

The United Nations Food and Agriculture Organization (FAO) developed a definition of IUU fishing for its International Plan of Action to Combat IUU Fishing (IPOA) that includes three parts: illegal, unreported, unregulated. The three activities are distinguished in the definition:

3.1 Illegal fishing refers to activities:

3.1.1 conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;

3.1.2 conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or

3.1.3 in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.

3.2 Unreported fishing refers to fishing activities:

3.2.1 which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or

3.2.2 undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.

3.3 Unregulated fishing refers to fishing activities:

3.3.1 in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or

3.3.2 in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State

⁵ See FAO, STATE OF WORLD FISHERIES AND AQUACULTURE, SELECTED ISSUES 58 (2000); D.J. Doulman Illegal, Unreported and Unregulated Fishing: Mandate for an International Plan of Action, FAO Doc AUS:IUU/2000/4, at 13 (2000).

responsibilities for the conservation of living marine resources under international law.

3.4 Notwithstanding paragraph 3.3, certain unregulated fishing may take place in a manner, which is not in violation of applicable international law, and may not require the application of measures envisaged under the International Plan of Action.⁶

In the FAO view, IUU fishing includes activities such as poaching; noncompliance with license terms; unreported, misreported, and underreported fishing within coastal state jurisdiction; illegal fishing because of noncompliance with conservation and management measures of regional fishery bodies; and noncompliance with measures of treaties to which a nation is party. IUU fishing may include noncompliance with conservation measures by nonparties under a broad reading of the Compliance Agreement, the Straddling Stocks Agreement, and UNCLOS Articles 64 and 116-119.⁷

According to the FAO, IUU fishing comprises “complex webs of actions and entities.” It is not limited to illegal harvest, but includes shipment, processing, landing, sale and distribution of fish and fishery products, as well as support and provisioning of vessels, transport, financing, and a variety of transactions along the entirety of the supply chain.⁸ Nor is IUU fishing restricted to the high seas or deepwater fisheries. It can occur in areas under national jurisdiction or in convention areas managed by RFMOs. It can be as blatant as the overfishing of toothfish in the CCAMLR area by orders of magnitude greater than the legal, regulated catches, or as subtle as encroachment of industrial fishing vessels into zones reserved for small-scale, artisanal fisheries.⁹

The U.S. adopted its National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unregulated, and Unreported Fishing in 2004.¹⁰ It follows the IPOA definitions and describes for each of the plan elements what the United States is doing or will do to implement the plan. The U.S. National Plan of Action is organized along the same lines as the IPOA, including sections on All State Responsibilities, Flag State Responsibilities, Coastal State Measures, Port State Measures, Internationally Agreed Market State Measures, Measures to be Implemented Through Regional Fisheries Management Organizations, and Special Requirements of Developing States. Although IUU fishing may occur in all fisheries, the U.S. plan focuses on marine fisheries. As envisioned in the IPOA, the United States intends to review the implementation of this National Plan of Action at least every four years after its adoption.

⁶ U.N. Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (FAO IPOA-IUU).

⁷ See W. Edeson, “Tools to Address IUU Fishing: The Current Legal Situation,” FAO, Rome, 2000, pp 14-15.

⁸ FAO Committee on Fisheries. Combating illegal, unreported and unregulated fishing through monitoring, control and surveillance, port state measures and other means. COFI/2007/7

⁹ COFI/2007/7at 2.

¹⁰ U.S. Department of State, NOAA, NMFS, U.S. Coast Guard, U.S. Trade Representative, U.S. Fish and Wildlife Service, U.S. Customs Service, June 2004.

According to the National Plan of Action, “the United States has been – and will continue to be – among the leaders of the international community in efforts to address IUU fishing.”

Congress, in passing the Magnuson Stevens Reauthorization Act in 2006, also described measures to enhance U.S. leadership. International provisions of the law are aimed at both improving compliance with international fishery management regimes and enhancing fairness for the U.S. fleet. According to the Senate Report, the U.S. fleet is disadvantaged when “other countries do not impose the same stringent regime on their fishing fleets, either within their EEZs or on the high seas. . . . Even when agreements exist, implementation is slow, and management requirements are weak or ineffective in the face of economic pressures.”¹¹

The MSRA defines IUU fishing in Section 609 as:

Fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is a party, including catch limits or quotas, capacity restrictions, and bycatch reduction requirements;

Overfishing of fish stocks shared by the United States, for which there are no applicable international conservation or management measures or in areas with no applicable international fishery management organization or agreement, that has adverse impacts on such stocks; and

Fishing activity that has an adverse impact on seamounts, hydrothermal vents, and cold water corals located beyond national jurisdiction, for which there are no applicable conservation or management measures or in areas with no applicable international fishery management organization or agreement.

Congress directed NMFS to publish a definition of IUU by April 12, 2007. The agency published a final rule articulating its decision to “publish the definition exactly as set forth in section 403 of MSRA (new section 609(e)(3) of the Driftnet Moratorium Protection Act.”¹² NMFS has reserved the possibility of revising the definition as it proceeds with separate rulemaking for the IUU certification procedure.

Effects of IUU Fishing

The extent of the effects of IUU fishing is largely unknown because the activity itself is often clandestine. The FAO notes that while it is difficult to quantify the scale of the problem, for some important fisheries about 30 percent of the total

¹¹ S.Rpt. 109-229, Report of the Committee on Commerce, Science and Transportation on S. 2012, M-SFCMA Reauthorization Act of 2005. April 4, 2006.

¹² Illegal, Unreported, or Unregulated Fishing. NMFS/NOAA. Final Rule. 72 Fed. Reg. 18404 at 18405 (April 12, 2007).

catch is taken in IUU activities.¹³ In the most notorious example, IUU catches of toothfish in the CCAMLR convention area exceed reported fishing by a factor several times over.¹⁴ Based on reviews of IUU vessel lists and compliance reports of RFMOs that have measures to address IUU fishing, the activity occurs in numerous fisheries. Catches that exceed agreed limits, violate size requirements, gear restrictions or occur in closed areas have occurred in swordfish, tuna, pollock, salmon, squid, cod and whitefish fisheries, among others. Unreported catches occur in many fisheries, most notably tuna and toothfish. Unregulated catches are an emerging problem in high seas and deep sea fisheries where no regional body manages activity by distant water fleets.

The FAO reports that IUU fishing has widespread economic, social, and management consequences, not the least that it deprives legitimate fishers of potential catches. The activity undermines conservation and management, prevents rebuilding of depleted stocks, disadvantages and discriminates responsible fishers, and overall thwarts progress toward achieving goals of long-term sustainability.¹⁵

Those who engage in IUU fishing are also unlikely to observe other rules designed to protect the marine environment such as gear restrictions established to minimize waste and bycatch of non-target species, and prohibitions on fishing in known spawning areas. To avoid detection, IUU fishers often violate certain basic safety requirements, such as keeping navigation lights lit at night, putting other users of the oceans at risk.¹⁶ Enforcement actions often result in lengthy, dramatic, and dangerous ocean chases.¹⁷

Operators of IUU vessels also tend to deny crew members fundamental rights concerning the terms and conditions of their labor, including those concerning wages, safety standards, and other living and working conditions. Other rules flouted by IUU fishers include those associated with food safety and aquatic animal health, potentially putting consumers and fish populations at risk.

In addition to its detrimental economic, social, environmental, and safety consequences, the unfairness of IUU fishing raises serious concerns. By definition, IUU fishing is either an expressly illegal activity or, at a minimum, an activity undertaken with little regard for applicable standards. IUU fishers gain an unjust advantage over legitimate fishers operating in accordance with those standards. In this sense, IUU fishers are “free riders” unfairly benefiting from the

¹³ Bray, K. A global review of illegal, unreported and unregulated (IUU) fishing. Available at <http://www.oceansatlas.org/servlet/CDSServlet?status=ND1maWdp>. Last accessed Oct. 4, 2007.

¹⁴ Doulman, supra note 4 at 13.

¹⁵ Bray, supra note 11.

¹⁶ U.S. NPOA at 4.

¹⁷ News accounts of a February 2007 apprehension by the U.S. Coast Guard include descriptions of the fleeing vessel taking evasive maneuvers, including throwing nets into the propellers of the enforcement boats. The Chatham House site devoted to IUU fishing features 900 news items regarding enforcement, including high seas chases. http://www.illegal-fishing.info/sub_approach.php?approach_id=13&subApproach_id=50#news_anchor

sacrifices made by others for the sake of proper fisheries conservation and management.

From a management perspective, IUU fishing strikes at the heart of the precautionary approach because it deprives managers of information critical to stock assessments. IUU fishing limits the availability of catch information and distorts and devalues information gathered from compliant fisheries, reducing confidence in stock assessments. “The consequent application of lowered limits to allowable catches, in order to minimize stock overexploitation risks, further reduces stock availability to legitimate participants.”¹⁸ Experts estimate that on an international scale, the degree of underreporting can be up to 75 percent and may be as high as 100 percent for high seas deepwater stocks.¹⁹ When IUU fishing occurs in areas where coastal states license foreign vessels, the state is deprived of revenue.²⁰

By frustrating fishery management objectives, IUU fishing can contribute to the overfishing of fish stocks, impair efforts to rebuild such stocks, and, in principle, even lead to the collapse of a fishery. This, in turn, may result in lost economic and social opportunities, both short-term and long-term, and may diminish food security.

Moreover, IUU fishing “may have exacerbated the problem of discards and bycatch,” according to the FAO.²¹ Because vessels engaged in illegal activity are likely to use unsustainable fishing practices and non-selective gear, their impacts on non-target species and marine biodiversity are assumed to be greater. Deliberate disposal of gear to evade sighting or inspection contributes to the problem of ghost fishing and increased mortality of fish, seabirds, and marine mammals.²²

One disturbing trend reported by the FAO is the infiltration of “organized criminal enterprises into the fishing business. In addition, sophisticated syndicates of illegal fishers are engaged in the global trade, often designing and building vessels to their own requirements to avoid detection by surveillance.”²³

In passing the MSRA, the U.S. Congress noted that “unsustainable fishing practices of foreign fleets adversely impact fish stocks and undermine the effectiveness of the U.S. management measures.”²⁴ Among other adverse effects of IUU fishing, the report noted competition with cheaper imports, economic disadvantage, falling seafood prices, and bycatch of protected species.

¹⁸ Evans, D.W. The consequences of illegal, unreported and unregulated fishing for fishery data and management, at 2. Document AUS:IUU/200/12. 2000. Available online at <http://www.fao.org/docrep/005/Y3274E/y3274e0e.htm#bm14>. Last accessed Oct. 4, 2007.

¹⁹ Id.

²⁰ Doulman, *supra* note 4 at 4.

²¹ Id. at 16.

²² Id.

²³ COFI/2007/7 at 5.

²⁴ S.Rpt. 109-229, *supra* note 10 at 43.

Factors contributing to IUU fishing

Most of the factors that contribute to IUU fishing are economic. Noncompliant vessels and fleets can realize significant economic gains meeting the world demand for fish. As legal fishing is constrained as part of the international goal to reach long-term sustainability by reducing catches, IUU activity stands to be even more profitable. Excess capacity is believed to be a component of the economic motivation to fish illegally, compounded by payment of government subsidies.²⁵ Lack of flag state control over vessels on open registries, no supervision of their operations, transshipment at sea to freezer transports, isolated fishing areas, and lack of surveillance and enforcement all make IUU fishing worth the risk.

In a global review of trends in the use of flags of convenience (FOC),²⁶ the authors found that the implementation of the IPOA-IUU has had little effect in deterring FOC use. The review found that:

- It is no longer only aging vessels that operate under FOCs and open registries; new vessels appear to be constructed for the very purpose of IUU fishing under FOCs.
- Fourteen countries appear to have the greatest activity on open registries, with Belize, Panama, Honduras, and St. Vincent and the Grenadines at the top of the list of FOC countries for more than five years running.
- The number of large-scale vessels operating with “unknown” or convenience flags is growing.
- Owners and operators do not bother to hide behind fictitious residence or company names. They are often nationals of countries that are party to fishing agreements.
- The number of large-scale vessels, especially those equipped to fish for tuna exceeds the number of vessels authorized by various RFMOs to fish in their respective convention areas.

Enforcement issues that hamper efforts to deal with IUU fishing

Barriers to combating IUU fishing arise in the enforcement realm, but some are broader and stem from international legal issues. These include the status of states that are outside regional and global fisheries management instruments, and as such do not consider themselves bound by those obligations;²⁷ conflicting

²⁵ Doulman supra note 4 at 5.

²⁶ Gianni, M. and Simpson, W. (2005). The Changing Nature of High Seas Fishing: how flags of convenience provide cover for illegal, unreported and unregulated fishing. Australian Department of Agriculture, Fisheries and Forestry, International Transport Workers' Federation, and WWF International.

²⁷ Edeson, supra n. 7, suggests that although states have limited authority to reach vessels on the high seas other than their own vessels or nationals, the FAO Compliance Agreement and the Straddling Stocks Agreement may provide additional authority because they impose an obligation on states: “A State whose vessels fish on the high seas shall take such measures as may be necessary to ensure that vessels flying its flag comply with subregional and regional conservation

policy objectives; and the “corporate veil” that cloaks the ownership of vessels engaged in IUU fishing.²⁸ When pending instruments enter into force, including the Code of Conduct, the Compliance Agreement, the Straddling Stocks Agreement, and the IPOAs on birds, sharks, and capacity, compliant states will have additional leverage to reach activity by nonmember states on the high seas.

Specific enforcement issues include ineffective fleet monitoring, control, and surveillance; gaps in vessel registries; flag state apathy; ineffective port state authority; and obstacles to product tracking. Even where cooperative efforts among states lead to enforcement action,²⁹ the actual chase and capture of IUU vessels is dangerous.³⁰

Traceability of fish products is an effective trade-related measure to stop IUU fishing, as well as a barrier. These programs are expensive and require significant investment in enforcement resources and tracking protocols. However, in some cases a system may already be required for food safety and security, or public health purposes, as well as fishery management aims. Mandatory product certification and catch documentation are increasingly used in the course of monitoring and enforcement in fisheries, and as a means of excluding IUU products from consumer markets. The use of certification or catch document schemes is encouraged in the FAO’s International Plan of Action on IUU Fishing. The United States has taken the lead in promoting the use of catch documentation and certification schemes in a number of RFMOs such as CCAMLR, ICCAT, and IATTC. RFMOs that prescribe tracking systems include CCAMLR’s Catch Documentation Scheme for Toothfish, CCSBT’s Trade Information Scheme for Southern Bluefin Tuna, and ICCAT’s Bluefin Tuna Statistical Document Programme.

The United States has had country of origin labeling for many products for a number of years, including fish and seafood. Certification of Origin for tuna, and tuna tracking and verification systems developed in the context of tuna-dolphin programs, have been expanded to include bluefin tuna, swordfish, salmon, and other products.³¹ Examples where product tracking and certificates of origin have led to enforcement include toothfish, swordfish, bluefin tuna, and dolphin-safe tuna.³²

and management measures and that such vessels do not engage in any activity which undermines the effectiveness of such measures.” Article 18.1.

²⁸ See *supra* note 26 and accompanying text (discussing flags of convenience).

²⁹ Examples of cooperation include shared lists, regional vessel registers, VMS, joint surveillance, advance notice when IUU vessels are spotted, and joint at-sea operations. Many of these are detailed in COFI/2007/7, *supra* note x, pp. 3-6.

³⁰ See Chatham House website for news items on high profile chases and arrests in illegal fishing enforcement actions. Available at http://www.illegal-fishing.info/sub_approach.php?approach_id=13&subApproach_id=50&category_id=#news_anch or

³¹ Department of Agriculture. Mandatory Country of Origin Labeling of Fish and Shellfish; Interim Rule, 69 Fed. Reg. 59708 (Oct. 5, 2004).

³² Recent developments in traceability and labeling in fish trade are described in a 2006 report to COFI. COFI:FT/X/2006/6 p. 9. For a detailed description of Tuna Tracking and the Dolphin-Safe

Increased authority for port states, as suggested by the proposal for a binding instrument based on the Port State Model Scheme, may provide the mechanism to overcome numerous enforcement issues.

Domestic laws and regulations designed to end or reduce IUU fishing³³

The 2006 amendments to the Magnuson-Stevens Act and the High Seas Driftnet Fisheries Enforcement Act were not the first attempt by the U.S. Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international conservation regimes, though they differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. In the 1970s and 1980s, the U.S. used unilateral trade sanctions to push compliance with provisions of the International Whaling Commission. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers to pull turtle excluder devices (TEDs) as a means to release endangered marine turtles from trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The existing statutory framework was employed in these earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast, in the 1970s and 1980s the United States sought to use unilateral trade sanctions to push compliance with provisions of the International Convention for the Regulation of Whaling. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers who used turtle excluder devices (TEDs) as a means to release endangered marine turtles from their trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The earliest example of domestic law aimed at excluding imports of fishery products taken illegally is the Lacey Act of 1900. While not aimed specifically at fishery products, the purpose of the original Lacey Act was to strengthen state fish and wildlife laws by restricting commerce of illegal fish and wildlife. It was bolstered in 1926 by the Black Bass Act, which prohibited interstate shipment of species of bass when the fish were taken contrary to state law. The modern Lacey Act results from amendments in 1981 that repealed the earlier law and the Black Bass Act, and substituted new provisions that strengthen and expand the

Label, see Report to Congress under Section 305 of the Marine Mammal Protection Act, August 2007. The program has a website at <http://www.DolphinSafe.gov>

³³ Related materials are provided in additional Appendices: complete listings of U.S. law related to IUU fishing (Appendix A), U.S. actions to reduce bycatch (Appendix C), and tools to reduce global bycatch of cetaceans (Appendix E).

provisions against importation of illegally taken fish and wildlife.³⁴ The Lacey Act Amendments of 1981 are considered “one of the United States’ primary laws directly targeting illicit interstate or foreign trade in illegally taken species.”³⁵ The act prohibits import, export, transport, sale, possession or transactions in interstate or foreign commerce of any fish or wildlife “taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law.”³⁶ It includes specifications on package marking and record keeping,³⁷ and provides for penalties including forfeiture of product and equipment in felony cases.³⁸ The two-part prohibition requires evidence of a violation of domestic or foreign law and of trafficking: import, export, sale and so forth.³⁹ The law has been used extensively in a variety of wildlife resource cases, and NOAA has used it to prosecute foreign fishing vessels that import catch such as tuna that was caught without authorization in another country’s EEZ.⁴⁰

In 1971, Congress passed the Pelly Amendment to the Fisherman’s Protective Act of 1967. The amendment was in response to concerns regarding the inability of the International Whaling Commission to enforce its quotas. The Amendment directs the Secretary of Commerce to certify to the President if “nationals of a foreign country, directly or indirectly, are conducting fishing operations in a manner or under circumstances which diminish the effectiveness of an international fishery conservation program.”⁴¹ Although the President always retains the discretion to direct the Secretary of Treasury to impose trade sanctions, the Fisherman’s Protective Act specifies a prohibition on the importation of fish products from the certified country.⁴² The Secretary of Commerce made five certifications under Pelly in the ensuing 10 years, but no sanctions or import bans were ever imposed.⁴³

The Packwood Amendment to the Fishery Conservation and Management Act was passed in 1982, and added the additional sanction on certified nations of a 50 percent reduction in their allocation of fish from the U.S. EEZ.⁴⁴ The

³⁴ Pub. L. 97-79, 95 Stat 1073, 18 U.S.C. 3371 et seq. See, M. Bean. 1983. The Evolution of National Wildlife Law, rev’d edition, at 111.

³⁵ P. Ortiz. An overview of the U.S. Lacey Act Amendments of 1981 and a Proposal for a Model Port State Fisheries Enforcement Act. Prepared for Ministerially Led Task Force on IUU Fishing on the High Seas. November 2005, at 3.

³⁶ 18 U.S.C. 3372.

³⁷ 18 U.S.C. 3372 (b), (d).

³⁸ 18 U.S.C. 3374.

³⁹ Ortiz at 4.

⁴⁰ Ortiz provides a detailed description of the investigation, charge and trial aspects of the Lacey Act and uses the U.S. experience to develop a model enforcement law for port states.

⁴¹ 22 U.S.C. 1978(a)(1).

⁴² 22 U.S.C. 1978(a)(4).

⁴³ H. R. Rep. No. 95-1029, p. 9 (1978); 125 Cong. Rec. 22084 (1979) (remarks of Rep. Oberstar).

⁴⁴ 16 U.S.C. 1821(e)(2). At the time, foreign nations could receive an allocation in U.S. waters for fish not being harvested by U.S. fishermen. New language was added to in Section 201(d) in MSRA regarding the Total Allowable Level of Foreign Fishing (TALFF) as follows: “Allocations of the total allowable level of foreign fishing are discretionary, except that the total allowable level

amendment made the imposition of sanctions mandatory once a certification of “diminishing effectiveness” of the IWC was made.⁴⁵ It did not, however, change the standard for certification set out earlier in Pelly.⁴⁶

The Marine Mammal Protection Act of 1972⁴⁷ provides another example of how Congress has asserted itself in international wildlife conservation policy. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop “new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare.”⁴⁸ Congress also acknowledged that “unilateral action by the U.S.” affecting any species or subspecies of marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures.”⁴⁹

The MMPA prohibits “taking” (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act’s stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.⁵⁰ The U.S. Customs Service within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA states: “The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards.” This prohibition is mandatory. Subparagraph (A) requires the Secretary to “insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S.”⁵¹

shall be zero for fisheries determined by the Secretary to have adequate or excess domestic harvest capacity.”

⁴⁵ 16 U.S.C. 1821 (e)(2)(B)(ii)

⁴⁶ Japan Whaling Assn v American Cetacean Society. 478 US 221 (1986) at 227. Court held that even though sanctions were mandatory once a certification was made, the Secretary had a range of discretion in making the finding whether a nation’s fishing activity was sufficient to diminish the effectiveness of the IWC, citing “no reason to impose a mandatory obligation upon the Secretary to certify that every quota violation necessarily fails the standard.” At 228.

⁴⁷ 16 U.S.C. 1371-1407

⁴⁸ Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

⁴⁹ Report 92-863 Senate 92d Congress 2d Session page 10.

⁵⁰ 16 U.S.C 1372 (a)(2)

⁵¹ 16 U.S.C 1372 (a)(2)(A)

The importation ban provisions have been used only once outside the context of the “tuna-dolphin issue.”⁵² The history of U.S. action to reduce the number of dolphins killed in the course of tuna fishing operations in the Eastern Pacific Ocean is one of the most prominent examples of unilateral enforcement of conservation standards. The story is a lengthy one and will not be repeated here although the issue was one of the driving forces behind the enactment of MMPA.⁵³

The MMPA creates a ban on “the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards.”⁵⁴ In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This result precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).⁵⁵ The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.⁵⁶

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of “dolphin safe tuna” to mean “tuna harvested without dolphin mortality.” In 1997, Congress enacted the IDCPA,⁵⁷ which revised the criteria for banning imports by amending the MMPA.

⁵² Protecting marine mammals from direct takes for crab bait was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s.

⁵³ See, e.g. Michael J. Bean and Melanie J. Rowland, *The Evolution of National Wildlife Law* (3d ed. 1997) at 116-136; C.J. Carr and H.N. Scheiber, *Dealing with a Resource Crisis: regulatory regimes for managing the world’s marine fisheries*, in *How Globalization affects national regulatory policies*. Available at <http://repositories.cdlib.org/uciaspubs/editedvolumes/1/3>. 2002

⁵⁴ 16 U.S.C.A. § 1371(a)(2)

⁵⁵ Pub. L. No. 102-523, 106 Stat.3425 (1992).

⁵⁶ H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.

⁵⁷ Pub. L. No. 105-42, 111 Stat. 1122 (1997).

Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.⁵⁸

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.⁵⁹

A detailed discussion of the most recent progress in dolphin conservation, research, tuna tracking, labeling standards, and litigation can be found in the August 2007 NOAA Report to Congress.⁶⁰

The Driftnet Impact Monitoring, Assessment and Control Act attempts to reduce the mortality of non-target marine animals in driftnets used by foreign fisheries operating in the North Pacific Ocean and Bering Sea.⁶¹ It was passed in response to congressional findings that driftnets are "a fishing technique that may result in the entanglement and death of enormous numbers of target and non target marine resources in the waters of the North Pacific Ocean."⁶² The Driftnet Act was intended to increase efforts "to monitor, assess, and reduce the adverse impacts of driftnets."⁶³

The President signed Public Law 101-627, the Fishery Conservation Amendments of 1990, on 28 November 1990. Title I, Section 107, of the law amended Section 206 of the Magnuson-Stevens Fishery Conservation and Management Act (hereafter referred to as the Magnuson-Stevens Act) (16 USC 1826) to incorporate and expand upon provisions of the Driftnet Impact Monitoring, Assessment, and Control Act of 1987.

On 2 November 1992, the President signed Public Law 102-582, the High Seas Driftnet Fisheries Enforcement Act. Among other things, this Act is intended to enforce implementation of United Nations General Assembly Resolution 46/215,

⁵⁸ *Id.* at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).

⁵⁹ <http://swr.nmfs.noaa.gov/psd/embargo2.htm>

⁶⁰ Available online at <http://www.nmfs.noaa.gov/ia/intlbycatch/mammals.htm>.

⁶¹ Driftnet Act §4002, 16 U.S.C. 1822. On February 6, 1990, the House of Representatives passed H.R. 2061 amending the Magnuson Fishery Conservation and Management Act to prohibit "large-scale driftnet fishing" in U.S. waters. 136 Cong. Rec. H231 (daily ed. Feb. 6, 1990). The bill also instructed the Secretary of State to seek an international ban on large-scale driftnet fishing. *Id.* at 230.

⁶² *Id.* at §4002(1).

⁶³ *Id.* at § 4002(3).

which called for a worldwide driftnet moratorium beginning in December 1992. Public Law 104-43, the Fisheries Act of 1995, was enacted on 3 November 1995. Title VI of this law, the High Seas Driftnet Fishing Moratorium Protection Act, prohibits the United States, or any agency or official acting on behalf of the United States, from entering into any international agreement with respect to the conservation and management of living marine resources or the use of the high seas by fishing vessels that would prevent full implementation of UNGA Resolution 46/215.

A description of efforts the U.S. has made to carry out the policy expressed in these provisions is available in the annual report to congress [link]. The most recent report was made to Congress in August 2007 and describes efforts the United States has made to implement its own driftnet ban as well as the United Nations General Assembly driftnet ban and the Wellington Convention in the North Pacific, Mediterranean, Antarctic and globally. Activities have included coordination with other fishing nations, U.S. Coast Guard enforcement actions, negotiation of bilateral agreements, coordination with other nations to track vessels with the potential for high seas drift net fishing and research on the impacts of driftnet fishing on marine resources.

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in a 1989 amendment to the Endangered Species Act,⁶⁴ requiring the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. Currently, 16 nations have received positive certification under the law, 24 nations fish for shrimp in environmental conditions where sea turtles are unlikely to occur, so do not pose a threat, and 8 additional nations use small-scale technology that is determined not to pose a threat.⁶⁵ Any other nations catching shrimp are prohibited from importing it into the United States. The import ban has been applied to countries that failed to meet the requirements for positive certification, with mixed results.

In 1991, the United States issued guidelines for assessing the comparability of foreign sea turtle conservation programs with the U.S. program. The 1991 Guidelines also determined that the scope of Section 609 was limited to the wider Caribbean/western Atlantic region. In 1993, the United States issued revised guidelines providing that, to receive a certification in 1993, affected nations (those determined in 1991 Guidelines) had to maintain their commitment to require TEDs on all commercial shrimp trawl vessels.

The Earth Island Institute, a San Francisco-based environmental organization, filed suit in the U.S. Court of International Trade to force the Departments of State and Commerce to comply with certification procedures under federal law⁶⁶ for countries exporting to the United States shrimp caught in a manner that

⁶⁴ Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).

⁶⁵ Federal Register notice available online at: <http://www.thefederalregister.com/d/p/2007-05-22-E7-9884>.

⁶⁶ See, discussion of sea turtle conservation amendments to the ESA, *supra* n. 23.

harmed endangered sea turtles.⁶⁷ In December of 1995, the U.S. CIT found that the 1991 and 1993 Guidelines were contrary to law by limiting the geographic scope of the application of Section 609 to shrimp harvested in the wider Caribbean-Western Atlantic region. In April 1996, the U.S. Department of State published revised guidelines to comply with the CIT order of December 1995. The new guidelines extended Section 609 to shrimp harvested in all foreign nations, but confined positive certification to nations whose vessels used TEDs. In October 1996, the CIT ruled that the 1996 Guidelines were contrary to Section 609 because they allowed imports of shrimp from non-certified countries, if the shrimp was harvested with commercial fishing technology that did not adversely affect sea turtles. The CIT later clarified that shrimp harvested by manual methods, which did not harm sea turtles, could continue to be imported even from countries which had not been certified under Section 609, and refused to postpone the worldwide enforcement of Section 609.

Once application of the requirements expanded, several Asian nations were not able to obtain positive certification and import bans ensued.⁶⁸ In accordance with World Trade Organization (WTO) rules, the governments of Pakistan, Malaysia, India, and Thailand expressed their concerns to the WTO regarding the U.S. imposed embargo of shrimp imports. In 1996, they filed a complaint against the United States under WTO dispute settlement procedures, claiming that the U.S. law violated international trade law by barring the importation of their shrimp and shrimp products.⁶⁹ After pursuing informal consultations unsuccessfully, the complaining parties requested that a WTO Dispute Panel be convened and for the Panel to find that Section 609 of Public Law 101-162 and its implementing measures were contrary to the Governing Agreement on Tariffs and Trade (GATT). The dispute panel found the measure was inconsistent with the GATT, and the U.S. appealed. The WTO Appellate Body ruled in 1998 against the United States, finding that it had discriminated by giving Asian countries only four months to comply with the law, but giving Caribbean Basin nations three years. Even though the United States lost the case, the Appellate Body ruling recognized the validity of the U.S. Endangered Species Act and the rights of the United States to adopt environmental conservation measures as long as they are administered fairly.⁷⁰

In response to the original Panel and Appellate Body decisions, the United States revised its guidelines on the importation of shrimp, changing both the method and the schedule by which it evaluated turtle protection measures. Under the original guidelines, countries were certified if they implemented regulation to require shrimps to use TEDs. Under the Revised Guidelines, other regulatory

⁶⁷ *Earth Island Institute vs. Christopher*, 20 Ct. Int'l Trade 1221 (1996) vacated sub nom *EII v Albright*, 147 F2d 1352 (Fed Cir 1998).

⁶⁸ 61 Fed. Reg. 24998-24999 (May 17, 1996).

⁶⁹ *United States— Import Prohibition of Certain Shrimp and Shrimp Products*. WTO case Nos. 58 and 61. Ruling adopted on 6 November 1998. Available online at http://www.wto.org/english/tratop_e/envir_e/edis08_e.htm

⁷⁰ Report of the Appellate Body on *U.S. Import Prohibitions of Certain Shrimp and Shrimp Products*, Oct. 12, 1998, 38 I.L.M. 118 (1999)

approaches to the protection of sea turtles may substitute for TEDs, or a state may show that its shrimp fishing does not threaten sea turtles and on that basis obtain certification. Malaysia took the action back to the WTO in 2001, but the WTO Appellate Body held that the implementation steps had remedied any unfair discrimination and provided due process to exporting nations.⁷¹

Binding and nonbinding international instruments to address IUU fishing

UNCLOS

The 1982 U.N. Convention on the Law of the Sea (UNCLOS)⁷² is the overarching body of law covering every aspect of marine endeavours, from transportation to pollution to military issues to scientific research. In its sections addressing the protection of living marine resources, UNCLOS sets out the rights and responsibilities of coastal states and flag states with regard to fishing. While UNCLOS conferred economic rights over resources to coastal states, it preserved the traditional notion of freedom of fishing on the high seas. Although it only entered into force in 1994, “by the time UNCLOS was signed its provisions already constituted customary international law in the eyes of most countries.”⁷³

UNCLOS gives coastal states sovereign rights over resources out to 200 miles for the purpose of “exploring and exploiting, conserving and managing the natural resources, whether living or nonliving.”⁷⁴ A coastal nation must ensure, using the best scientific information available and conservation and management measures, that the living resources of its EEZ are not threatened by overexploitation.⁷⁵ UNCLOS adopts the concept of maximum sustainable yield (MSY) as the goal for maintaining or restoring exploited populations.⁷⁶ The coastal state is to collect, contribute, and exchange scientific information, as well as catch and effort statistics with other concerned states.⁷⁷ Access to the EEZ by foreign fleets is solely within coastal state discretion and subject to its laws and

⁷¹ USTR. U.S. Wins WTO Case on Sea Turtle Conservation. Available online at http://www.ustr.gov/Document_Library/Press_Releases/2001/October

⁷² The Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994) (hereinafter UNCLOS).

⁷³ David Hunter, James Salzman and Durwood Zaelke, “International Environmental Law and Policy,” Foundation Press (2002) at 659.

⁷⁴ UNCLOS, *supra* note 1 at Art. 56.

⁷⁵ *Id.* at Art. 61(2).

⁷⁶ *Id.* at Art. 61(3). “The concept of maximum sustainable yield recognizes that fisheries must be managed so that fish stocks can be sustainably caught year after year without causing the population of fish stocks to decline. 50 CFR 602.11(d)(1).... Scientists assume that population levels at 40% of unfished abundance (or biomass) are close to MSY, and that populations are overfished when levels fall below half the MSY level, roughly 20% of unfished abundance.” However, MSY does not necessarily signify healthy fish populations, and should be viewed as a minimum target used in conjunction with precautionary and ecosystem management approaches. See Tim Eichenberg and Mitchell Shapson, “The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development,” 34 Golden Gate University Law Review 587 at 624-626.

⁷⁷ UNCLOS, *supra* note 32, at Art. 61(5).

regulations, including requirements for licensing, observers, and other conservation measures. Compliance with conservation and management measures is also required.⁷⁸ UNCLOS directs states to seek coordinated measures necessary to conserve stocks that occur within the EEZs of two or more coastal states, or adjacent to their zones.⁷⁹

With regard to highly migratory species, UNCLOS calls for cooperation through international organizations and, where none exist, for the establishment of such organizations “with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone.”⁸⁰ UNCLOS even imposes new obligations on high seas fishing states. While freedom of fishing on the high seas continues in principle, UNCLOS can be read as imposing a dual responsibility on fishing nations: conservation and cooperation with coastal states.⁸¹

Even though UNCLOS provided a new framework for better fisheries management, extending coastal state jurisdiction to 200 miles has been insufficient to protect ocean fisheries. As fleets, technology, and the demand for fish and fishery products grew, it became clear by the late 1980s that the world’s fish populations could not withstand continuing rapid and often uncontrolled exploitation and development.⁸² Reports of violence, confrontations between fishing nations, uncontrolled fishing on the high seas, and—for the first time in history—several consecutive years of declines in world catches led to a series of meetings and conferences where fishery experts called for action to control high seas fishing. In 1991, the Committee on Fisheries (COFI)⁸³ called for the

⁷⁸ Id. at Art. 62.

⁷⁹ Id. at Art. 63.

⁸⁰ Id. at Art. 64.

⁸¹ Louis B. Sohn and Kristen Gustafson, *The Law of the Sea* 115 (1984). UNCLOS imposes duties on all states to take “such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas,” Article 117; to cooperate “in the conservation and management of living resources” of the high seas, Article 118; and to “maintain or restore populations of harvested species at levels which can produce maximum sustainable yield,” Article 119.

⁸² FAO. *The State of World Fisheries and Aquaculture 2004*. Available at http://www.fao.org/sof/sofia/index_en.htm. Last accessed 9 May 2006. See also, Reg Watson and Daniel Pauly, “Systematic Distortions in World Fisheries Catch Trends,” *Nature*, Nov. 29, 2001 at 534-536. China remains the largest producer by far and in 2002 produced 16.6 and 27.7 million tones from capture fisheries and aquaculture respectively. The top ten countries producing supply from capture fisheries in 2002 (in addition to China) were Peru, the United States, Indonesia, Japan, Chile, India, Russian Federation, Thailand and Norway. This group has not changed since 1992.

⁸³ “The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a world-wide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated.” Available at <http://www.fao.org/fi/body/cofi/cofi.asp>. Last accessed 3 Oct. 2007.

development of new concepts to foster responsible, sustained fisheries. This was followed in 1992 by an International Conference on Responsible Fishing in Cancun, Mexico, where participants adopted a Declaration stating that “States should cooperate...to establish, reinforce and implement effective means and mechanisms to ensure responsible fishing on the high seas.”⁸⁴ These efforts culminated in the 1992 U.N. Conference on Environment and Development in Rio de Janeiro (UNCED).⁸⁵

UNCED, or the “Earth Summit,” adopted a list of recommendations, including a chapter on the marine environment. Specifically, Chapter 17.C of Agenda 21 called for the U.N. to find ways to conserve fish populations and prevent international conflicts over fishing on the high seas, consistent with the provisions of the Law of the Sea.⁸⁶ Ten years later, at the World Summit on Sustainable Development, 191 nations agreed to a series of targets and timetables to restore depleted fish stocks, manage fishing capacity prevent IUU fishing, and create marine protected areas.⁸⁷

FAO Code of Conduct for Responsible Fisheries

The U.N. Food and Agricultural Organization (FAO) recognized the need for norms for international fisheries and in 1995 unanimously recommended “the formulation of a global Code of Conduct for Responsible Fisheries which would...establish principles and standards applicable to the conservation, management and development of all fisheries.”⁸⁸ In its 12 Articles, the Code of Conduct covers both policy and technical matters, including fisheries management, fishing operations, aquaculture, coastal area development, research, and trade.

The Code is voluntary, but some provisions are binding because of their relation to other legal instruments.⁸⁹ The Code is directed toward all persons concerned with conservation, management or development of fisheries, processing,

⁸⁴ International Conference on Responsible Fishing. Declaration of Cancun. Done at Cancun, Mexico 8 May 1992.

⁸⁵ United Nations Conference on Environment and Development (1992) (hereinafter UNCED)

⁸⁶ Agenda 21 (UN Doc. A/CONF.151/26 (Vol. I-III)).

⁸⁷ See generally, www.johannesburgsummit.org, and “Report of the World Summit on Sustainable Development, available at <http://ods-dds-ny.un.org/UNDOC/GEN/N02/636/93/PDF/No263693.pdf>. Although the WSSD set a number of ambitious fishery timetables, it generally fell short of expectations and mechanisms to ensure the timetables are met. See Eichenberg and Shapson, *supra* note 36 at 588 and 624-636.

⁸⁸ United Nations Food and Agriculture Organization. Code of Conduct for Responsible Fisheries. Rome. 1995 (hereinafter FAO Code of Conduct), available at <http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm> last visited Dec. 6, 2007, at Preface. For more detail on the Code of Conduct, See United Nations Food and Agriculture Organization, Fisheries Report No. 809. Report of the FAO Regional Workshop on the Elaboration of the National Plans of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing – South Asian Subregion, Bangkok 19-23 June 2006, Appendix E, David Doullman, 1995 FAO Code of Conduct for Responsible Fisheries: development considerations and implementation challenges, available at <ftp://ftp.fao.org/docrep/fao/009/a0717e/a0717e00.pdf> last visited Dec. 6, 2007.

⁸⁹ *Id.* at Art. I, 1.

marketing, or any “users of the aquatic environment in relation to fisheries.”⁹⁰ It provides principles and standards for every aspect of fisheries, from aquaculture to capture, from research to fishing operations, and from processing to trade.⁹¹

The Code attaches an obligation to the freedom to fish and calls for users of living marine resources to use them “in a responsible manner so as to ensure effective conservation and management.”⁹² Intergenerational equity appears in the fishery context for the first time as well, with the call for maintaining the diversity of fishery resources for “present and future generations” as well as for “food security, poverty alleviation and sustainable development.”⁹³ The Code urges effort controls, ecosystem management, the precautionary approach, selective fishing gear, habitat protection, and use of the best scientific information.⁹⁴ It calls not only for monitoring and control of flag state vessels, but also cooperation at all levels and among jurisdictions, as well as cooperation to prevent disputes.⁹⁵

States are urged to conduct transparent decision-making processes, education, and training, provide safe and fair working conditions, and recognize and protect the rights of subsistence, small-scale, and artisanal fishers.⁹⁶ Articles 7 through 12 provide specific guidance to states and interested parties on operational and technical matters. These have been further elaborated by a series of technical guidelines from the FAO. Many of the provisions supply further detail on the principles by setting out how, for example, application of the precautionary approach would occur in fishery management measures.⁹⁷

Management objectives include maintaining or restoring stocks to maximum sustainable yield,⁹⁸ avoiding excess fishing capacity, protecting biodiversity and endangered species, assessing and mitigating adverse impacts from human activities, and minimizing pollution, waste, discards, ghost fishing,⁹⁹ and bycatch.¹⁰⁰ The Code recommends assessment of whole ecosystems and

⁹⁰ Id. at Art. II, 2.

⁹¹ Id. at Art. I, 3.

⁹² Id. at Art. VI, 1.

⁹³ Id. at Art. VI, 2.

⁹⁴ Id. at Art. VI, 3-8

⁹⁵ Id. at Arts. VI, 10-12; VI, 15.

⁹⁶ Id. at Arts. VI, 13; VI, 16-18

⁹⁷ Id. at Art. VI, 5. See *infra* note 72 and accompanying text for further explanation of the precautionary approach.

⁹⁸ For an explanation of MSY see *supra* note 36.

⁹⁹ Capture of fish in the water by lost or abandoned fishing gear. Angela Somma for the National Marine Fisheries Service. “The Environmental Consequences and Economic Costs of Depleting the World’s Oceans.” 2003. Available at <http://usinfo.state.gov/journals/ites/0103/ijee/somma.htm>. Last visited 3 May 2007.

¹⁰⁰ Fish or other fauna (e.g. birds or marine mammals) that are caught during fishing, but which are not sold or kept for personal use. In commercial fishing these include both fish discarded for economic reasons (economic discards) and because regulations require it (regulatory discards). Organisation for Economic Co-operation and Development Glossary of Statistical Terms, 2001. Available at <http://stats.oecd.org/glossary/detail.asp?ID=252>. Last visited 3 October 2007.

interrelationships, and directs states to consider the whole stock unit over its entire area of distribution.¹⁰¹

At the same time the FAO was developing the Code of Conduct for Responsible Fisheries, it was responding to growing concerns, highlighted during the Earth Summit, about incursions on coastal states' EEZs, confrontations between distant water fleets and coastal states, violations of fishing agreements, reflagging to avoid compliance with applicable rules, and general dissatisfaction with increasing fishing pressure on the high seas that was likely to affect stocks or fishing fleets in adjacent EEZs. In November 1993, the parties to the FAO Conference 27th Session adopted the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Compliance Agreement).¹⁰² The parties made clear that the provisions of the agreement were to be made part of the Code, where the Compliance Agreement is referenced as one of the exceptions to the voluntary nature of the Code.¹⁰³

Compliance Agreement

The Compliance Agreement applies to all fishing vessels on the high seas, with a few exceptions for small vessels. Flag States are called upon to ensure that vessels flying their flag do not engage in activity that undermines the effectiveness of international conservation and management measures. The Agreement requires a state to authorize the use of its flag by fishing vessels, and states may not authorize vessels unless they can exercise control over them, nor may they authorize vessels with previous compliance problems. Significantly, the authorization to fly the flag constitutes an authorization to fish on the high seas and can be withdrawn: "Where a fishing vessel that has been authorized to be used for fishing on the high seas by a Party ceases to be entitled to fly the flag of that Party, the authorization to fish on the high seas shall be deemed to have been cancelled."¹⁰⁴ Parties are required to ensure that vessels are clearly marked, that they can be identified, and that they fulfil recordkeeping and information-sharing obligations. Parties are required to take enforcement measures against vessels acting in contravention to the Agreement, and are urged to use serious sanctions "of sufficient gravity as to be effective in securing compliance...and to deprive offenders of the benefits accruing from their illegal activities."¹⁰⁵ Parties are also directed to urge non-parties to adopt consistent measures and to exchange information about non-parties whose activities undermine the effectiveness of international conservation and management measures.¹⁰⁶

¹⁰¹ FAO Code of Conduct, *supra* note 48 at Arts II, VIII.

¹⁰² Food and Agriculture Organization of the United Nations. Agreement To Promote Compliance with International Conservation and Management Measure by Fishing Vessels on the High Seas. 1993. (hereinafter Compliance Agreement)

¹⁰³ FAO Code of Conduct, *supra* note 48 at Article I, 1.

¹⁰⁴ Compliance Agreement, *supra* note 62 at Art. III, 4.

¹⁰⁵ *Id.* at Art. III, 8.

¹⁰⁶ *Id.* at Art. V, 1.

U.N. Convention on Straddling and Highly Migratory Fish Stocks

The most significant outcome of the fishery management directives of Agenda 21 at the Earth Summit was the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish (Fish Stocks Agreement).¹⁰⁷ The Fish Stocks Agreement, which prescribes, “generally recommended international minimum standards” for conservation,¹⁰⁸ has been called a “sea change” in international fishery management.¹⁰⁹

Following a conference to address the problems of high seas fishing convened on April 19, 1993, delegates met six times in negotiating sessions over the next two years, concluding a document that was open for signing on 4 December 1995. As of April 2007, 66 states and the European Community had become parties.¹¹⁰

The Fish Stocks Agreement establishes detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks.¹¹¹ It calls for compatible measures and effective high seas compliance and enforcement. It was the first time an international fishing agreement shifted focus from producing maximum food for humans to sustainable fishing, ecosystem protection, conservation of biodiversity, and the precautionary approach to fishery management.¹¹² It also is the first agreement to produce an actual methodology for the precautionary approach, setting up

¹⁰⁷ The 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. U.N. Doc. A/Conf./164/37 (hereinafter Fish Stocks Agreement). Fish Stocks Agreement.

¹⁰⁸ Id. at Art. V(b).

¹⁰⁹ David Freestone. "International Fisheries Law: Who is Leading Whom?" The Magnuson Stevens Act: Sustainable Fisheries for the 21st Century? Tulane Law School Symposium, 7-9 Sept 1997. New Orleans, LA.

¹¹⁰ UN, Chronological List of Ratifications. April 2007. Available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm. Last visited 3 May 2007.

¹¹¹ In general, highly migratory species (HMS) have a “wide geographic distribution, both inside and outside the 200-mile zone, and ... undertake migrations on significant but variable distances across oceans for feeding or reproduction. They are pelagic species (do not live on the sea floor)...” UNCLOS Annex I “includes 11 tuna, 12 billfish species, pomfrets, 4 species of sauries, dolphinfish (*Coryphaena spp.*), oceanic sharks and cetaceans (both small and large).” FAO, Fisheries and Aquaculture Department. Highly Migratory Species Fact Sheet. Available at <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=13686>. Last visited 3 May 2007. See also UNCLOS, supra note 1 at Annex 1 and Art. 64.

¹¹² The precautionary approach includes these general features: identifying precautionary reference points for each stock, identifying in advance what measures will be adopted if reference points are exceeded, adopting cautious management for developing fisheries, monitoring impact on non-target species, and adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event. Freestone, supra note 69.

reference points, targets, and limits.¹¹³ Most significantly, it denies (for party nations) unqualified access to fish on the high seas.¹¹⁴

The Fish Stocks Agreement does all this without creating a new international structure, relying instead on existing regional agreements and organizations, and calling for mechanisms to strengthen them. Where such agreements or organizations do not exist, it directs states to create them.¹¹⁵ It also elaborates on the fundamental principle, established in UNCLOS, that states should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.¹¹⁶

The Fish Stocks Agreement provided for subsequent conferences to assess the adequacy of the provisions and propose ways to strengthen its implementation. These conferences have resulted in declaration of additional objectives such as considering the regional, subregional and global implementation. Informal consultations of state parties have met annually to continue review and oversight of the implementation of the Fish Stocks Agreement.¹¹⁷

UN Resolution Prohibiting Large-Scale Pelagic Driftnet Fishing

Large-scale high seas driftnets were recognized in the 1980s as a significant cause of incidental take of marine mammals, birds, turtles, and non-target fish species. This gear was finally banned internationally by U.N. resolution in 1990.¹¹⁸

Until they were outlawed, driftnets were used in the North Pacific and on the high seas where single vessels were capable of deploying driftnets up to 40 miles in length. In the North Pacific, 2 million miles (3.2 million km) of net were set per season between 1976 and 1989.¹¹⁹ With more than enough netting set each night to encircle the earth, not only were target fish caught (squid, tuna, and billfish) but approximately 100,000 dolphins and porpoises, as well as hundreds of thousands of seabirds, sharks, sea turtles, and salmon.

Although the driftnet fleet operated under requirements set by a multinational agreement relating to salmon fishing, that agreement did not address incidental

¹¹³ Fish Stocks Agreement, *supra* note 67 at Article 6, Annex II.

¹¹⁴ *Id.* at Article VVIII.

¹¹⁵ *Id.* at Art. VIII, 5

¹¹⁶ United Nations website. Available at

http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm. Last accessed 3 October 2007. Despite its many innovations, the Fish Stocks Agreement still suffers some of the limitations similar to other international fishery agreements such as the absence of major fishing nations and reliance on flag state enforcement. Eichenberg and Shapson, *supra* note 28 at 610.

¹¹⁷ See, e.g. resolutions, report of 2006 conference, ICSP5/UNFSA/REP/INF.1. 26 April 2006. Available at

http://www.un.org/Depts/los/convention_agreements/fishstocksmetings/icsp5report.pdf

¹¹⁸ UN Resolution A/RES/45/197, 21 December 1990. See also, UN Resolution A/RES/44/225, 22 December 1989.

¹¹⁹ Simon P. Northridge with the United Nations Environment Programme. "Driftnet fisheries and their impacts on non-target species; a worldwide review." FAO 1991.

take of birds and marine mammals.¹²⁰ Additionally, the fleets were frequently found by U.S. enforcement to be catching salmon and steelhead in violation of the provisions of the governing treaty. In 1987, due to continued compliance problems with the Japanese, Korean, and Taiwanese fishers, the U.S. Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act (Driftnet Act), calling for negotiations with nations driftnetting in the North Pacific to establish monitoring and enforcement agreements by June 29, 1989.¹²¹ If these nations refused to come to the bargaining table, they risked trade sanctions.¹²² The Driftnet Act required further research into the nature and extent of driftnet fishing to facilitate the development of effective solutions to the problem.¹²³

Driftnetting had also become a major concern in the South Pacific. After several nations had banned driftnet fishing in their waters, 20 nations in the South Pacific negotiated and signed the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (The Wellington Convention).¹²⁴ The Wellington Convention endorsed a ban on driftnets commencing in May 1991, prevented violators from crossing signatory nations' waters, and denied access to food, fuel, and facilities in these nations. The Wellington Convention set the stage for international efforts to end driftnetting.

On December 22, 1989, the United Nations General Assembly passed Resolution 44/225, promoted by the U.S. and New Zealand, calling for an end to driftnetting by June 30, 1992, and an end to it in the South Pacific by 1991.¹²⁵ Although Resolution 44/225 is nonbinding under international law, its strength lies in the fact that it demonstrates a global consensus on the issue. Its weakness, however, is that South Korea and Taiwan are not Member States of the U.N. and use driftnets frequently. Moreover, the Resolution carries neither sanctions nor any mechanisms for monitoring driftnet operations.

Conflicts continued between driftnet fishing nations and nations opposed to the practice. Reports surfaced of the introduction of driftnets into new areas such as the Caribbean, and in 1990, the U.N. passed Resolution 45/197 restating concern about the practice of driftnetting and calling for a report on driftnetting.¹²⁶

In June 1991, observer data from two previous years of driftnetting were compiled, and experts met in British Columbia to discuss the results. The numbers confirmed fears of massive numbers of marine mammals, sea birds, and non-target fish being killed by the driftnet fishery. Armed with the new data, the United States submitted a report to the U.N. condemning the use of large-scale pelagic driftnets and soon thereafter introduced a resolution mandating a

¹²⁰ Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7.

¹²¹ 16 U.S.C.A. § 1822.

¹²² 16 U.S.C.A. § 1826 (f) relating to 22 U.S.C.A. § 1978 authorizing, *inter alia*, the banning of the import of fish products from offending nations.

¹²³ 16 U.S.C.A. § 1826 (b)(3), (4).

¹²⁴ The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Available at <http://www.oceanlaw.net/texts/summaries/wellington.htm>. Last visited 3 May 2007.

¹²⁵ UN Resolution A/RES/44/225, 22 December 1989.

¹²⁶ UN Resolution A/RES/45/197, 21 December 1990.

ban on their use by June 1992. Japan introduced a resolution to study the problem further, again suggesting that there may be "effective management measures" available to continue the fishery. However, the U.N. General Assembly passed Resolution 46/215, which stated, without exceptions, that large-scale high seas driftnetting must end by December 31, 1992.¹²⁷ The deadline affects the high seas. But it should be noted that much driftnetting continues within the EEZs of many nations, including the U.S., with only slightly smaller nets.

The UN reaffirmed its stance on driftnets in 1995, particularly in the context of unauthorized fishing in national zones, the effects of driftnets on bycatch mortality, and the adoption of the FAO Code of Conduct for Responsible Fisheries. The General Assembly resolution reaffirms the global moratorium on high seas driftnet fishing, urges nations to take greater enforcement responsibility and to impose sanctions, refers to the Compliance Agreement and states' responsibilities under that convention, and makes a high priority of improvement of monitoring and enforcement.¹²⁸ (See Appendix D for a description of U.S. efforts to implement the UNGA Resolution and domestic law prohibiting use of high seas driftnets.)

The International Plan of Action to Prevent, Deter and Eliminate on Illegal, Unreported and Unregulated Fishing

In 2001, the FAO adopted the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU).¹²⁹ The aim of this voluntary instrument is to prevent, deter, and eliminate IUU fishing by providing all states with comprehensive, effective, and transparent measures by which to act, including through appropriate regional fisheries management organizations established in accordance with international law.

¹²⁷ UN Resolution A/RES/46/215, 31 December 1992

¹²⁸ UN Resolution A/RES/50/25, 4 Jan 1996.

¹²⁹ United Nations Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (hereinafter FAO IPOA-IUU). Available at <http://www.fao.org/docrep/005/y3536e/y3536e04.htm> last visited Dec. 6, 2007. Other fishing-related IPOAs include those for Management of Fishing Capacity; Conservation and Management of Sharks; and Reduction of Incidental Catch of Seabirds in Longline Fisheries. All four international plans of action (IPOAs) are voluntary instruments, apply to all States and all fisheries, and elaborate the general Code of Conduct for Responsible Fisheries (CCRF). The latter three IPOAs were developed when in 1997 the COFI Members found it necessary to have some form of international agreement in order to manage these issues arising in implementation/compliance of/with the CCRF. The most suitable instrument for each of the three texts was developed in the course of two intergovernmental meetings, open to all FAO Members, held in 1998. The IPOAs were adopted by the twenty-third Session of the FAO Committee on Fisheries in February 1999 and endorsed by the FAO Council at the session it held in November 2000. There is also an FAO Strategy on Improving Information on the Status and Trends of Capture Fisheries, endorsed in 2003. FAO, Fisheries and Aquaculture Department, Implementation of the 1995 FAO Code of Conduct for Responsible Fisheries, available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=CCRF_prog.xml&xp_nav=2.3 last visited Dec 6, 2007.

History

This effort must first be considered within the context of earlier international instruments that involved fisheries management and conservation. These include instruments discussed above: UNCLOS, the 1993 FAO Compliance Agreement, the U.N. Fish Stocks Agreement, and the FAO Code of Conduct. This last document, if fully implemented, “would...establish principles and standards applicable to the conservation, management and development of all fisheries.”¹³⁰ Thus, like UNCLOS, it establishes a limitation on the freedom to fish in a way that could ensure effective conservation and management. The IPOA-IUU is considered an incorporated part of the Code of Conduct.

FAO had earlier formalized its concern with IUU fishing through the adoption of the 1999 Rome Declaration on the Implementation of the Code of Conduct for Responsible Fisheries at its Ministerial Meeting on Fisheries. Although mounting alarm was being voiced in many quarters about IUU fishing, states appeared to be unable or unwilling to meet their obligations under international law regarding flag state control. With FAO assistance, states would develop a global plan of action to effectively address the issue. This would include recognizing the problems associated with vessels flying “flags of convenience.” This declaration set the stage and provided both impetus and a basic framework for what resulted: an IPOA-IUU.¹³¹ By 2001, FAO Committee on Fisheries (COFI) had formulated and adopted the IPOA and the FAO Council endorsed it in June of that year.

The Instrument

The IPOA-IUU attempts to address this issue in a holistic, integrated fashion, mindful that IUU fishing occurs in violation, or disregard, of national, regional and international fishery laws.¹³² It is intended “to provide all States with comprehensive, effective and transparent measures” through which to act including through regional fisheries management organizations.¹³³ Such comprehensive and integrated measures should look at all capture fisheries and all States should “embrace measures building on the primary responsibility of the flag State to prevent IUU fishing.”¹³⁴ As with the Code of Compliance into which framework the IPOA is elaborated, the IPOA is voluntary.¹³⁵ It is viewed as a

¹³⁰ FAO Code, supra note 48, Art. VI, 1, available at <http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm> last visited Dec. 6, 2007.

¹³¹ United Nations Food and Agriculture Organization Fisheries Report No. 809. Report of the FAO Regional Workshop on the Elaboration of the National Plans of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing – South Asian Subregion, Bangkok 19-23 June 2006, Appendix F, David Douman, 2001 FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing: background and progress toward implementation (hereinafter Douman Appendix F), 35-37 available at <ftp://ftp.fao.org/docrep/fao/009/a0717e/a0717e00.pdf> last visited Dec. 6, 2007.

¹³² Id.

¹³³ FAO IPOA-IUU Par. 8

¹³⁴ Id. at Par 9.3

¹³⁵ Id. at Par. 4. Though voluntary, because of relationship with other international instruments, some provisions may be binding. Iudicello, ABA Chapter in press.

toolkit, a place where provisions can be mixed and matched in order to arrive at the most desirable plan.

In its 93 paragraphs, divided into seven sections, the IPOA has actions that can be utilized by all states and includes international instruments, national legislation, national plans of action (NPOA), cooperation with other states, publicity, and increasing the technical capacity and resources devoted to the task.¹³⁶ Flag states can act on vessel registration, reporting, records and data, and authorizations to fish.¹³⁷ There are also sections for coastal¹³⁸ and port¹³⁹ states and for internationally agreed market measures;¹⁴⁰ research;¹⁴¹ regional fisheries management organizations;¹⁴² special regulations for developing countries;¹⁴³ reporting;¹⁴⁴ and defining the role of the FAO.¹⁴⁵

All states were encouraged to ratify, accept, or accede to UNCLOS, the 1995 U.N. Fish Stocks Agreement, and the FAO Compliance Agreement,¹⁴⁶ as well as to fully and effectively implement the Code of Conduct and all of its accompanying IPOAs.¹⁴⁷ Importantly, all States were to have developed and implemented their NPOA within three years of the adoption of the IPOA-IUU or by June 2004; should review them every 4 years thereafter; and should ensure that their internal national efforts to prevent IUU fishing are coordinated.¹⁴⁸

The section on RFMOs asserts that States should comply and cooperate with RFMO management even if they choose not to become parties.¹⁴⁹ There is a long list of items deemed necessary “to strengthen and develop innovative ways” to deal effectively with IUU fishing.¹⁵⁰ These range from developing compliance measures and comprehensive arrangements for mandatory reporting to developing definitions for when a vessel will be presumed to have engaged in or supported IUU fishing.¹⁵¹ The RFMOs would become clearing houses for all State efforts to combat IUU fishing, sharing the collected information with all other RFMOs and the FAO.¹⁵² RFMOs are indirectly charged with tasks throughout the IPOA-IUU including in the objectives and principles section,¹⁵³ in

¹³⁶ FAO IPOA-IUU supra, n. 89, Pars. 10-33.

¹³⁷ Id. at Pars 34-50.

¹³⁸ Id. at Par 51.

¹³⁹ Id. at Pars 52-64

¹⁴⁰ Id. at Pars 65-76

¹⁴¹ Id. at Par 77

¹⁴² Id. at Pars 78-84.

¹⁴³ Id. at Par 85-86.

¹⁴⁴ Id. at Par 87.

¹⁴⁵ Id. at Pars. 88-93.

¹⁴⁶ Id. at Par. 11.

¹⁴⁷ Id. at Par. 14.

¹⁴⁸ Id. at Pars. 25-27.

¹⁴⁹ Id. at Pars. 77-78.

¹⁵⁰ Id. at Par 80.

¹⁵¹ Id. at Pars 80.2, 80.3, 80.11

¹⁵² Id. at Par.81

¹⁵³ Id. at Pars. 8,9.

paragraphs on NPOA,¹⁵⁴ on cooperation between States,¹⁵⁵ in-port State measures,¹⁵⁶ market measures,¹⁵⁷ and reporting.¹⁵⁸

FAO's role is delineated in the final section to provide data, support development of the NPOAs, hold an expert consultation on the issue of certain internationally agreed market-related measures, and to biannually evaluate the IPOA-IUU implementation progress.¹⁵⁹ In the section on special requirements for developing countries, FAO is to provide financial support, along with other relevant financial institutions and mechanisms, for various types of training and capacity building to enable those states to meet their tasks under the IPOA-IUU.¹⁶⁰

FAO and its COFI continue to take a leading role on the issue of illegal fishing. At its latest annual session, its 27th, COFI discussed and took action on a number of IUU-related concerns.¹⁶¹ This included reaffirming that fishing capacity (over-capacity) must be addressed by states that wish to control IUU fishing by attempting to match allowed capacity to sustainable harvest levels.¹⁶² It has recognized that there needs to be a comprehensive suite of port state measures on monitoring, control, and surveillance and thus has endorsed a process and timetable to develop a legally-binding instrument based on widespread support for the 2005 Model Scheme on Port State Measures to Combat IUU Fishing and the IPOA-IUU.¹⁶³ COFI also has supported convening an Experts Consultation with a goal of creating an accurate global record of fishing vessels,¹⁶⁴ data that is absolutely necessary if IUU fishing is to be successfully controlled. Irresponsible flag States were discussed and many Members suggested that the performance of flag States must be judged based on a derived set of criteria that could then be used as well as to examine possible actions against vessels flying the flags of States not meeting such criteria. An expert consultation on this will be considered by COFI.¹⁶⁵ Finally, and importantly in this regard, the session analyzed methods to strengthen RFMOs¹⁶⁶, which, after individual states, constitute an important line of defense in combating IUU fishing.

Following this meeting, in September 2007, FAO held an Expert Consultation in Washington, D.C., to draft a legally binding instrument on port state measures to prevent, deter, and eliminate IUU fishing. This draft document will be the basis

¹⁵⁴ Id. at Par. 25.

¹⁵⁵ Id. at Pars. 28, 51.2.

¹⁵⁶ Id. at Pars 58.5, 62-64.

¹⁵⁷ Id. at Pars. 68, 73.

¹⁵⁸ Id. at Par. 87.

¹⁵⁹ Id. at Pars 88-93.

¹⁶⁰ Id. at Pars. 85-86.

¹⁶¹ United Nations Food and Agriculture Organization, FAO Fisheries Report No. 830 (Rome 2007) available at <http://ftp.fao.org/docrep/fao/010/a1160e/a1160e00.pdf> last visited Dec. 6, 2007.

¹⁶² Id. at 3.

¹⁶³ Id. at 11. See text accompanying footnote 127, *infra*.

¹⁶⁴ Id. at 11.

¹⁶⁵ Id. at 11.

¹⁶⁶ Id. at 14.

for a Technical Consultation on Port State Measures to be held in Rome, June 23-27, 2008, and then will be presented as a formal document to the 28th session of COFI in March 2009 for further consideration and action.¹⁶⁷

Implementation of IPOA-IUU

The year following adoption of the IPOA-IUU, FAO Fisheries Department published its Technical Guidelines for Responsible Fisheries No. 9, Implementation of International Plan of Action on Illegal, Unreported and Unregulated Fishing.¹⁶⁸ These are intended to be practical, flexible and subject to modification as better ideas come along.¹⁶⁹ In general, they provide guidance as to how IUU actions can be put in place, with organization and content suggestions for NPOAs. They encourage RFMOs to integrate their IUU efforts into other ongoing RFMO missions such as conservation, catch and effort control, reduction of capacity and catch, scientific research and data collection, and dissemination. Importantly, Guidelines urge removal of any and all economic support for IUU.

In addition to publishing the Guidelines, between 2002 and 2006 the FAO has held 14 workshops on the issue, attended by up to 300 representatives of more than 100 countries; conducted a pilot workshop in the Pacific Islands in cooperation with the South Pacific Forum Fisheries Agency and the Western and Central Pacific Fisheries Commission; and developed a Model Plan For A Pacific Island Country: A National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.¹⁷⁰ Considering the link between fishing fleet overcapacity and IUU, it held a Technical Consultation in 2004 to look at the progress and implore that states undertake the full implementation of the IPOA on Fishing Capacity and the IPOA-IUU.¹⁷¹

¹⁶⁷ FAO, Report of the Expert Consultation to Draft a Legally-binding Instrument on Port State Measures, Fisheries Report No 846, FIEL/R846 (En) available at <http://ftp.fao.org/docrep/fao/010/a1375e/a1375e00.pdf> last visited Dec 6, 2007. This still incomplete draft (no preamble or final clauses or annexes) sets out minimal standards which would be a uniform basis for even stricter controls. See also FAO, COFI/2007/7 Combating IUU Fishing through Monitoring, Control and Surveillance, Port Measures and Other Means, Dec. 2006, prepared for 27th Meeting of COFI, and available at <http://ftp.fao.org/docrep/fao/meeting/011/j8989e.pdf> last visited Dec. 6, 2007. The FAO Model Scheme on Port State Measures to Combat IUU Fishing is available at <http://ftp.fao.org/docrep/fao/010/a0985t/a0985t00.pdf> last visited Dec 6, 2007. An interesting analysis of some of these measures appears in M. Lack, Catching On: Trade-Related Measures as a Fisheries Management Tool, 27-31, a 2007 TRAFFIC Report available at <http://www.traffic.org/content/850.pdf> last visited Dec 6, 2007.

¹⁶⁸ United Nations Food and Agriculture Organization, Technical Guidelines for Responsible Fisheries, No. 9, Implementation of International Plan of Action on Illegal, Unreported and Unregulated Fishing. Rome 2002 (hereinafter Technical Guideline No 9) available at <http://ftp.fao.org/docrep/fao/005/y3536e/y3536e00.pdf> last visited Dec. 6, 2007.

¹⁶⁹ Id. at iii.

¹⁷⁰ David Doullman, Implementing the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing at the National Level: A View from FAO, a Power Point presentation, FAO Fisheries, Rome (May 2006).

¹⁷¹ FAO Report of the Technical Consultation to Review Progress and Promote Full Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal,

The adoption of NPOAs has been mixed. As the call for national plans originates from a non-binding action, there is no formal signatory/acceptance process and thus numbers are based upon informal reporting. As of December 2007, an informal survey indicates that 32 had been elaborated, many of these with FAO technical assistance, and include: Australia, New Zealand, Tonga, Cook Islands, Niue, Palau, New Zealand, Samoa, Tonga, Tuvalu, Federated States of Micronesia, Angola, Zambia, Cameroon, Gambia, Mauritania, Namibia, Benin, Ghana, Seychelles, Tanzania, Oman; Japan, Republic of Korea, European Community, Spain, United Kingdom, Canada, United States, Mexico, Panama, Colombia, Chile and Peru. Others, developed to some extent but not yet published include Malaysia and two Regional RFMOs, one for countries of South East Asia and the other adopted by the Lake Victoria Fisheries Organization.¹⁷²

Regional Fisheries Bodies, Regional Fisheries Management Organizations and Arrangements, and Regional Fisheries Advisory and Scientific Bodies

Although regional fishery management organizations (RFMOs) have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the Fish Stocks Agreement, which call for creation of such bodies. In its Oceans Atlas, FAO editors point out that “under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation.”¹⁷³

As of 2006, there were 44 regional fishery bodies including RFMOs, advisory bodies, and scientific bodies. These organizations, among other responsibilities, collect and distribute fishery statistics, conduct stock assessments, set catch quotas, limit vessels allowed in the fishery, regulate gear and allocation, and are responsible for research oversight, monitoring, and enforcement.¹⁷⁴

Unreported and Unregulated Fishing and the International Plan of Action for the Management of Fishing Capacity. FAO Fisheries Report No. 753, FAO, Rome, available at <http://ftp.fao.org/docrep/fao/007/y5681s/y5681s00.pdf> last visited Dec. 6, 2007.

¹⁷² E-mails from David Doulman, FAO, (Dec. 13, 2007, 5:54 AM PST; Dec. 17, 2007, 12:15 AM PST; and Dec. 18, 2007, 3:05 AM PST) on file with author Suzanne Iudicello; and David Doulman, Implementing the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing at the National Level: A View from FAO. FAO Fisheries, Rome (May 2006), a Power Point presentation. Countries with a completed (or other status) NPOA in May 2006 included Africa: Angola, Gambia, Ghana, Namibia, Seychelles, Tanzania; Asia and Pacific: Australia; Federated States of Micronesia, Japan, Republic of Korea, New Zealand, Tonga, Tuvalu; Near East: Oman (in preparation); Latin America: Chile, Mexico, Panama, Columbia (in preparation), Peru (in preparation); North America: Canada, USA; Europe: EC, Spain, UK (in preparation). The NPOA-IUU done by the USA is discussed in this paper supra note 10 and accompanying text.

¹⁷³ Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. <http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ>, updated 25 Aug. 2000, last visited 8 October 2006.

¹⁷⁴ P.L. Devaney, Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw,

Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. RFMOs are only as strong as their members and rely upon flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include: inconsistent authority; failure by key fishing interests to join the RFMO or follow its rules; illegal, unreported, and unregulated fishing; lack of equity and disparate interests between developed states and developing states; conflicts of interest among parties; lack of funding; and lack of political will.¹⁷⁵ A number of innovations have been suggested to make RFMOs more effective, including audits, performance review, improvements through neutral bodies such as the FAO, a stronger role for port state enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.¹⁷⁶

RFMOs reside under the general heading of Regional Fishery Bodies (RFBs). RFMOs are inter-governmental fisheries organizations, established by a treaty, designed to formulate and implement fisheries conservation and management measures. They are perceived as the most effective forum for international cooperation, enabling States to agree on measures to conserve species that do not recognize national boundaries. Some have existed since the middle of the 20th century, such as the North Atlantic Fisheries Organization (NAFO), which was formed under a different name in 1949. The International Pacific Halibut (IPHC), formed in 1923, may be the oldest, continuously operating RFMO. Others came into existence as late as the 1990s, and new ones are still being formed, such as the Western and Central Pacific Fisheries Commission (WCPFC) formed in 2004.

RFMOs also can include an entity that has come together under an arrangement. These organizations manage resources through an agreement, but less formally.¹⁷⁷ They must comply with the rules of international law, both formal and customary, but do not have to be based upon a treaty. Compared to RFMOs, arrangements may have significant advantages in terms of expeditiousness, flexibility, and costs. Existing RFMOs can function as a forum within which new

eds. Harvard, 2005 at 4. See also, FAO Oceans Atlas, Regional Fishery Organizations. <http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ>. Last visited 8 October 2006.

¹⁷⁵ Id. at 5-6. See also, Eichenberg and Shapson, *supra* note 36 at 611-616.

¹⁷⁶ Id. at 7-12.

¹⁷⁷ The term "arrangement" is defined in Article 1(1)(d) of the Fish Stocks Agreement as: a cooperative mechanism established in accordance with the [LOS] Convention and this Agreement by two or more States for the purpose, *inter alia*, of establishing conservation and management measures in a subregion or region for one or more straddling fish stocks or highly migratory fish stocks. In the case of the Fish Stocks Agreement, arrangement requisites are: consistency with international law and a purpose within the scope of the Fish Stocks Agreement. However, this does not prevent States from establishing an arrangement with a purpose that does not fall within the scope of the Fish Stocks Agreement, for instance because it deals with discrete high seas fish stocks. Molenaar, Erik, Addressing Regulatory Gaps in High Seas Fisheries, 20 Intl. Journal of Marine and Coastal Law 533, 545(NILOS, 2005) (hereinafter, Molenaar).

The list below is based upon FAO tabulation of RFBs.¹⁷⁹ It provides the names of RFMOs and those of Advisory and Scientific Bodies, as well as a link to several Internet resources (Internet Guide to International Fisheries Law and the FAO RFB page) containing further information. Table 1 shows a subset of this list: those that include IUU provisions, those that list IUU vessels, the bodies to which the United States is a party, and those under which the United States has taken action as a contracting party.

FAO Compilation of Regional Fishery Bodies

CCAMLR

CCBSP [CCBSP](#) Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (Arrangement)

CCSBT [CCSBT](#) Commission for the Conservation of Southern Bluefin Tuna

GFCM [General Fisheries Commission for the Mediterranean](#)

IATTC [Inter-American Tropical Tuna Commission](#)

IBSFC [International Baltic Sea Fishery Commission](#)

ICCAT [International Commission for the Conservation of Atlantic Tunas](#)

IOTC [Indian Ocean Tuna Commission](#)

IPHC [International Pacific Halibut Commission](#)

IWC International Whaling Commission [www.iwcoffice](#)

NAFO [Northwest Atlantic Fisheries Organization](#)

NASCO [North Atlantic Salmon Conservation Organization](#)

NEAFC [North East Atlantic Fisheries Commission](#)

NPAFC [North Pacific Anadromous Fish Commission](#)

PSC [Pacific Salmon Commission](#)

SEAFO [South East Atlantic Fisheries Organization](#)

SIOFA Southern Indian Ocean Fisheries Agreement (Arrangement not in force.) (Six countries—the Comoros, France, Kenya, Mozambique, New Zealand and Seychelles—and the European Community have signed a multilateral agreement on the management of fishing in a vast area of the high seas in the South Indian Ocean. It will enter into force once FAO, which is its legal depositary, receives the fourth instrument of ratification, including at least two from coastal states from: <http://www.fao.org/newsroom/en/news/2006/1000360/index.html>.)

(SPRFMO) South Pacific RFMO (In Process of forming as Management Body w/ 4th meeting held Sept. 10-14, 2007)

WCPFC [Western and Central Pacific Fisheries Commission](#)

¹⁷⁹ FAO Regional Fishery Bodies, http://www.fao.org/fi/body/rfb/chooseman_type.htm (last visited Oct. 3, 2007).

WIOTO [Western Indian Ocean Tuna Organization](#) (Inoperative since 1994)

Advisory Bodies

APFIC [Asia-Pacific Fisheries Commission](#)

[BOBP-IGO](#) Bay of Bengal Programme – Intergovernmental Organisation

[CARPAS](#) Regional Fisheries Advisory Committee for the South Atlantic

ATLAFCO [African Atlantic Fisheries Conference](#) [GO](#)

CRFM [Caribbean Regional Fisheries Mechanism](#) [GO](#)

[CECAF](#) Committee for the Eastern Central Atlantic Fisheries

[CIFA](#) Committee for Inland Fisheries of Africa

COMHAFAT Conference on Fisheries Cooperation among African States
Bordering the Atlantic Ocean

[COPESCAL](#) Commission for Inland Fisheries of Latin America

[COFREMAR](#) Joint Technical Commission for the Argentina/Uruguay Maritime
Front

COREP [Regional Fisheries Committee for the Gulf of Guinea](#)

CPPS [Permanent Commission for the South Pacific](#)

[EIFAC](#) European Inland Fisheries Advisory Commission

FFA [South Pacific Forum Fisheries Agency](#)

[LVFO](#) Lake Victoria Fisheries Organization

[MRC](#) Mekong River Commission

[NAMMCO](#) North Atlantic Marine Mammal Commission

[OLDEPESCA](#) Latin American Organization for Fisheries Development

RECOFI [Regional Commission for Fisheries](#)

[SEAFDEC](#) Southeast Asian Fisheries Development Center

SRCF [Sub-Regional Commission on Fisheries](#)

SWIOFC [South West Indian Ocean Fisheries Commission](#)

WECAFC [Western Central Atlantic Fisheries Commission](#)

Scientific Bodies:

[ACFR](#) Advisory Committee on Fisheries Research

[CWP](#) Coordinating Working Body on Fisheries Statistics

[ICES](#) International Council for the Exploration of the Sea

[NACA](#) Network of Aquaculture Centres in Asia-Pacific

[PICES](#) North Pacific Marine Science Organization

[SPC](#) Secretariat of the Pacific Community

Table 1. RFBs with measures related to IUU Fishing				
Organization	U.S. party	FAO Statistical Areas	IUU vessel list	U.S. action
AIDPC		77		
APFIC		71		
CCAMLR		48, 58, 88		
CCBSP		61, 67		
CCSBT		41, 51, 81		
GMFC		37		
IATTC		77, 87		
ICCAT		21, 27 31, 37, 41, 47, 48		
IOTC		51, 57		
IPHC		67		
IWC		Global		
NAFO		21		
NASCO		27, 37		
NEAFC		27		
NPAFC		61, 67, 77		
PSC		67		
SEAFO		31, 41		
SPTT		77		
WCPFC		67, 71		

RFBs and IUU Fishing

While no RFB was or is designed to deal solely with IUU fishing, “a widely held view [is] that RFMOs are the only realistic option for the conservation and management of shared stocks, or high seas stocks.”¹⁸⁰ Certainly, that means they must deal effectively with illegal fishing. In the five-year period between

¹⁸⁰ FAO, Judith Swan, International Action and Responses by Regional Fishery Bodies or Arrangements to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, FAO Fisheries Circular C 996, p.11, 2004 (hereinafter FAO Swan 2004) available at <http://ftp.fao.org/docrep/fao/006/y5361e/y5361e00.pdf> last visited Dec. 6, 2007.

2000 and 2005, 29 resolutions passed by RFBs dealt directly with IUU fishing.¹⁸¹ And that was before the issue was considered fully mature.

As noted in the earlier analysis of the IPOA-IUU, the important role of RFMOs in combating IUU fishing is reflected in the section devoted to them, paragraphs 78 through 84 of that instrument. These, briefed below, encourage States to take measures and actions through their RFMOs, in conformity with international law and obligations. (While they appear directed at regional bodies with management authority, they have also sometimes been applied by advisory or scientific RFBs.¹⁸²)

- States should ensure compliance with and enforcement of policies and measures having a bearing on IUU fishing that are adopted by any relevant RFMO and by which they are bound, and cooperate to establish such organizations where none exist.¹⁸³
- [As non-members are not discharged from requirement to cooperate with RFMOs] ... States should give effect to their duty to cooperate by agreeing to apply the conservation and management measures established by that regional fishery management organization, or by adopting measures consistent with those ..., and should ensure that vessels entitled to fly their flag do not undermine such measures.¹⁸⁴

States, acting through the relevant RFMO, should act to strengthen and develop innovative ways to deal with IUU fishing. Measures intended to achieve this objective include¹⁸⁵ institutional strengthening;¹⁸⁶ compliance measures;¹⁸⁷ mandatory reporting arrangements;¹⁸⁸ information exchange on vessels engaged in or supporting IUU fishing;¹⁸⁹ development and maintenance of records of authorized and IUU vessels in the area of competence;¹⁹⁰ “development of methods of compiling and using trade information to monitor IUU fishing;”¹⁹¹ development of a range of specified MCS measures;¹⁹² development of boarding and inspection regimes and¹⁹³ observer programs;¹⁹⁴; use of market-related measures;¹⁹⁵ development of criteria for making presumptions concerning IUU

¹⁸¹ Id., p.12

¹⁸² Id., p.12

¹⁸³ IPOA-IUU, supra n. 89, Par. 78

¹⁸⁴ Id. Par. 79

¹⁸⁵ Id. Par. 80

¹⁸⁶ Id. Par. 80.1

¹⁸⁷ Id. Par. 80.2

¹⁸⁸ Id. Par. 80.3

¹⁸⁹ Id. Par. 80.4

¹⁹⁰ Id. Par. 80.5

¹⁹¹ Id. Par. 80.6

¹⁹² Id. Par. 80.7

¹⁹³ Id. Par. 80.8

¹⁹⁴ Id. Par. 80.9

¹⁹⁵ Id. Par. 80.10

fishing;¹⁹⁶ use of education and public awareness programs;¹⁹⁷ development of action plans;¹⁹⁸ and "... examination of chartering arrangements, if there is concern that these may result in IUU fishing."¹⁹⁹

States should compile and make available annually to other RFMOs and FAO information relevant to combating IUU fishing, including²⁰⁰ estimates of the extent, magnitude and character of IUU activities;²⁰¹ details of measures to combat IUU fishing;²⁰² records of authorized fishing vessels;²⁰³ and records of vessels engaged in IUU fishing.²⁰⁴

Objectives of institutional and policy strengthening in RFMOs in relation to IUU fishing should include enabling RFMOs to:²⁰⁵

- determine policy objectives, both for internal purposes and for coordination with other RFMOs;²⁰⁶
- "strengthen institutional mechanisms, including mandate, functions, finance, decision-making, reporting or information requirements and enforcement schemes, for the optimum implementation of policies in relation to IUU fishing;"²⁰⁷
- "regularize coordination with institutional mechanisms of other regional fishery management organizations as far as possible in relation to IUU fishing, in particular information, enforcement and trade aspects;"²⁰⁸
- "ensure timely and effective implementation of policies and measures internally, and in cooperation with other regional fishery management organizations and relevant regional and international organizations."²⁰⁹

"States should ... encourage non-contracting parties with a real interest in the fishery concerned to join the regional fishery management organizations and participate fully in their work." Where this is not possible, noncontracting parties should be encouraged to participate in the RFMO and apply its conservation and management measures. RFMOs should address access to the resource to foster cooperation and sustainability.²¹⁰ And finally:

¹⁹⁶ Id. Par. 80.11

¹⁹⁷ Id. Par. 80.12

¹⁹⁸ Id. Par. 80.13

¹⁹⁹ Id. Par. 80.14

²⁰⁰ Id. Par. 81

²⁰¹ Id. Par. 81.1

²⁰² Id. Par. 81.2

²⁰³ Id. Par. 81.3

²⁰⁴ Id. Par. 81.4

²⁰⁵ Id. Par. 82

²⁰⁶ Id. Par. 82.1

²⁰⁷ Id. Par. 82.2

²⁰⁸ Id. Par. 82.3

²⁰⁹ Id. Par. 82.4

²¹⁰ Id. Par. 83

When a State fails to ensure that fishing vessels entitled to fly its flag, or, to the greatest extent possible, its nationals, do not engage in IUU fishing activities that affect the fish stocks covered by a relevant regional fisheries management organization, the member States, acting through the organization, should draw the problem to the attention of that State. If the problem is not rectified, members of the organization may agree to adopt appropriate measures, through agreed procedures, in accordance with international law.²¹¹

Numerous other recent reports and studies have evaluated the success of this process and recommended ways to strengthen the roles of Regional Fishery Management Bodies in international fisheries conservation. These include a FAO contract with Judith Swan to survey RFBs and describe numerous initiatives taken to implement the IPOA-IUU²¹² and *Recommended Best Practices for Regional Fisheries Management Organizations*, released by Chatham House in August 2007 to develop a model toward better governance by RFMOs. A major impetus for this work was to seek better ways to address IUU fishing.²¹³

In addition, TRAFFIC completed a review of the use of trade as an effective management device in February 2007 entitled *Catching On? Trade-Related Measures as A Fisheries Management Tool*.²¹⁴ Further attention to the role of RFBs in controlling IUU fishing is indicated by the establishment of a RFB Secretariat, and emphasis on it in the Report on the First Meeting of the RFB Secretariat, March 12-13, 2007, in Rome.²¹⁵ The role of RFMOs and the potential for the United States to foster capacity to address IUU fishing is the subject of a NOAA Fisheries report that will be submitted to Congress in early 2008.

Detailed Analysis of Three RFBs

The following discussion examines the IUU measures of three regional fishery bodies: CCAMLR, NAFO and WCPFC. Although NAFO predates CCAMLR, the Antarctic treaty was the first to take action against IUU fishing. WCPFC is a more recent instrument and its IUU measures are among the most newly adopted. Unless otherwise noted or supplemented, initial address and factual summary for each RFB is derived from the Internet Guide to International Fisheries Law, <http://www.intfish.net/orgs/index-1.htm>, and FAO's Fisheries RFB Homepage, <http://www.fao.org/fi/body/rfb/index.htm>.

²¹¹ Id. Par. 84

²¹² FAO Swan, supra n. 140.

²¹³ Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations (hereinafter Chatham House, Recommended Best Practices), vii, available at http://www.chathamhouse.org.uk/files/10301_rfmo0807.pdf last visited Dec. 7, 2007.

²¹⁴ M. Lack, *Catching On? Trade-Related Measures as A Fisheries Management Tool*, A TRAFFIC Report (2007) available at <http://www.traffic.org/content/850.pdf> last visited Dec. 7, 2007.

²¹⁵ FAO Fisheries Report 837, Report of the First Meeting of Regional Fishery Body Secretariats Network available at <ftp://ftp.fao.org/docrep/fao/010/a1184e/a1184e00.pdf> last visited Dec. 7, 2007.

CCAMLR [Commission for the Conservation of Antarctic Marine Living Resources](#)

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Official website: www.ccamlr.org

Establishment: [1980 Convention for the Conservation of Antarctic Marine Living Resources](#), Canberra, Adopted, May 20 1980; Entered into force, April 7, 1982.

Members as of November 31, 2007: Argentina, Australia, Belgium, Brazil, Chile, China, European Community, France, Germany, India, Italy, Japan, Korea (Rep. of), Namibia, New Zealand, Norway, Poland, Russia, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, Uruguay.

Geographic Scope: The Antarctic.

(For an exact definition, see Article I of the [Convention](#)).

(Note also: the area coincides exactly with FAO statistical areas 48, 58 and 88).

[\[Map\]](#)

Material Scope: The Commission covers all Antarctic marine living resources found south of the Antarctic Convergence in the Convention area, meaning the populations of fin fish, mollusks, crustaceans and all other species of living organisms, including birds.²¹⁶

Main Objectives: To conserve marine life of the Southern Ocean without excluding harvesting carried out in a rational manner. The convention was developed in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on populations of krill and other marine life; particularly on birds, seals and fish, which mainly depend on krill for food.²¹⁷

Organizationally, CCAMLR has a Secretariat, a Commission of members that sets and implements management policy and regulations, a Scientific Committee (SC-CCAMLR) which advises the Commission based upon information from the Working Group on Ecosystem Monitoring and Management (WG-EMM) and the Working Group on Fish Stock Assessment (WG-FSA).²¹⁸ Its management precept is ecosystemic, using a precautionary approach that considers the lack of complete knowledge available when setting take allowances in order to minimize the risks of long-term adverse affects. It thus considers the effects of any harvesting on dependant and associated species, not just the target species, in order that ecological relationships are maintained.²¹⁹

CCAMLR has been in the forefront on IUU Fishing, having been the first RFMO to use the term.²²⁰ Swan succinctly details this history:

²¹⁶ Internet Guide to International Fisheries Law, <http://www.intfish.net/orgs/fisheries/ccamlr.htm> last visited Dec. 6, 2007.

²¹⁷ CCAMLR website <http://www.ccamlr.org/pu/e/gen-intro.htm> last visited Dec. 6, 2007

²¹⁸ Id.

²¹⁹ CCMLAR Web Site <http://www.ccamlr.org/pu/e/gen-intro.htm>. last visited Dec. 3, 2007.

²²⁰ FAO Swan 2004 supra n. 140, p.1

Reference to IUU fishing was included as an agenda item for the Sixteenth Meeting of the Commission in 1997, perhaps the first formal use of the term. It also appeared in an Annex to the Report of that Meeting, setting out a communication policy with non-Contracting Parties relating to IUU fishing in the CCAMLR Convention Area. In 1998, the Report of the Seventeenth Meeting of the Commission, in relation to IUU fishing, recorded discussion on the following measures aimed at better controlling IUU fishing in the Convention Area: catch certification scheme; trade statistics for *Dissostichus* spp.; marking of fishing vessels and fishing gear; automated satellite-linked vessel monitoring system (VMS); application of VMS in areas adjacent to the Convention Area; licensing and inspection regime of Contracting Parties; cooperation between Contracting Parties to ensure compliance; CCAMLR vessel register; action plan; and actions in respect to companies and nationals of flag States.²²¹

The Convention is a textbook case on how to address IUU fishing, actions developed because of the magnitude of illegal fishing -- in the past it is thought to have been more than twice that of regulated take.²²² CCAMLR's response was a suite of measures, lead by its Catch Documentation Scheme for *Dissostichus* spp. (CDS). The CDS, formally named Conservation Measure 10-05, became mandatory on all Convention members in 2000 (then similarly named CDS although numerically identified as Conservation Measure 170/XIX; in 2001, CM 170/XX; and gaining its current designation CM 10-05 in 2002).²²³ It is designed to track the landings and trade flows of toothfish caught in the Convention Area and in adjacent waters, where possible. It will allow identification of all toothfish entering the markets of all parties to the CDS and aids in determining if the fish are captured consistent with CCAMLR conservation rules. The CDS invites non-Convention members whose vessels fish for toothfish to participate²²⁴ The scheme includes the basic document, three annexes, five resolutions and a policy statement.²²⁵

In addressing IUU fishing, the CDS works in conjunction with other conservation measures (CM) discussed later.

²²¹ Id.

²²² NOAA/NMFS FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT on Codified Regulations at 50 CFR Part 300 Subparts A and G Implementing Conservation and Management Measures Adopted by the Commission for the Conservation of Antarctic Marine Living Resources CCAMLR Vol. 2, p 165 (2006) available at http://www.nmfs.noaa.gov/sfa/domes_fish/Volume2_CCAMLR.pdf last visited Dec. 6, 2007; see also text with fn infra 186.

²²³ CCAMLR, Conservation Measure 10-05, Catch Documentation Scheme for *Dissostichus* spp. (hereinafter CCAMLR CM 10-05) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/10-05.pdf; see also, CCAMLR website for operation of the Catch Documentation Scheme <http://www.ccamlr.org/pu/e/cds/cds-ops.htm> last visited Dec. 3, 2007.

²²⁴ CCAMLR websites <http://www.ccamlr.org/pu/e/cds/intro.htm> and http://www.ccamlr.org/pu/E/e_pubs/cm/06-07/10-05.pdf last visited Nov 18, 2007.

²²⁵ CCAMLR CM 10-05 supra n. 183.

The success, but not outright victory, of the efforts over time can be illustrated by reading annual meeting reports. At the 19th meeting of CCMLR in 2000, the Standing Committee on Observation and Inspection (SCOI) reported that the illegal catch of toothfish for the years 1996 -1999 was unsustainable, at approximately 90,000 tons, more than twice the regulated take from the convention area. It also noted that the bycatch of seabirds in the longline fishery, mostly albatross and petrel species, was also unsustainable and had resulted in their decline.²²⁶ By the 25th meeting in 2006, it was estimated that the IUU fishery for toothfish resulted in approximately 3080 tons in the 2005-06 season, showing an overall decline over the past three years. But it was also noted that IUU fishing was up in selected divisions, take there accounting for almost 90 percent of the total and most likely by approximately 13 vessels that consistently fish in violation.²²⁷

In summary, the current CDS requires each Contracting Party:

- To take steps to identify the origin of toothfish when it enters or leaves a CP's port;²²⁸
- To assure that each vessel flying its flag complete a Dissostichus Catch Document (DCD) before landing or transferring toothfish, the elements of which are set out in Annex 10-05/A and any landing without one is prohibited²²⁹ (and a NCP may allow its vessels to participate in the toothfish fishery if it issues each vessel that wishes to fish a DCD and follows the procedure set out in Annex 10-05/C.);²³⁰
- To assure that each landing at any of its ports shall have a DCD -- no DCD, landing is pro forma illegal;²³¹
- To specifically authorize each of its flagged ships if it is to catch toothfish, even if the take will be outside the Convention area;²³²

²²⁶ CCMLAR, Report of the Nineteenth Meeting of the Commission 2000, Annex 5, SCOI Explanatory Memorandum on the Introduction Catch Documentation Scheme (CDS) for Toothfish (*Dissostichus* spp.), available at http://www.ccamlr.org/pu/e/e_pubs/cr/00/toc.htm last visited Nov.18, 2007. Other commentators say that the IUU harvest in the late 1990s was three to five times that legally caught under CCAMLR conservation measures. Liza D. Fallon and Elaine Stratford, *Issues of Sustainability in the Southern Ocean Fisheries – the Case of the Patagonian Toothfish (Dissostichus eleginoides)*, 34 *School of Geography and Environmental Studies*, University of Tasmania, (2003), available at <http://alternative-solution.org/fileadmin/LHF/PDF/pat-toothfish.pdf> last visited Dec 6, 2007.

²²⁷ CCMLAR, Report of the Twenty-fifth Meeting of the Commission 2006, Item 9.1, available at http://www.ccamlr.org/pu/e/e_pubs/cr/06/toc.htm last visited Dec. 15, 2007. Note that the 26th meeting [2007] has occurred but the report is not officially available at the time according to CCAMLR Secretariat.

²²⁸ CCAMLR CM 10-05 (2006), *supra* note 183, para. 2.

²²⁹ *Id.* para 3.

²³⁰ *Id.* para 6, 7.

²³¹ *Id.* para 4.

²³² *Id.* para 5.

- To assure that each shipment of toothfish imported into or exported from its territory be accompanied by an export-validated DCD and, if appropriate, a validated re-export document sufficient to account for all the *Dissostichus* spp. in the shipment -- otherwise any such activity is illegal;²³³
- To assure that as to each shipment of toothfish customs officials request and examine the required documentation;²³⁴
- To transfer by the most rapid electronic means a copy of such toothfish documentation to the CCAMLR Secretariat and submit an annual summary of all toothfish related activities;²³⁵ and
- To provide the Secretariat with the name addresses etc. of all official that have authority to issue DCDs (and the same is true for NCPs that are issuing DCDs).²³⁶

CPs, and NCPs participating in the CDS, may require further verification of catch documents using *inter alia*, VMS, if the origin of catch is on the high seas outside the Convention area.²³⁷ If the catch document is invalid under this or other provisions where one is required, then there can be no import, export, or re-export of the catch.²³⁸ There are provisions for special sale of fish confiscated due to failures set out above and for the proceeds to be transferred into a Convention or national fund that is used to prevent IUU fishing.²³⁹

As noted, further conservation measures buttress this scheme, specifically 10-02, which requires CPs to license and inspect those vessels that fly their flag and fish in Convention waters.²⁴⁰ Conservation measure 10-03 establishes requirements for CPs to inspect all vessels that land toothfish at their ports. If there is evidence that the fish were caught in contravention of CCAMLR conservation measures, the vessel is prohibited from landing the fish.²⁴¹ Measure 10-04 is a sophisticated Vessel Monitoring System (VMS) instituted in large part to work in conjunction with the CDS and to help verify the DCD.²⁴²

There are also schemes to promote compliance by CP vessels with conservation measures, numbered CM 10-06, the IUU Vessel List procedure for contracting

²³³ Id. para 10, 11.

²³⁴ Id. para 12.

²³⁵ Id. para 14

²³⁶ Id. para 15.

²³⁷ Id. para 16.

²³⁸ Id. para 17.

²³⁹ Id. para 18, 19.

²⁴⁰ CCAMLR Conservation Measure 10-02 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

²⁴¹ CCAMLR Conservation Measure 10-03 (2005) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

²⁴² CCAMLR Conservation Measure 10-04 (2006) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

member vessels that offend,²⁴³ as well as those relating to NCP vessels, numbered CM 10-07, the IUU Vessel List procedure for non-contracting member vessels.²⁴⁴ Among the changes made at the 2006 meeting were several that significantly affected these final two measures. Conservation measure 10-06 was modified to further and more clearly restrict access to ports and facilities by vessels on the CP-IUU Vessel List and to extend actions that CPs can take relative to those vessels.²⁴⁵ Similarly, CM 10-07 was amended to restrict access to ports and facilities by vessels on the NCP-IUU Vessel List and to extend actions that CPs can take relative to those vessels.²⁴⁶

Finally, CM 10-08, promotes compliance by CP nationals with CCAMLR conservation measures by requiring CPs to take appropriate action if a national is discovered to be on ships on either IUU Fishing Vessel List that will become mandatory in July 2008.²⁴⁷

CCAMLR is now closer to adopting the full panoply of measures that COFI endorsed in the FAO Model Scheme on Port State Measures in 2005 and the recent draft of a legally binding agreement on port state measures.²⁴⁸ These and the other measures discussed make it much more unlikely that rouge vessels will get a warm welcome at any CP port that has both implemented and has sufficient port personnel to enforce conservation provisions, and more likely that the IUU fishing for toothfish will continue to drop.

NAFO [Northwest Atlantic Fisheries Organization](#)

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Establishment: **[1978 Convention on Future Multilateral Cooperation in Northwest Atlantic Fisheries](#)**, Ottawa, Adopted, October 24 1978; Entered into force, January 1, 1979

Members as of November 31, 2007: Canada, Cuba, Denmark (in respect of Faroe Islands and Greenland), European Community, France (in respect of St.

²⁴³ CCAMLR Conservation Measure 10-06 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

²⁴⁴ CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

²⁴⁵ CCAMLR Conservation Measure 10-06 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007

²⁴⁶ CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

²⁴⁷ CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/E/e_pubs/cm/06-07/10-08.pdf last visited Dec. 3, 2007.

²⁴⁸ FAO Model Scheme on Port State Measures to Combat IUU Fishing 2007, available at <ftp://ftp.fao.org/docrep/fao/010/a0985t/a0985t00.pdf> last visited Nov. 29, 2007; FAO, Report of the Expert Consultation to Draft a Legally-binding Instrument on Port State Measures, Fisheries Report No 846, available at <ftp://ftp.fao.org/docrep/fao/010/a1375e/a1375e00.pdf> last visited Dec. 6, 2007.

Pierre and Miquelon), Iceland, Japan, Korea (Rep. of), Norway, Russian Federation, Ukraine, and the United States.

Geographic Scope: Northwest Atlantic Ocean, approximately north of 35°N latitude and west of 42°W longitude. (For an exact definition, see Art. 1(1) of the [Convention](#)). It has regulatory competence only in the parts of the Convention Area beyond the limits of national jurisdiction. (This area is known as the Regulatory Area).

[\[Map\]](#)

Material Scope: All fishery resources of the Convention area with the exception of sea mammals, sedentary species, and, in so far as they are dealt with by other international agreements, highly migratory species and anadromous stocks.

Main Objectives: To contribute to the optimum utilization and rational management and conservation of Northwest Atlantic fishery resources.²⁴⁹

NAFO regulates 19 stocks of 11 migratory, high seas fisheries. It is structured with a Secretariat providing administrative services; a General Council responsible for supervising and coordinating the organizational, administrative, financial and other internal affairs of the Organization; a Scientific Council providing a forum for consultation and cooperation among the Contracting Parties with respect to the study, appraisal and exchange of scientific information and views relating to the fisheries of the Convention Area; and a Fisheries Commission responsible for the management and conservation of the fishery resources of the Regulatory Area. There are committees under each of the latter three bodies including the Fisheries Commission's Standing Committee on International Control (STACTIC), which reviews and evaluates conservation and enforcement measures including those relating to IUU fishing and IUU List matters.²⁵⁰

In earlier decades the organization experienced management problems, including, notoriously, significant illegalities in the Turbot fishery, and in 1990-1992, a major collapse of many of the regulated fisheries.²⁵¹ In May 2005, a report identified a number of the major problems with NAFO, including its decision-making, and a lack of serious enforcement and dispute settlement procedure. In September 2005, Canada proposed a working group to consider amendments to the Convention. This working group's September 2006 report

²⁴⁹ Internet Guide to International Fisheries Law, <http://www.intfish.net/orgs/fisheries/nafo.htm> last visited Nov. 29, 2007; NAFO web site, available at <http://www.nafo.int/about/frames/about.html> last visited Dec. 7, 2007.

²⁵⁰ NAFO website, available at <http://www.nafo.int/about/frames/about.html> last visited Dec. 7, 2007.

²⁵¹ Saunders, Phillip, *Recent Developments in NAFO: 'Reforming' an RFMO?* in Chatham House, *Illegal, Unreported and Unregulated Fishing*, 2nd Chatham House Update and Stakeholder Consultation Meeting, 16 (Nov. 2006), available at http://www.illegal-fishing.info/item_single.php?item=event&item_id=4&approach_id= last visited Dec. 7, 2007.

made a series of recommendations based in part on the U.N. Fish Stocks Agreement's implementation.²⁵²

This marked the beginning of a campaign of substantial reform,²⁵³ including substantial changes to NAFO's Conservation and Enforcement Measures (CEM), most recently revised in 2007.²⁵⁴ They now include seven chapters, with 57 articles and 26 annexes and specifically address IUU fishing, which can result in placement of vessels on an IUU List.²⁵⁵ This list was first compiled in 2006.²⁵⁶ Access to it appears at the top of the NAFO website with a colorful "New Feature" button announcing the "IUU List." Once that button is selected, not only does information about these boats appear (including a cross listing to show which of those vessels appear on the NEAFC IUU List), but also a link to the IUU Lists of CCAMLR, IATTC, ICCAT, IOTC, and NEAFC.

Perhaps most notable is that the recently concluded 29th Annual Meeting, which adopted an amendment to the Convention changing its formal name to the Convention on Cooperation in Northwest Atlantic Fisheries, formally added an article to the Convention that specifically commits the Commission to take action for the "prevention, deterrence and elimination" of IUU fishing.²⁵⁷ It also changed the purpose of the organization to a more sustainable one, as Article II now states the purpose as being:

...to ensure the long-term conservation and sustainable use of the fishery resources in the Convention Area and, in so doing, to safeguard the marine ecosystems in which these resources occur.²⁵⁸

The CEM provisions directly addressing IUU fishing fall under Chapter VI: "Scheme to Promote Compliance by Non-contracting party Vessels with Recommendations Established by NAFO," with some of the more notable methods detailed below.

²⁵² Id.

²⁵³ NAFO, Report of the General Council, 29th Annual Meeting, 24-28 Sept. 2007 (Serial No. N5478, NAFO/GC Doc. 07/5) (Hereinafter NAFO 29th Meeting), Annex 16, *Press Release and Backgrounder*, 34 available at <http://www.nafo.int/publications/frames/general.html> last visited Dec. 4, 2007.

²⁵⁴ NAFO, Conservation and Enforcement Measures, Serial # N5335 NAFO/FC, Doc 07/1 available at <http://www.nafo.int/fisheries/frames/regulations.html> last visited Dec. 4, 2007.

²⁵⁵ Id., Chpt. VI, Scheme to Promote Compliance by Non-contracting party Vessels with Recommendations Established by NAFO, Articles 43-51.

²⁵⁶ NAFO 29th Meeting *supra*, note 213, p.35.

²⁵⁷ NAFO 29th Meeting *supra*, note 213, Annex 17 wherein the new convention, as amended, is reproduced at 40-59. The amendment, totaling eight articles and two annexes, is given Serial # N.5453, NAFO/GC Doc. 07/4 and within the adopted new convention, Article VI, giving the responsibilities of the Commission, section 9(d), deals with IUU. Under the terms of the current convention, Article XXI, to take effect the adopted amendment must be ratified by $\frac{3}{4}$ of the contracting parties.

²⁵⁸ Id. Art. II, p.41.

It establishes presumptions whereby a non-contracting party vessel sighted fishing in the regulatory area (RA) is presumed to be undermining NAFO's CEMs. If the vessel is on NEAFC's IUU List, then the mere sighting of the vessel in the RA leads to the presumption of illegal fishing.²⁵⁹ Inspections at sea are authorized.²⁶⁰ If a NCP presumed fishing enters a CP's port, it must be fully inspected before any fish can be landed or transshipped.²⁶¹ A CP vessel cannot receive fish from a NCP vessel in a CP port unless the fish is from outside the RA, or it is established that the fish was caught in conformity with CEM.²⁶²

Once NAFO gets information from CPs based upon provisions in this CEM relative to illegal fishing activities of NCP vessel, the ship is placed on a Provisional List on a secure NAFO website, NAFO notifies the NCP that a vessel flying its flag has been thus observed, requests the reason for the transgression and that the vessel be informed to desist, and provides timelines for a NCP response and the next meeting where vessels will be added to a formal IUU List. NCP representatives are invited to this meeting. A vessel may immediately be moved from the Provisional List to the published IUU List if the NCP agrees to the listing.²⁶³

The IUU list is reviewed regularly both as to vessels added and removed through a process handled by a standing committee of NAFO's Fisheries Commission.²⁶⁴ Article 50 lists the repercussions of being on the IUU List. CPs shall take all necessary measures, mindful of national law, to prohibit (except for an emergency); any assistance by any CP vessel, including fish processing, transshipment, or joint fishing or provisioning of any kind; right of entry into any CP port or change of crew; fishing in CP national waters; chartering involving the CP; CP flagging the vessel; import of any fish from such vessel. CPs should encourage importers, transporters, and other sectors concerned to refrain from negotiating and transshipping fish caught by such vessels. And it encourages CPs to engage in wide-ranging information exchange among themselves, NCPs, and RFMOs in order to help dissuade the practice of IUU fishing.²⁶⁵

The final article in the chapter has CPs, severally or jointly, seeking cooperation from NCPs with offending vessels, reviewing facts to identify NCPs that have not taken actions to rectify IUU fishing problems and restricting export or transfers of any CP's formerly licensed fishing vessels to those NCPs.²⁶⁶

The NAFO website currently shows 21 vessels on its IUU List (although notes indicate six of those have been scrapped). Over half of these same vessels are

²⁵⁹ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 44.

²⁶⁰ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 45.

²⁶¹ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 46.

²⁶² NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 47.

²⁶³ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 48.

²⁶⁴ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 49.

²⁶⁵ NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 50. Article 15 also prohibits a CP from being involved in any chartering of a vessel involved in IUU activity under Chapter VI of the CEM. NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 15.

²⁶⁶ NAFO, Conservation and Enforcement Measures, Supra note 214, Art 51.

also shown on IUU list of NEAFC (although with different names and flags). Georgia is the predominant place of registry (6 vessels, five of which have been scrapped). Other nations include Russia, Cambodia, Togo, Sierra Leone, Guinea, Belize, Bahamas, Panama, and Cuba.²⁶⁷

While the NAFO IUU Fishing Vessel List only contains NCP boats, there are provisions in Chapter IV of the CEM as to illegal fishing by contracting party ships, and a list of recommended sanctions that can be taken, in accordance with the CP's national law, including fines, seizure of gear and catch, sequestration of vessel, suspension or cancellation of right to fish, reduction or withdrawal of quota.²⁶⁸

WCPFC [Western and Central Pacific Fisheries Commission](#)

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Establishment: [Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean](#), Honolulu, Adopted, September 5, 2000; Entered into force, June 19, 2004.

Members as of November, 2007: Australia, China, Canada, Cook Islands, European Community, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea (Rep. of), Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, USA, Vanuatu.²⁶⁹ There are also seven participating territories and one cooperating non-member.

Geographic Scope: Broadly speaking, the area of competence of the Commission is the Western and Central Pacific Ocean. Article 3 of the [Convention](#) provides a detailed delimitation.

[\[Map\]](#)

Material Scope: Highly migratory fish stocks, defined as all fish stocks of the species listed in Annex 1 of the [LOS Convention](#) occurring in the Convention Area, and such other species of fish as the Commission may determine.

Main Objectives: To ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western

²⁶⁷ NAFO website, <http://www.nafo.int/about/frames/about.html>, last visited Dec. 7, 2007.

²⁶⁸ NAFO, Conservation and Enforcement Measures, Supra note 214, Ch IV, Joint Inspection and Surveillance Scheme, Articles 25-40, Art. 36.

²⁶⁹ Western and Central Pacific Fisheries Commission website, <http://www.wcpfc.int/index.html> last visited Dec 7, 2007.

and central Pacific Ocean in accordance with the [LOS Convention](#) and the [UN Fish Stocks Agreement](#).²⁷⁰

This convention, the second regional fisheries management to be negotiated after conclusion of the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, did not begin operations until late 2005.²⁷¹ Its major resource concerns are target bigeye, yellowfin, South Pacific albacore, and North Pacific albacore with bycatch issues involving sea turtles, sea birds and immature tuna and non-target species.

The Convention specifically outlines a precautionary approach that shall be used in management and details application methods.²⁷² It provides for the Western and Central Pacific Fisheries Commission (WCPFC) to carry out the business of the convention and specifically to adopt necessary conservation and management measures.²⁷³ Other organizational elements include an administrative Secretariat,²⁷⁴ a Scientific Committee,²⁷⁵ a Technical and Compliance Committee to advise as to implementation of and compliance with conservation and compliance measures,²⁷⁶ and a Northern Committee, which makes recommendations on stocks north of 20 degrees north parallel.²⁷⁷

Although negotiated in 2000, the Convention has no specific IUU fishing language. It thus also has no provision for establishing an IUU Fishing Vessel list. Not unexpectedly, in the Convention's compliance and enforcement article, it does speak about actions that may be taken in regard to illegal fishing or activities that diminish the effectiveness of the established conservation regimes.²⁷⁸ Other articles give boarding and inspection rights²⁷⁹ and provide very basic port state remedies to prevent landings and transfers if catch is identified

²⁷⁰ Internet Guide to International Fisheries Law, <http://www.intfish.net/orgs/fisheries/wcpfc.htm>

²⁷¹ Secretariat of the Western and Central Pacific Fisheries Commission, Contribution to the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York, 22-26 May 2006, available at http://www.un.org/Depts/los/convention_agreements/reviewconf/wcpfc_reviewconference.pdf last visited Nov. 29, 2007.

²⁷² [Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean](#), Art. 5(c), 6, available at <http://www.wcpfc.int/index.html> last visited Dec 7, 2007.

²⁷³ Id., Art. 10.

²⁷⁴ Id. Art. 15.

²⁷⁵ Id. Art. 12, 13.

²⁷⁶ Id. Art. 14.

²⁷⁷ Id., Art. 11, para. 7.

²⁷⁸ Id. Art. 25.Par. 6, 10.

²⁷⁹ Id. Art. 26.

as caught in contravention to conservation measures²⁸⁰ and encourage cooperation with a list of other fisheries-related bodies.²⁸¹

In 2006, the WCPFC adopted Conservation and Management Measure (CMM) 2006-09 which went into force on February 13, 2007.²⁸² It sets out provisions to establish an IUU Vessel List and a process, with presumptions, that first results in a draft, then a provisional, and finally the published IUU Vessel List. It determines how a vessel gets placed upon such a list and how it can get removed. As of October 2007, there were five ships on the Provisional WCPFC IUU Vessel List, which will be finalized by the Commission at its December 2007 meeting.²⁸³ However, unlike the NAFO web site discussed above where the IUU Vessel List is a prominent button, there appears to be no easy (or even direct) way to gain access to the WCPFC list.

The most recent annual meeting of the Technical and Compliance Committee (TCC), its third regular session, occurred from September 27 to October 2, 2007, in Pohnpei and its actions and recommendations are forwarded to the full commission meeting in December for action. Several issues relating to dealing successfully with IUU fishing were considered.²⁸⁴ These included discussion of a draft CMM for transshipment monitoring with a decision to have further drafting occur and to submit that to the December 2007 full commission meeting for review.²⁸⁵ A draft on Port State Measures was presented, but after discussion, including recognition that the FAO was working on developing legally binding standards with a scheduled Expert Consultation, the draft was referred to the next year's TCC session (TCC4).²⁸⁶ Discussion about vessel chartering schemes occurred, but no draft was presented and it was agreed that it would be revisited at TCC4.²⁸⁷ The Committee did not reach a conclusion on the next steps after presentations of trade documentation schemes, which would be included under monitoring surveillance and control programs.²⁸⁸ And a report by the working

²⁸⁰ Id. Art 27, Par. 3.

²⁸¹ Id. Art. 22.

²⁸² Western and Central Pacific Fisheries Commission, Conservation Measure to Establish a List of Vessels Presumed to Have Carried Out Illegal, Unreported and Unregulated Fishing Activities in the Western and Central Pacific Ocean, available at <http://www.wcpfc.int/> last visited Nov. 29, 2007.

²⁸³ WCPFC, Technical and Compliance Committee, Third Regular Session, Summary Report of Meeting 27 Sept.-2 Oct 2007 Attachment H, p 78 ; WCPFC, Report of the Executive Director on the Work of the Commission prepared for the WCPFC Fourth Regular Session, December 3-7, 2007, Guam, Pars. 14, 15, Nov. 2007 WCPFC4-2007/15 both available at <http://www.wcpfc.int/> last visited Nov. 29, 2007.

²⁸⁴ WCPFC, Technical and Compliance Committee, Third Regular Session, Summary Report of Meeting 27 Sept.-2 Oct 2007 available at <http://www.wcpfc.int/> last visited Nov. 30, 2007.

²⁸⁵ Id. Par. 63-76.

²⁸⁶ Id. Par. 77-82.

²⁸⁷ Id. Par. 83-87.

²⁸⁸ Id. Par. 88-91.

group of TCC3 on the development of a vessel monitoring system for the WCPFC resulted in a decision to continue to work on the issue.²⁸⁹

Concluding Comments on RFMOs

It is probably undeniable that a majority on commentators and observers believed that the 1995 U.N. Fish Stocks Agreement's placement of regional fisheries management organizations at the heart of international fisheries management would provide relief from the tragedy of the commons. Garret Hardin's proposition, as revealed in the world's oceans, had resulted in diminished fish populations. Unfortunately, most of those same parties seem to admit that the reality of the situation is that high seas fisheries have continued to decline. In the words of Richard Tarasofsky, Head, Energy, Environment and Development Program at London's Chatham House (The Royal Institute of International Affairs), "RFMO performance has not lived up to expectations," as evinced by "the FAO's recently released *State of the World Fisheries and Aquaculture 2006* [that] reveals [the] stark picture [that] more than two thirds of high fish stocks are either depleted or at high risk of collapse, especially the straddling stocks that move between national maritime waters and the high seas."²⁹⁰ Michael Lodge, Director of the Independent High Level Panel on Regional Fisheries Management Organizations and an Associate Fellow at Chatham House states that "if international actions aimed at curbing IUU fishing were to achieve their full effect, it would be essential to improve the effectiveness with which the present system of high seas governance is implemented," a key element being "progressive reform of RFMOs."²⁹¹

The Chatham House report, Recommended Best Practices for Regional Fisheries Management Organizations, is more than 100 pages of analysis with recommendations on how the expectations of RFMOs might be better met. Some of the most salient issues are summarized below, with mention of other reports that have focused specifically on certain aspects of IUU fishing.

It is probably goes without question that a majority of commentators and observers believed that the 1995 U.N. Fish Stocks Agreement's placement of regional fisheries management organizations at the heart of international fisheries management would provide relief from the tragedy of the commons. Garret Hardin's proposition²⁹², as revealed in the world's oceans, had just as undeniably resulted in (often dramatically) diminished fish populations. Unfortunately, most of those same parties today seem to admit that the reality of

²⁸⁹ WCPFC, Technical and Compliance Committee, Third Regular Session, Outcomes from the TCC3 Vessel Monitoring System Working Group, available at http://www.wcpfc.int/tcc3/pdf/WCPFC-TCC3-2007-34%20_Rev.1_%20%5BVMS%20Working%20Group%20Paper_rev%201_%5D.pdf last visited Nov. 30, 2007.

²⁹⁰ Chatham House, Recommended Best Practices, *supra* note 173, vi.

²⁹¹ Chatham House, Recommended Best Practices, *supra* note 173, vii.

²⁹² Hardin, G. Tragedy of the Commons. *Science* 162:1243-1248 (1968). The incentives that arise in open access fisheries have been likened to Hardin's discussion of the village commons, where each user has an incentive to graze many cattle because doing so costs no more than grazing a few.

the situation is that high seas fisheries have continued to decline. In the words of Richard Tarasofsky, Head, Energy, Environment and Development Program at London's Chatham House (The Royal Institute of International Affairs), "RFMO performance has not lived up to expectations," as evinced by "the FAO's recently released *State of the World Fisheries and Aquaculture 2006* [that] reveals [the] stark picture [that] more than two thirds of high seas fish stocks are either depleted or at high risk of collapse, especially the straddling stocks that move between national maritime waters and the high seas."²⁹³ Michael Lodge, Director of the Independent High Level Panel on Regional Fisheries Management Organizations and an Associate Fellow at Chatham House states that "if international actions aimed at curbing IUU fishing were to achieve their full effect, it would be essential to improve the effectiveness with which the present system of high seas governance is implemented," a key element being "progressive reform of RFMOs."²⁹⁴

The full Chatham House report, *Recommended Best Practices for Regional Fisheries Management Organizations*, is more than 100 pages of analysis with recommendations on how the expectations of RFMOs might be better met. Some of the most salient issues are presented here, with mention of other reports that have focused specifically on IUU fishing issues. The following discussion is based on paragraphs of the IPOA-IUU that are enumerated above.²⁹⁵ These admonitions, which are to be developed and implemented through a NPOA-IUU, would, if met, go a long way toward meeting the best practices enumerated below. Furthermore, the IPOA-IUU was not adopted by the FAO until 2001; the U.N. Fish Stocks Agreement only preceded it by six years. Thus in less than a decade and a half there has been a dramatic shift of expectations as to RFMOs – this while most of the organizations have charters that precede both of these seminal documents. Such earlier-established RFMOs may not have the mandated capacity to undertake the roles and duties ascribed to them without charter revision. Some have done so as was discussed relative to NAFO at text accompanying footnote 211 and following; but many others have not.

However, general agreement also exists that there are a number of practical issues that could be addressed without major changes in most RFMO underlying agreements. These involve more effective internal communications among members; better communication between RFMOs and a more systematic approach in dealing with non-members to prevent them from undermining adopted conservation mechanisms. This is especially true as to compliance and enforcement matters. Michael Lodge summarizes those to include: standardizing and sharing/consolidating vessel registers and information from vessel monitoring systems; adoption of a uniform port state scheme combined with a standardized catch documentation scheme; and use of alternative dispute

²⁹³ Chatham House, *Recommended Best Practices*, supra note 173, vi.

²⁹⁴ Chatham House, *Recommended Best Practices*, supra note 173, vii.

²⁹⁵ See supra, notes 141-173, and accompanying text.

resolution including an experts' panel to promote better, more rapid decision making.²⁹⁶

Other expectations will be more difficult to accomplish without prerequisite modification of charters or dramatic changes as to how many RFMOs currently operate. These include incorporation of the precautionary approach and use of ecosystem-based management; dealing with overcapacity of the global fleet and allocation; and moving toward rational, uniform mechanisms to deal with developing countries that often are flag states for IUU fishing vessels.

For instance, Lodge points out that while defining best practices for use of the precautionary approach and ecosystem-based management may be relatively straightforward, implementation will be more challenging, in no small part because of the additional data and analytical tools required,²⁹⁷ plus the need to utilize prudent, longer-termed foresight when sufficient information is lacking. Other factors that will hinder instituting ecosystem-based and precautionary approaches, but that are not unique to these elements, include not only the questions of the legal ability to act based upon the interpretation of the charter, but also matters related to external conditions. Lodge succinctly lists these as including "poverty alleviation, food security, profit motives and lack of political will...."²⁹⁸

Overcoming this stasis is important. Professor Eric Molenaar of the Netherlands Institute for the Law of the Sea urges that a critical but currently largely missing initiative must be taken to insure that efforts to preserve the vitality of high seas fisheries succeed.²⁹⁹ He discusses the United Nations General Assembly Resolution 59/25³⁰⁰ passed in 2004 and its paragraph 68, which relates to threats to marine biodiversity posed by marine capture fisheries. He is convinced that the issue boils down to whether RFBs are authorized to regulate all bottom fisheries not only for the purpose of the sustainability of the target species but also for the purpose of minimizing negative ecosystem impacts resulting from take of species that have not yet been directly related to the health/magnitude of target species. He concludes that of the RFBs with high seas regulatory areas, only CCAMLR and SEAFC clearly have competence to do both; SIOFA, once in force, will also grant competence for this to its annual meetings of the parties; and both NEAFC and NAFO are considering expanding their regulatory ability as to this matter.³⁰¹

²⁹⁶ Michael Lodge, Managing International Fisheries: Improving Fisheries Governance by Strengthening Regional Fisheries Management Organizations, 5 (Chatham House Briefing Paper, March 2007) available at <http://www.chathamhouse.org.uk/publications/papers/view/-/id/446/> last visited Dec 26, 2007

²⁹⁷ Id.

²⁹⁸ Id.

²⁹⁹ Molenaar, *supra* n. 139 at 535-537

³⁰⁰ United Nations General Assembly (UNGA) Resolution 59/25 (2004), Adopted on 17 November 2004 (Doc. A/RES/59/25, of 17 January 2005) available at <http://daccessdds.un.org/doc/UNDOC/GEN/N04/477/70/PDF/N0447770.pdf?OpenElement> last visited Dec. 26, 2007.

³⁰¹ Molenaar, *supra* n. 139 at 535-537.

An analysis of the progress towards the use of the precautionary approach and ecosystem-based management was issued October 2007 as part of the Chatham House series of technical papers on RFMOs. It looked at 13 RFMOs in this regard (one now defunct). It concludes that most have taken some steps toward incorporation, but only a few have actually firmly embraced precautionary measures that resulted in a positive management advantage, namely IPHC and NAFO. It determines what all the reviewed RFMOs lack is adequate compliance and enforcement by the contracting parties. Even when catch limits are established, only a few RFMOs have sufficient, clear management measures in place to respond if they are surpassed.³⁰²

A particularly thorny issue in the IUU fishing discussion is how to incorporate or manage parties that are not members of a RFMO with jurisdiction where vessels registered to the non-member fish. An October report by Chatham House discusses a variety of practices regarding non-members after investigating 11 RFMOs (one with a treaty not yet entered into force).³⁰³

If the FAO Uniform legally binding recommendations for port state measures are approved in 2008, they will boost port state measures worldwide. Some of the implications for how a better and more coordinated front in this regard could help alleviate IUU fishing are addressed in the TRAFFIC report published in 2007.³⁰⁴ How effective these and other trade-related measures are will take more research and further wider implementation, but the report notes "...there is some evidence that, where such measures have been used systematically, and in conjunction with other MCS measures, such as centralized vessel monitoring systems, observer programmes and controls on transshipment, there has been a reduction in estimated IUU catch."³⁰⁵

The increasingly important role of RFBs is indicated by the establishment of a RFB Secretariats Network, which held its first meeting (RSN-1) March 12-13, 2007 in Rome.³⁰⁶ This closely followed the 27th Meeting of the Committee on

³⁰² Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations, Regional Fisheries Management Organizations, Technical Study No. 1: Progress in Adopting the Precautionary Approach and Ecosystem-Based Management, Marjorie L Mooney-Seus and Andrew A Rosenberg, xvii (October 2007), available at <http://www.chathamhouse.org.uk/research/eedp/papers/view/-/id/563/> last visited, Dec. 26, 2007. Certainly, CCAMLR should be incorporated here. FAO, Fisheries Report No. 837, *infra* note 262, 14-16.

³⁰³ Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations, Technical Study No. 2: Practice of RFMOs Regarding Non-members, Daniel Owen (October 2007) available at <http://www.chathamhouse.org.uk/publications/papers/view/-/id/554/> last visited Dec. 26, 2007.

³⁰⁴ M. Lack, *Catching On? Trade-Related Measures as A Fisheries Management Tool*, A TRAFFIC Report (2007) available at <http://www.traffic.org/content/850.pdf> last visited Dec. 26 2007. The U.S. approach on port access measures is the subject of proposed rulemaking that is currently in development.

³⁰⁵ *Id.* at vi

³⁰⁶ FAO, Fisheries Report No. 837, Report on the First Meeting of the RFB Secretariats Network, (March 12-13, 2007 Rome) available at <ftp://ftp.fao.org/docrep/fao/010/a1184e/a1184e00.pdf> last visited Dec. 27, 2007. This was also considered the fifth meeting of the RFBs. *Id.*, i.

Fisheries (COFI-27) where emphasis was placed on key issues including better collection and sharing of fisheries data; development of a legally binding port state measures document; implementation of an ecosystems approach to fisheries (EAF); overcapacity; and development of best practices for regional fishery bodies.³⁰⁷

These were prime issues of discussion for the gathered representatives of RFBs at RSN-1. The Assistant Director-General of FAO Fisheries and Aquaculture set the tone as he opened the meeting by noting that with illegal, unreported and unregulated fishing constituting one of the greatest threats to sustainable and responsible fisheries, RFBs have a growing role, obligation and status in terms of effective fisheries governance to counteract the problem. He concluded, echoing Michael Lodge, that this highlights the urgent need to further strengthen and improve regional and global fisheries governance, the reason for the gathering.³⁰⁸

The meeting also reviewed the results of a conference on the Straddling Stocks Agreement that took place in May 2006, at U.N. headquarters in New York.³⁰⁹ Of highest importance were the Review Conference's recommendations to modernize the approach of RFMOs to fisheries management; to encourage non-members and post opt-out members to use sustainable practices; to conduct RFMO performance reviews; and to strengthen compliance and enforcement and to develop mechanisms to coordinate monitoring, control and surveillance among RFMOs to ensure full exchange of information on IUU fishing.³¹⁰

Delegates discussed the Chatham House effort to develop best practices for RFMOs and considered how to establish criteria for RFMO performance reviews.³¹¹ The key IUU fishing question centered on how to improve the dissemination of information about these actions. Because of the lack of access to such information in general, and particular difficulty of availability in developing states, it was agreed that a most beneficial start would be to complete a comprehensive global record of fishing vessels and further agreed that blacklisting through use of IUU Vessel Lists seemed to be effective.³¹² The conferees emphasized the need for harmonization of catch documentation schemes and, while it might not be appropriate for every RFB, commended CCAMLR's CDS.³¹³

³⁰⁷ FAO, Fisheries Report No. 830 Supra note 121, xii-xiii, 3 (par. 16).

³⁰⁸ FAO, Fisheries Report No. 837, supra note 262, 28-29.

³⁰⁹ Review Conference of the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA Review Conference) (22-26 May 2006 at UN headquarters in New York), summary report available at International Institute for Sustainable Development, Earth Negotiations Bulletin website at <http://www.iisd.ca/vol07/enb0761e.html> last visited Dec. 26 2007.

³¹⁰ FAO, Fisheries Report No. 837, supra note 262, 4-5, 31-32.

³¹¹ FAO, Fisheries Report No. 837, supra note 262, 7-8.

³¹² FAO, Fisheries Report No. 837, supra note 262, 9-10.

³¹³ FAO, Fisheries Report No. 837, supra note 262, 11-12.

Participants acknowledged that while ecosystem based approaches to fisheries management are a work in progress, efforts are to be encouraged. Efforts of the Benguela Current Commission's were referenced and, again, CCAMLR was noted as the only RFMO with such a system fully in place, instituted in 1980. As with other actions, it was pointed out that such complex management would require capacity building especially in developing countries.³¹⁴

Finally, the parties discussed the possibility of establishing a web site for the RSN in order to facilitate and coordinate information exchange among the RFMOs; and determined that the next meeting, RSN-2, will be held immediately after the 2009 meeting of the Committee on Fisheries (COFI-28).³¹⁵

The full Chatham House report, Recommended Best Practices for Regional Fisheries Management Organizations devotes Chapter 12, a stand-alone summary, to a listing of recommended best practices in relation to conservation and management of fish stocks.³¹⁶ These are broken down into nine broad categories: General Practice (including to "recognize the grave threat to the stability of the cooperative regime posed by IUU fishing and work vigorously towards the suppression and elimination of such fishing;");³¹⁷ Conservation and Management Practices (including "In each RFMO, the members should ensure that: There are robust methods for measuring and monitoring so as to account for illegal, unreported and unregulated fishing and catch, including by-catch.");³¹⁸ Allocation Practices; Compliance and Enforcement Practices (including : "Schemes promoting compliance by nationals of its members, requiring the latter to ensure that natural and legal persons subject to their jurisdiction do not support or participate in IUU fishing; and Mechanisms for sharing surveillance information with adjacent coastal States and with other RFMOs targeting non-members conducting IUU fishing.");³¹⁹ Decision-Making Practices; Dispute Settlement Practices; Transparency; Special Requirements of Developing Countries; and Institutional Practices. They cover, in succinct form, over a dozen pages. They are a "model." Some might consider them overbroad, too general or, perhaps, too specific in certain areas. But in conjunction with the IPOA-IUU, they are required reading for how RFMOs might be constituted, in light of what is now and will be in the future expected of them.

Further discussion of the role of RFMOs and the potential for the United States to foster capacity to address IUU fishing is the subject of a NOAA Fisheries report that will be submitted to Congress in the first part of 2008.

³¹⁴ FAO, Fisheries Report No. 837, *supra* note 262, 14-16

³¹⁵ FAO, Fisheries Report No. 837, *supra* note 262, 17-18.

³¹⁶ Chatham House, Recommended Best Practices, *supra* note 173, 117-128.

³¹⁷ Chatham House, Recommended Best Practices, *supra* note 173, A.1.(d), p.117.

³¹⁸ Chatham House, Recommended Best Practices, *supra* note 173, B.16., p.121.

³¹⁹ Chatham House, Recommended Best Practices, *supra* note 173, D.1., p.122.

APPENDIX C

2006 REPORT ON U.S. FISHERIES BYCATCH REDUCTION

STANDARDS AND MEASURES RELEVANT

TO SECTION 202(H) OF THE MAGNUSON-STEVENSON

FISHERY CONSERVATION AND MANAGEMENT ACT

**2006 REPORT ON U.S. FISHERIES BYCATCH REDUCTION
STANDARDS AND MEASURES RELEVANT TO SECTION 202(h) OF THE
MAGNUSON-STEVEN'S FISHERY CONSERVATION AND MANAGEMENT
ACT**

Section 202(h)(1) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) states that "The Secretary of State, in cooperation with the Secretary, shall seek to secure an international agreement to establish standards and measures for bycatch reduction that are comparable to the standards and measures applicable to United States fishermen for such purposes in any fishery regulated pursuant to this Act for which the Secretary, in consultation with the Secretary of State, determines that such an international agreement is necessary and appropriate." Similar provisions are contained in both the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA).

Section 202(h)(3) of the Magnuson-Stevens Act requires that the Secretary of Commerce, in consultation with the Secretary of State, submit annually to the Senate Committee on Commerce, Science and Transportation and the House Committee on Natural Resources a report describing actions pursuant to Section 202(h) of the Act.

In its 2000 Annual Report to Congress on International Bycatch Reduction Agreements, the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) concluded, with Department of State concurrence, that seeking international agreements with foreign nations conducting pelagic longline fishing operations for Atlantic and Pacific highly migratory species was necessary to protect endangered and threatened sea turtles. An international strategy, referred to as the Course of Action to Promote International Agreements that Address the Need to Reduce Sea Turtle Bycatch in Foreign Longline Fisheries, was subsequently developed to address this issue and detailed in the 2001 Report to Congress on International Bycatch Reduction Agreements.

In January 2002, NMFS convened an International Bycatch Reduction Task Force to develop a Plan of Action to implement the sea turtle bycatch strategy. This Task Force was made up of NMFS and Department of State personnel. Although the initial focus of this group was to further discussions and ultimately to reduce sea turtle bycatch in longline fisheries internationally, the issues of incidental catch of seabirds in longline fisheries and the conservation and management of sharks were quickly added to the work of the Task Force. More information on the Course of Action to Promote International Agreements that Address the Need to Reduce Sea Turtle Bycatch in Foreign Longline Fisheries and the activities of the International Bycatch Reduction Task Force is available from NMFS.

In this report, NMFS identifies relevant bycatch standards and measures adopted in 2006 under fishery management plans addressing fish stocks also harvested by foreign fishermen. A description of these bycatch standards and measures by region, an update on initiatives identified in previous reports (where relevant), and NMFS' conclusions on the necessity and

appropriateness of seeking international agreements establishing comparable standards and measures follow. This report also provides an update on the status and work of the International Bycatch Reduction Task Force.

I. NORTHEAST REGION

The Final Rule to Implement Framework 43 to the Northeast Multispecies Fishery Management Plan (FMP) (71 FR 46871, August 15, 2006) is designed to address bycatch of haddock by New England groundfish vessels fishing for Atlantic herring. Under the Final Rule, vessels with a

Category 1 Atlantic herring fishing permit (generally larger, herring-specific vessels) may possess incidentally caught haddock until they reach a specified cap. Once the Category 1 cap is reached, all herring vessels in the fishery are limited to 2,000 pounds of herring per trip if any of the herring was caught within a defined area. In addition, Atlantic herring processors and dealers that sort herring catches as part of their operations are required to cull and report all haddock.

The Final Rule to Implement Framework 18 to the Atlantic Sea Scallop FMP (71 FR 33211, June 8, 2006) establishes a seasonal closure of the Elephant Trunk Access Area to reduce potential interactions between the scallop fishery and sea turtles and to reduce finfish and scallop bycatch mortality.

During 2006, the United States and Canada discussed bilateral strategies for reducing bycatch in the transboundary herring and scallop fisheries detailed above during meetings of the U.S.-Canada Transboundary Guidance Committee and the U.S.-Canada Steering Committee.

II. SOUTHEAST REGION

Although final rules were adopted in 2006 implementing new measures to reduce bycatch by U.S. vessels fishing for shrimp and reef fish in the Gulf of Mexico, these fish stocks are not harvested by foreign fishermen.

III. ATLANTIC HIGHLY MIGRATORY SPECIES

The Final Rule to Implement the Consolidated Highly Migratory Species FMP (71 FR 58058, September 2, 2006) establishes a circle hook requirement for U.S. fishermen using natural bait and natural/artificial bait combinations in billfish tournaments. The final rule also establishes mandatory workshops on sea turtle handling and safe release for pelagic and bottom longline and shark gillnet vessel owners and operators.

During 2006, NMFS completed a research program to evaluate methodology to reduce sea turtle bycatch and bycatch mortality in the U.S. Atlantic pelagic longline fishery. The research was conducted using commercial vessels as research platforms in the Atlantic Ocean and Gulf of Mexico. The experiment tested fishing protocols using bait types and hook types and resulted in implementation of the measures contained in the Final Rule to Implement the Consolidated Highly Migratory Species FMP. In 2006, the United States actively sought bilateral and international bycatch reduction agreements focusing on the use of appropriate circle hook and bait technology by pelagic longline vessels and safe handling and release of sea turtles in fisheries of highly migratory species.

IV. NORTHWEST REGION

The Final Rule to Implement Revisions to the 2006 Commercial and Recreational Measures for West Coast Groundfish (71 FR 8489, February 17, 2006) is intended to reduce and minimize the incidental catch and discard of overfished and depleted stocks. This fishery's trawl bycatch model was updated with bycatch and discard rates based on West Coast Groundfish Observer Program data from September 2004 through April 2005. The Pacific Fishery Management Council recommended adjustments to cumulative limits in limited-entry trawl fisheries for certain target species coastwide, such as sablefish, thornyheads, Dover sole, other flatfish, and arrowtooth flounder, based on projections from the trawl bycatch model. These adjustments for 2006 are projected to keep harvest within optimum yields. NMFS concurred with this recommendation and adjusted cumulative limits for these species during March through December 2006.

The Final Rule to Implement Amendment 18 to the Pacific Coast Groundfish FMP (71 FR 66122, November 13, 2006) requires vessels that participate in the open access groundfish fisheries to carry observers if directed by NMFS; and authorizes the use of depth-based closed areas as a routine management measure for minimizing the incidental harvest of any protected or prohibited non-groundfish species and discouraging target fishing while allowing small incidental catches to be landed.

V. SOUTHWEST REGION

No new measures specifically to reduce bycatch were implemented in 2006.

VI. PACIFIC ISLANDS REGION

In March 2006 (71 FR 14416, March 22, 2006), NMFS closed the Hawaii-based shallow-set swordfish longline fishery after it reached the interaction limit for loggerhead sea turtles. Federal regulations limit the fishery to 2,021 sets annually, beginning January of each year, and also specify that the fishery must be closed for the remainder of the year if the longline fleet reaches a threshold of allowable interactions of 16 leatherback or 17 loggerhead turtles. As of March 13, 2006, under a 100 percent observer coverage program for this fishery, NMFS observers had recorded 17 loggerhead interactions, triggering the closure. NMFS continues to conduct research to evaluate the efficacy of sea turtle protection measures on reducing sea turtle bycatch in the Hawaii-based pelagic longline fishery.

During 2006, NMFS conducted research to determine the survival rate of turtles by-caught in pelagic longline fisheries by monitoring post-release movements of turtles with satellite tag technology. Additionally, NMFS conducted behavioral and physiological research and experimented with various longline gear and bait adaptations to evaluate

practices that may reduce the unintentional catch of sea turtles in pelagic longline fisheries.

NMFS also supported institutional capacity building, including support to the Forum Fisheries Agency in their continuing efforts to provide observer training services for members from the western and central Pacific region. NMFS also sponsored workshops and clinics to export advances in pelagic longline gear technology aimed at reducing sea turtle bycatch to institutions in Japan, Philippines, Vietnam, Indonesia, Korea, Mexico, Costa Rica, Peru, Brazil, Columbia, Chile, and Spain. NMFS disseminated sea turtle identification and safe handling guidelines, turtle handling tools, and provided training on safe handling of unintentionally hooked sea turtles to officials in Ecuador, Guatemala, Costa Rica, Brazil, Korea, Thailand, and Japan.

VII. ALASKA REGION

The Final Rule to implement Amendment 69 to the FMP for Groundfish of the Gulf of Alaska (71 FR 12626, March 13, 2006) revises components of "other species" management. The final rule also raises the maximum retainable amount of "other species" in the directed arrowtooth flounder fishery from 0 percent to 20 percent, which will reduce the amount of "other species" that are discarded in the arrowtooth flounder fishery.

The final rule to implement Amendment 79 (71 FR 17362, April 6, 2006) to the FMP for Groundfish of the Bering Sea and Aleutian Islands establishes a groundfish retention standard (GRS) program for non-American Fisheries Act trawl catcher/processors that are 125 ft (38.1 m) length overall. The program is effective beginning January 20, 2008, for each vessel on an annual basis. The percent of groundfish retained will be calculated as a specified ratio of the weight of retained groundfish to total catch. Vessel owners or operators will be required to meet a GRS of 65 percent in 2008, 75 percent in 2009, 80 percent in 2010, and 85 percent in 2011 and following years. To monitor and enforce the GRS program, each vessel owner or operator will be required to use NMFS-approved scales to determine the weight of total catch, carry two observers or modify fishing practices so that each haul is available for sampling, and provide an observer sampling station where samples may be collected and processed from a single location. In addition, individual hauls may not be mixed.

A final rule was published on April 20, 2006 (71 FR 20346), amending regulations that require catcher vessels, catcher/processors, motherships, and shoreside and stationary floating processors carrying the observer communications system (OCS) to install hardware upgrades to meet current technology standards necessary to support OCS software. The OCS consists of industry-provided hardware and NMFS-supplied software that allows observers to provide fishery-dependent data to fishery managers. Timely electronic communication of catch reports submitted to NMFS by industry and observers is crucial to the effective in-season monitoring of groundfish catch and bycatch quotas.

VIII. MARINE MAMMAL PROTECTION ACT (MMPA) ACTIVITIES

MMPA List of Fisheries: NMFS finalized the 2006 List of Fisheries (LOF) on August 22, 2006 (71 FR 48802) and proposed the 2007 LOF on December 4, 2006 (71 FR 70339). Final LOFs reflect new information on interactions between commercial fisheries and marine mammals. The LOF places all commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occur in each fishery.

Bottlenose Dolphin Take Reduction Plan: In April 2006, NMFS finalized a plan (71 FR 24776) to reduce bottlenose dolphin serious injury and mortality incidental to nine commercial fisheries along the U.S. East Coast. The plan includes both regulatory and non-regulatory measures to reduce dolphin bycatch. Regulatory measures include prohibiting fishing at night in certain areas during specific times and requiring that fishermen tend their gear. Non-regulatory measures include increased enforcement and monitoring efforts, outreach to fishermen, and research.

Pelagic Longline Take Reduction Team: In June 2005, NMFS convened a team of stakeholders to address the incidental mortality and serious injury of long-finned pilot whales, short-finned pilot whales, and Risso's dolphins in the mid-Atlantic region of the Atlantic pelagic longline fishery. Under section 118 of the MMPA, the team was charged with developing a take reduction plan to reduce bycatch of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery to a level approaching a [zero mortality and serious injury rate](#) within 5 years of implementation of the plan. The team submitted consensus draft recommendations to NMFS in June 2006. Recommended measures to reduce bycatch include a 20-nautical-mile limit on mainline length in the Mid-Atlantic Bight; designation of a special research area off Cape Hatteras, North Carolina, with observer and other special requirements; development and use of equipment and methods for careful handling and release of entangled or hooked marine mammals; distribution of an updated informational placard on careful handling and release of marine mammals; and development of mandatory certification workshops on marine mammal bycatch for owners and operators of pelagic longline vessels.

Atlantic Trawl Gear Take Reduction Team (ATGTRT): In October 2006, NMFS convened a team of stakeholders to address the incidental mortality and serious injury of long-finned pilot whales, short-finned pilot whales, common dolphins, and white-sided dolphins in the Northeast bottom trawl, Northeast mid-water trawl (including pair trawl), mid-Atlantic mid-water trawl (including pair trawl), and mid-Atlantic bottom trawl fisheries. Under section 118 of the MMPA, the ATGTRT is charged with developing a take reduction plan to reduce bycatch of pilot whales, common dolphins, and white-sided dolphins in Atlantic trawl fisheries to a level approaching a [zero mortality and serious injury rate](#) within 5 years of implementation of the plan.

IX. OTHER ACTIVITIES—INTERNATIONAL BYCATCH REDUCTION

Larger Turtle Excluder Device Openings: Public Law 101-162 mandates that shrimp exported to the United States be harvested in a manner that is comparable to the sea turtle regulations of the United States. The law requires foreign governments whose shrimp trawl fleets adversely impact sea turtles to adopt programs requiring the use of turtle excluder devices (TED) if they want to export shrimp to the United States. Beginning in 2003, U.S. shrimp fishermen were required to use larger openings in their TEDs. The larger openings allow leatherback sea turtles, as well as large sexually mature loggerhead and green turtles, to escape the shrimp nets. Due to the changes in U.S. requirements, large TED openings were required by August 31, 2004, for those nations exporting wild-harvested shrimp to the United States. NMFS and the Department of State made 14 visits to these nations to inform them about the new TED opening requirements. During 2006, NMFS and the Department of State inspected 11 countries.

International Bycatch Reduction Task Force: In January 2002, NMFS convened an International Bycatch Reduction Task Force made up of NMFS and Department of State representatives. The Task Force subsequently developed a Plan of Action to: (1) implement the strategy to promote international agreements that reduce sea turtle bycatch in foreign longline fisheries, and (2) promote the implementation of the Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries and the FAO IPOA for the Conservation and Management of Sharks.

The Task Force Plan of Action outlines steps to be taken in implementing the U.S. strategy for international bycatch reduction. These tasks are broken up into four categories: (1) international sea turtle workshops, technology transfer, and gear experiments; (2) international seabird workshops, technology transfer, and gear experiments; (3) international communications relating to sea turtles, sharks, and seabirds; and (4) other task force activities. NMFS activities during 2006 relating to these categories include the following:

1) International Sea Turtle Workshops, Technology Transfer, and Gear Experiments: Since 1999, NMFS has conducted and supported research to develop measures to reduce the incidental take, mortality, and serious injury of sea turtles in pelagic longline fisheries. Efforts have focused on fishing gear modifications and changes to fishing practices to reduce sea turtle interactions and mortality. Experiments conducted in the eastern and northwestern Atlantic Ocean demonstrated that the use of 18/0 and larger circle hooks in combination with certain bait significantly reduces loggerhead and leatherback interactions with longline gear. In addition, 16/0 and 18/0 circle hooks lessen the severity of associated injuries. Activities relating to sea turtle bycatch reduction in longline fisheries continued to be influenced by these studies in 2006. NMFS remains committed to working cooperatively with other nations (including through establishment of international agreements) to share these results and to advance the adoption of technology and fishing practices that will reduce global sea turtle longline interactions. A selection of 2006 activities relating to workshops, technology transfer, and gear research are included below.

- *International Sea Turtle Workshops and Meetings:* During 2006, NMFS continued to engage in discussions and organized working sessions on sea turtle longline interactions at numerous international fishery and conservation forums and at fisheries bilateral meetings with longlining nations, including the 26th Annual Symposium on Sea Turtle Conservation and Biology (April 2006, Greece); the NAFO Annual Meeting (September 2006, Dartmouth, Nova Scotia); the 3rd Conference of Parties for the Inter-American Convention for the Protection and Conservation of Sea Turtles (September 2006, San Jose, Costa Rica); the Annual Trilateral Committee Meeting (May 2006, San Diego, California); the U.S.–Brazil Common Agenda Meeting (December 2006, Brasilia, Brazil); the U.S.–Canada Fisheries Bilateral (July 2006, Washington, D.C.); other fisheries bilateral meetings; and a November 2006 meeting in Juan Dolio, Dominican Republic, to discuss environmental projects funded under the Central American–Dominican Republic Free Trade Agreement.
- *Technology Transfer and Outreach:* NMFS staff in the Southeast, Pacific Islands, and Southwest Fisheries Science Centers are working with numerous longlining nations to provide information on results of gear experiments that have been conducted with the U.S. fleet; disseminate educational and outreach materials that have been translated into multiple languages; conduct training workshops on safe handling and release practices; provide technical guidance and circle hooks for the development of research programs; and coordinate on longline gear experiments. The Pacific Islands Fisheries Science Center, in cooperation with the Inter-American Tropical Tuna Commission (IATTC), held the First Technical Workshop of the Regional Sea Turtle Program of the Eastern Pacific, June 12–17, 2006 in Puntarenas, Costa Rica. The workshop focused on standardization and improvement in data collection and regional database development with participants from Central and South America, Spain, and Japan.
- During 2006, NMFS partnered with the Department of State’s Bureau of Oceans, Environment and Science (OES) to develop and support scientific, technological, and environmental initiatives in member countries of the Central America–Dominican Republic Free Trade Agreement (CAFTA-DR). Specifically, NMFS will use funds to expand the capacity of the CAFTA countries to reduce bycatch of sea turtles in longline and trawl fisheries, improve fisheries management and enforcement, and reduce threats from invasive species. These research and management activities build upon past and ongoing cooperative activities and frameworks in the region, including existing regional programs to promote sustainable fisheries management and reduce marine turtle bycatch, as well as partnerships with the World Wildlife Fund and the IATTC.
- *Gear Experiments:* During 2006, NMFS continued to assist in the planning and/or execution of international and domestic workshops focusing on technology transfer and outreach relating to reduction of sea turtle bycatch in longline fisheries. These workshops focused on transfer of circle hook and bait technology to Latin American, Asian, and other countries that have longline fleets that

interact with sea turtles. In April 2005, NMFS convened the first Technical Assistance Workshop on Sea Turtle Bycatch Reduction Experiments. The purpose of this workshop was to provide technical assistance in the design of research programs for the development and testing of turtle bycatch reducing technology appropriate to the longline fisheries of participating nations. Australia, Indonesia, Malaysia, Mexico, and the Philippine Islands sent national delegations to the meeting, and individuals from Italy, New Caledonia, Papua New Guinea, Spain, the Solomon Islands, and Vietnam participated. In 2006, NMFS provided technical guidance for new research programs that evolved out of the 2005 workshop. In 2006, NMFS continued collaborative circle hook and bait research with a number of additional countries, including Chile, Peru, and Ecuador. In February and March 2006, the Southeast Fisheries Science Center, in cooperation with the IATTC and the Pacific Islands Fisheries Science Center, worked with longline fishermen in Peru and Ecuador to test a new circle hook design modification that effectively increases the width of the hook by using a wire appendage on the back side of the eye. If effective, this would allow smaller circle hooks in the mahi-mahi fishery, which has shown a significant loss of catch with the standard circle hooks tested to date. NMFS is also continuing to engage with Japan on Japanese-style tuna hook experiments. NMFS continues to monitor sea turtle interactions in domestic longline fisheries and to conduct research in this area. In 2006 a cooperative research project investigating bycatch in coastal longline fisheries in the Gulf of Mexico and Atlantic was completed. The project involved using hook timers and time-depth recorders to investigate temporal and spatial relationships between target and bycatch species and further testing of circle hooks and baiting techniques. When analyses are completed, these findings should have application to international longline bycatch issues.

2) *International Seabird Workshops/Technology Transfer/Gear Experiments:* A number of Task Force members also participate as members of an Interagency Seabird Working Group, which works to increase coordination and collaboration between government agencies involved in the implementation of the U.S. National Plan of Action for Seabirds. During 2006, the Working Group provided input and guidance to a number of international workshops, gear experiments, and activities to promote technology transfer relating to reduction of seabird bycatch. These efforts are summarized below.

- **International Seabird Workshops and Meetings:** During 2006, Task Force members participated in a number of workshops and meetings, including: the 2nd Meeting of the Advisory Committee to the Agreement for the Conservation of Albatrosses and Petrels in Brasilia, Brazil (June 2006); presentation on the FAO's implementation of the IPOA-Seabirds at the North American Ornithological Congress in Veracruz, Mexico (October 2006); Co-convening the ad-hoc Working Group on the Incidental Mortality Associated with Fishing at the meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Hobart, Australia (October/November 2006); and the 2nd Meeting of the Parties of the Agreement for the Conservation of Albatrosses and Petrels in Christchurch, New Zealand (November 2006)

- **Technology Transfer and Outreach:** The United States continues to share findings from seabird mitigation research conducted in the United States in international arenas as well as support the development of effective resolutions and mitigation measures, in arenas such as FAO's Committee on Fisheries (COFI), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Western and Central Pacific Fisheries Commission, International Scientific Committee, CCAMLR, and IATTC. Integrated weight groundlines and paired streamer lines (used and tested with demersal longline gear in Alaska to avoid seabirds) continue to be tested and used in Russian longline fisheries and elsewhere. A technical assistance program in the Hawaii pelagic longline fleet continues for vessel conversions to side-setting (used with pelagic longline gear to minimize seabird interactions).
- **Research and Gear Experiments:** NMFS and the U.S. Fish and Wildlife Service continue to collaborate with university Sea Grant programs, the longline industry, and non-governmental organizations to develop and evaluate the effectiveness of seabird mitigation devices. Continued efforts have included gear studies and sea trials on streamer lines, side-setting, integrated weight groundlines, and trawl mitigation devices. Research results have been presented at domestic and international scientific meetings and integrated into U.S. efforts to seek international bycatch reduction agreements. Through the Commission for Environmental Cooperation, the United States collaborates with Canada and Mexico on numerous projects involving marine species of conservation concern. A North American Conservation Action Plan for the Pink-footed Shearwater was developed and research projects implementing this plan continued in 2006.

3) *International Communications Relating to Sea Turtles, Sharks, and Seabirds:* Task Force members participated in a number of activities designed to communicate U.S. concern regarding bycatch of sea turtles, sharks, and seabirds. As noted above, many of these international communications and other activities focused on further dissemination of information relating to gear/bait modifications to reduce sea turtle bycatch in longline fisheries and measures to reduce the bycatch of seabirds in longline fisheries. Recent activities included the following:

- Over the past year, the United States has continued to use international organizations, regional and subregional fishery management organizations and arrangements, and bilateral relationships to highlight international problems of sea turtle bycatch and incidental catch of seabirds and sharks in longline fisheries. We have continued to impress upon foreign governments the importance of this issue to the United States and have stressed the need for their active engagement and concrete action (including bilateral and international agreements) as part of an effective strategy for the conservation and management of these species. In this regard, the Administration's efforts to address this pressing problem continue to focus on the following key areas:
 - a) Obtaining additional data on the level of sea turtle interaction with longline fisheries, including distribution by time, depth and area.
 - b) Continuing research into new fishing gear and techniques to reduce sea turtle bycatch, including gear modifications, alternative baits, and alternative fishing strategies.
 - c) Identifying interim measures at the international level to reduce sea turtle bycatch, while efforts continue to further identify, refine, and implement possible solutions through numbers 1 and 2, above.
 - d) Providing technical assistance and outreach to foreign nations to document sea turtle interactions in longline fisheries, conduct gear modification experiments and implement measures to reduce sea turtle bycatch, and implement safe-handling practices to reduce sea turtle injury and mortality.
 - e) Promoting full international implementation of the Guidelines adopted by the 2004 FAO Technical Consultation on Sea Turtle Conservation and Fisheries and supported by COFI.

4) *Other Task Force Activities:* In addition to tasks specifically associated with the Task Force Action Plan, members of the Task Force participated in the following activities:

- *Inter-American Sea Turtle Convention:* The United States was a driving force behind negotiation of the Inter-American Convention for the Protection and Conservation of Sea Turtles in the Western Hemisphere. The Convention, which entered into force in May 2001, establishes a comprehensive framework for international protection of sea turtles and their habitats, including specific provisions relating to the interaction of sea turtles in commercial fisheries. Before 2006, there were two Conferences of the Parties (COP1—August 2002/August

2003, and COP2—November 2004). During these meetings, Parties to the Convention agreed to procedural rules and bylaws; developed guidelines for international cooperation and an ongoing work program for the Secretariat pro tempore; constituted the Consultative Committee; finalized the format for the annual report form; continued discussions on the structure of the Scientific Committee; passed the Convention's first resolution (a largely advisory resolution on conservation of the leatherback sea turtle); and concluded its first Memorandum of Understanding between the Convention and the regional South American fisheries development organization OLDEPESCA.

All 11 Parties to the Convention sent delegates to COP3, which was held September 2006 in Mazatlan, Mexico. The major issues discussed at COP3 included the rules of procedure for the Scientific Committee, establishing and funding a permanent Secretariat, revising the annual report format, and convening a meeting in 2007 to resolve important issues (e.g., establishing and funding a permanent Secretariat). Two resolutions passed at COP3—convening a regional meeting to discuss declines in hawksbill nesting at Yucatan, Mexico, and encouraging Parties to implement bycatch mitigation techniques outlined in the FAO guidelines to reduce sea turtle fisheries bycatch. The United States is continuing to take a lead role, and is working with the other Parties to establish the framework, including a permanent Secretariat, for the Parties to carry out their Convention obligations.

- *Indian Ocean Sea Turtle Memorandum of Understanding:* The Memorandum of Understanding (MOU) on the Conservation and Management of Marine Turtles of the Indian Ocean and Southeast Asia, and its associated Conservation and Management Plan (CMP), provide a comprehensive framework for the conservation and protection of sea turtles and their habitats in the Indo-Pacific region. Though non-binding, the MOU and CMP contain strong, forward-looking provisions that, if effectively implemented, will advance conservation of endangered sea turtle populations and promote their recovery. To date, 24 countries have signed the MOU. The 3rd meeting of the Signatory States was held in March 2005 in Bangkok. Member States requested the Indian Ocean–South-East Asia (IOSEA) Advisory Committee to assess the impacts of the December 2004 tsunami on sea turtles and their habitats, with a special emphasis on leatherbacks. The IOSEA also decided to launch a regionwide Year of the Turtle initiative in 2006 to draw attention to the dramatic declines in turtle populations. The 4th meeting of the Signatories was held in March 2006 in Oman, the first Middle Eastern country to host a meeting. This meeting focused largely on outreach, specifically launching the 2006 Year of the Turtle initiative. The advisory committee presented a draft report on the 2004 tsunami impacts on leatherback turtles, and the United States agreed to provide additional information on threats to leatherbacks as they migrate through the high seas before the report is finalized. Here again, the United States continues to work to establish through the MOU and CMP a strong and effective sea turtle conservation regime.

- *IATTC Consolidated Resolution on Bycatch:* At its 74th annual meeting, June 26–30, 2006, in Busan, Korea, the IATTC extended the Consolidated Resolution on Bycatch (C-04-05) through January 1, 2008. This resolution requires full retention of juvenile tunas and non-target species of fish, and provides for a review of compliance on the full retention measure (by flag state or entity) to take place in the Permanent Working Group on Compliance in 2007. The U.S. proposal to strengthen sea turtle mitigation measures was deferred until next year. A standalone resolution or amendments to the Consolidated Resolution on Bycatch to further elaborate sea turtle interaction requirements was discussed but not adopted due to resistance from the European Union and Korea. The European Union called for the Bycatch Working Group to meet in early 2007 and for the issue of sea turtles to be on the agenda.
- *2006 ICCAT Annual Meeting:* During the 2006 ICCAT annual meeting, no additional measures were taken regarding species taken as bycatch. However, the Commission decided to conduct its first-ever assessment on the impact of ICCAT fisheries on seabird populations in the Convention area, an important step to improving fisheries management to protect these species. In addition, the Standing Committee for Research and Statistics formed a new working group whose focus will be ecosystem effects of fishing, mainly looking at impacts on sea turtles, sea birds, and sharks. Scheduled assessments for shortfin mako and blue sharks were delayed until 2008 with a Standing Committee data preparatory meeting scheduled for 2007. These assessments will be critical as ICCAT moves forward in its management of sharks.
- *2006 NAFO Annual Meeting:* During the 2006 NAFO Annual Meeting, the Organization adopted a U.S.-proposed resolution calling for implementation of the *Guidelines to Reduce Sea Turtle Mortality in Fishing Operations* adopted by the 2004 FAO Technical Consultation on Sea Turtle Conservation and Fisheries and supported by COFI. In addition, the resolution calls on NAFO Contracting Parties to enhance implementation of existing sea turtle mitigation measures; collect and provide to the NAFO Secretariat information on sea turtle interactions in the NAFO Convention Area; and collaborate with each other and with subregional, regional, and global organizations to share data on sea turtle interactions and develop and apply compatible bycatch reduction measures. Beginning in 2007, all NAFO Contracting Parties should provide to the NAFO Secretariat detailed sea turtle–fishery interaction data (including observer data) in NAFO fisheries. The NAFO Secretariat will compile the data resulting from implementation of this resolution and NAFO will develop further strategies for consideration at the 2008 Annual Meeting. Resulting data will also be shared with the FAO.

CONCLUSION

During 2006, the United States continued its efforts to secure international measures to reduce bycatch that are comparable to the standards and measures applicable to United States fishermen. Given the ongoing negative impacts of bycatch internationally, the United States will continue these efforts seeking to secure international measures designed both to minimize bycatch and minimize the mortality resulting from unavoidable bycatch.

Section 610 of the newly reauthorized Magnuson-Stevens Act contains substantial new obligations to address international issues in living marine resource stewardship, including actions to address bycatch of protected species. The implementation of these measures is an extremely high priority for NMFS, NOAA, and the Department of Commerce. This implementation, as well as the relationship between the new Magnuson-Stevens Act requirements and those contained in the MMPA and ESA, are currently under consideration.

APPENDIX D

EXAMPLES OF APPLICATION OF U.S. LAW TO IUU FISHING AND BYCATCH

Examples of Application of U.S. Law to IUU Fishing and Bycatch

Related materials are provided in additional Appendices: complete listings of U.S. law related to IUU fishing (Appendix A), U.S. actions to reduce bycatch (Appendix C), and tools to reduce global bycatch of cetaceans (Appendix E).

The amendments to the Magnuson-Stevens Act and the Enforcement Act in 2006 are not the first attempt by the U.S. Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international conservation regimes, though they differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. The existing statutory framework was employed in these earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast, in the 1970s and 1980s the United States sought to use unilateral trade sanctions to push compliance with provisions of the International Convention for the Regulation of Whaling. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers who used turtle excluder devices (TEDs) as a means to release endangered marine turtles from their trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The earliest example of domestic law aimed at excluding imports of fishery products taken illegally is the Lacey Act of 1900. While not aimed specifically at fishery products, the purpose of the original Lacey Act was to strengthen state fish and wildlife laws by restricting commerce of illegal fish and wildlife. It was bolstered in 1926 by the Black Bass Act, which prohibited interstate shipment of species of bass when the fish were taken contrary to state law. The modern Lacey Act results from amendments in 1981 that repealed the earlier law and the Black Bass Act, and substituted new provisions that strengthen and expand the provisions against importation of illegally taken fish and wildlife.¹ The Lacey Act Amendments of 1981 are considered "one of the United States' primary laws directly targeting illicit interstate or foreign trade in illegally taken species."² The act prohibits import, export, transport, sale, possession or transactions in interstate or foreign commerce of any fish or wildlife "taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law."³ It includes specifications on package marking and record keeping,⁴ and provides for penalties including forfeiture of product and equipment in felony cases.⁵ The two-part prohibition requires evidence of a violation of domestic or

¹ Pub. L. 97-79, 95 Stat 1073, 18 U.S.C. 3371 et seq. *See*, M. Bean. 1983. The Evolution of National Wildlife Law, rev'd edition, at 111.

² P. Ortiz. An overview of the U.S. Lacey Act Amendments of 1981 and a Proposal for a Model Port State Fisheries Enforcement Act. Prepared for Ministerially Led Task Force on IUU Fishing on the High Seas. November 2005, at 3.

³ 18 U.S.C. 3372.

⁴ 18 U.S.C. 3372 (b), (d).

⁵ 18 U.S.C. 3374.

foreign law and of trafficking: import, export, sale and so forth.⁶ The law has been used extensively in a variety of wildlife resource cases, and NOAA has used it to prosecute foreign fishing vessels that import catch such as tuna that was caught without authorization in another country's EEZ.⁷

In 1971, Congress passed the Pelly Amendment to the Fisherman's Protective Act of 1967. The amendment was in response to concerns regarding the inability of the International Whaling Commission to enforce its quotas. The Amendment directs the Secretary of Commerce to certify to the President if "nationals of a foreign country, directly or indirectly, are conducting fishing operations in a manner or under circumstances which diminish the effectiveness of an international fishery conservation program."⁸ Although the President always retains the discretion to direct the Secretary of Treasury to impose trade sanctions, the Fisherman's Protective Act specifies a prohibition on the importation of fish products from the certified country.⁹ The Secretary of Commerce made five certifications under Pelly in the ensuing 10 years, but no sanctions or import bans were ever imposed.¹⁰

The Packwood Amendment to the Fishery Conservation and Management Act was passed in 1982, and added the additional sanction on certified nations of a 50 percent reduction in their allocation of fish from the U.S. EEZ.¹¹ The amendment made the imposition of sanctions mandatory once a certification of "diminishing effectiveness" of the IWC was made.¹² It did not, however, change the standard for certification set out earlier in Pelly.¹³

The Marine Mammal Protection Act of 1972¹⁴ provides another example of how Congress has asserted itself in international wildlife conservation policy. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop "new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare."¹⁵ Congress also acknowledged that "unilateral action by the U.S." affecting any species or subspecies of

⁶ Ortiz at 4.

⁷ Ortiz provides a detailed description of the investigation, charge and trial aspects of the Lacey Act and uses the U.S. experience to develop a model enforcement law for port states.

⁸ 22 U.S.C. 1978(a)(1).

⁹ 22 U.S.C. 1978(a)(4).

¹⁰ H. R. Rep. No. 95-1029, p. 9 (1978); 125 Cong. Rec. 22084 (1979) (remarks of Rep. Oberstar).

¹¹ 16 U.S.C. 1821(e)(2). At the time, foreign nations could receive an allocation in U.S. waters for fish not being harvested by U.S. fishermen. New language was added to in Section 201(d) in MSRA regarding the Total Allowable Level of Foreign Fishing (TALFF) as follows: "Allocations of the total allowable level of foreign fishing are discretionary, except that the total allowable level shall be zero for fisheries determined by the Secretary to have adequate or excess domestic harvest capacity."

¹² 16 U.S.C. 1821 (e)(2)(B)(ii)

¹³ *Japan Whaling Assn v American Cetacean Society*, 478 US 221 (1986) at 227. Court held that even though sanctions were mandatory once a certification was made, the Secretary had a range of discretion in making the finding whether a nation's fishing activity was sufficient to diminish the effectiveness of the IWC, citing "no reason to impose a mandatory obligation upon the Secretary to certify that every quota violation necessarily fails the standard." At 228.

¹⁴ 16 U.S.C. 1371-1407

¹⁵ Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures.”¹⁶

The MMPA prohibits “taking” (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act’s stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.¹⁷ The U.S. Customs Service within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA states: “The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards.” This prohibition is mandatory. Subparagraph (A) requires the Secretary to “insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S.”¹⁸

The importation ban provisions have been used only used once outside the context of the “tuna-dolphin issue.”¹⁹ The history of U.S. action to reduce the number of dolphins killed in the course of tuna fishing operations in the Eastern Pacific Ocean is one of the most prominent examples of unilateral enforcement of conservation standards. The story is a lengthy one and will not be repeated here although the issue was one of the driving forces behind the enactment of MMPA.²⁰

The MMPA creates a ban on “the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards.”²¹ In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

¹⁶ Report 92-863 Senate 92d Congress 2d Session page 10.

¹⁷ 16 U.S.C 1372 (a)(2)

¹⁸ 16 U.S.C 1372 (a)(2)(A)

¹⁹ Protecting marine mammals from direct takes for crab bait was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s.

²⁰ See, e.g. Michael J. Bean and Melanie J. Rowland, *The Evolution of National Wildlife Law* (3d ed. 1997) at 116-136; C.J. Carr and H.N. Scheiber, *Dealing with a Resource Crisis: regulatory regimes for managing the world’s marine fisheries*, in *How Globalization affects national regulatory policies*. 2002. Available online at <http://repositories.cdlib.org/uciaspubs/editedvolumes/1/3>.

²¹ 16 U.S.C.A. § 1371(a)(2)

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This result precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).²² The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.²³

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of “dolphin safe tuna” to mean “tuna harvested without dolphin mortality.” In 1997, Congress enacted the IDCPA,²⁴ which revised the criteria for banning imports by amending the MMPA. Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.²⁵

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.²⁶

A detailed discussion of the most recent progress in dolphin conservation, research, tuna tracking, labeling standards, and litigation can be found in the August 2007 NOAA Report to Congress.

The Driftnet Impact Monitoring, Assessment and Control Act attempts to reduce the mortality of non-target marine animals in driftnets used by foreign fisheries operating in the North Pacific Ocean and Bering Sea.²⁷ It was passed in response to congressional

²² Pub. L. No. 102-523, 106 Stat.3425 (1992).

²³ H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.A.N. at 1632.

²⁴ Pub. L. No. 105-42, 111 Stat. 1122 (1997).

²⁵ Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).

²⁶ Available online at <http://swr.nmfs.noaa.gov/psd/embargo2.htm>.

²⁷ Driftnet Act §4002, 16 U.S.C. 1822. On February 6, 1990, the House of Representatives passed H.R. 2061 amending the Magnuson Fishery Conservation and Management Act to prohibit “large-scale driftnet

findings that driftnets are "a fishing technique that may result in the entanglement and death of enormous numbers of target and non target marine resources in the waters of the North Pacific Ocean."²⁸ The Driftnet Act was intended to increase efforts "to monitor, assess, and reduce the adverse impacts of driftnets."²⁹

The President signed Public Law 101-627, the Fishery Conservation Amendments of 1990, on 28 November 1990. Title I, Section 107, of the law amended Section 206 of the Magnuson-Stevens Fishery Conservation and Management Act (hereafter referred to as the Magnuson-Stevens Act) (16 USC 1826) to incorporate and expand upon provisions of the Driftnet Impact Monitoring, Assessment, and Control Act of 1987.

On 2 November 1992, the President signed Public Law 102-582, the High Seas Driftnet Fisheries Enforcement Act. Among other things, this Act is intended to enforce implementation of United Nations General Assembly Resolution 46/215, which called for a worldwide driftnet moratorium beginning in December 1992.

Public Law 104-43, the Fisheries Act of 1995, was enacted on 3 November 1995. Title VI of this law, the High Seas Driftnet Fishing Moratorium Protection Act, prohibits the United States, or any agency or official acting on behalf of the United States, from entering into any international agreement with respect to the conservation and management of living marine resources or the use of the high seas by fishing vessels that would prevent full implementation of UNGA Resolution 46/215.

A description of efforts the U.S. has made to carry out the policy expressed in these provisions is available in the annual report to Congress.³⁰ The most recent report made to Congress describes efforts the United States has made to implement its own driftnet ban as well as the United Nations General Assembly driftnet ban and the Wellington Convention in the North Pacific, Mediterranean, Antarctic and globally. Activities have included coordination with other fishing nations, U.S. Coast Guard enforcement actions, negotiation of bilateral agreements, coordination with other nations to track vessels with the potential for high seas drift net fishing and research on the impacts of driftnet fishing on marine resources.

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in a 1989 amendment to the Endangered Species Act,³¹ requiring the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. Currently, 16 nations have received positive certification under the law, 24 nations fish for shrimp in environmental conditions where sea turtles are unlikely to occur, so do not pose a threat, and 8 additional nations use small-scale technology that is determined not to pose a threat.³² Any other nations catching shrimp are prohibited from importing it into the United States. The import ban has been applied

fishing" in U.S. waters. 136 Cong. Rec. H231 (daily ed. Feb. 6, 1990). The bill also instructed the Secretary of State to seek an international ban on large-scale driftnet fishing. *Id.* at 230.

²⁸ *Id.* at §4002(1).

²⁹ *Id.* at § 4002(3).

³⁰ Available online at <http://www.nmfs.noaa.gov/ia/intlbycatch/docs/CONGO07RPT.pdf>.

³¹ Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).

³² Federal Register notice available online at <http://www.thefederalregister.com/d.p/2007-05-22-E7-9884>.

to countries that failed to meet the requirements for positive certification, with mixed results.

In 1991, the United States issued guidelines for assessing the comparability of foreign sea turtle conservation programs with the U.S. program. The 1991 Guidelines also determined that the scope of Section 609 was limited to the wider Caribbean/western Atlantic region. In 1993, the United States issued revised guidelines providing that, to receive a certification in 1993, affected nations (those determined in 1991 Guidelines) had to maintain their commitment to require TEDs on all commercial shrimp trawl vessels.

The Earth Island Institute, a San Francisco-based environmental organization, filed suit in the U.S. Court of International Trade to force the Departments of State and Commerce to comply with certification procedures under federal law³³ for countries exporting to the United States shrimp caught in a manner that harmed endangered sea turtles.³⁴ In December of 1995, the U.S. CIT found that the 1991 and 1993 Guidelines were contrary to law by limiting the geographic scope of the application of Section 609 to shrimp harvested in the wider Caribbean/western Atlantic region. In April 1996, the U.S. Department of State published revised guidelines to comply with the CIT order of December 1995. The new guidelines extended Section 609 to shrimp harvested in all foreign nations, but confined positive certification to nations whose vessels used TEDs. In October 1996, the CIT ruled that the 1996 Guidelines were contrary to Section 609 because they allowed imports of shrimp from non-certified countries, if the shrimp was harvested with commercial fishing technology that did not adversely affect sea turtles. The CIT later clarified that shrimp harvested by manual methods, which did not harm sea turtles, could continue to be imported even from countries which had not been certified under Section 609, and refused to postpone the worldwide enforcement of Section 609.

Once application of the requirements expanded, several Asian nations were not able to obtain positive certification and import bans ensued. In accordance with World Trade Organization (WTO) rules, the governments of Pakistan, Malaysia, India, and Thailand expressed their concerns to the WTO regarding the U.S. imposed embargo of shrimp imports. In 1996, they filed a complaint against the United States under WTO dispute settlement procedures, claiming that the U.S. law violated international trade law by barring the importation of their shrimp and shrimp products.³⁵ After pursuing informal consultations unsuccessfully, the complaining parties requested that a WTO Dispute Panel be convened and for the Panel to find that Section 609 of Public Law 101-162 and its implementing measures were contrary to the Governing Agreement on Tariffs and Trade (GATT). The dispute panel found the measure was inconsistent with the GATT, and the U.S. appealed. The WTO Appellate Body ruled in 1998 against the United States, finding that it had discriminated by giving Asian countries only four months to comply with the law, but giving Caribbean Basin nations three years. Even though the United

³³ See, discussion of sea turtle conservation amendments to the ESA, *supra* n. 23.

³⁴ Earth Island Institute vs. Christopher, 20 Ct. Int'l Trade 1221 (1996) vacated sub nom EII v Albright, 147 F2d 1352 (Fed Cir 1998).

³⁵ United States— Import Prohibition of Certain Shrimp and Shrimp Products. WTO case Nos. 58 and 61. Ruling adopted on 6 November 1998. Available online at http://www.wto.org/english/tratop_e/envir_e/edis08_e.htm.

States lost the case, the Appellate Body ruling recognized the validity of the U.S. Endangered Species Act and the rights of the United States to adopt environmental conservation measures as long as they are administered fairly.³⁶

In response to the original Panel and Appellate Body decisions, the United States revised its guidelines on the importation of shrimp, changing both the method and the schedule by which it evaluated turtle protection measures. Under the original guidelines, countries were certified if they implemented regulation to require shrimps to use TEDs. Under the Revised Guidelines, other regulatory approaches to the protection of sea turtles may substitute for TEDs, or a state may show that its shrimp fishing does not threaten sea turtles and on that basis obtain certification. Malaysia took the action back to the WTO in 2001, but the WTO Appellate Body held that the implementation steps had remedied any unfair discrimination and provided due process to exporting nations.³⁷

³⁶ Report of the Appellate Body on U.S. Import Prohibitions of Certain Shrimp and Shrimp Products, Oct. 12, 1998, 38 I.L.M. 118 (1999)

³⁷ USTR. U.S. Wins WTO Case on Sea Turtle Conservation. Available online at http://www.ustr.gov/Document_Library/Press_Releases/2001/October.

APPENDIX E

**AN EVALUATION OF THE MOST SIGNIFICANT THREATS
TO CETACEANS, THE AFFECTED SPECIES AND THE
GEOGRAPHIC AREAS OF HIGH RISK, AND THE
RECOMMENDED ACTIONS FROM VARIOUS
INDEPENDENT INSTITUTIONS**

NOAA TECHNICAL MEMORANDUM NMFS-OPR-36

WORLDWIDE BYCATCH OF CETACEANS

An evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions.

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**NOAA Technical Memorandum NMFS-OPR-36
July 2007**



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Worldwide Bycatch of Cetaceans

ANALYSIS AND ACTION PLAN



Order No.
DG133F06SE4641

A Report to the NOAA Fisheries Office
of International Affairs

Nina Young, Principal Investigator.
With S. Iudicello and MRAG Americas

30 June 2007

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Hector's dolphin (*Cephalorhynchus hectori*) calf killed in gillnet,
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EXECUTIVE SUMMARY

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. The U.S. Ocean Commission in 2005 judged incidental catch in fisheries the “biggest threat to marine mammals worldwide . . . [killing] hundreds of thousands of them each year.” Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on quantifying the scale of this mortality, identifying the magnitude of this threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.

Cetaceans are “migratory.” They spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective migratory species are exposed to an array of threats because they do not confine themselves to one location. Moreover, because they periodically cross through a number of jurisdictions, the level of protection afforded to cetaceans fluctuates according to their geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

With bycatch a serious and widespread threat to cetaceans, there is an urgent need to better document the extent of this threat, assess cetacean populations, develop alternative fishing gear and practices and, at the same time, institute effective regional agreements that call for mitigation measures ranging from temporal and spatial closures to deterrents. There is also the need to foster greater engagement by inter-governmental bodies (e.g. Food and Agriculture Organization of the United Nations (FAO), the United Nations, and the International Union for the Conservation of Nature (IUCN)) as well as international regional fishery management bodies. Because it requires a country to outline specific measures to address bycatch, the FAO’s International Plan of Action model and resolutions adopted through regional fishery management organizations may provide useful mechanisms to address interactions between cetaceans and fisheries. Finally technology transfer is necessary to develop the scientific infrastructure necessary to monitor cetacean populations, fisheries, and any accompanying bycatch.

There are other recognized threats to cetaceans including toxic pollution, acoustic pollution, ship strikes, environmental change, global warming, and habitat degradation. The occurrence and effects of these threats are even more poorly documented than bycatch. With provisions in U.S. law and international attention turning toward cetacean bycatch, it is appropriate that the focus of this report is the assessment and mitigation of global cetacean bycatch. Any efforts to better document and mitigate bycatch will have collateral benefit to address other threats to cetaceans. Therefore, this report will evaluate the magnitude of the bycatch problem, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report will describe the tools afforded through the MMPA and international agreements relevant to marine mammal conservation and bycatch; identify gaps in conservation and management efforts related to cetacean bycatch and identify opportunities for international action, cooperative research, and information exchange. The final element will prioritize and recommend strategic actions that NMFS’ Office of International Affairs can undertake to address the international cetacean bycatch threat.

Methodology

The report was completed under contract with the Office of International Affairs of the National Marine Fisheries Service (NMFS) of NOAA for a study that details steps it could take to engage foreign nations and multilateral organizations in reducing marine mammal bycatch. The project scope of work called for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report identifies gaps in conservation and management efforts related to threats to cetacean populations and opportunities for international action, cooperative research, and information exchange.

As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO. This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of occurrence or migration of cetaceans. Following the first general geographic cut, the next level of focus is on populations that are affected by bycatch that represents more than 2 percent of the population. The next screen is for high-risk populations in areas where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

The investigation was undertaken primarily by a review of the scientific literature, but also included some follow-up personal contacts with key authors, managers and policy experts. The summary of legal instruments was conducted through examination of U.S. law and relevant international materials, particularly treaties summarized in 1997 by the U.S. Marine Mammal Commission in a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents*. The analysis of potential tools examines the domestic and international framework available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes.

A comparison of the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch produced a gap analysis that highlights both gaps in information and mitigation measures. Recommendations were drawn from the literature, in response to the gap analysis, and from discussion with key authors, managers and policy experts. A ranking of the recommendations was completed by sorting possible actions according to the level of risk and potential benefit to cetacean species and examining the feasibility and likelihood of success of possible actions. This template for priority setting based on considerations of risk and feasibility results in recommendations for high, second-tier and low priority action options.

The Magnitude of Cetacean Bycatch

Through a review of the literature, several overarching themes or issues emerged. The first is the consistent need that permeates all species in all regions for cetacean abundance and bycatch estimates. Even though most species of cetaceans have been recorded at some time caught in some type of fishing gear, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers. Such information can result in underestimates of bycatch. Also, estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Further compounding the problem is that in many regions of the world data generally are lacking statistics on fisheries catch, fishing capacity and fishing effort. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states. This problem is exacerbated in developing coastal states where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, the fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, humpback and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten survival or recovery. In the report, the authors review by FAO statistical area the known fisheries interactions for species for which this interaction is either unsustainable (> than two percent of the population estimate) or may be approaching an unsustainable level (one to two percent of the population estimate). The material in boxes highlights those species that are considered a

priority for the Atlantic and Pacific, based on the level of incidental mortality. Chapter 2 of the report describes and highlights research needs that have been identified in the literature and by scientists and managers; offers preliminary recommendations for action in each area based on scientific data and available mitigation strategies (e.g., national laws, closed areas, or technological fixes); and provides a thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area. Appendix A provides a detailed listing of these findings.

Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries. Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Atlantic Species at Risk from Fishery Bycatch

- *Northwest Atlantic—Northern right whale*
- *Northeast Atlantic—harbor porpoise, common and striped dolphins*
- *Western Central Atlantic—tucuxi*
- *Eastern Central Atlantic—humpback dolphin*
- *Mediterranean and Black Sea—sperm whale, striped and common dolphins, harbor porpoise*
- *Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana*

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean. Many areas in the Pacific are characterized by a lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim.

Developed nations such as the United States and Japan, as well as developing countries such as Natal and Sri Lanka, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to providing more complex technological solutions and implementation of action plans.

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiami paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan. In the Pacific Ocean, the major bycaught species and gear types in which this bycatch occurs are Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning; bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets, south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Indo-Pacific humpback dolphins in Natal (South Africa), anti-shark nets south coast of Zanzibar (Tanzania), drift and bottom-set gillnets, Madagascar and East Africa, coastal gillnets; Ganges river dolphins in India and Bangladesh, gillnets; Irrawaddy dolphins in Chilka Lake (India), gillnets, Bay of Bengal, heavy-mesh drift gillnets for elasmobranchs; Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia; Finless porpoises in Korea and Japan, coastal nets and traps, in Inland Sea (Japan), gillnets, Yangtze River, gillnets and electrofishing; marine waters of China and Southeast Asia, coastal nets and traps; Baijis in China, electrofishing and rolling hooks; Spinner dolphins and Fraser's dolphins in the Philippines, driftnets for large pelagics and flying fish, purse seines for small pelagics; Irrawaddy dolphin (marine), Philippines, (matang quarto) crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets; False killer whales, Hawaii, longlines; Vaquitas, Gulf of California (Mexico), gillnets; Hector's dolphins, North Island (New Zealand), coastal gillnets; Dusky dolphin, Peru, drift gillnets; Burmeister's porpoises, Peru, coastal gillnets.

Pacific Species at Risk from Fishery Bycatch

- *Northwest Pacific (including the Sea of Japan, East and South China Seas, Yangtze River)—finless porpoise, baijis, Dall's porpoise, finless porpoise*
- *Western Central Pacific (including Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River) —spinner dolphin, Fraser's dolphin, Irrawaddy dolphin,*
- *Eastern Central Pacific—Vaquita and false killer whales ,*
- *Southwest Pacific--Hector's dolphin and Maui's dolphin*
- *Southeast Pacific—Dusky dolphin, Burmeister's porpoise*
- *Western Indian Ocean—Spinner, Risso's, bottlenosed and humpback dolphins*
- *Eastern Indian Ocean—Ganges and Irrawaddy river dolphins*

Tools for Action to Reduce Bycatch

U.S. law and policy provide mechanisms for action to reduce bycatch of cetaceans and other marine mammals in fishing operations. The Marine Mammal Protection Act, the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act provide policy statements, action mandates and research direction for U.S. actions. The MMPA, and more recently the M-SFCMA also direct U.S. managers to work in the international arena to protect marine mammals.

The Marine Mammal Protection Act of 1972 (MMPA) contains international sections that provide tools to address international threats to cetaceans. The MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals. However, the U.S. has rarely applied these measures nor has it taken actions to reduce cetacean bycatch or to protect ecosystems abroad.

In 2006, the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA), the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries for purposes of leveling the playing field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy.

The international title of the reauthorization creates a new section in the M-SFCMA authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements. The provisions call for improved communication and cooperation among law enforcement organizations, an international monitoring network, an international vessel registry, remote sensing technology, technical assistance, and a listing and certification process to decide whether sanctions should be applied to nations that participate in IUU fishing or do not reduce bycatch of protected living marine resources.

The U.S. is party to numerous international agreements related to cetacean protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives arises from the numerous regional agreements to which the U.S. is party. Finally, the increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of cetacean bycatch in fisheries.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. Fishery conservation agreements, particularly those that create new regional fishery management organizations (RFMOs) have potential to prevent bycatch of non-target species and protected species in the course of fishing. The report examines the emergence of an increased role for regional fishery management organizations in bycatch reduction. This report summarizes relevant and applicable examples in

key regions, concentrating on a few international tools and the agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch require urgent action.

International agreements examined include the International Convention for the Regulation of Whaling, the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) and the Convention on International Trade in Endangered Species among others. Under the auspices of the Bonn Convention, parties have negotiated additional regional agreements such as the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, the Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area. The report describes and posits options for action under regional measures such as the UN Regional Seas Programme and specific area protocols that are relevant to cetacean conservation. In addition to wildlife, environmental and specific marine mammal conventions, treaties that govern fisheries can be brought to bear on cetacean bycatch problems.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles. (UNCLOS III) This includes the authority to conserve and manage living resources. The UN Law of the Sea, and measures that flow from it, such as the voluntary Code of Conduct for Responsible Fisheries and the Straddling Stocks agreement provide numerous alternatives for tackling cetacean bycatch, such as General Assembly resolutions or creation of new regional management authorities, including ones that may be specific to cetacean conservation.

Exemplary regional authorities discussed include the Northwest Atlantic Fisheries Organization, the International Convention for the Conservation of Atlantic Tunas, Convention on the Conservation and Management of Fishery resources in the Southeast Atlantic Ocean, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, and the Convention for the Conservation of Antarctic Marine Living Resources. In addition to treaties and other legal instruments, tools such as information exchange, training and technical assistance, gear workshops, professional exchanges and other capacity building activities can contribute to reducing cetacean bycatch.

Analysis

The analysis examines problems by region. It sets out species at risk, gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The table below illustrates the gaps in elements critical to conservation.

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000- 2004)		NE (VU- over all)		II	BILAT	US- Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I & II	I&II	BILAT	US- Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Reg	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276- 64,083)		83/0.2%		VU		II	Reg	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Reg	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Reg	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240- 1,430)				VU		II	Reg	CS/FS/PS	

¹ For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

² The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/ SPECIES	ABUND. EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
Southwestern Baltic proper	599 (200- 3,300)		13/2.1%		VU		II	Reg	CS/FS/PS	
Northern North Sea	98,564 (66,679- 145,697)		5,000/5%		VU		II	Reg	CS/FS/PS	Pingers (DMK) gillnet fishery Aug - Oct
Southern & Central North Sea	169,888 (124,121- 232,530)		7,493/4.3%		VU		II	Reg	CS/FS/PS	
Celtic Sea	36,280 (12, 828- 102,604)		2,200/6.2%		VU		II	Reg	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Reg	CS/FS/PS	
DELPHINUS DELPHIS-COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Reg	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Reg	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 - 185,802)		356-8353 614-2005/ 0.6-1.1%		LC	nl	II	Reg	CS/FS/PS	
STENELLA COERULEOALBA-STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-1526 /1.6-1.56%		LR/cd	nl	II	Reg	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-5287 448/ 0.27- 0.79%		LR/cd	nl	II	Reg	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										

AREA/ SPECIES	ABUND. EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
SOTALIA FLUVIATILIS TUCUXI										
Cananeaia estuary	156-380 No estimate for rest of range				DD	I&II	II	Reg	CS (US)	Marine Mammal Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
SOUSA TEUSZII-ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Reg	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Reg	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Reg	CS	
Canal do Geba-Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Reg	CS	
South Guinea					DD	I&II	II	Int'l/Reg	CS	
Cameroon					DD	I&II	II	Int'l/Reg	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Reg	CS	
Angola	Considered small				DD	I&II	II	Int'l/Reg	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
STENELLA COERULEOALBA – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145- 201/1.2%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligur ian Sea	25,614 (15,377 – 42,685)		51-326 (+/- 146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Reg	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379- 214,800)		14- 15/0.006%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
DELPHINUS DELPHIS -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145- 201/1.2%		LC	nl	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHYETER MACROCEPHALUS—SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHOCOENA PHOCOENA – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,40 31)				DD		II	Reg	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Reg	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Reg& Nat (EC Direct.)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,13 7)				VU		II	Reg	CS/FS/PS	
Central Black Sea> waters Ukraine/Turke y	8,240 (1,714–39,6 05)				VU		II	Reg	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
SOTALIA FLUVIATILIS-TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/ year		DD	nl	II			

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
coast			.96%-2.7%							
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
<i>CEPHALORHYNCHUS COMMERSONII</i> – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/ .67%-1.0% 25-170/ .1%-.8%		DD	nl	I			
Tierra del Fuego	14,000		5-30/.03%- .2%		DD	nl	I			
<i>PONTOPORIA BLAINVILLEI</i> FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694- 2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360- 74,397)		651 (398- 1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS										
AREA 51 – WESTERN INDIAN OCEAN										
<i>SOUSA CHINENSIS</i> – INDIAN HUMPBACK DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Reg	CS/FS	
Zanzibar (Tanzania)	71		5.6%		DD	I&II	II	Reg	CS/FS	
<i>TURSIOPS TRUNCATES</i> – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8- 9%		DD		II	Reg	CS/FS	

AREA/ SPECIES	ABUND. EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
Indian Ocean coast north of Natal S Africa	1,000		11-14/1- 1.4%		DD		II	Reg	CS/FS	
<i>TURSIOPS ADUNCUS</i> – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Reg	CS/FS	
<i>GRAMPUS GRISEUS</i> – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Reg	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
<i>ORCAELLA BREVIROSTRIS</i> – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Reg	CS/FS	
<i>PLATANISTA GANGETICA</i> GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Reg	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
<i>PHOCOENOIDES DALLI</i> – DALL'S PORPOISE										
Western N Pacific	141,800		643- 4,187/0.4- 3.0%		LR		II	Reg	CS/FS	
<i>NEOPHOCAENA PHOCAENOIDES</i> – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Reg	CS/FS	
<i>LIPOTES VEXILLIFER</i> - BAIJI										
Yangtze	100-300		5/1.6- 5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
<i>TURSIOPS ADUNCUS</i> – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Reg	CS/FS/PS	
<i>STENELLA LONGIROSTRIS</i> – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Reg	CS/FS/PS	
Sulu Sea	30,000		1,500- 2,000/5		LR	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND. EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT Monitoring Mitigation Observers Enforcement
			3,000/5- 10%							
<i>LAGENODELPHIS HOSEI</i> —FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Reg	CS/FS/PS	
<i>SOUSA CHINENSIS</i> —INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—C entral Section Great Barrier Reef	200		11- 100/5.5- 50%		DD	I&II	I	Int'l/Reg	CS/FS/PS	
<i>ORCAELLA BREVIOSTRIS</i> – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5- 6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
<i>PSEUDORCA CRASSIDENS</i> – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6- 2.5%					Reg'l/Nat l	FS (US)	
<i>PHOCOENA SINUS</i> – VAQUITA										
	567		35-39/6.2- 6.9%		CR	I&II		BilatUS/ Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
<i>CEPHALORHYNCHUS HECTORI</i> – HECTOR'S DOLPHIN										
South Island east	1,900		16/.8%		EN			Nat'l	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							Nat'l	CS	Regs, pingers
<i>CEPHALORHYNCHUS HECTORI MAUI</i> – MAUI'S DOLPHIN										

AREA/ SPECIES	ABUND. EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS ¹			AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES ² Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEM Monitoring Mitigation Observers Enforcement
North Island	100-150		3/3-2%		CR			Nat'l	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
<i>LAGENORHYNCHUS OBSCURUS</i> – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l/Reg	CS/FS	
<i>PHOCOENA SPINIPINNIS</i> – BURMEISTER'S PORPOISE										
			450-200		DD		II	Nat'l	CS/FS	

Following the problem assessment by region, the next step of the analysis examines actions that could be taken under a variety of mechanisms: U.S. law, agreements to which U.S. is a party, and areas with potential for negotiation of amendments to existing treaties or development of new instruments. In addition, the report examines actions the U.S. could pursue outside the legal and diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization sectors, and employing its convening power to foster information exchange.

Recommendations

Throughout this report the authors identify a combination of research needs and recommendations for agency action. With more than twenty recommendations provided in Chapter 6, but limited agency resources, priority setting is needed. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

1. Assists a critically endangered species;
2. Assists a species at risk (listed under the IUCN Red List);
3. Addresses unsustainable bycatch;
4. Aids a trans-boundary species;
5. Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

1. Regional agreement is in place that can be used to implement the recommendation;
2. Bilateral agreement is in place that can bring about prompt action;
3. National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
4. Mitigation strategies or possible solutions are available to be used or tested;
5. Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. The results of that evaluation are graphed and summarized Chapter 7 (Table 7.1).

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile to reduce cetacean harvests. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions. NAFO and the WCPFC have recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. In these agreements the Office of International Affairs can put forward a resolution (see example Appendix C) that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also could call upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement or the Americas Multilateral Agreement. The cetacean bycatch legislation referred to here (Appendix E) was introduced in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with

existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model. An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority includes adoption of a United Nations General Assembly Resolution on cetacean bycatch; workshop for science and technology transfer; an Indian Ocean Multilateral Agreement; modifications to the International Whaling Commission (IWC) to recognize its competence to manage small cetaceans; and investigations into West Coast of Africa tuna/dolphin interactions. While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific multilateral, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise

language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization; the Caribbean Specially Protected Areas and Wildlife Protocol; the Marine Mammal Action Plan in the Southeast Pacific Ocean; and the South Pacific Regional Environment Program. The three organizations all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, ocean multilaterals or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with other recommendations.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis the table below illustrates the ranking of recommendations and priorities. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top and second tier priorities.

Table ES.2 Priority Recommendations
<i>Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements</i>
US/Mexico Bilateral
US/Canada Bilateral
Mediterranean Driftnets
Peruvian Fisheries Bycatch
Workshops for Science and Technology Transfer
<i>Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements</i>
Northwestern Atlantic Fisheries Organization
Western Central Pacific Fisheries Commission
Western Central Pacific--tuna/dolphin interactions
Southeast Atlantic Fisheries Organization

Table ES.2 Priority Recommendations
West Coast of Africa--tuna/dolphin interactions
Plan of Action for Marine Mammals in the Southeast Pacific Ocean
Caribbean SPAW Protocol
South Pacific Regional Environment Program
<i>Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements</i>
Pacific Ocean Multilateral Agreement
Americas Multilateral Agreement
Bycatch Legislation
United Nations General Assembly Resolution
<i>Low Priority Recommendations</i>
Amend IWC
Southwest Indian Ocean Fisheries Commission
Indian Ocean Multilateral Agreement

CHAPTER 1. INTRODUCTION

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. Now the threats facing cetaceans go beyond whaling, to include toxic pollution, acoustic noise, ship strikes, environmental change, global warming, and habitat degradation. Even though the complexity and magnitude of these threats are increasing, there are still few international mechanisms to address these threats. Little is being done under the authorities that do exist to bring about any significant improvement. Another difficulty arises in that there is no single international entity with the authority to govern and focus solely on cetacean conservation issues.

The U.S. Ocean Commission stated in its 2005 report: the “biggest threat to marine mammals worldwide is their accidental capture or entanglement in fishing gear (bycatch)⁹, which kills hundreds of thousands of them each year.”¹⁰ In particular, bycatch represents a major threat to the survival of cetaceans, particularly small cetaceans. Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on assessing cetacean populations, quantifying cetacean bycatch, evaluating the scale and magnitude of this problem, identifying specific conservation actions, and reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.¹¹ Therefore, as a matter of priority, the focus of this report is the assessment and mitigation of global cetacean bycatch

Cetaceans, like many other animals, can be described as “migratory” because they spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective, migratory species are not exposed to specific threats because they do not confine themselves to one location; instead they periodically cross through a number of jurisdictions and encounter several threats as they do so. The level of protection afforded to cetaceans fluctuates according to their particular geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

⁹ Bycatch is defined in U.S. law as “fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.” 16 U.S.C.1802(2). The Marine Mammal Protection Act uses the term “take,” defined as “harass, hunt, capture, or kill...any marine mammal.” 16 U.S.C. 1362(13). Bycatch is defined internationally as “Fish or other fauna (e.g. birds or marine mammals) that are caught during fishing, but which are not sold or kept for personal use. In commercial fishing these include both fish discarded for economic reasons (economic discards) and because regulations require it (regulatory discards).” Organisation for Economic Co-operation and Development Glossary of Statistical Terms, 2001. Available at <http://stats.oecd.org/glossary/detail.asp?ID=252>. Last visited 3 May 2007. For purposes of this report, the term “bycatch” will be used to describe all types of incidental capture of marine mammals in fishing gear, rather than the MMPA terminology “take,” unless the discussion is about MMPA provisions. The term “incidental mortality” will be used when deaths are documented. However, it is generally understood that most bycatch of marine mammals results in death, with limited circumstances where live release is accomplished.

¹⁰ U.S. Commission on Ocean Policy. An Ocean Blueprint for the 21st Century. Final Report. Washington DC, 20004 ISBN#0-9759462-0-X at 306.

¹¹ Reeves R.R., Berggren, P., Crespo, E.A., Gales, N., Northridge, S.P., Notarbartolo di Sciara, G., Perrin, W.F., Read, A.J., Rogan, E., Smith, B.D., and Van Waerebeek, K. 2005. Global Priorities for Reduction of Cetacean Bycatch. World Wildlife Fund

With bycatch a serious and widespread threat to marine mammals, there is an urgent international need to develop alternative fishing gear and practices and, at the same time, put into place effective regional agreements that call for the assessment of cetacean populations, documentation of bycatch, and the implementation of mitigation measures ranging from temporal and spatial closures to deterrents. Greater involvement of inter-governmental bodies such as regional fishery management organizations, the United Nations Environment Program, The World Conservation Union (IUCN), and the Food and Agriculture Organization of the United Nations (FAO) is necessary. Because it requires a country to outline a series of specific measures to deal with such interactions, FAO's International Plan of Action model may provide a useful mechanism to address interactions between cetaceans and fisheries. In some regions, FAO is the only body competent to engage countries on a multinational level.

The Marine Mammal Protection Act of 1972¹² (MMPA) contains an international program that includes tools to address international threats to marine mammals. Specifically, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to "initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals."¹³ It also directs the federal government to encourage other agreements to protect specific ocean and land regions "which are of special significance to the health and stability of marine mammals" and to amend any existing treaty to make it consistent with the purposes and policies of the Act.¹⁴

The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals.¹⁵ However, with the exception of the provisions associated with the Agreement on the International Dolphin Conservation Program (AIDCP), rarely has the U.S. applied these measures nor has it taken actions to reduce marine mammal bycatch or to protect ecosystems abroad.

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),¹⁶ the law governing how the U.S. manages fisheries within its Exclusive Economic Zone (EEZ). The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries¹⁷ for purposes of leveling the playing

¹² Marine Mammal Protection Act of 1972, (16 U.S.C. 1361-1407, P.L. 92-522, October 21, 1972, 86 Stat. 1027) as amended.

¹³ 16 U.S.C 1378(a)(1)

¹⁴ 16 U.S.C 1378(a)(3)-16 U.S.C 1378(a)(4)

¹⁵ 16 U.S.C 1378 (a)(2)

¹⁶ 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

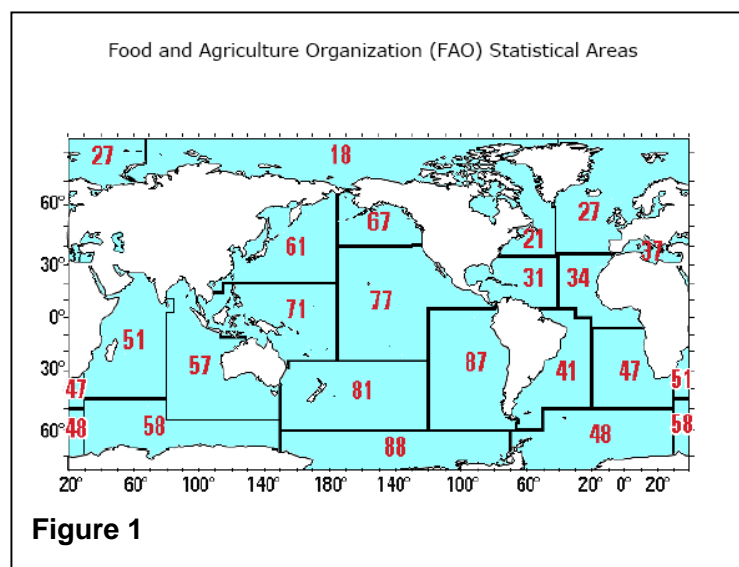
¹⁷ Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species "disadvantage U.S. fleets and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy to protected species at risk, including marine mammals.

The Office of International Affairs of the NOAA National Marine Fisheries Service (NMFS) contracted development of a study that details steps it could take to engage foreign nations and multilateral organizations in reducing cetacean bycatch. The report produced under this contract reviews information on cetacean population abundance and documented bycatch, evaluates international cetacean conservation activities, describes the tools afforded through the MMPA and M-SA and international agreements relevant to cetacean conservation and bycatch, and makes recommendations for U.S. action.

Methodology

The project scope of work calls for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report is to identify gaps in conservation and management efforts related to threats to cetacean populations and identify opportunities for international action, cooperative research, and information exchange. The final element of the work is to develop a strategic plan of action for NOAA that identifies priorities for action, existing tools, necessary mechanisms, and required resources.



As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO (see Figure 1). This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of cetacean occurrence or and documented bycatch. Part of the methodology includes a detailed review of cetacean abundance and bycatch within each statistical area (Appendix A) and every species at risk is summarized in Tables A1-A137.

This is followed by a distillation of

this information, placing a priority for action on species based on their status and the sustainability of the level of bycatch. The methodology then evaluates U.S. domestic authorities and international treaties and agreements. In this analysis, rising to priority level are instances where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

Chapter 2 describes incidental bycatch of cetaceans in fisheries by FAO statistical area and summarizes the species and areas of greatest interest. The analysis examines the areas and nature of bycatch and suggests which interactions represent the highest risk to these populations. It also discusses needs that have been raised in the literature by scientific or management bodies as necessary to assess the population abundance and status, estimate

and evaluate current bycatch levels, or mitigate cetacean bycatch. Chapter 3 describes the U.S. legal framework for international cetacean protection and management. Chapter 4 analyzes the international framework and tools that are available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes. Appendix B provides a list of parties to the agreements discussed, as of the date of this report. Chapter 5 compares the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch. It also identifies gaps in information and mitigation measures. This analysis is summarized in Table 5.1. Chapter 6 makes recommendations on the types of actions the United States could take or could urge upon states party to mutual marine mammal conservation agreements. It also examines actions the U.S. could pursue outside the diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization (NGO) sectors, and employing its convening power to foster information exchange. Appendices C, D and E provide sample language for resolutions and legislation discussed in Chapter 6. Chapter 7 concludes the report with a template for priority setting based on considerations of risk and feasibility and makes recommendations for high, second-tier and low priority action options.

CHAPTER 2. BYCATCH CRITICAL ISSUES

For decades scientists have known that large numbers of cetaceans are incidentally killed in fisheries each year throughout the world. The information provided in Appendix A substantiates this allegation and indicates an extensive worldwide interaction between cetaceans and fisheries. Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries.

Most species of cetaceans have been recorded at some time caught in some type of fishing gear. However, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Generally, data are still lacking on fisheries catch statistics, fishing capacity (number of vessels and fishers), and fishing effort in many regions of the world. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. This problem is further compounded in developing nations where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.¹⁸

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, hump-backed and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten their survival or recovery. The following sections review, by FAO statistical area, the known fisheries interactions for species for which the interaction is either unsustainable or may be approaching an unsustainable level. The descriptions highlight only those species that are considered a priority for this area, based on the level of incidental mortality. Text boxes highlight needs for

¹⁸ The estimates in the U.S. Ocean Commission Report were derived from extrapolations and models, and are not estimates of actual bycatch.

abundance estimates, observer data or recommended actions that have been drawn from the scientific literature, proceedings of scientific bodies, or available mitigation strategies (e.g., national laws, closed areas, or technological or gear modifications). A more thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area is provided in Appendix A.

Atlantic Areas and Populations Analyzed for Highest Risk

The following sections examine incidental bycatch of cetaceans in FAO statistical areas in the Atlantic. Where available, an assessment of the level of bycatch against estimated population is made. There are eight areas examined in the Atlantic, including the Mediterranean and Baltic Seas. Figure 2 shows the boundaries of these areas. Critical issues that arise include bycatch of critically endangered northern right whales and sperm whales, incidental mortality of harbor porpoises from populations numbering only in the hundreds of animals, and bycatch of numerous species of dolphins in fisheries from the northernmost reaches of the Atlantic south to Tierra del Fuego.

Developed nations such as the U.S., Canada and the European Union (EU), as well as developing countries such as Ghana and Caribbean Island nations, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more complex technologic solutions and implementation of action plans. Necessary actions that have been identified in the literature or by scientific or management organizations are summarized in boxes for each area. High priority recommendations are included in Chapter 6.

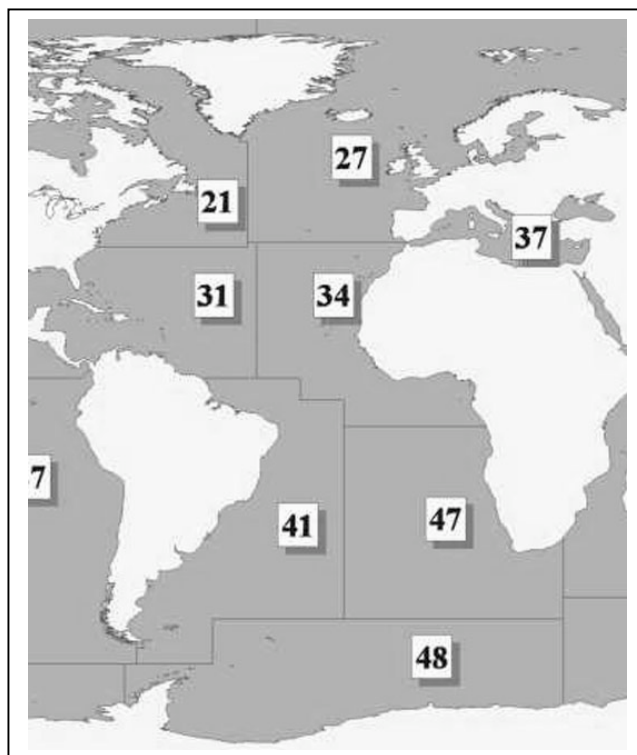


Figure 2: FAO Statistical Areas of the Atlantic

Area 21 Northwest Atlantic

Although the Northwest Atlantic includes the U.S. Exclusive Economic Zone (EEZ), because the focus of this report is international bycatch, the description for this area will focus only on international bycatch of shared cetacean stocks in the area. The assessment and mitigation of bycatch of these marine mammals within U.S. jurisdiction is governed under the MMPA and, as such, is not discussed here.

The species most affected by accidental entrapments in fishing gear in this area is the harbor porpoise. Catches of certain of the large whales, notably humpback and right whales, are also considered significant. The major fisheries involved with cetaceans are the Greenlandic driftnet fishery for salmon, the inshore trap and gillnet fisheries of Newfoundland (and probably elsewhere in eastern Canada, which remains comparatively less well-studied), Canadian herring weir fishery, and Canadian and U.S. gillnet fisheries and lobster trap fisheries.

The harbor porpoise may be most severely affected by gillnet fisheries in the Bay of Fundy–Gulf of Maine region, but also possibly in other gillnet and trap fisheries farther north. From 2000 through 2004, the total average annual mortality in Canadian fisheries is 55 animals (51 in the Canadian groundfish sink gillnet fishery and 4.4 in the Canadian herring weir fishery). This bycatch level is a significant decline from the high of 424 harbor porpoises incidentally killed in Canadian gillnets fisheries in 1993. The reduction in bycatch is due to a combination of closed areas and the implementation of pingers in the fishery beginning in 1996. In 2002, the Canadian Department of Fisheries and Oceans (DFO) suspended its Bay of Fundy monitoring program because of financial constraints. Without a monitoring program, it will be difficult to estimate overall bycatch.

In 1995, the International Whaling Commission (IWC) small cetacean subcommittee suggested that current levels of incidental mortality pose a serious threat to the harbor porpoise subpopulation in this area. However, subpopulations in the Gulf of St Lawrence, Newfoundland, Labrador, and Greenland are also subjected to large directed or incidental catch, but population status in these areas remains unknown. The U.S. must work with Canada to develop abundance and bycatch estimates for these stocks and an effective conservation plan for harbor porpoises.

Bycatch of right whales internationally is one of the leading causes of right whale mortality around the world. It is responsible for both the failure of the population to recover and its continuing current decline. While right whale bycatch numbers fewer than five animals per year, the precarious state of the population means this incidental mortality is considered a potential threat to population recovery. Northern right whales are entangled in cod traps, lobster trap lines, groundfish gillnets, and herring weirs at the rate of 1.2 whales per year (2000–2004). While this number may appear insignificant, it is unsustainable for a population that numbers only 300 animals. The DFO listed right whales as endangered under a Canadian Species At Risk Act, which is similar to the U.S. Endangered Species Act. DFO has developed a recovery plan and established a recovery-implementation team. The plan includes a number of recommendations to mitigate threats such as ship collisions and fishing gear entanglements, as well as recommendations on research, communications, whale watching, and regulations and enforcement. The U.S. right whale recovery plan calls on the federal government to engage in bilateral cooperative efforts with Canada to recover right whales.

Area 27 Northeast Atlantic

In the Northeast Atlantic, the major species affected by accidental catch in fishing gear are the harbor porpoise and the common dolphin. The fisheries that most frequently interact with cetaceans are gillnet fisheries, mainly set gillnet fisheries, which are distributed throughout coastal waters of this region and in some places extend for many tens of kilometers offshore. Trawls may also catch relatively large numbers of some species in some places (e.g., harbor porpoises in Shetland, common dolphins in mackerel mid-water trawls). Depending on tow times, most interactions with trawl fisheries result in death from drowning.

Overall, harbor porpoises are killed in more types of fishing gear, and possibly in larger numbers, than any other cetacean species in this area. Specifically, harbor porpoise bycatch from bottom-set gill nets is estimated as more than 7,000 animals annually in the North Sea. This exceeds 2 percent of the population and is considered unsustainable; in most cases, estimated mortality levels exceed the 1.7 percent of minimum population size established by the

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS),¹⁹ indicating that past or current bycatch levels are unsustainable.

Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch. Likewise, bycatch in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea are at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas. Removal levels are lower in other areas. For example, in Danish and UK fisheries that use mitigation measures such as pingers, more recent analyses are based on much lower estimated bycatch. However, these comparisons are made between recent bycatch estimates and relatively old abundance estimates and therefore do not take into account the potential decrease of harbor porpoise numbers due to bycatch that occurred between the two estimates.²⁰ The true impact to the various harbor porpoise stocks cannot be assessed until more current estimates of both abundance and bycatch are gathered, and the latter must be acquired through an effective independent monitoring program. Only when these data are available can effective mitigation strategies be developed and evaluated over time.

Dolphins tend to be caught more often in pelagic trawls. For example, vessels using large pelagic trawls to target horse mackerel southwest of Ireland are known to catch white-sided and common dolphins and long fin pilot whales, with a bycatch rate of one dolphin per 93 towing hours. From 2001 through 2003, 91 common dolphins were caught in 313 hauls in the pelagic trawl fisheries for bass (southwest England).²¹

Identified Needs

Information: regular abundance surveys, estimates of bycatch rates in fixed gear fisheries, knowledge of stock structure and growth.

Monitoring: Entanglement monitoring in pair trawl and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforce existing EU and ASCOBANS regulations and policies

Prior to the introduction of EU legislation to ban the use of driftnets for tuna, dolphins—particularly striped and common—were caught in large numbers (more than 750 individuals in 1,420 hauls).²² The impact of this bycatch on common dolphins is unknown. Common dolphin populations don't appear to be declining in this region, even though bycatch of common dolphins still numbers around 1,000 animals annually. It has been suggested that harbor porpoise populations may have declined in some areas such as the Baltic and southern North Seas, but what role, if any, fisheries may have had in such a decline is not clear. Up-to-date abundance and bycatch estimates for common dolphins in ASCOBANS waters are needed to determine the potential impact of known high mortalities in pelagic trawls.

Recent studies indicate that mortalities of delphinids such as white-sided and white-beaked dolphins and pilot whales may be substantial in pelagic trawl fisheries operating in the North

¹⁹ Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas. Done at New York 17 March 1992. Not in force. Concluded under the Convention on Migratory Species. ASCOBANS is principally intended to address the problems of fishery bycatch in the Baltic and North Seas. The focal species of ASCOBANS is the harbor porpoise although a variety of other odontocetes are regular inhabitants of the region.

²⁰ Furthermore, removal levels may be substantially underestimated, because bycatch remains to be assessed in many fisheries operating in the same area (e.g., Norwegian gillnet fisheries).

²¹ Website for the Joint Nature Conservation Committee—Marine Mammal Bycatch.

²² *Id.*

Sea, the English Channel, the Celtic Shelf, and the Bay of Biscay.²³ Similarly, abundance estimates are either outdated or lacking for these species, and bycatch estimates are unreliable.

The bottlenose dolphin populations in the nearshore Atlantic waters of Europe number only in the tens of animals for each stock. This species (along with harbor porpoise) is listed on Appendix II of the EU's Habitats Directive (Council Directive 92/43/EEC) as requiring special conservation measures. There is cause for concern that this "population" is low and declining and therefore requires particular measures to ensure that it suffers no further incidental mortality. Incidental mortality estimates are largely not available for this species and should be made a priority given the small population size.

There are very few recent comprehensive studies on cetacean abundance or population sizes; very little is actually known about stock structure in this region.

Estimates of abundance are either out-dated or completely lacking for cetacean species in these waters (e.g., Risso's dolphin, long-finned pilot whales, and killer whales). Alternatively, estimates are only available for some small regions (e.g., the Celtic Sea for common dolphins or striped dolphins) or have been combined for several species (e.g., white-beaked and Atlantic white-sided dolphins). More up-to-date estimates of cetacean abundance are needed because current impact assessments based on the 1994 abundance estimates and more recent bycatch numbers cannot take into account the potential depletion of stocks resulting from bycatch and other factors over the last decade. Scientists agree that it is necessary to carry out further comprehensive surveys to estimate cetacean abundance in ASCOBANS waters at regular intervals.²⁴ Moreover, scientists have said that, given the high costs of such surveys and the problems of current estimation techniques in low-density areas, there is a need to further develop existing techniques to overcome these problems.²⁵

Additionally, monitoring cetacean entanglement is urgently needed for all single and pair pelagic trawling operations, particularly those targeting sea bass, mackerel, and horse mackerel in the Channel (as well as in the Celtic Sea and Bay of Biscay), especially between December and March where there is considerable evidence for high levels of bycatch. These include British, French, Dutch, Danish, and German fisheries, though there may be others.

Monitoring the various—usually relatively small—driftnet fisheries operating in the Baltic also is needed, as is expansion and continuation of existing observer programs of all bottom-set gillnet fisheries in the North and Baltic seas and adjacent waters, including the English Channel.

Identified Needs

Information: Research investigating stock structure and maximum population growth rates, document bycatch rates in set nets.

Monitoring: Monitoring in set net and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforcement strategy for European-wide implementation of EU and ASCOBANS regulations.

²³ Northridge S., 2003. Investigations into cetacean bycatch in a pelagic trawl fishery in the English Channel: preliminary results (SC/55/SM26). Berlin, Germany, (unpublished); 10.

²⁴ CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

²⁵ *Id.*, at 63.

Information about bycatch rates is especially needed for the Norwegian setnet fisheries and German fixed gear fisheries operating in the North Sea and in the Kiel & Mecklenburg Bight. Scientists within ASCOBANS recommend observer coverage of 5 percent to 10 percent of total fishing effort for all bycatch monitoring programs.

In March 2004, the European Commission introduced a new regulation aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. From the summer of 2005, pinger Use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggeak & Kattegat region that were deployed from vessels greater than 12m in length. Similar rules were to apply to the western English Channel and South Western approaches from January 2006 and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea, and off western Britain and Ireland and from January 2006 in the North Sea and west Scotland.

On a larger scale, EU Commission scientists have stressed that a European wide management framework, including legally accepted bycatch limits and enforcement strategies, must be developed and implemented. Scientists generally agree that using an approach similar to the MMPA's potential biological removal (PBR), incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is useful in determining critical bycatch mortality limits.²⁶ However, they point out that the development of species-specific critical mortality limits for species other than harbor porpoises is necessary. More research investigating stock structure and maximum population growth rates would be necessary to achieve this objective.

Area 31 Western Central Atlantic

The Western-Central Atlantic encompasses the Mid-Atlantic, Southeast Atlantic, and Gulf of Mexico, U.S. EEZ. The abundance and mortality estimates for these areas are summarized in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments and will not be reviewed here. Instead, this section will focus on the incidental mortality in the Caribbean and off the Yucatan Peninsula and Central America.

Identified Needs

Information: Collaborative studies to understand and document range and abundance.

Monitoring: Training activities to aid in documentation of fishery bycatch and directed catch.

Legal Framework: Regional networks and collaboration under UNEP regional seas.

There has been a limited effort to document cetacean bycatch in the Mexican side of the Gulf of Mexico and Caribbean Sea, Colombia, the Dominican Republic, French Guyana, Puerto Rico, and Venezuela. Despite these valuable efforts, the magnitude of threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations is difficult to assess, and published information on bycatch is scarce. Systematic survey effort in the Caribbean and tropical Atlantic has been very

limited; this results in sparse quantitative information on populations of cetaceans.

Small-scale and subsistence gillnet fisheries occur along the entire Gulf of Mexico and Caribbean. Cetacean species caught in these fisheries include pygmy sperm whale, tucuxi, Risso's dolphin, bottlenose dolphin, Atlantic spotted dolphin, killer whale, clymene dolphin,

²⁶ CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

spinner dolphin, and humpback whale. The annual incidental mortality has not been estimated for any species or fishery, and abundance estimates are sorely needed for most species.

In particular, studies call for scientific effort on *Sotalia* along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated incidental mortality of more than 1,050 tucuxis in a single year. Along with franciscanas, tucuxis are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.²⁷ The tucuxi may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

Given the sparse nature of the data, it is difficult to identify the species most frequently involved in fishery interactions. The Caribbean regional seas program of the United Nations Environment Programme (UNEP) has recently promulgated a regional marine mammal action plan. It also has established a Regional Activity Centre (RAC) in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW). It has been suggested that local scientists and UNEP's RAC/SPAW officials develop regional networks, collaborative studies, and training activities to understand and document the range and abundance of cetaceans and the impacts of fishery bycatch and directed catch on cetacean populations in the wider Caribbean.

Area 34 Eastern Central Atlantic

In 1997, the IWC Scientific Committee concluded that information on small cetaceans in Africa (outside southern Africa) is very sparse and that issues of cetacean fishery bycatch must be addressed.²⁸ Projects that have sampled landing sites of small-scale coastal fisheries in Ghana since 1998 show that bycatch and directed harvests of small cetaceans are commonplace and possibly increasing. The largest catches, by far, are the result of deployment of large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. The species most frequently caught are clymene (Ghanaians call it the "common dolphin"), bottlenose, pan-tropical spotted, Risso's, long-beaked common, and rough-toothed dolphins, together with short-finned pilot and melon-headed whales.²⁹ Dwarf sperm and Cuvier's beaked whales may also be caught with some regularity.

Identified Needs

Information: Research to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins.

Monitoring: Systematic data collection supported by training and resources.

Mitigation: Close RAMSAR site to gillnet fishing; add humpback dolphin to conservation program.

Legal Framework: CMS, national wildlife agencies.

Enforcement: Ban or limit commerce in cetacean products.

²⁷ Beltrán, S. 1998. "Captura accidental de *Sotalia fluviatilis* (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp. [In Portuguese] See also: Siciliano, S. 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. *Report of the International Whaling Commission* (Special Issue) **15**: 241–250.

²⁸ IWC. 1998. Report of the scientific committee. Report of the International Whaling Commission **48**: 53–302.

²⁹ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

Off Mauritania, common dolphins and *Stenella* (spp.) are caught by eastern European pelagic trawlers. It is estimated these fisheries catch a minimum of about 500 to 1,000 dolphins per year. The artisanal lobster fishery near the border between Mauritania and Morocco is estimated to catch 20 harbor porpoises and other dolphins annually.³⁰

Recent surveys sponsored by UNEP and the Convention on the Conservation of Migratory Species of Wild Animals (CMS or “Bonn Convention”)³¹ in Senegal and Gambia indicate continuing bycatch and deliberate takes of small cetaceans in artisanal and semi-industrial fisheries. Most of the animals caught are bottlenose, Atlantic hump-backed, and long- and short-beaked common dolphins and, on Senegal’s Petite Côte, harbor porpoises.³² The total bycatch in the artisanal fisheries in Senegal probably does not exceed 100 cetaceans per year.³³

In West Africa, bycatch threatens the continued existence of Atlantic humpback dolphins. While bycatch of humpback dolphins is well documented in other West African countries, bycatch monitoring of coastal fisheries in Ghana and Togo has failed to yield a single record because of the severely depleted population.³⁴ Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana’s Volta River region and western Togo.

Conservation efforts are needed for Atlantic humpback dolphins. For example, if research indicates cross-border movements between Ghana and Togo, the chances of international attention and investment in humpback dolphin conservation may be greatly improved through the Bonn Convention. The Ghana and Togo fisheries and wildlife departments must become engaged and cooperate to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). One action Ghana could take to facilitate humpback dolphin conservation would be to add this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps prohibit gillnet fishing in this area.

With sufficient funding and appropriate training, it should be possible to achieve systematic data collection at the national level and, in turn, to make progress toward assessing trends and implementing sound conservation measures. In the longer term, introduction of tourism focused

³⁰ Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

³¹ Convention on the Conservation of Migratory Species of Wild Animals, Done at Bonn, 23 June 1979. Entered into force 11 January 1983. 19 ILM 15 (1980). See Chapter 3.

³² Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E., and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80 pp.

³³ Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

³⁴ Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E., and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

on dolphin watching seems feasible because species diversity is unusually high, seas are calm, and tourism to exotic Ghana is rising.³⁵

A new Dakar-based non-governmental organization, Conservation and Research of West African Aquatic Mammals, or COREWAM, and an interdepartmental Gambian Aquatic Mammal Working Group are now in place. These organizations and other scientists must work together to obtain baseline abundance data and establish seasonal patterns of distribution of coastal cetaceans at subregional, rather than national, scales. These organizations and national bodies must also systematically collect data at the national level to assess trends in bycatch and develop practical measures for the reduction of net entanglements. Such actions are crucial to the survival of cetacean communities—especially the Atlantic humpback dolphin.

Finally, since at least the late-1960s, scientists have speculated that dolphins are involved in the tuna purse seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S., as well as in several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.³⁶ The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.).³⁷ Tuna–whale interactions are also known to occur, and baleen whales are considered good indicators of tuna schools.³⁸ Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess cetacean bycatch is currently lacking.

Area 37 Mediterranean and Black Seas

The species most affected by interactions with fisheries in this area appear to be harbor porpoise, striped dolphins, and sperm whales. Bottlenose dolphins are also caught in a wide variety of gear and are reported to cause damage to some fisheries locally. Common dolphins are also caught in high numbers in some fisheries in the Alboran Sea. The fisheries with the greatest level of cetacean–fishery interactions are generally gillnet fisheries. One major driftnet fishery has been banned since 1992, but others continue on a smaller scale, and setnet fisheries are widespread. Illegal driftnet fishing poses a major threat to all of these species.

The Black Sea population of harbor porpoises is classified as Vulnerable on the IUCN Red List. Harbor porpoises in the Black Sea are isolated from Atlantic populations by a range hiatus in the Mediterranean Sea. Harbor porpoises that occur in Greek waters of the Aegean Sea may

³⁵ Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

³⁶ Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

³⁷ Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr. Pêches Mouadhibou* **10**, 89–101.

³⁸ Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

belong to the Black Sea population or, alternatively, may be a remnant of a separate Mediterranean population.³⁹ Cetacean fisheries ended in the Soviet Union, Bulgaria, and Romania in 1966 but continued until 1983 in Turkey, mainly in the southeastern Black Sea.⁴⁰

Identified Needs

Information: Determine the distribution and abundance of harbor porpoise in the Mediterranean and Black seas and connecting waters. Assess bycatch and develop a conservation plan.

Legal Framework: Implementation of ACCOBAMS.

Enforcement: Enforce existing gear regulations.

Harbor porpoises in the Black Sea are also threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. At present, incidental mortality in fishing nets is the most serious threat to harbor porpoises, with the majority (95 percent) of recorded cetacean entanglements being porpoises. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.⁴¹ This area needs a comprehensive effort to determine distribution patterns and to estimate abundance of harbor porpoises; it also needs a program—through interview surveys, visits to fish markets and landing sites, and on-board observer programs—to evaluate incidental catch and illegal hunting. Results of the

population and threat assessments should lead to the development of a basin-wide conservation plan.

Large numbers of sperm whales are known to have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s.⁴² The recorded number of sperm whales found dead or entangled

³⁹ Frantzis, A., Gordon, J., Hassidis, G., and Komnenou, A. 2001. The enigma of harbor porpoise presence in the Mediterranean Sea. *Marine Mammal Science* **17**, 937–944.

⁴⁰ From 1976 through 81, harbor porpoises accounted for 80% of the total catch of cetaceans in Turkey, with 34,000–44,000 killed annually. With an estimated loss rate (porpoises killed but not recovered) of 50% total mortality could have been as much as double these numbers. Illegal catches of unknown magnitude were also reported in 1990. Klinowska, M. 1991. *Dolphins, Porpoises, and Whales of the World. The IUCN Red Data Book*. IUCN, Gland, Switzerland and Cambridge, UK. See also IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270.

⁴¹ Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.S.R (present Georgia, Russia, and Ukraine), Bulgaria, and Romania and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). In 2002, however, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

⁴² International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005.

from 1971 through 2004 in Spain, France, and Italy (combined) was 229. Surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean.

Likewise, large numbers of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s and may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.⁴³ The recorded number of striped dolphins killed annually in driftnet fisheries may be in the thousands. With no recent estimates of abundance or incidental mortality available, surveys are needed to assess the abundance, distribution, and incidental mortality of striped dolphins in the Mediterranean.

Identified Needs

Information: Determine distribution and abundance of common dolphins; evaluate extent and risk posed by incidental mortality.

Monitoring: Monitor incidental mortality, develop bycatch estimates.

Mitigation: Eliminate driftnets in region.

Legal Framework: Implement ACCOBAMS actions and measures to regulate and reduce incidental mortality.

Enforcement: Enforce existing regulations on driftnets.

In the Mediterranean and Black seas, bottlenose dolphins occur in scattered inshore communities of perhaps 50–150 individuals. Incidental kills of bottlenose dolphins in trammel and gillnets occur frequently in some areas.⁴⁴ In some Mediterranean areas and the Black Sea, the incidental mortality rates are probably unsustainable.⁴⁵ There is a need for intensive population assessments in areas of the Mediterranean and Black seas and interconnecting waters where bottlenose dolphins are known to occur. Efforts are also required to monitor incidental catches (best accomplished through on-board observer programs).

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades, and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.⁴⁶ No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea, but massive directed

Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

⁴³ International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005: 69.

⁴⁴ Silvani, L., Gazo, M., and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90, 79–85.

⁴⁵ Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, *Tursiops truncatus*, interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

⁴⁶ UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

killing, which continued to the early 1980s, is believed to have considerably reduced the population size.⁴⁷ Other than the reported bycatch of 145–200 common dolphins in the Spanish swordfish driftnet fishery in 1993–1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

Pelagic driftnets have been prohibited in Spain since 1992, and their use has been limited by EU regulations since 2002. However, a reduced Italian fleet still fishes with such gear in an unregulated manner, as does a large Moroccan fleet and the French *tonnaille* vessels.⁴⁸ All of these operations are known to cause substantial cetacean mortality.

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)⁴⁹ calls for actions to address fishery bycatch for these species. ACCOBAMS came into force in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS should coordinate among various national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. Without such estimates, ACCOBAMS's ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished.

Area 41 Southwest Atlantic

The large number of species present and the wide range of geographical zones encompassed by this area make analyses difficult. The franciscana (*Pontoporia blainvillei*) is the most threatened cetacean species in the southwestern Atlantic Ocean. Although the franciscana is the species of greatest concern, the tucuxi has also experienced relatively high levels of incidental mortality in some areas.

Commerson's dolphins are also reportedly caught quite frequently in Argentina; again, however, the impact on populations is not known. Other species—including bottlenose, spinner, Risso's, rough-toothed, Atlantic spotted, and common dolphins and false killer, killer, pilot, minke, humpback, and southern right whales—have been caught in lower numbers; current bycatch estimates for these species are either nonexistent or extremely poor.

The major fisheries in this area with cetacean bycatch are shark gillnet and other inshore gillnet fisheries. Trawls and seines also take a proportion of cetaceans, but apparently to a lesser extent than do gillnets. Driftnet fisheries in southern Brazil are also of concern because of their potential to incidentally kill humpback, sperm, dwarf sperm, and pilot whales and spinner, Atlantic spotted, common, striped, clymene, and bottlenose dolphins.

Identified Needs

Information: Identify and delineate management units; acquire up-to-date abundance estimates for all populations in this region.

Monitoring: On-board observers.

Mitigation: Pingers.

⁴⁷ Buckland, S.T., Smith, T., and Cattanach, K. L. 1992. Status of small cetacean populations in the Black Sea: a review of current information and suggestions for future research. Report of the International Whaling Commission 42, 513–516.

⁴⁸ Imbert, G., Gaertner, J.-C., and Laubier, L. 2001b. Prevention à l'aide de repulsifs acoustiques des captures de dauphins par les thonilles. 10e Conference Internationale sur les cétacés Méditerranée de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract).

⁴⁹ Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area. Done at Monaco, 1996. Entered into Force 2001. Source citation from CMS Secretariat.

Between 1 and 10 percent of the population of franciscana are incidentally killed in gillnet fisheries. The total estimated mortality throughout the range could be in the order of 1,500–2,000 animals per year. Most animals incidentally captured in fisheries are juveniles with an average age of one year, and 64 percent of the individuals are under three years.⁵⁰ There has been significant progress made in the assessment of franciscana populations, mostly because of strong collaboration among researchers from Brazil, Uruguay, and Argentina, but work must continue to secure a more accurate abundance estimate for each of the four management areas.

Although workshops have been held in that region to address scientific questions regarding the status of franciscana and to identify research and conservation priorities, there is still a need to gather biological information on ecology, genetics, and mortality rates. The range states must (at the national and provincial level) focus on monitoring and mitigation of franciscanas bycatch, including mechanisms to evaluate potential mitigation measures and their implementation and monitoring.

The IWC Scientific Committee's Subcommittee on Small Cetaceans discussed the status of franciscanas at the 2004 meeting of the IWC. That group recommended further testing, implementation trials, and development of both pingers⁵¹ and the replacement of gillnets with less harmful gear. The committee recommended developing educational programs with artisanal fishermen and fishing communities to promote awareness of the franciscana's vulnerability and to engage stakeholders in the search for solutions to the bycatch problem.

Pelagic trawls for hake and shrimp off Patagonia are harmful to pelagic dolphins such as dusky, short-beaked common, and Commerson's dolphins (*Lagenorhynchus obscurus*, *Delphinus delphis*, and *Cephalorhynchus commersonii*) that feed on anchovies, mackerels, or sardines.⁵² This fishery incidentally kills less than 1 percent of the Commerson's and common dolphin populations, and 1 to 2 percent of the dusky dolphin population.

In addition to pelagic trawling, a shore-based gillnet fishery operates seasonally for Patagonian blenny (*Eleginops maclovinus*), hoki (*Macruronus magellanicus*), and silversides (*Odonthestes* spp). This artisanal fishery operates off southern Santa Cruz and Tierra del Fuego, from Cabo Espíritu Santo in the north to Río Irigoyen. Neither local nor regional authorities has made any attempt to estimate cetacean mortality in this gillnet fishery.

Bycatch has not been a priority in fishery management. Since 2002, provincial government authorities have been calling for an assessment of cetacean and seabird bycatch to take place prior to expansion of the anchovy fishery southward from 41°S. Still, estimates of mortality levels or rates are sorely lacking. There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently further research is needed to identify and delineate

⁵⁰ Culik, B.M. (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pp.

⁵¹ Pingers have shown promise for reducing bycatch mortality of franciscanas. Bordino, P., Kraus, S., Albareda, D., Fazio A., Palmerio, M. Mendez, A., and Botta, S. 2002. Reducing incidental mortality of franciscana dolphin *Pontoporia blainvillei* with acoustic warning devices attached to fishing nets. *Marine Mammal Science* 18:833–842.

⁵² Crespo, E.A., Koen Alonso, M., Dans, S.L., García, N.A., Pedraza, S.N., Coscarella, M.A., and González, R. 2000. Incidental catch of dolphins in mid-water trawls for southern anchovy off Patagonia. *Journal of Cetacean Research and Management* 2:11–16.

management units and acquire up-to-date abundance estimates for all populations in this region. Finally, range states should develop and test devices to prevent dolphins from entering trawls and possibly also to assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

Area 47 Southeast Atlantic

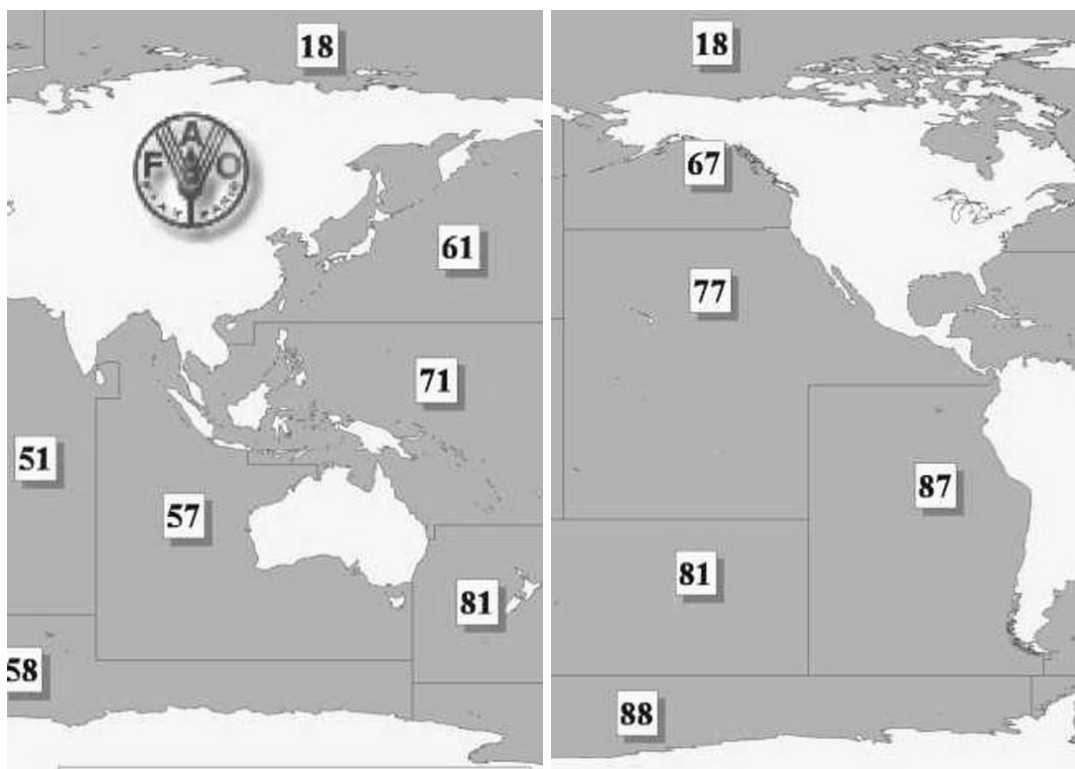
Few recent studies appear to have been made in this area. The recent revelation that a driftnet fishery has been operating off Tristan da Cunha for tuna, with concomitant incidental mortality of small whales and dolphins, suggests that there may also be considerable mortality to some as yet unidentified species. Incidental mortality to Heaviside's dolphin, which is restricted to the coastal zone of South Africa and Namibia, may also be an important interaction, but recent data on bycatch and population size are lacking.

Heaviside's dolphin is protected within the 200-mile Exclusive Fishery Zone of South Africa, where all delphinids are protected under the Sea Fisheries Act of 1973. Similar protection is provided in Namibia's 12-mile exclusive fishery zone (EFZ). The fisheries of concern are the inshore gillnet fishery and any coastal fisheries that may adversely affect Heaviside's dolphin. Neither the bycatch nor the abundance of this species is known, so there is a need for more thorough documentation. The St. Helena mullet and elephant fish fishery has caught only two dusky dolphins (*Lagenorhynchus obscurus*).

Pacific Areas and Populations Analyzed for Highest Risk

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean, illustrated in Figures 3a and 3b. Where available, an assessment of the level of bycatch against estimated population is made. Many areas in the Pacific are characterized by lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim. Critical issues are summarized in the box below.

Developed nations such as the United States and Japan as well as developing countries such as Natal and Sri Lanka all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more providing complex technologic solutions and implementation of action plans. Critical issues that have been identified in the literature or by scientific and management organizations are summarized in the box below. Area specific recommendations also are drawn from the literature. High priority recommendations are included in Chapter 6.



Figures 3a & 3b: FAO Statistical Areas of the Western and Eastern Pacific

Critical Incidental Take Issues in the Pacific Ocean

- Spinner dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning
- Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning
- Bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets
- Indo-Pacific humpback dolphins in Natal (south Africa), anti-shark nets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Madagascar and East Africa, coastal gillnets
- Ganges river dolphins in India and Bangladesh, gillnets
- Irrawaddy dolphins in Chilka Lake (India), gillnets; Bay of Bengal, heavy-mesh drift gillnets for elasmobranchs
- Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia
- Finless porpoises in Korea and Japan, coastal nets and traps; in Inland Sea (Japan), gillnets; Yangtze River, gillnets and electrofishing; marine waters of China and SE Asia, coastal nets and traps
- Baijis in China, electrofishing and rolling hooks
- Spinner dolphins and Fraser's dolphins in the Philippines, driftnets for large pelagics and flying fish, purse seines for small pelagics
- Irrawaddy dolphins (marine), Philippines, *matang quarto* crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets
- False killer whales, Hawaii, longlines
- Vaquitas, Gulf of California (Mexico), gillnets
- Hector's dolphins, North Island (New Zealand), coastal gillnets
- Dusky dolphins, Peru, drift gillnets
- Burmeister's porpoises, Peru, coastal gillnets

Area 51 Western Indian Ocean

In the western Indian Ocean (See Figure 4), incidental catch appears to be of spinner (4,000), spotted (1,500), common (1,000) and Risso's (1,300) dolphins. Catches of pygmy sperm whales (2,700), dwarf sperm whales (2,700), and bottlenose (500–1,250) dolphins are particularly high in the Sri Lankan fisheries. From 4 to 9 percent of the populations of bottlenose and humpback dolphins, respectively, are caught in shark nets to protect bathers along the Natal coast; this amounts to an unsustainable incidental bycatch. Finless porpoises and Irrawaddy dolphins may also be heavily affected by gillnet fisheries in Sri Lanka, India, and Pakistan, but studies in this region are insufficient to make a quantitative assessment.

Large numbers of at least 14 species of cetaceans have been killed in directed hunts and by entanglement in fishing gear in Sri Lanka, with spinner dolphins caught most frequently.⁵³ Scientists estimate that, from 1984 through 1986, some 350,000 gillnets accounted for between 8,042 and 11,821 bycatch mortalities around the Sri Lankan coast.⁵⁴ Other authors estimate that

the total annual catch for all cetaceans may be as high as 15,000 to 25,000 animals.⁵⁵ Additionally, many cetaceans are harpooned, and it appears that deliberate hunting may be increasing, possibly because of poor enforcement of legal protections for cetaceans enacted in Sri Lanka in 1993.⁵⁶ There is an immediate need to estimate population abundance for 14 cetacean species currently killed in Sri Lankan fisheries.

More than 2.5 million fishermen in the subcontinent of India deploy an estimated 1,216,000 passive gillnets annually, incidentally killing an estimated 1,000–1,500 cetaceans, 90 percent of

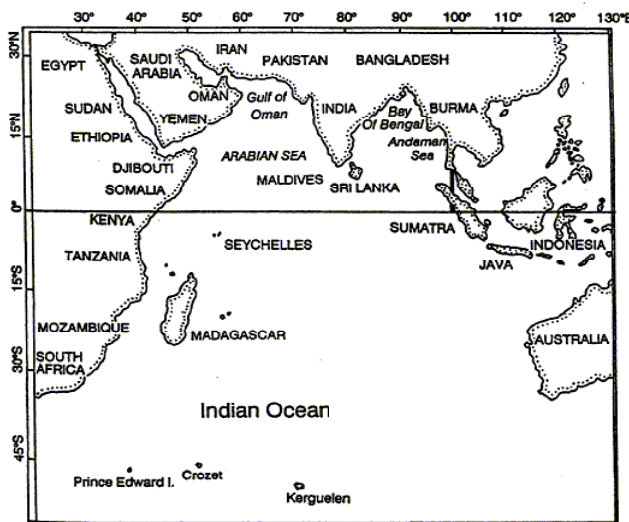


Figure 4: Indian Ocean

which are killed along the southwest coast. Most of these animals are spinner or common dolphins, although coastal fisheries in India also take a toll on Indo-Pacific humpback dolphin populations.⁴³ Continued monitoring of the entanglement of dolphins along the Indian coast is very important because the expanding coastal gillnet fishery may adversely affect some coastal dolphins such as the humpback dolphin. Incidental mortality in fisheries is thought to be a significant conservation problem for cetaceans in numerous areas along the

⁵³ Leatherwood, S., and Reeves, R.R. (eds.). 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

⁵⁴ Leatherwood, S. 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, Donovan, G.P., and Barlow, J. (eds). *Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

⁵⁵ Dayaratne, P., and de Silva, J. 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2–6 July 1990 8 pp.

⁵⁶ Ilangakoon, A. 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, southwest and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

western shores of the Indian Ocean. Relatively few areas along the coast have been the focus of dedicated assessment efforts.

Additionally, the driftnet, shrimp trawl, gillnet, and seine fisheries in the waters of Pakistan, Iran, the Arabian Sea, the Arabian Gulf, and the Gulf of Oman have not been studied and may take cetaceans in numbers as large as in the Sri Lankan fishery.

Off the coast of East Africa there are several bycatch problems. First, dolphins (*Stenella* sp., *Steno bredanensis* and *Tursiops* sp.) are harpooned mainly for use as bait in a longline fishery for tiger sharks in Zanzibar (Tanzania). Small populations of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) and humpback dolphins (*Sousa chinensis*) inhabit waters off the south coast of Zanzibar. Until 1996, these dolphins were hunted for bait and human consumption—an activity that likely reduced the local populations of these animals. The best current abundance estimates for the two species are 161 bottlenose and 71 humpback dolphins.⁵⁷ In 2000, scientists documented cetacean bycatch in fishing gear around Zanzibar. An estimated six species of dolphins are killed year-round in drift- and bottom-set gillnets predominantly; these killings were from two villages off the south coast of Zanzibar. In 2000–2004, observer programs estimated that the annual anthropogenic mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.⁵⁸

Second, the Natal shark net fishery, although small, is also an important threat for local populations of bottlenose and humpback dolphins. Between 1980 and 1988 inclusive, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7–8 animals per year representing 3.5 to 4 percent of the population.⁵⁹ More recent estimates of both mortality and abundance are not available.

Urgent action is clearly needed to reduce the pressure on these East African populations that are likely already depleted. Bycatch mitigation is important to conserve both the dolphin populations and the long-term economies of the local communities for which dolphin-oriented tourism has become an important part of their livelihood.

Reliable and current data on cetacean populations and mortality rates are virtually nonexistent, making it impossible to assess the magnitude of the problem and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Researchers from the various nations bordering the Indian Ocean need to be trained and equipped to conduct at-sea surveys; collect biological samples; estimate the species age, identify sex composition of landed cetaceans; and assess fishing effort by area and season.

⁵⁷ Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X. The hunt has since been replaced with dolphin-oriented tourism; in 2001, about 35 local boats were engaged in carrying passengers to watch dolphins. See: Amir, O.A., and Jiddawi, N.S., 2001. Dolphin tourism and community participation in Kizimkazi village, Zanzibar. Pp. 551–560 in M. Richmond and J. Francis (eds.), *Marine science development in Tanzania and Eastern Africa*. Proceedings of the 20th anniversary conference on advances in marine science in Tanzania, Zanzibar, Tanzania, IMS/ WIOMSA.

⁵⁸ Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

⁵⁹ Jefferson, T.A., and Karczmarski, L. 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also: Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20**(2), 44–51.

Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges river dolphin occurs.

Area 57 Eastern Indian Ocean

Recent information on cetacean–fishery interactions in Area 57 is lacking. The following summary is based on what might be expected from previous studies and studies in other areas with comparable fisheries. A now-terminated Taiwanese shark and tuna gillnet fishery operated off Northern Australia and caught bottlenose dolphins, spinner dolphins, spotted dolphins, humpback dolphins and false killer whales, a proportion of which are in this area. The fishery was mainly located in Area 71 and is discussed under that section. Given the amount of gillnetting likely to occur in this region, accidental catches may adversely affect small coastal species such as the finless porpoise and Irrawaddy dolphin to some extent. The driftnet fisheries operating farther offshore—in the Bay of Bengal, for example—might be expected to catch spinner and spotted dolphins, at least, and perhaps other species. Driftnet fisheries in the southern Indian Ocean may catch a variety of species such as the spectacled porpoise, the southern right whale dolphin, and common dolphin. All of these fisheries require more detailed information on non-target catches.

Along the east coast of India, the expansion of marine fisheries results in large numbers of cetaceans dying in gillnets. Also, there is some indication that bottlenose dolphins (probably *T. aduncus*), and possibly Indo-Pacific humpback dolphins, are also being deliberately killed along the coast of Andhra Pradesh, eastern India, because the fishermen perceive them as competitors for diminishing fish resources.⁶⁰ Deliberate and incidental killing of cetaceans may be especially frequent along the east coast of India near major population centers (e.g., Calcutta and Madras), where the demand is high for fish and fishing employment. This eastern coastline, at least as far south as Vishakhapatnam, includes the westernmost range of the Irrawaddy dolphin. The only other known freshwater population—in Chilka Lake, India—has not been adequately assessed but is known to be subject to bycatch in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for a rigorous monitoring program to document cetacean mortality of Irrawaddy dolphins in Chilka Lake and all cetaceans along the east coast of India.

Identified Needs

(Eastern & Western Indian Ocean)

Information: Reliable and current data on cetacean populations and mortality rates.

Monitoring: monitor entanglement in the Indian Ocean and establish bycatch estimates.

Mitigation: reduce mortality in drift- and bottom-set gillnets and shark nets.

Technology Transfer: train and equip scientists to conduct at-sea surveys; collect biological samples; estimate the species, age, and sex composition of landed marine mammals; and assess fishing effort by area and season.

Enforcement: enforce legal protections for cetacean in Sri Lanka.

⁶⁰ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

Area 61 Northwest Pacific

The information in this section was derived from reports that Japan provided to the IWC on its directed hunts and incidental captures in Japanese fisheries, together with largely anecdotal accounts from Korean, Chinese, and Soviet fisheries. According to the FAO, Area 61 encompasses the most productive fishery waters in the world, and in 1999 accounted for 24.1 million tons of fish landings. China continues to report the largest landings of any fishing nation, most of which come from this area. As such, it is also an area of high levels of cetacean bycatch. Incidental catch in Vietnamese and Taiwanese fisheries would also be expected, but little information is available. Figures available for Japan might suggest some accuracy and reliability in estimating total bycatch, but the reported mortality is a minimum estimate and not corrected for total effort. Because of this enormous and unmonitored fishing effort, reported bycatch of cetaceans is likely to be grossly underestimated. Additionally, the IWC Scientific Committee has expressed concern that Japan (as well as other nations) may not be providing a complete reporting of all direct and incidental captures.

Identified Needs

Information: Stock structure information for Dall's porpoise, pilot whales and striped dolphins and systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch.

Monitoring: monitor bycatch in Chinese, Japanese, Vietnamese and Taiwanese fisheries.

Mitigation: eliminate electrofishing and rolling hooks and establish a protected area for finless porpoises in Dongting Lake or Poyang Lake .

In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000–24,000 cetaceans per year. This mortality was particularly problematic for Pacific white-sided dolphins (6,100), Dall's porpoise (thousands or tens of thousands), and the northern right whale dolphin, which was reduced by 24 percent to 73 percent of its pre-exploitation size.⁶¹ The Bering Sea population of Dall's porpoise is estimated to have been reduced to somewhere between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.⁶² In January 1993, a

United Nations moratorium on high seas driftnet fisheries went into effect—virtually eliminating this source of mortality (See Chapter 4 for description of the moratorium). However, large numbers of Dall's porpoises continue to die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period of 1993 through 1999, ranging from 643 to 3,149 on an annual basis.⁶³

More than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all targets of directed fisheries. Catch levels for pilot whales and striped dolphins may be unsustainable if they are caught predominantly from one stock rather than several. While

⁶¹ Mangel, M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. *Ecol App* 3: 221–229

⁶² Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

⁶³ IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 4 (Supplement), 325–338.

available data indicate that, with the exception of the Dall's porpoise, the level of bycatch is less than 1 percent of each species, the absence of stock structure data and either absent or dated population estimates create significant uncertainty regarding whether these directed takes are adversely affecting these species. For nearly a decade the IWC Scientific Committee has expressed concern over the cumulative level of mortality of Dall's porpoise (14,992). Therefore, these catches highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

The most severely affected species in this region is clearly the baiji, but fisheries may also threaten others such as the finless porpoise. For the baiji, there are many threats⁶⁴, but electrofishing is the greatest, and 5 of 12 documented deaths in the 1990s have been attributed to electrofishing.⁶⁵ Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range. During an expedition in 2006, scientists failed to find any baiji in the Yangtze River. There are reports that scientists may now declare the baiji "functionally extinct," making it the first aquatic mammal species to become extinct since the 1950s.⁶⁶

In the Yangtze, finless porpoises occur in the same areas as the critically endangered baiji and face similar threats. Although recent studies suggest a dramatic decline in abundance of finless porpoises, densities are said to remain relatively high in the mouths of Poyang and Dongting lakes. The Chinese government should consider establishing a protected area for finless porpoises in Dongting Lake or Poyang Lake and adjacent waters.

China's extensive fishing fleets use gear (e.g., gill and trawl nets) known to kill cetaceans. Some scientists believe that the incidental catch of some small cetaceans, especially finless porpoises, is high.⁶⁷ From 1985 through 1992, 114 finless porpoises were found off the coast of

⁶⁴ The Three Gorges Dam spans the Yangtze River at Sandouping, Yichang, Hubei province, China. Construction began in 1994. It will be the largest dam in the world, more than five times the size of the Hoover Dam. The reservoir began filling on June 1, 2003, and will occupy the present position of the scenic Three Gorges area, between the cities of Yichang, Hubei, and Fuling, Chongqing. Structural work was finished on May 20, 2006, nine months ahead of schedule. However, several generators still have to be installed, and the dam is not expected to become fully operational until 2009.

As with many dams, there is controversy over the costs and benefits of the Three Gorges Dam. Although there are economic benefits from flood control and hydroelectric power, there are also concerns about the future of more than 1.9 million people who will be displaced by the rising waters, the loss of many valuable archaeological and cultural sites, and the effects on the environment. It is believed that the dam is a contributing factor in the decline and possible "functional" extinction of the Chinese River Dolphin.

⁶⁵ Zhang, X., Wang Ding., Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji (*Lipotes vexillifer*) and its conservation in the Yangtze River, China. Pp. 41–53 in: [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

⁶⁶ http://en.wikipedia.org/wiki/Chinese_River_Dolphin. Other scientists have noted, however, that conventional observation methods for sighting marine mammals may not be appropriate for the Yangtze, which not only is highly turbid, but also teeming with river traffic, making it nearly impossible to see any river dolphins even if any animals were present. Pers. Comm. David Cottingham, NOAA, March 2007.

⁶⁷ Parsons, E.C.M., and Wang, J.Y. 1998. A review of finless porpoises (*Neophocaena phocaenoides*) from the South China Sea. Pp. 287–306 in: The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

western and northeastern KyU.S.hu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1, and drifting ghost nets killed 1.⁶⁸ Finless porpoises were also incidentally captured, most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.⁶⁹ There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch for this species.

Numerically, the major fisheries that interact with cetaceans appear to be the smaller, salmon driftnet fisheries, but there are many other driftnet, gillnet, setnet, trap net, longline, and purse-seine fisheries in this area for which there is no information. Given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a need for systematic bycatch assessments in these diverse fisheries and for up-to-date abundance estimates.

Area 67 Northeast Pacific

Much of the Northeast Pacific Area 67 is made up of the U.S. EEZ off Alaska, Washington, and Oregon. It does, however, include areas off Canada and international waters outside the EEZs of Russia, Canada, and the United States. The United States and Canada account for 98 percent of all landings within the area.⁷⁰ This section will focus on international bycatch of shared cetacean stocks in the area, not on coastal stocks of cetaceans within the U.S. EEZ, which are managed under the MMPA and, as such, are not the subject of this report.

Many cetacean species interact with or are incidentally captured by commercial fisheries. Since the closure of the salmon and squid driftnet fisheries inside U.S. waters, the level of the mortality for cetacean species is less than 1 percent. Mortalities in fisheries in international waters in the area are poorly known. Fisheries include squid, pollock, salmon, halibut, cod, crab, and flatfish and Use a variety of gear, including pelagic and bottom trawls, longlines, gillnets, driftnets, purse seines, and troll lines.

The major fisheries that interact with cetaceans are the inshore salmon gillnet fisheries, the Alaska pollock fishery, longline fishery, and various pot fisheries. When considered in relation to other fisheries in the Pacific, the incidental mortality of cetaceans in Northeast Pacific fisheries is inconsequential.

Area 71 Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught in gillnet, driftnet, and purse-seine fisheries in the western central Pacific. Also at risk are Irrawaddy dolphins. This region's fisheries are diverse and poorly documented. Nevertheless, coastal gillnets, especially driftnets for tunas and mackerels, are widely Used. After a closure in Australian waters, the Taiwanese driftnet fishery relocated and continued fishing in Indonesian waters in the Arafura Sea. With no reduction in effort, high cetacean bycatch rates are probable.

Spinner and Fraser's dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser's—were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery

⁶⁸ Kasuy, T. 1999. Finless porpoise—*Neophocaena phocaenoides* (Cuvier, G. 1829). in: Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442.

⁶⁹ Yang G. Zhou K, Xu, X, and Leatherwood, S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

⁷⁰ David and Lucille Packard Foundation. 2001. Mapping Global Fisheries and Seafood Sectors. 34.

in Negros Oriental was estimated at about 400.⁷¹ Scientists estimate that even more cetaceans may be caught in round-haul nets. One estimate for the eastern Sulu Sea was 2,000–3,000 per year.⁷² Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus (*Nautilus pompilius*) fisheries in Palawan.⁷³ Currently there are no total bycatch estimates for the Philippines. Preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.⁷⁴

There is still a need to continue efforts to assess incidental catch in the tuna purse seine and drift gillnet fisheries. The major need is for comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews. There should also be intensive surveys to assess cetacean abundance and threats in biodiversity hotspots such as the Tubbataha National Park and World Heritage Site and adjacent Cagayan Islands; there is also a need to conduct more extensive surveys under the auspices of the Convention on Migratory Species in the Sulu Sea and the Sulawesi Sea. Although the directed take of small cetaceans is believed to have declined as a result of protective legislation, monitoring has become more difficult because fishermen are secretive in disposing of their catch.⁷⁵

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphin populations. The species has been seriously depleted in parts of Thailand.⁷⁶ Recent surveys indicate

Identified Needs

Information: Comprehensive cetacean abundance and bycatch surveys are needed for the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form) in the Philippines, Indonesia, Thailand and throughout the region.

Monitoring: Incidental catch assessments in the tuna purse seine and drift gillnet fisheries; comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews.

Mitigation: prohibit the intentional killing of dolphins and provide alternative gear or employment options for fishermen in Malampaya Sound and the Mahakam River.

Legal Framework: Use the Convention on Migratory Species to conduct abundance surveys.

Enforcement: enforce Indonesian and Philippine laws that prohibit killing and live-capture and direct harvests of cetaceans.

⁷¹ Dolar, M.L.L. 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) **15**:355–363.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ Dolar, M.L.L. 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. PhD. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W.F. 2002. Problems of marine mammal conservation in Southeast Asia. *Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science*. Fisheries Science 68, Supplement 1:238–242.

⁷⁵ Dolar, *supra*, note 65.

⁷⁶ Andersen, M., and Kinze, C.C. 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.⁷⁷

Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered by the IUCN.⁷⁸ Between 1995 and 2001, at least 37 dolphins died, primarily from entanglement in gillnets but also from vessel collisions and illegal hunting.⁷⁹ From 1997 through 1999, an average of three dolphins died per year from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.⁸⁰

While Irrawaddy dolphins are protected from killing and live-capture according to Indonesian law, monitoring and enforcement are minimal. Further population monitoring is vitally important, as is a continued evaluation of the threats facing this population. But immediate action should be taken to eliminate fishery mortality by, at a minimum, prohibiting the intentional killing of dolphins and providing alternative gear or employment options for gillnet fishermen. Other options include establishing protected areas and deterrent measures, both of which should be examined.

Another small, geographically isolated group of animals living at the head of Malampaya Sound in Palawan, Philippines, numbers approximately 77 individuals (CV 27.4%) and is confined to a 133-square-kilometer area of the inner sound.⁸¹ This population should also be classified as Critically Endangered simply by virtue of its low numbers. Between February and August 2001, researchers confirmed that two dolphins were accidentally killed in bottom-set nylon gillnets Used to catch crabs (called *matang quatro* nets locally). They also received reports from local fishermen that as many as three additional dolphins were killed in these nets during the same period.⁸² These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines. The crab fishery provides substantial employment and income to the fishermen in Malampaya Sound, an economically depressed region. Despite a scientific recommendation that dolphin mortality in the crab fishery be eliminated or at least drastically reduced, promoting the conservation goal of reducing entanglement in *matang quatro* gillnets will require socio-economic alternatives to the crab fishery that ensure an equal or greater income to the fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in Malampaya Sound.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, where the population is a high priority for Red List

⁷⁷ IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 3 (Supplement), 263–291.

⁷⁸ Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ Dolar, M.L.L., Perrin, W.F., Gaudio, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology*, Supplement, 155–160.

⁸² *Id.*

assessment.⁸³ In the Mekong River from 2001 through 2003, an average of four dolphin deaths per year were attributed to gillnet entanglement; this represents 5.8 percent of a population estimated to number only 69 individuals.⁸⁴ There is a need for a coordinated, comprehensive, and credible rangewide assessment of the Mekong River dolphin population. The assessment should include an abundance estimate, a determination of range limits during various water stages, and an evaluation of habitat quality.

In Thailand, the Irrawaddy dolphin, finless porpoise, and Indo-Pacific humpback dolphin are probably the most severely affected species because of their near-shore distribution and susceptibility to entanglement. Recent surveys revealed that Irrawaddy dolphins have almost entirely disappeared from Songkhla Lake, a large lagoon system connected to the Gulf of Thailand that may have harbored a substantial resident dolphin population in the past.⁸⁵ In Songkhla Lake from 1990 through 2003, scientists believe at least 15 Irrawaddy dolphins were killed incidentally in gillnets from a population that may number as few as 8–15 individuals.⁸⁶ A dwarf form of the spinner dolphin has been described from specimens caught by shrimp trawlers operating in the Gulf of Thailand. If these animals belong to a discrete breeding population, the impact of the shrimp fishery alone could put that population in jeopardy.⁸⁷ Now, there is a need for at-sea surveys to assess cetacean abundance, distribution, and fishery “hotspots” in the Gulf of Thailand and Andaman Sea.

Finally, this area needs further research. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, where relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form), comprehensive cetacean abundance and bycatch surveys are needed to develop effective mitigation strategies.

Area 77 Eastern Central Pacific

Although the Eastern Central Pacific includes cetaceans that occur within the U.S. EEZ, the description for this area will focus only on bycatch of shared cetacean stocks in international waters or the EEZs of other nations.

The species most frequently caught in this area are the dolphins incidentally captured in the purse-seine fishery for yellowfin tuna: eastern and white belly spinner dolphins; northeastern offshore and southern–western offshore spotted dolphins; coastal spotted dolphins, and the northern, central, and southern common dolphin.⁸⁸ In 1989, the U.S. and international fleets in the Eastern Tropical Pacific tuna purse-seine fishery incidentally caught approximately 100,000

⁸³ Baird, I.G., and Mounsouphom, B. 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins (*Orcaella brevirostris* Gray) in Lao PDR. *Asian Marine Biology* **14**, 41–48.

⁸⁴ Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, *Raffles Bulletin of Zoology*, Supplement 10: 75–83.

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ According to the National Marine Fisheries Service, although the number of coastal spotted dolphins reported caught by observers on class 6 purse seine vessels may be small, they may be caught more frequently by smaller purse seiners even though intentionally setting on dolphins with a vessel smaller than class 6 is technically prohibited. Personal communication with Brad Wiley, February 2007.

dolphins. In 2005, that mortality had declined significantly, to fewer than 1,200 dolphins. While the incidental mortality for each of these dolphin species still numbers in the low hundreds, the overall percentage of the population affected is less than 0.1 percent or the equivalent of the zero mortality rate goal in the U.S. MMPA. Nevertheless, within the Agreement on the International Dolphin Conservation Program (AIDCP) (see description in Chapter 3), the U.S. should advocate for updating the existing stock mortality limits to reflect the most recent and best available abundance estimates. Furthermore, the U.S. should continue to periodically conduct abundance surveys to investigate population trends and to support any modifications to the stock mortality limits that might be necessary.

Scientists are still concerned that despite the fact that reported dolphin mortality has been a very small fraction of population size, there is still no clear indication that either northeastern offshore spotted or eastern spinner dolphins are recovering. There are several hypotheses to explain this apparent failure to recover: cryptic effects of repeated chase and encirclement on survival or reproduction (internal injuries, stress, hyperthermia), separation of suckling calves from their mothers during the fishing process, unobserved or observed but unreported mortality, ecosystem or environmental changes, effects due to breakup of dolphin schools (increased predation, social disruption), ecological effects due to removing tuna from the tuna-dolphin association, and lags in recovery due to other inter-specific effects.⁸⁹

Much of the research to date to evaluate the cryptic mortality and cow/calf separation hypotheses has been based on data mining and modeling from information collected from 1970 through the 1990s, and not on direct observation in the present-day fishery. Among the parties to the AIDCP, there has been significant debate about the model's assumptions resulting in a general unwillingness to accept the results or take any further action to account for cryptic mortality in the stock mortality limits. If the U.S. is to make any progress on this issue, it must partner with both the Inter-American Tropical Tuna Commission and the other parties to undertake direct observational research to further test these hypotheses. This will require a substantial commitment of resources to design and execute a series of at-sea experiments to better understand why these dolphin populations are not recovering at the expected rate.

The most significant incidental mortality in the eastern central Pacific region occurs with bycatch of the vaquita in coastal gillnet fisheries and false killer whales in longline fisheries. The vaquita, endemic to the upper Gulf of California, Mexico, is considered critically endangered by the IUCN. Vaquitas, numbering in the low to mid-hundreds, are threatened with extinction by gillnet fisheries. The populations may be declining as commercial and artisanal fisheries for sciaenids, scombrids, shrimp, and elasmobranchs in the upper Gulf kill 35 to 40 vaquitas per year—6 to 7 percent of the population. According to recent estimates by the Southwest Fisheries Science Center, the

Identified Needs

Information: estimate vaquita abundance and trends; undertake abundance and quantitative bycatch estimates in coastal fisheries in Central America

Monitoring: monitor fishing activities and bycatch throughout the vaquita's range

Mitigation: extend the southern boundary of the Biosphere Reserve to cover the entire range of the vaquita and phase out gillnets and trawlers in the entire Biosphere Reserve

Legal Framework: convene a take reduction team for false killer bycatch in longlines and export mitigation measures internationally.

⁸⁹ NOAA information available online at <http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=248&id=1408>.

current estimate of annual mortality rate may be closer to 10 percent.⁹⁰

In 1992, President Carlos Salinas of Mexico created the Technical Committee for the Preservation of the totoaba (an endangered sciaenid fish) and vaquita. On 10 June 1993, the Government of Mexico established the Biosphere Reserve of the Upper Gulf of California and Colorado River Delta, in large part to protect the habitat of vaquitas and totoabas. The management plan for this reserve called for a ban on commercial fishing in its “nuclear zone.” In 1996, the Government of Mexico convened an international panel of experts to form a recovery team—the International Committee for the Recovery of the Vaquita. Regardless of which group, all of the various efforts have produced remarkably similar recommendations:

- To monitor fishing activities and bycatch throughout the vaquita’s range
- To estimate vaquita abundance and trends
- To take immediate action to eliminate incidental catch of vaquitas

More recently, the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and nongovernmental cooperation be fostered.⁹¹ Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are adversely affected by any restrictions.

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. National Marine Fisheries Service (NMFS) recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. In recent years, mortality and serious injury from the Hawaiian and Palmyra stocks has exceeded sustainable levels (1.6 percent to 2.5 percent of the population).⁹² To date, NMFS has not established a bycatch reduction team, as required by the MMPA, to develop measures to mitigate and reduce this bycatch. Additionally, the number of false killer whales caught by international fisheries has not been estimated for any of these three stocks, but scientists are concerned that bycatch may have a significant impact on them. NMFS must take the first step—convene a bycatch-reduction team—to develop effective mitigation measures that can then be exported to other international fleets that take false killer whales and enforced through international regional fisheries management organizations.

As stated, cooperative international management programs have dramatically reduced overall dolphin mortality in the yellowfin tuna purse-seine fishery in the eastern tropical Pacific during the last 15 years. Although much attention has been given to the bycatch problem associated with the yellowfin tuna purse-seine fishery, comparatively little notice has been given to incidental catch of cetaceans in coastal and artisanal gillnet fisheries in nations that border

⁹⁰ Personal Communication, February 2007. Barbara Taylor, NOAA Southwest Fisheries Science Center.

⁹¹ Rojas-Bracho, L., and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp 1,277–1,280 in: *Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

⁹² The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

the eastern tropical Pacific (eastern central Pacific). Although few quantitative data are available, the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is suspected to be high.⁹³ Because of the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation.

An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4 percent to 9.5 percent.⁹⁴ Even at the bottom end of this range, the mortality would be unsustainable—exceeding the recommended limit of 1 percent to 2 percent of the population abundance.⁹⁵ Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins (*S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these populations are likely over-represented, relative to their abundance, in the bycatch.⁹⁶ The report estimated that annual incidental mortality in artisanal gillnets was 16,596 in Costa Rica and 3,581 in Panama.⁹⁷ Nevertheless, information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species, which are not restricted to U.S. territorial waters, present a particular problem: no cooperative management agreements exist with Mexico to address the bycatch in widely dispersed, artisanal gillnet fisheries. These coastal fisheries involve many relatively small vessels and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua, as well as local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a cooperative management agreement with Mexico, because this is especially important for transboundary cetacean species, given the apparently dynamic nature of geographical stock boundaries. Until these goals are accomplished, the conservation and management actions that the U.S. is taking under the MMPA are at best hindered and at worst severely undermined.

Area 81 Southwest Pacific

Hector's dolphin is endemic to New Zealand. The total size of all populations is

Identified Needs

Information: Monitor abundance and distribution of Maui's and Hector's dolphins.

Monitoring: Observer program to estimate throughout the range of the dolphins.

Mitigation: Allow fishing only with gears and methods that do not catch Maui's dolphins; increase the size of the North Island sanctuary to include the harbors and bays and extend the offshore boundaries of both sanctuaries.

⁹³ Vidal O., Van Waerebeek K., and Findley L.T., 1994. Cetacean distribution in the eastern tropical Pacific and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233.

⁹⁴ Palacios, D.M., and Gerrodette, T. 1996. Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

⁹⁵ Wade, P. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Sci 14: 1–37.

⁹⁶ Palacios, *supra*, note 86.

⁹⁷ *Id.*

estimated at approximately 7,400, with 7,270 (CV 16.2 percent) distributed around South Island⁹⁸ and some 100 individuals (called Maui's dolphins) off the west coast of North Island.⁹⁹ The IUCN lists the species as Endangered and the North Island population as Critically Endangered.

Hector's dolphins have been bycaught in gillnets throughout most of their range since gillnetting became widespread in New Zealand waters in the early 1970s. Scientists believe that gillnet mortality is causing continuing declines in all of the populations.¹⁰⁰ The Banks Peninsula Marine Mammal Sanctuary was created in 1988 to reduce bycatch off the Canterbury coastline on the east side of South Island. However, in 1997–1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula (fishing outside of the sanctuary area) was 16 Hector's dolphins (CV 39 percent).¹⁰¹ In view of continued recreational and commercial bycatch north and south of the sanctuary, New Zealand introduced regulations to prohibit recreational gillnetting along the Canterbury coastline from 1 October through 31 March. Commercial fishermen have developed a voluntary code of practice (COP) for reducing bycatch in the Canterbury area as an interim measure while a management plan for the species is prepared. Acoustic deterrents (pingers), specially developed for Hector's dolphin based on field studies of this species, are being used by Canterbury gillnet fishermen as part of the COP.¹⁰² Although there have been no reports of bycatch of Hector's dolphins in any of the nets using pingers, it is difficult to scientifically judge their effectiveness, and thus there is uncertainty about whether the pingers and COP are effective at reducing bycatch.

For Maui's dolphin, the situation is grave. Scientists have concluded that the population has been reduced to such low levels that in order for the North Island population to recover, human-induced mortality must be reduced to zero. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting.

While there has been some progress, bycatch continues throughout most of the species range. Bycatch of Hector's and Maui's dolphins in gillnets must be reduced to sustainable levels. It is likely that additional measures will be necessary for Maui's dolphins such as allowing fishing only with gears and methods known not to catch Maui's dolphins (e.g., replace gillnetting or trawling with line fishing). Additionally, New Zealand should consider increasing the size of the existing protected areas—to include the harbors and bays in the North Island sanctuary and

⁹⁸ Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. dsis35.pdf.

⁹⁹ Russell, K. 1999. "The North Island Hector's dolphin: a species in need of conservation". Unpublished M.Sc. thesis, University of Auckland.

¹⁰⁰ Martien, K.K., Taylor, B.L., Slooten, E., and Dawson, S. 1999. A sensitivity analysis to guide research and management for Hector's dolphin. *Biological Conservation* **90**, 183–191.

¹⁰¹ Baird, S.J., and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997–1998 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

¹⁰² Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). 2003. *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp. at 88

extend the offshore boundaries of both sanctuaries. Finally, New Zealand should implement a statistically robust observer program throughout the species range to verify whether and when bycatch has been reduced to sustainable levels, and it should continue to monitor abundance and distribution of Hector's and Maui's dolphins to assess exposure to threats and the effectiveness of management efforts.

Area 87 Southeast Pacific

The dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are perhaps the most frequently captured species by a variety of fisheries in this area. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins; the bycatch is large enough to cause serious concern for the continued existence of these species.¹⁰³ Changes in the catch composition suggest that the regional population of dusky dolphins is depleted.¹⁰⁴ In addition, a growing concern in Peru is the

demand for dolphin meat and blubber to be used as shark bait.¹⁰⁵

Identified Needs

Information: Abundance of Peale's, Chilean, and Commerson's dolphins off Chile and Dusky dolphins and Burmeister's porpoise off of Peru.

Monitoring: In Chile and Peru studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch. A coastal port survey for discarded remains and boat-based observers to document entanglement and evaluate current fishery-caused mortality.

Enforcement: In Peru, enforce existing laws; in Chile re-evaluate the extent to which cetaceans are still caught for bait.

Clearly the most important fisheries are the coastal gillnet fisheries, especially the driftnet fisheries that operate along the entire west coast of South America. With the exception of Pucusana in Peru, these fisheries and bycatches are virtually undocumented. Directed take of cetaceans for crab bait may also be an important source of mortality, but recent quantitative information on this is lacking.

In Ecuador, the estimated cetacean bycatch in 1993 for the fleets in Puerto Lopez, Santa Rosa, Manta, and Anconcito was between 2,500 and 5,000.¹⁰⁶ However, if the mortality levels are similar in other

¹⁰³ Van Waerebeek, K., Van Bressem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

¹⁰⁴ Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

¹⁰⁵ Van Waerebeek, *supra*, note 95.

¹⁰⁶ Felix, F., and Samaniego, J. 1994. Incidental catches of small cetaceans in artisanal fisheries of Ecuador. Report of the International Whaling Commission (Special Issue) 15:475480.

artisanal ports in Ecuador, the total bycatch in 1993 may have been two to three times greater.¹⁰⁷ Other scientists place estimated mortality at 6,377 small cetaceans.¹⁰⁸ The most affected species are common dolphins, spotted dolphins, and pilot whales.

In Chile, the hunting of Peale's, Chilean, and Commerson's dolphins for crab bait in southern Chile and the harpooning and net entanglement of various species off central and northern Chile has been a concern. Point-sampling at fishing ports in central and northern Chile in 1998 indicated fishery-related killing—including illegal directed takes—in 80 percent of the specimens found of at least five small cetacean species (Burmeister's porpoise, pygmy sperm whale, long-beaked common dolphin, pygmy beaked whale, and long-finned pilot whale). This deliberate killing combined with bycatch mortality also has contributed to declines in abundance of Commerson's dolphins and Peale's dolphins.

Under an agreement between NMFS and the Fishery Subsecretary of Chile, the Chilean government agreed to take measures to decrease the impacts of crab fisheries on marine mammals.¹⁰⁹ These measures included programs to evaluate the scale of the problem, educate the fishing community concerning the ecological effects of the crab fisheries, and provide alternative sources of bait.¹¹⁰ Some action has been taken on all of these aspects. Today a proportion of the bait consists of fish or fishery by-products, either obtained by the fishermen themselves or provided through government agencies within a legal framework.¹¹¹ The practice of using dolphins and other marine mammals as bait is reported to have declined in recent years, due in part to the fact that legal bait has been more readily available and in part to measures taken by government agencies; however, a certain amount of illegal fishing and baiting is believed to continue.

Nevertheless, there is a clear need for researchers in Chile to initiate or continue studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch in order to evaluate the likely implications for cetacean conservation. Researchers should also investigate the geographical distribution, scale, economics, and dynamics of the crab fisheries in southern South America and re-evaluate the extent to which cetaceans are still caught for bait. Field surveys to assess the status of dolphin populations in the crab fishing areas are needed.

In Peru, cetaceans are still being caught incidentally in gillnets, in purse seines, and with harpoons.¹¹² Bycatch remains high, presumably unchanged from earlier levels because no bycatch reduction measures have been implemented.¹¹³ Directed take was believed to be increasing from a low immediately after 1990, when a dolphin conservation law was implemented and the Peruvian government officially closed markets for dolphin meat.¹¹⁴ In

¹⁰⁷ *Id.*

¹⁰⁸ Palacios, D.M., and Gerrodette, T. 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

¹⁰⁹ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC.

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² Van Waerebeek, *supra*, note 95.

¹¹³ In the period 1990 through 1993, the bycatch in Peruvian fisheries ranged from 15,000 to 20,000 small cetaceans.

¹¹⁴ Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–520.

1994, a second, more stringent small cetacean conservation law was enacted that assigned joint responsibility for enforcement to district and provincial authorities. Today there may be an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; they are instead hidden and sold clandestinely or transferred at sea to shark-fishing boats.¹¹⁵

The species of most concern continues to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise, a species endemic to coastal southern South America. In the 1990s, in Peru alone, annual directed take of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. The continuous decline of dusky dolphins as a proportion of the overall cetacean catch since 1985 (when recording began), with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.¹¹⁶

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters. Scientists need better information on stock structure and reliable estimates of abundance for the affected stocks. Total mortality caused by fisheries should be estimated using an on-board-observer-sampling scheme of some kind, in combination with information about total fishing effort. Reeves et al., recommend an independent observer scheme that consists of a three-part effort:

- A coastal port survey for discarded remains to evaluate current fishery-caused mortality relative to former levels, using the same criteria.
- Boat-based observers in areas where large numbers of porpoises were killed in the past to document entanglement dynamics (gear-related, temporal, and circumstantial factors).
- An estimate of current Burmeister's porpoise bycatch by extrapolation from the observed bycatch per unit of effort, which could be applied to data from the nationwide census of artisanal fisheries in September 2004.
- Compilation, analysis, and publication of substantial existing datasets that are relevant to this problem.

Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, mortality of these species must be drastically reduced and the existing laws fully enforced.

¹¹⁵ Van Waerebeek, *supra*, note 95. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bresseem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

¹¹⁶ *Id.*

CHAPTER 3. U.S. TOOLS FOR INTERNATIONAL CONSERVATION

The Marine Mammal Protection Act of 1972 provides some of the tools necessary to engage in activities to mitigate cetacean bycatch beyond the U.S. EEZ. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop “new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare.”¹¹⁷ Congress also acknowledged that “unilateral action by the U.S.” affecting any species or subspecies of marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures.”¹¹⁸

Marine Mammal Protection Act

Section 101 Embargo Provisions (non-tuna dolphin embargo provisions)

The MMPA requires a general prohibition of “taking” (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act’s stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.¹¹⁹ The MMPA is enforced by the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce. The U.S. Customs Service, within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA also states, “The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards”. This prohibition is mandatory. Subparagraph (A) requires the Secretary to “insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S.”¹²⁰

Outside the tuna-dolphin issue, these provisions have been only used once to bring about reductions in cetacean bycatch or direct harvests. Protecting marine mammals from direct takes, such as for crab bait as discussed in Chapter 2, was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s. Since those initial meetings, the two sides have discussed conducting joint research on cetaceans and Chile has received information from the U.S. on whale watching regulations. The U.S. has requested information from Chile regarding its marine mammal data collection and research programs.

¹¹⁷ Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

¹¹⁸ Report 92-863 Senate 92d Congress 2d Session page 10

¹¹⁹ 16 U.S.C 1372 (a)(2)

¹²⁰ 16 U.S.C 1372 (a)(2)(A)

Section 108 International Provisions

The MMPA requires the Secretary of Commerce, working through the Secretary of State, to initiate negotiations “as soon as possible” for the development of bilateral or multilateral agreements with other nations for the protection and conservation of all marine mammals covered by the MMPA.¹²¹

Many of the provisions in section 108 relate to bycatch reduction, calling on the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal to develop bilateral and multilateral treaties with such countries to protect marine mammals.¹²² Likewise, this subsection also calls upon the Secretary of State to enter into international arrangements (either through the Inter-American Tropical Tuna Commission or such other bilateral or multilateral institutions) for the conservation of marine mammals caught incidentally in the course of harvesting yellowfin tuna with purse seines.¹²³

The final two provisions of section 108(a) call on the Secretary of State to seek to amend any existing international treaty to which the U.S. is a party for the protection and conservation of any species of marine mammal, to make such treaty consistent with the purposes and policies of the MMPA, and to seek an international ministerial meeting on marine mammals by July 1, 1973, to negotiate a binding international convention for the protection and conservation of all marine mammals.¹²⁴

With the exception of the provisions related to the Inter-American Tropical Tuna Commission, these provisions have gone largely unused by either the Department of Commerce or Department of State. Congressional oversight has focused on the incidental capture of dolphins in tuna purse-seine nets and not on other forms of international bycatch. Therefore, with limited resources provided to both agencies, the priority has been action to reduce the bycatch of dolphins in the yellowfin tuna fishery and very little effort has been expended to initiate bilateral discussion, modify existing international treaties, or initiate a new international convention to address other forms of global bycatch.

Magnuson-Stevens Fishery Conservation and Management Act

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),¹²⁵ the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries¹²⁶ for purposes of leveling the playing field between the U.S. fleet and

¹²¹ 16 U.S.C. § 1378(a)(1)

¹²² 16 U.S.C. § 1378 (a)(2)(A)

¹²³ 16 U.S.C. § 1378 (a)(2)(B)

¹²⁴ 16 U.S.C. § 1378 (a)(4) and (5)

¹²⁵ 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

¹²⁶ Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species “disadvantage U.S. fleets

those of other nations, the new provisions have strong bycatch language applicable to marine mammals.

The international title of the reauthorization creates a new section in the M-SFCMA, authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.¹²⁷ Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.¹²⁸

Section 403 of the reauthorization's international provisions amends the High Seas Driftnet Fisheries Enforcement Act by adding four new sections: a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; identification and listing of nations whose vessels participate in IUU fishing; and identification and listing of nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States, taking into account different conditions."¹²⁹ The amendment defines "protected living marine resource" to mean non-target fish, sea turtles, or marine mammals that are protected under U.S. law or international agreement.¹³⁰

The listing provisions are very comparable to certification under the Pelly and Packwood amendments (see below). The Secretary of Commerce determines whether a nation has taken appropriate corrective action in response to illegal fishing, gives the offending party notice and opportunity for comment, and then certifies to Congress whether it has provided documentary evidence of corrective action.¹³¹ A similar procedure is required for bycatch of protected living marine resources in international waters or of a protected resource shared by the U.S. The certification must demonstrate that:

- the vessels have had bycatch in the prior year,
- the relevant organization has failed to implement measures to reduce such bycatch,
- the nation is not a party to a relevant organization, or
- the nation has not adopted a bycatch reduction program comparable to that of the U.S.¹³²

After a notification and consultation process that gives the international community time to respond under relevant agreements, amend existing treaties or develop new instruments, the list of certified nations is provided to Congress and the sanctions of the Driftnet Enforcement Act

and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

¹²⁷ Section 207(a)

¹²⁸ Section 207(b) (1) – (7).

¹²⁹ S.Rpt. 109-229 at 45, H.R. 5946, Sec. 610.

¹³⁰ H.R. 5946, Sec. 610(e)

¹³¹ H.R. 5946, Sec. 609.

¹³² H.R. 5946, Sec. 610(a)(1)-(3)

may be applied.¹³³ An alternative procedure allows for certification on a shipment-by-shipment or shipper-by-shipper basis of fish or fish products.

The measure calls for the Secretary of Commerce and Secretary of State to provide assistance to nations or organizations to help them develop gear and management plans that will reduce bycatch.¹³⁴

International Dolphin Conservation Protection Act

The history of the dolphins dying in tuna purse-seine nets is a lengthy one and will not be repeated in this report. This issue was one of the driving forces behind the enactment of MMPA.¹³⁵ As stated earlier, the law created a ban upon “the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards.”¹³⁶ In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This decision precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).¹³⁷ The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse-seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.¹³⁸

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of “dolphin safe tuna” to mean “tuna harvested without dolphin mortality.”

In 1997, Congress enacted the IDCPA,¹³⁹ which revised the criteria for banning imports by amending the MMPA. Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting

¹³³ H.R. 5946, Sec. 610(c)(5)

¹³⁴ S.Rpt. 109-229 at 12.

¹³⁵ Pub. L. No. 92-522, 86 Stat. 1027

¹³⁶ 16 U.S.C.A. § 1371(a)(2)

¹³⁷ Pub. L. No. 102-523, 106 Stat. 3425 (1992).

¹³⁸ H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.

¹³⁹ Pub. L. No. 105-42, 111 Stat. 1122 (1997).

its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.¹⁴⁰

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.¹⁴¹

Whaling Convention Act

The Whaling Convention Act of 1949¹⁴² authorizes the Secretary of Commerce to enforce the provisions of the International Convention for the Regulation of Whaling and to issue regulations necessary for this purpose. Regulations can be found at 50 CFR Parts 230 and 351. The Secretary is authorized and directed to administer and enforce all provisions of the convention, this act, and regulations promulgated pursuant to this act. In conducting the duties prescribed under this act, the Secretary of Commerce cooperates with other agencies of the federal government, state governments, or other independent institutions. The Secretary may also cooperate with any agency from any other government of any party to the convention.

Under this act, it is illegal for any person under U.S. jurisdiction to engage in any act prohibited or not do any act required by the convention, this act, or any regulations promulgated by the Secretary of Commerce pursuant to this act. It is also illegal to ship, transport, purchase, sell, offer for sale, import, export, or have in possession any whale or whale products taken in violation of the convention, this act, or any regulation promulgated by the Secretary of Commerce pursuant to this act. The prohibitions of this act do not preclude the taking of whales for scientific investigation, with the approval of the Secretary.

To the extent that the convention applies to the U.S., the Secretary of Commerce issues regulations deemed necessary to further the goals of the convention.

As part of the international program anticipated under the act, Section 917(c) calls for appropriate bilateral agreements with Mexico and Canada for the protection and conservation of whales.¹⁴³ Even though no specific bilaterals have ever been negotiated, considerable cooperative research on marine mammals has taken place between the U.S. and Mexico in addition to work conducted under the tuna-dolphin program. Examples include population surveys for vaquita, gray whales, Gulf of Mexico bottlenose dolphins, and cooperative surveys of pinniped populations. Collaborative research has taken place on genetic studies for California sea lions, bottlenose dolphins, and sperm whales. The countries have also exchanged information on marine mammal bycatch from their respective longline observer programs and on coordinating responses to marine mammal strandings.

¹⁴⁰ Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).

¹⁴¹ <http://swr.nmfs.noaa.gov/psd/embargo2.htm>

¹⁴² 16 USC 916-9161; Act of August 9, 1950, as amended

¹⁴³ 16 U.S.C. 917(c). However, this provision is generally thought to be superceded by the MMPA.

Endangered Species Act

The U.S. Endangered Species Act (ESA) was enacted in 1973 to provide for the conservation of species “which are in danger of extinction throughout all or a significant portion of their range.”¹⁴⁴ The act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of the Convention on International Trade in Endangered Species (CITES). CITES operates primarily by controlling trade of listed species. Species are listed under various appendices, depending on their status. See Chapter 4 for a full discussion of the provisions of the treaty.

International Cooperation under the ESA

The U.S. president, with the foreign country’s consent, may use foreign currencies to provide assistance for any listed endangered or threatened species, which may include acquisition of lands, waters or interests therein. These currencies must be used in preference to funds appropriated under §1542 of the Act.

Additionally, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.¹⁴⁵

For purposes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Secretary of the Interior is designated as the management authority and the scientific authority, with the functions of the authorities to be carried out by the U.S. Fish and Wildlife Service. The Secretary of the Interior must give advice and make determinations under Article IV of CITES based on the best available biological information derived from professionally accepted wildlife management practices, but is not required to make population estimates. If the United States votes against including a species under CITES and does not enter a reservation pursuant to CITES, the Secretary of State must submit a report to the appropriate Senate and House committees.

The Secretary of Interior in cooperation with the Secretary of State and other secretaries, represents the U.S. regarding the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (the Western Convention). The Interior Secretary must take steps to implement the Western Convention, including developing personnel resources and programs, identifying species, habitats, and cooperative measures to ensure that species of migrating birds will not become threatened or endangered, and by identifying measures for the protection of wild plants.

¹⁴⁴ 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.

¹⁴⁵ 16 U.S.C. 1537.

Agency Action

The MMPA places authority for protection of marine mammals in the Department of Commerce. Since 1972, the management authority has been delegated through NOAA to NMFS, Office of Protected Resources.

Many of the agency's ESA activities involve its duty to develop strategies for the conservation and survival of endangered and threatened species. In the area of marine mammals, the ESA and the MMPA offer similar management authority for endangered and threatened marine mammal species or stocks. Section 4(f) of the ESA requires the development and implementation of recovery conservation plans, while §115 of the MMPA mandates conservation plans modeled after the ESA for listed species. NMFS has recovery or conservation plans in place for North Pacific fur seals, Hawaiian monk seals, Steller sea lions, right whales, blue whales, and humpback whales. Consultations occur on an ongoing basis, under §7 of the ESA, with federal action agencies to avoid or mitigate the impacts of their activities on listed species. NMFS also reviews nonfederal activities that may affect listed species and issues §10 permits for incidental bycatch.

Pelly Amendment

In the years after the signing of the Convention for the Regulation of Whaling, it became clear the convention had no clear mandate for conservation.¹⁴⁶ The U.S. used instead the leverage it could apply through the MMPA, the Pelly Amendment and the Packwood Amendment to the Fishery Conservation and Management Act. Under these laws various official determinations about foreign government policies or production practices are deemed certifications under Pelly and are handled like any other certification. Some of these determinations involve international treaties and some do not.

The 1971 Pelly Amendment to the Fishermen's Protective Act¹⁴⁷ authorizes the U.S. president to prohibit the importation of products from countries that allow fishing operations that diminish the effectiveness of an international fishery conservation program or that engage in trade or taking that diminishes the effectiveness of an international program for endangered or threatened species. Specifically, the Secretary of Commerce, upon determination that foreign nationals are conducting fishing operations in a way that diminishes the effectiveness of international fishery conservation programs, is directed to certify such to the president. The secretary also has the responsibility to certify to the president when foreign nationals are engaging in trade or taking in a manner that diminishes the effectiveness of any international program for endangered or threatened species. Upon receipt of certification, the President may direct the Secretary of the Treasury to prohibit the importation into the U.S. of any products from the offending country for a period of time the President determines and to the extent prohibition is sanctioned by the General Agreement on Tariffs and Trade. The secretary also periodically reviews the activities of the offending nations to determine if the reasons for the certification still prevail. If the reasons no longer prevail, the secretary revokes the certification and publishes a notice thereof in the *Federal Register*.

While the Pelly Amendment is the most noteworthy section of the act for wildlife conservation purposes, the act also provides for federal reimbursement of money paid by owners to secure the release of fishing vessels improperly seized by foreign countries. In

¹⁴⁶ Bean, M. 1983. *The Evolution of National Wildlife Law*. Praeger. New York. 448 pages, at 265.

¹⁴⁷ 22 U.S.C. 1978

addition, the act sets up a fund to compensate owners for damage to or destruction of their fishing vessel or gear.

Under Section 1821 of the Fishery Conservation and Management Act of 1976, also known as the Packwood-Magnuson Amendment, a certification by the Secretary of Commerce that foreign nationals are “engaging in trade or taking” that diminishes the effectiveness of the International Whaling Convention is deemed a Pelly certification. The only way this provision expands potential application of Pelly is by mandating certification for trade in whales even though they may not be endangered.

Under the MMPA amendments of 1988, the Secretary of Commerce must certify under Pelly any nation whose yellowfin tuna is embargoed whenever the embargo continues for more than six months.

If, under the Fishery Conservation Amendments of 1990, the Secretary of Commerce finds that a nation is engaging in trade in unlawfully taken anadromous fish or fish products, that finding is deemed a Pelly certification.

History of Pelly Applications Related to Marine Mammals

This subsection provides a short case history of a few Pelly episodes related to marine mammals. For purposes of the following, the authors deem as successful those episodes where the Pelly threat led to a significant concurrent change in the target country's policy in the direction sought by the U.S. government. Thus a commitment to greater adherence to international standards by a foreign government would be deemed successful.

1974—Japan and Soviet Union

In 1974, the Secretary of Commerce certified Japan and the Soviet Union for exceeding the International Whaling Commission's (IWC) minke whale quota for 1973–1974. Both countries had objected to the IWC quota, however, and were therefore not legally bound by it. In announcing that he had decided against imposing sanctions, President Ford explained that both countries had voted for the 1974–1975 quotas, which incorporated conservation improvements. He also explained that imposing sanctions against Japan would result in higher prices for American consumers. These episodes are rated as successful because the two countries agreed to the IWC quota for the next year.

1986—Norway

In 1986, the Secretary of Commerce certified Norway for violating the IWC moratorium on commercial whaling. Norway had objected to the zero quotas and was therefore not bound by them. Less than a month after the Pelly certification, Norway announced that it would suspend commercial whaling after the 1987 season and would reduce its catch for that year. President Reagan then decided not to impose sanctions. This episode is rated as successful because Norway agreed to suspend commercial whaling after that season.

1990—Norway

In 1990, the Secretary of Commerce certified Norway for taking minke whales in violation of IWC research criteria. In announcing that he would not impose sanctions, President Bush stated that Norway was making progress in its “program and presentation” and noted current efforts to improve United States–Norwegian scientific consultations. This episode is rated as unsuccessful because Pelly did not affect Norway's whale-hunting behavior.

1993—Norway

In August 1993, the Secretary of Commerce certified Norway for violating the IWC zero catch limit on minke whales by killing 157 whales. Norway argued that the minke whale was not endangered. The IWC, however, included this whale in its zero catch limit. Moreover, the minke whale is on CITES Appendix I. Norway also argued that it was not legally bound by the zero catch limit because it had entered a reservation under IWC procedures. In October 1993, President Clinton stated that, although “Norway’s action is serious enough to justify sanctions,” he would nevertheless not impose them. This episode is rated as unsuccessful because Pelly did not affect Norway’s behavior.

1996—Canada

In December 1996, the Secretary of Commerce certified Canada for allowing its Inuit to take two bowhead whales from a highly endangered stock in the eastern Canadian arctic. Neither hunt was authorized by the IWC, which had expressed particular concern about whaling in the eastern Canadian arctic, where bowhead stocks are not known to be recovering. Canada was not a member of the IWC, withdrawing in 1982 and stating at the time that it no longer had any direct interest in the whaling industry or in the related activities of the IWC. This episode is rated as unsuccessful because Pelly did not affect Canada’s behavior—it did not cease hunting nor did it return to the IWC.

2004—Iceland

In 2003, Iceland announced that it would begin a lethal, research whaling program and planned to take 250 minke, fin, and sei whales for research purposes. On June 16, 2004, the Secretary of Commerce certified Iceland for its lethal research whaling. The U.S. and a majority of the IWC nations questioned the scientific validity of Iceland’s research whaling program. Iceland reduced its proposed take to 38 minke whales and actually killed 36 whales. President Bush did not impose trade sanctions on Icelandic products for the whaling activities, but directed U.S. delegations to seek ways to halt these whaling operations in its bilateral discussions with Iceland. This episode is deemed unsuccessful as Iceland announced its intention to resume commercial whaling.

CHAPTER 4. INTERNATIONAL AGREEMENTS RELATED TO BYCATCH

The previous chapter discussed U.S. law and policy that provide mechanisms for action to reduce bycatch of marine mammals in fishing operations. The U.S. is party to numerous international agreements related to marine mammal protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives is the collection of regional agreements to which the U.S. is party. The increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of marine mammal bycatch in fisheries. Finally, the 2006 amendments to the Magnuson-Stevens Fishery Conservation and Management Act place a considerable burden on the U.S. to evaluate bycatch in international fisheries and take action to press fishing nations to reduce incidental catch of protected species such as cetaceans.

This report does not describe all of these instruments. The agreements discussed here and in Chapter 5 are included in Appendix B with lists of the parties to each instrument. In 1997, the U.S. Marine Mammal Commission published a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents* related to marine mammal and wildlife conservation. This exhaustive resource provided the basis for much of the material covered. The following section concentrates on a few international tools and the relevant agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch requires urgent action, based on the analysis presented in Chapter 5.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. This chapter provides a compilation of agreements that relate directly to cetacean bycatch, or might be applied to actions to reduce cetacean bycatch. It presents global agreements for wildlife, fisheries and the marine environment first then discusses regional agreements for wildlife, fisheries and the environment. Finally, the chapter examines the emergence of an increased role for regional fishery management organizations in bycatch reduction, and the creation of several new regional fishery management organizations (RFMOs) that might be tasked with preventing bycatch of non-target species and protected species in the course of fishing.

Background

For centuries, customary international law and practice embraced the concept of *mare liberum*, freedom of the seas. Many assumptions that flowed from this principle continued until as recently as the 1980s and 1990s: anyone possessing the wherewithal to ply the seas and cast nets was free to fish; anyone wanting to impose restrictions on fishing bore the burden of proof to demonstrate the activity was harmful; fish, like wildlife, belonged to the state, which was the decision-maker on issues of access and other rights in the living resources of the sea. Even the inception of the International Whaling Commission in the 1940s was for the purpose of “regulating whaling,” an activity that was seen as just another kind of fishing.

It was not until the 1970s that international public opinion raised the notion that marine mammals were species of “special concern.” This era saw the beginning of a policy shift toward protecting marine mammals, rather than managing their exploitation.

In addition to agreements that are aimed specifically at protecting marine mammals, it is necessary to examine fishery management in an international context through several important agreements that changed the traditional freedom of seas approach to fisheries and led to the

emergence of the precautionary approach. These include the fishing provisions of the 1982 Convention on the Law of the Sea¹⁴⁸ (UNCLOS), the so-called U.N. Fish Stocks Agreement (UNFSA),¹⁴⁹ and the FAO Code of Conduct for Responsible Fisheries (Code of Conduct).¹⁵⁰ Sections briefly summarize a number of other important international and regional agreements that govern fisheries, including the Convention on the Conservation of Antarctic Marine Living Resources¹⁵¹, the International Convention for the Conservation of Atlantic Tunas,¹⁵² the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean,¹⁵³ and the North Atlantic Fisheries Organization.¹⁵⁴

The role of regional fishery management organizations is explored as a tool for managing resources that cross jurisdictions and as a means to access decision-making bodies that may be able to influence fishing methods that pose harm to cetacean populations through bycatch. The emerging influence of trade, labeling, certification, product tracking, and similar regimes on international fishery management and their potential for reducing marine mammal bycatch are examined in Chapter 6.

International Tools for Reducing Bycatch

For most of human history people have seen the ocean as a frontier to be explored or a limitless and unchangeable source of fish. Hugo Grotius first expressed the philosophy of freedom of the seas in an anonymously published essay in November 1608 in defense of the rights of the Dutch East India Company to trade in waters claimed by Spain or Portugal.¹⁵⁵ Historically, fishing fleets took advantage of access to the richest fishing grounds—relatively shallow areas on the continental shelf—no matter where they were. It was not until after World War II that within their own waters, states exercised control over who fished and how much they caught. Beyond the territorial zone, access to fisheries continued to remain open and subject only to such regulations as their flag state imposed.¹⁵⁶ In the early nineteenth century, increased exploitation of fisheries led several coastal states to enter explicit bilateral and multilateral

¹⁴⁸ The Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.)

¹⁴⁹ The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, *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*. U.N. Doc. A/Conf./164/37.

¹⁵⁰ United Nations Food and Agriculture Organization. Code of Conduct for Responsible Fisheries. Rome. 1995.

¹⁵¹ Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T 3476.

¹⁵² International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T 2887.

¹⁵³ Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Available at <http://www.wcpfc.int/>. Last accessed 17 November 2006.

¹⁵⁴ The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.)

¹⁵⁵ Hugo Grotius, *Mare Liberum* or *The Freedom of the Seas or the Right Which Belongs to the Dutch to Take Part in the East Indian Trade*, Oxford University Press (New York 1916).

¹⁵⁶ Burke, *The New International Law of Fisheries*, 2-6 Clarendon Press (Oxford 1994).

agreements to conserve and manage fisheries.¹⁵⁷ However, even where a multilateral institution was created by such agreements, the fishing nations and the coastal states generally were not willing to confer on such institutions the authority needed to enforce the rules. Therefore, few of the world's fisheries were subjected to meaningful management.¹⁵⁸

Over the past 40 years, the international law of fisheries has evolved from absolute freedom of the seas and unencumbered access to fishing, through assertion and extension of the rights of coastal states to protect their fisheries and fleets, to some limitations on fishing fleets operating in the zones of coastal states, to consensual limitations on vessels operating on the high seas, and finally to the current situation, where the right of freedom of fishing is restricted.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. In addition to reaffirming the right of coastal states to manage the living marine resources within their 200-mile zones, the convention placed qualifications on the rights of distant water fishing fleets fishing on the high seas.

UNCLOS III: Fishery Management Provisions of the Law of the Sea Treaty (Fisheries Articles 56, 61, 63, 64)

The 1982 UN Convention on the Law of the Sea is the overarching body of law covering every aspect of marine endeavor from transportation to pollution to military issues to scientific research. In its sections on protection of living marine resources, the Convention sets out the rights and responsibilities of coastal states and flag states with regard to fishing. While the Convention conferred economic rights over resources to coastal states, it preserved the traditional notion of freedom of fishing on the high seas. Although the Convention only entered into force in 1994, its provisions and policies have been recognized as customary international law since the late 1980s.¹⁵⁹

Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles.¹⁶⁰ This includes the authority to conserve and manage living resources.¹⁶¹ The coastal nation must ensure, using best scientific information available and conservation and management measures, that the living resources of the EEZ are not threatened by overexploitation.¹⁶² The Convention adopts MSY as the goal for maintaining or restoring exploited populations.¹⁶³ The coastal state is to collect, contribute and exchange scientific

¹⁵⁷ Louis B. Sohn & Kristen Gustafson, *The Law of the Sea* 115 (1984).

¹⁵⁸ William Burke, Remarks at University of Washington on Fisheries Law, at 3-1 (1992), cited in Iudicello and Lytle (1994).

¹⁵⁹ David Hunter, James Salzman and Durwood Zaelke, "International Environmental Law and Policy," Foundation Press (2002) at 659.

¹⁶⁰ UNCLOS, *supra* note 1 at Art. 56.

¹⁶¹ *Id.* at Art. 61.

¹⁶² *Id.* at Art. 61(2).

¹⁶³ *Id.* at Art. 61(3). "The concept of maximum sustainable yield recognizes that fisheries must be managed so that fish stocks can be sustainably caught year after year without causing the population of fish stocks to decline. 50 CFR

information, catch and effort statistics with other concerned states.¹⁶⁴ Access to the zone by foreign fleets is solely within coastal state discretion and subject to its laws and regulations, including requirements for licensing, observers and other conservation measures; compliance with conservation and management measures is required.¹⁶⁵ The convention directs states to seek coordinated measures necessary to conserve stocks that occur within the zones of two or more coastal states, or adjacent to their zones.¹⁶⁶ With regard to highly migratory species, UNCLOS calls for cooperation through international organizations, and where none exists, for the establishment of such organizations “with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone”.¹⁶⁷ The 1982 conference even imposed new obligations on high seas fishing states. While freedom of fishing on the high seas continues in principle, the Convention can be read as imposing a dual responsibility on fishing nations: conservation and cooperation with coastal states.¹⁶⁸

Even though the 1982 LOS Convention provided a new framework for better fisheries management, the extended jurisdiction of coastal states to 200 miles was insufficient to protect ocean fisheries.¹⁶⁹ As fleets, technology and the demand for fish and fishery products grew, it became clear by the late 1980s that the world’s fish populations could not withstand continuing rapid and often uncontrolled exploitation and development. Reports of violence, confrontations between fishing nations, uncontrolled fishing on the high seas, and—for the first time in history—several consecutive years of declines in world catches led to a series of meetings and conferences where fishery experts called for action to control high seas fishing. In 1991, the Committee on Fisheries (COFI) called for the development of new concepts to foster responsible, sustained fisheries.¹⁷⁰ This was followed by an International Conference on

602.11(d)(1).... Scientists assume that population levels at 40% of unfished abundance (or biomass) are close to MSY, and that populations are overfished when levels fall below half the MSY level, roughly 20% of unfished abundance.” However, MSY does not necessarily signify healthy fish populations, and should be viewed as a minimum target used in conjunction with precautionary and ecosystem management approaches. See Tim Eichenberg and Mitchell Shapson, “The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development, 34 Golden Gate University Law Review 587 at 624-626.

¹⁶⁴ UNCLOS, *supra* note 1, at Art. 61(5).

¹⁶⁵ *Id.* at Art. 62.

¹⁶⁶ *Id.* at Art. 63.

¹⁶⁷ *Id.* at Art. 64.

¹⁶⁸ Louis B. Sohn & Kristen Gustafson, *The Law of the Sea* 115 (1984). UNCLOS imposes duties on all states to take “such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas,” Article 117; to cooperate “in the conservation and management of living resources” of the high seas, Article 118; and to “maintain or restore populations of harvested species at levels which can produce maximum sustainable yield,” Article 119.

¹⁶⁹ FAO. *The State of World Fisheries and Aquaculture 2004* at Preface. Available at http://www.fao.org/sof/sofia/index_en.htm. Last accessed 9 May 2006.

¹⁷⁰ “The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a world-wide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated.” Available at <http://www.fao.org/fi/body/cofi/cofi.asp>. Last accessed 3 May 2007.

Responsible Fishing in Cancun, Mexico in 1992, where participants adopted a Declaration stating that “States should cooperate...to establish, reinforce and implement effective means and mechanisms to ensure responsible fishing on the high seas.”¹⁷¹ These efforts culminated in the 1992 UN Conference on Environment and Development in Rio de Janeiro.¹⁷² Ten years later, at the World Summit on Sustainable Development, 191 nations agreed to a series of targets and timetables to restore depleted fish stocks, manage fishing capacity prevent IUU fishing, and create marine protected areas.¹⁷³

UNCED or the “Earth Summit,” concluded in June with the adoption of a list of recommendations, including a chapter on the marine environment. Specifically, Chapter 17.C of Agenda 21 called for the UN to find ways to conserve fish populations and prevent international conflicts over fishing on the high seas, consistent with the provisions of the Law of the Sea.¹⁷⁴

Code of Conduct for Responsible Fisheries

The FAO, recognizing these developments, “recommended the formulation of a global Code of Conduct for Responsible Fisheries which would...establish principles and standards applicable to the conservation, management and development of all fisheries.”¹⁷⁵ The FAO Conference adopted the Code unanimously on October 31, 1995. In its 12 Articles, the Code covers both policy and technical matters including fisheries management, fishing operations, aquaculture, coastal area development, research and trade.

The Code is voluntary, and to be adopted by parties through national legislation, but some provisions are binding because of their relation to other legal instruments.¹⁷⁶ The Code is directed toward all persons concerned with conservation, management or development of fisheries, processing, marketing or any “users of the aquatic environment in relation to fisheries.”¹⁷⁷ It provides principles and standards for every aspect of fisheries from aquaculture to capture, from research to fishing operations, processing to trade.¹⁷⁸

For the first time, the Code attaches an obligation to the freedom to fish, and calls for users of living marine resources to use them “in a responsible manner so as to ensure effective conservation and management.”¹⁷⁹ Inter-generational equity appears in the fishery context for the first time, as well, with the call for maintaining the diversity of fishery resources for “present and future generations” as well as for “food security, poverty alleviation and sustainable

¹⁷¹ International Conference on Responsible Fishing. Declaration of Cancun. Done at Cancun, Mexico 8 May 1992.

¹⁷² United Nations Conference on Environment and Development (1992) (hereinafter UNCED).

¹⁷³ See generally, www.johannesburgsummit.org, and “Report of the World Summit on Sustainable Development, available at <http://ods-dds-ny.un.org/UNDOC/GEN/N02/636/93/PDF/No263693.pdf>. Although the WSSD set a number of ambitious fishery timetables, it generally fell short of expectations and mechanisms to ensure the timetables are met. See Eichenberg and Shapson, *supra* note 28 at 588 and 624-636.

¹⁷⁴ Agenda 21 (UN Doc. A/CONF.151/26 (Vol. I-III)).

¹⁷⁵ FAO Code of Conduct, *supra* note 141.

¹⁷⁶ *Id.* at Art. I, 1.

¹⁷⁷ *Id.* at Art. II, 2.

¹⁷⁸ *Id.* at Art. I, 3.

¹⁷⁹ *Id.* at Art. VI, 1.

development.”¹⁸⁰ The Code urges effort controls, ecosystem management, the precautionary approach, selective fishing gear, habitat protection, and use of the best scientific information.¹⁸¹ It calls for not only monitoring and control of flag state vessels, but also cooperation at all levels and among jurisdictions, and cooperation to prevent disputes.¹⁸² In procedural recommendations, as well as substantive ones, the Code is far ahead of traditional fishery agreements. States are urged to conduct transparent decision making processes, education and training, provide safe and fair working conditions, and recognize and protect the rights of subsistence, small-scale and artisanal fishers.¹⁸³

Articles 7 through 12 provide specific guidance to states and interested parties on operational and technical matters. These have been further elaborated by a series of technical guidelines from the FAO. Many of the provisions provide further detail on the principles by setting out how, for example, application of the precautionary approach would occur in fishery management measures.¹⁸⁴

Management objectives include maintaining or restoring stocks to MSY, avoiding excess fishing capacity, protecting biodiversity and endangered species, assessing and mitigating adverse impacts from human activities, and minimizing pollution, waste, discards, ghost fishing, and bycatch. The Code recommends assessment of whole ecosystems and interrelationships, and directs states to consider the whole stock unit over its entire area of distribution.¹⁸⁵

Straddling Stocks Agreement

The most significant outcome of the fishery management directives from Agenda 21 was the Straddling Stocks Agreement (UN Fish Stocks Agreement or UNFSA)¹⁸⁶. This agreement has been called a “sea change” in international fishery management.¹⁸⁷ According to the UN, the agreement is considered to prescribe: “generally recommended international minimum standards” for conservation. As of August 2005, 52 states and the European community had become parties.¹⁸⁸

Following a conference to address the problems of high seas fishing convened on April 19, 1993, delegates met six times in negotiating sessions over the next two years, concluding a

¹⁸⁰ *Id.* at Art. VI, 2.

¹⁸¹ *Id.* at Art. VI, 3-8.

¹⁸² *Id.* at Arts. VI, 10-12; VI, 15.

¹⁸³ *Id.* at Arts. VI, 13; VI, 16-18.

¹⁸⁴ *Id.* at Art. VI, 5.

¹⁸⁵ *Id.* at Arts II, VIII.

¹⁸⁶ 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 (Status: entered into force December 2001)

¹⁸⁷ David Freestone. "International Fisheries Law: Who is Leading Whom?" The Magnuson Stevens Act: Sustainable Fisheries for the 21st Century? Tulane Law School Symposium, 7-9 Sept 1997. New Orleans, LA.

¹⁸⁸ UN, Chronological List of Ratifications. April 2007. Available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm. Last visited 3 May 2007.

document that was open for signing on 4 December 1995. The Agreement establishes detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks. It calls for compatible measures and effective high seas compliance and enforcement. It was the first time an international fishing agreement shifted focus from producing maximum food for humans to sustainable fishing, ecosystem protection, conservation of biodiversity, and the precautionary approach to fishery management.¹⁸⁹ It also is the first agreement to produce an actual methodology for the precautionary approach, setting up reference points, targets, and limits.¹⁹⁰ Most significantly, it denies (for party nations) unqualified access to fish on the high seas.¹⁹¹

The guiding principle that governs the 1995 Agreement is the duty to cooperate. This core concept is given specific new meaning, and the coastal nations and distant-water fishing nations of each region are now required to share data and manage the straddling fisheries together. Article 7(2) requires that "[c]onservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety" (emphasis added). This duty gives the coastal state a leadership role in determining the allowable catch to be taken from a stock that is found both within and outside its exclusive economic zone, as evidenced by the requirement in Article 7(2)(a) that contracting parties "take into account" the conservation measures established by the coastal state under Article 61 of the Law of the Sea Convention for its EEZ "and ensure that measures established in respect of such stocks for the high seas do not undermine the effectiveness of such measures." This polite diplomatic language indicates clearly that catch rates outside a 200-nautical-mile exclusive economic zone cannot differ significantly from those within the EEZ.

The UN Agreement does all this without creating a new international structure, relying instead on existing regional agreements and organizations, and calling for mechanisms to strengthen them. Where such agreements or organizations do not exist, the Agreement directs states to create them.¹⁹² The Agreement elaborates on the fundamental principle, established in the Convention, that States should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.¹⁹³

The agreement provided for subsequent conferences to assess the adequacy of the provisions and propose ways to strengthen its implementation. These conferences have resulted in declaration of additional objectives such as considering the regional, subregional and

¹⁸⁹ The approach includes these general features: identifying precautionary reference points for each stock, identifying in advance what measures will be adopted if reference points are exceeded, adopting cautious management for developing fisheries, monitoring impact on non-target species, and adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event. Freestone, *supra*, note 178.

¹⁹⁰ Fish Stocks Agreement, *supra* note 177 at Article 6, Annex II.

¹⁹¹ *Id.* at Article XVIII.

¹⁹² *Id.* at Art. VIII, 5.

¹⁹³ United Nations website. Available at http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm. Last accessed 3 May 2007. Despite its many innovations, the Fish Stocks Agreement still suffers some of the limitations similar to other international fishery agreements such as the absence of major fishing nations and reliance on flag state enforcement. Eichenberg and Shapson, *supra* note 154 at 610.

global implementation of the Agreement. Informal consultations of states parties have met annually to continue review and oversight of the implementation of the agreement.¹⁹⁴

The following is a summary of the provisions of the Straddling Stocks Agreement:

Management Goal: The management goal of the UN Agreement, expressed in Article 2, is "to ensure the long-term conservation and sustainable use" of straddling fish stocks and highly migratory fish stocks.

Precautionary Approach: Article 6 and Annex II describe the precautionary approach. The core of the precautionary approach is to act cautiously but expeditiously when information is "uncertain, unreliable, or inadequate," in the words of the UN Agreement. The UN Agreement describes a process for applying this approach that includes the following general features:

- a) identifying precautionary reference points for each stock of fish;
- b) identifying in advance management measures that will be adopted if reference points are exceeded;
- c) adopting "cautious" management measures for developing fisheries, until information allows setting reference points;
- d) monitoring the impact of fishing on non-target species and developing plans to conserve them;
- e) adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event.

Compatibility of Measures: Article 7 requires compatibility between conservation measures on the high seas and those in the exclusive economic zones (EEZ) of coastal States. Among other considerations in determining compatibility, States are to take into account the biological unity of stocks and the distribution of the stocks, the fisheries, and the geography of the region. If compatible measures are not achieved, States are to use the procedures for dispute resolution identified in the UN Agreement.

Elements of Regional Agreements: According to Article 9, regional arrangements are to identify the stocks under management, the area of application, and the way in which a regional regime will obtain scientific advice.

Functions of Regional Regimes: Article 10 identifies 13 specific functions that may be summarized as follows:

- developing conservation measures in a timely manner;
- obtaining scientific advice;
- collecting, analyzing, and disseminating fisheries data;
- monitoring and enforcing conservation measures;
- insuring full cooperation of national agencies in implementation;
- identifying how new members will be accommodated; and
- promoting peaceful settlement of disputes.

¹⁹⁴ See, e.g. resolutions, report of 2006 conference, ICSP5/UNFSA/REP/INF.1. 26 April 2006. Available at http://www.un.org/Depts/los/convention_agreements/fishstocksmeetings/icsp5report.pdf.

Transparency: Article 12 calls for transparency in decision making by regional regimes and for the participation of intergovernmental and nongovernmental organizations, subject to procedural rules that are not "unduly restrictive."

Membership: Article 17 calls upon State members of regional regimes to request that non-participating States join the regime and to take action to deter activities that undermine the effectiveness of regional conservation regimes.

Flag State Responsibilities: Article 18 enumerates eight obligations of flag States, including maintaining an accessible registry of vessels authorized to fish on the high seas, requirements for vessel and gear marking and for timely reporting of catch and other information, national inspection and observer schemes, and measures to insure transshipment at sea does not undermine conservation measures.

Enforcement: Article 19 enumerates five obligations of flag States in enforcing regional conservation measures. Articles 20-23 describe procedures by which Flag States and other States should collaborate in enforcing regional conservation measures, and provides authority for States to board fishing vessels of other States. Article 21 identifies eight specific activities that qualify as serious violations, including failing to maintain accurate records of catch, fishing in closed areas or seasons, or using prohibited fishing gear. Regional regimes may identify other serious violations.

Developing States: Articles 24-26 of the UN Agreement call for providing financial and technical assistance to developing States for management under the Agreement. Conservation measures are not to place an undue burden on developing States.

Dispute Resolution: Articles 27-32 call for States to settle disputes through peaceful means of their choice, and describe procedures for settling disputes.

Information Collection and Analysis: Article 14 describes five principal obligations of States for collecting and providing information and cooperating in scientific research. Annex I provides specific types of data that should be collected on fisheries and vessels, and describes obligations for frequent reporting by vessels, verification of data, and data exchange.

Other Obligations: Article 5 briefly describes 12 general tasks, some of which are described in greater detail elsewhere in the UN Agreement. Tasks that do not receive significant additional treatment in the UN Agreement include:

- Assess the impacts of fishing and other factors on target, associated, or dependent stocks;
- adopt measures to maintain or restore associated or dependent species above levels "at which their reproduction may become seriously threatened";
- minimize pollution, waste, discards, catch by lost or discarded gear, and bycatch;
- protect biodiversity;
- adopt measures to prevent or eliminate over-fishing and overcapitalization;
- consider the interests of artisanal and subsistence fishermen.

The U.N. Straddling Stocks Agreement has broken significant new ground in defining and refining what had heretofore been lip service to the "precautionary principle." UNCLOS, the Code of Conduct and the U.N. Straddling Stocks Agreement all anticipate and recommend formation of regional organizations and agreements to carry out their provisions. Because the Code is voluntary, using existing regional regimes and organizations to promote conservation

measures is likely to be the most effective route. Some of the newer organizations created since the Straddling Stocks Agreement went into force go even beyond its groundbreaking provisions.

Finally, although each of the agreements calls for the “best available scientific evidence” as the basis for decision-making, in most cases the information is limited at best. Perhaps the first and most important task for promoting conservation would be to use the provisions of the agreements that promote data collection, information sharing, and scientific research.

The Straddling Stocks Agreement calls explicitly for work to assess the impacts of fishing and other factors on target, associated, or dependent stocks and for members to minimize bycatch and protect biodiversity. The Code of Conduct includes in its management objectives protecting biodiversity and endangered species and minimizing bycatch.

Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

At the same time the FAO was developing the Code of Conduct for Responsible Fisheries, it was responding to growing concerns, highlighted during the Earth Summit, about incursions on coastal states’ EEZs, confrontations between distant water fleets and coastal states, violations of fishing agreements, reflagging to avoid compliance with applicable rules, and general dissatisfaction with increasing fishing pressure on the high seas that was likely to affect stocks or fishing fleets in adjacent EEZs. In November 1993, the parties to the FAO Conference 27th Session adopted the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.¹⁹⁵ They made clear that the provisions of the agreement were part of the Code, where the Compliance Agreement is referenced as one of the exceptions to the voluntary nature of the Code.¹⁹⁶

The Compliance Agreement applies to all fishing vessels on the high seas, with a few exceptions for small vessels. Flag States are called upon to ensure that vessels flying their flag do not engage in activity that undermines the effectiveness of international conservation and management measures. The Agreement requires a party to authorize the use of its flag by fishing vessels, and parties may not authorize vessels unless they can exercise control over them, nor may they authorize vessels with previous compliance problems. Significantly, the authorization to fly the flag constitutes an authorization to fish on the high seas, and can be withdrawn: “Where a fishing vessel that has been authorized to be used for fishing on the high seas by a Party ceases to be entitled to fly the flag of that Party, the authorization to fish on the high seas shall be deemed to have been canceled.”¹⁹⁷

Parties are required to ensure that vessels are clearly marked, that they can be identified, and fulfill record keeping and information sharing obligations. Parties are required to take enforcement measures against vessels acting in contravention to the Agreement, and are urged to use serious sanctions, “of sufficient gravity as to be effective in securing compliance...and to deprive offenders of the benefits accruing from their illegal activities.”¹⁹⁸

¹⁹⁵ Food and Agriculture Organization of the United Nations. Agreement To Promote Compliance with International Conservation and Management Measure by Fishing Vessels on the High Seas. 1993. (hereinafter Compliance Agreement)

¹⁹⁶ FAO Code of Conduct, *supra* note 162 at Article I, 1.

¹⁹⁷ Compliance Agreement, *supra* note 54 at Art. III, 4.

¹⁹⁸ *Id.* at Art. III, 8.

Parties are directed to urge non-Parties to adopt consistent measures, and to exchange information about non-Parties whose activities undermine the effectiveness of international conservation and management measures.¹⁹⁹

International Agreements Relating to Wildlife

The highly migratory nature of cetaceans and the need for multilateral cooperation to protect them was recognized as early as the 1940s. The treaties examined here include two that have provisions that may apply to cetaceans in addition to the International Convention for the Regulation of Whaling.

International Convention for the Regulation of Whaling (IWC)²⁰⁰

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling of 1946. Currently, 71 nations including the United States are parties to the IWC. The purpose of the Convention is to provide for the proper conservation of whale stocks and the orderly development of the whaling industry. (Preamble)

The main duty of the IWC is to keep under review and revise as necessary the measures laid down in the Schedule to the Convention. These govern the whaling conduct of member nations throughout the world. These measures, among other things, provide for the complete protection of certain species; designate specified areas as whale sanctuaries; set limits on the numbers and size of whales which may be taken; prescribe open and closed seasons and areas for whaling; and prohibit the capture of suckling calves and female whales accompanied by calves. The compilation of catch reports and other statistical and biological records is also required.

In addition, the Commission encourages, co-ordinates and funds whale research, publishes the results of scientific research and promotes studies into related matters such as the humaneness of the killing operations.

The IWC currently operates a moratorium on commercial whaling, in force since 1986, although there are exceptions for aboriginal subsistence needs and scientific purposes and parties to the Convention may object to the operation of the moratorium (for example, Norway has entered such an objection and sets quotas for a commercial hunt of minke whales every year).

Small cetaceans occupy a precarious position within the IWC framework. The 1946 Convention does not define a 'whale', although a list of names in a number of languages of a dozen whales was annexed to the Final Act of the Convention. Some governments take the view that the IWC has the legal competence to regulate catches only of these named great whales. Others believe that all cetaceans, including the smaller dolphins and porpoises, also fall within IWC jurisdiction. It is agreed that the Scientific Committee can study and provide advice on the small cetaceans.

Consequently, to date there is no universal agreement on the competency of the IWC to regulate interactions with these animals. Nevertheless, the Scientific Committee has

¹⁹⁹ *Id.* at Art. V, 1.

²⁰⁰ International Convention for the Regulation of Whaling, Done at Washington, 2 November 1946. 4 Bevans 248, TIAS 1849. For amendments to the schedule see Appendix B.

investigated many species and carried out major reviews of significant directed and incidental catches of small cetaceans, and the mortality of cetaceans in passive fishing nets and traps. The IWC does recognize the need for further international co-operation to conserve and rebuild depleted stocks of small cetaceans.

Each year the Scientific Committee, through its sub-committee on small cetaceans, identifies priority species/regions for consideration by a review. Topics considered include distribution, stock structure, abundance, seasonal movements, life history, ecology, and directed and incidental takes.

Since 1990 the IWC has adopted 17 resolutions directed at small cetaceans, specific small cetacean issues (e.g. baiji, vaquita, Dall's porpoise, striped dolphins and harbor porpoise), and small cetacean bycatch.²⁰¹

Bonn Convention on Migratory Species of Wild Animals²⁰²

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) seeks to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental agreement concluded under the aegis of the United Nations Environment Program, concerned with the conservation of wildlife and habitats on a global scale. CMS acts as a framework Convention. Arrangements concluded under it may vary from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions. The development of models tailored according to the conservation needs throughout the migratory range is a unique capacity of CMS.

The Convention was signed in Bonn on 23 June 1979, came into force on 1 November 1983, and since its membership has grown steadily to include 99 (as of 1 December 2006) parties from Africa, Central and South America, Asia, Europe and Oceania (see Appendix B). The U.S. is not a signatory, but has signed a memorandum of understanding for Indian Ocean turtles, a less formal mechanism for meeting the goals of the agreement.

At the heart of the Convention lies the concept that wild animals constitute a common natural heritage for humankind, and should therefore be protected for the benefit of future generations. The CMS recognizes that "each generation of man holds the resources of the earth for future generations and has an obligation to ensure that this legacy is conserved and, where utilized, is used widely" (Preamble). Responsibility for this is vested in the individual States party, who are under an obligation to ensure that such species should be protected as they pass through their national jurisdictions (Article I).

To this end, Article II sets out the fundamental principles of the CMS, which are essentially two-fold:

Parties to the Convention must ensure that they take action specifically to protect those migratory species that are endangered, and those deemed to have an "unfavourable conservation status". This is not confined solely to guarding against the further depletion of the numbers of such species, but also to take individual or collective action to avoid the further degradation of their natural habitats.

²⁰¹ <http://www.iwcoffice.org/meetings/resolutions/resolutionmain.htm>

²⁰² Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

Article II(2) creates a more general duty to take action to avoid **any** migratory species becoming endangered.

Under Article II(3), these aims are to be achieved by requiring the parties to promote, co-operate in and support research in relation to migratory species; endeavor to provide immediate protection for endangered migratory species; and endeavor to conclude agreements to allow for the conservation and management of migratory species classed as having an "unfavorable conservation status".

Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration, and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. Additional protection is provided through Article III (5), which prohibits the taking of animals listed in Appendix I—this translates into an absolute ban on the hunting of any Appendix I species.²⁰³

There are currently six species of cetacean listed in Appendix I, namely the blue whale, humpback whale, bowhead whale, Northern right whale, Southern right whale and Franciscana.

Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements to protect species listed in Appendix II of the Convention. There are thirty-three species of cetaceans currently listed in Appendix II.

With regard to cetaceans, Article V(4)(f) lays down specific requirements for Article IV(3) Agreements that have been concluded in respect of cetaceans. Under this provision, such agreements should: "at a minimum, prohibit, in relation to a migratory species of the Order Cetacea, any taking that is not permitted for that migratory species under any multilateral agreement and provide for accession to that Agreement by States that are not Range States of that migratory species".

The Agreements according to Article V(5) should include the review of the species' conservation status and coordinated conservation and management plans; research and the exchange of information; maintenance, restoration and protection of habitats; restriction of impediments to migration; co-operative action against illegal taking and emergency provisions to strengthen conservation measures. Although States party have concluded three Article IV(3) Agreements since the Bonn Convention came into force(17), none of these affect cetaceans.

Article IV(4) provides that States party "are encouraged to take action with a view to concluding agreements for any population or geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdictional boundaries." Article IV(4) agreements are therefore wider and more general than Article IV(3) Agreements. Agreements formed under Article IV(4) are very different to the Agreements envisaged by Article IV(3). For instance, the scope of Article IV (4) Agreements encompasses a wide range of animals; Article IV(4) agreements do not apply to the restricted list of Appendix II species; and the definition of the type of animals subject to such an agreement is far wider than that of a "migratory species" for the purposes of the CMS.

²⁰³ Article III(5) is subject to exceptions, however, namely if the taking of such animals is for scientific purposes; to enhance the propagation or survival of the affected species (for example capture for breeding programs); to accommodate the needs of traditional subsistence users of such species; or if extraordinary circumstances so require.

To date eight Agreements have been concluded under Article IV(4) of the CMS, of which two are directly relevant to the issue of cetacean conservation. These are the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, 1991 (ASCOBANS) and the Agreement on the Conservation of Cetaceans of the Mediterranean and Black Seas, 1996 (ACCOBAMS)(See Sections 2.1.1 and 2.1.2).

Convention on International Trade in Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora²⁰⁴ (CITES) is a multilateral treaty regarding the export, import and transit of certain species of wild animals and plants. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The goal of the convention is to prevent overexploitation of listed species whose survival is jeopardized. (Article II)

The convention on International Trade in Endangered Species entered into force July 1, 1975. As of December 2006, 169 nations, including the U.S., were parties. CITES is constructed to use Appendices that list species based on a set of criteria. Parties to CITES are not allowed to trade in species listed in the appendices of the Convention, except in accordance with the Convention. (Article II). Appendix I lists species threatened with extinction, (Article III) and Appendix II lists species that may become threatened with extinction unless trade is subject to regulation. (Article IV) Commercial trade is generally prohibited for Appendix I species, and requires both import and export permits. (Article III, 2) Commercial trade in Appendix II species requires an export permit verifying that trade will not be detrimental to the survival of the species. (Article IV, 2-6) "CITES allows the imposition of bans against the export of listed species to any signatory nation in order to diminish the economic incentives for continued taking" of the species.²⁰⁵

More than 20 cetaceans are listed on Appendix I of CITES, and Appendix II includes a zero annual export quota for live specimens from the Black Sea population of *Tursiops truncatus* removed from the wild and traded for primarily commercial purposes. Assessment of marine species has become a priority of the International Union for the Conservation of Nature (IUCN), which began a comprehensive regional assessment of marine species groups in 2006. The IUCN publishes the Red List of Threatened Species, which in 2006 included 65 cetaceans (both marine and freshwater).²⁰⁶

Other agreements on environment and wildlife that are not discussed here, but that may have relevance to protection of cetaceans, include the Convention on Biological Diversity, Agenda 21 Oceans Chapter, Convention on the Conservation of the Living Resources of the Southeast Atlantic,

²⁰⁴ Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249)

²⁰⁵ Global Marine Biological Diversity: A strategy for Building Conservation into Diversity (Elliot A. Norse ed., 1993) at 209.

²⁰⁶ IUCN http://www.iucn.org/themes/ssc/biodiversity_assessments/indexgmsa.htm. Last accessed 17 November 2006.

Regional Marine Mammal Agreements

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)²⁰⁷

As noted above, the thrust of the Convention on Migratory Species is to encourage member nations to conclude regional agreements under the umbrella convention that deal with specific problems. The First Meeting of the CMS Conference of the Parties held in 1985 initiated the development of ASCOBANS by passing a resolution urging CMS Parties to conclude an Agreement for two species of small cetaceans from the Baltic and North Sea: the bottlenosed dolphin (*Tursiops truncatus*) and the harbor porpoise (*Phocoena phocoena*). ASCOBANS was concluded on 13 September 1991 in Stockholm, Sweden, and entered into force on 29 March 1994. (The U.S. is neither a party to the agreement nor signatory to the MOU.) The Agreement applies to species initially considered, as well as all species, subspecies or populations of small cetaceans in the Baltic Sea and North Sea, with the exception of the Sperm whale (*Physeter macrocephalus*). The flagship species of the Agreement is the harbor porpoise.

The Agreement area covers the marine environment of 15 Range States, including the European Community, around the shores of the Baltic and North Seas. The Fourth Meeting of the Parties, held in Esbjerg, Denmark, in August 2003, agreed to extend the Agreement area farther west to cover parts of the North Atlantic and to incorporate waters adjacent to Ireland, Portugal and Spain. Once this amendment to the Agreement enters into force, the extension will close the gap for some species of small cetaceans between the Agreement areas of ASCOBANS and its sister agreement, the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). (See below.)

The ASCOBANS includes a conservation and management plan that briefly describes the conservation, research and management measures that should be applied by the Parties. This plan foresees measures towards the mitigation of marine pollution and the reduction of bycatch, surveys and research about species ecology and population status and the establishment of an international database. Additionally, the plan further calls for Parties to adopt national laws to prohibit the intentional taking and killing of small cetaceans where such regulations are not already in force. General guidelines on public awareness and participation are also included in the plan.

The first major study of small cetaceans in this area took place in 1994, after ASCOBANS came into force, when scientists from the Sea Mammal Research Unit at St. Andrews University launched the SCANS project.²⁰⁸ SCANS identified nine species of small cetaceans resident within the Convention area²⁰⁹ (along with four species of whales), and identified three main threats to their survival: bycatch, pollution and environmental change.

²⁰⁷ Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994.

²⁰⁸ Hammond PS, Benke H, Berggren P, Borchers DL, Buckland ST, Collet A, Heide-Jørgensen M-P, Heimlich-Boran S, Hiby AR, Leopold MP, Øien N, 1995a. Distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. Life, LIFE 92-2/UK/027, European Community LIFE Programme; 242 pp. See also Hammond PS, Heimlich-Boran S, Benke H, Berggren P, Collet A, Heide-Jørgensen MP, Leopold MP, 1995b. The distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. (SC/47/SM30). (unpublished); 21.

²⁰⁹ Namely the Harbour porpoise, Bottlenose dolphin, White-beaked dolphin, Atlantic white-sided dolphin, Common dolphin, Striped dolphin, Long-finned pilot whale, Risso's dolphin and Killer whale.

ASCOBANS conservation and management plan prescribes, in general terms, the measures that parties are to introduce. The conservation and management plan is in five parts and States must:

- Introduce conservation and management measures that strive to: prevent the release of substances that constitute a potential threat to small cetaceans, modify fishing gear to reduce bycatch, and prevent fishing apparatus from becoming a hazard to cetaceans, regulate activities affecting food sources and preventing other types of disturbance – especially of an acoustic nature.
- Cooperate in research activities to assess the status and movements of populations, locate areas of special importance to their survival and to identify present and potential threats to small cetaceans.
- Endeavor to establish an effective reporting system for bycatch and strandings.
- Endeavor to establish under national law a prohibition on taking and killing small cetaceans, supported by an obligation to immediately release any animals that have been caught.
- Provide information to the general public to encourage the reporting of sightings and strandings, and to encourage fishermen to report any bycatch of small cetaceans.

The conservation and management plan is implemented through a series of specific Resolutions passed during the Meetings of the Parties. The following resolutions contain measures to reduce bycatch.

- ***The Resolution on the Implementation of the Conservation and Management Plan*** called for Parties to establish an independent observer scheme to assess bycatch, conduct research into feeding habits, and set up a sightings survey for the harbor porpoise population in the Baltic Sea.
- ***The Resolution on the Incidental Take of Small Cetaceans*** set as the immediate short-term objective of the Agreement, to restore or maintain stocks to 80 percent of the carrying capacity, with a view to eventually preventing *all* anthropogenic removals. In the interim, it established a maximum allowable bycatch level at 2 percent of the population abundance estimate, with the possibility that this would be reduced if the population were severely depleted.
- ***Resolution on the Incidental Take of Small Cetaceans 2000*** reduced the bycatch limit for the harbor porpoise to 1.7 percent, with a view towards a further reduction. It also stated that the ultimate goal of ASCOBANS is the reduction of bycatch to less than 1 percent of the best population estimate, in line with the IWC guidelines.
- ***The Jastarnia Plan***, a recovery plan for the depleted harbor porpoise stocks within the convention area establishes guidelines to assist in the recovery of harbor porpoise.

Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)²¹⁰

CMS adopted a regional approach for cetacean conservation in the Mediterranean and Black Seas.²¹¹ ACCOBAMS, concluded in 1996 and entered into force on 1 June 2001, binds the countries of two sub-regions to work together on an environmental problem of common concern. ACCOBAMS covers an area that includes the Black Sea, Mediterranean Sea and the Atlantic coasts of North Morocco and South Portugal. The Agreement area includes 28 Range States. ACCOBAMS covers large and small cetaceans and applies to all cetaceans that have a range that lies entirely or partly within the Agreement area or that accidentally or occasionally frequent the Agreement area.²¹² Species covered include the harbor porpoise, striped dolphin, short-beaked common dolphin, false killer whale, killer whale, long-finned pilot whale, Blainville's beaked whale, Cuvier's beaked whale, sperm whale, dwarf sperm whale, Northern right whale, minke whale, sei whale, fin whale and humpback whale.²¹³

The Agreement aims to reduce threats to all cetaceans in these waters and to promote closer cooperation amongst Parties with a view to conserving all cetacean species present in the area. ACCOBAMS calls also on its members to enforce legislation to prevent the deliberate taking of cetaceans in fisheries by vessels under their flag or within their jurisdiction, and to minimize incidental catches.

ACCOBAMS' objectives, set out in Article II, state: "Parties shall take coordinated measures to achieve and maintain a favorable conservation status for cetaceans. To this end, Parties shall prohibit and take all necessary measures to eliminate...any deliberate taking of cetaceans and shall co-operate to create and maintain a network of specially protected areas to conserve cetaceans."²¹⁴

Additionally, annexed to the Agreement is a comprehensive conservation plan in Article II (3) that covers six substantive areas:

²¹⁰ Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001

²¹¹ The Action Plan for the Conservation of Cetaceans in the Mediterranean Sea was developed, within the framework of the Mediterranean Action Plan, following concerns about the status of cetaceans in the region. The Action Plan was adopted at the seventh Ordinary Meeting of the Parties of the Barcelona Convention, in Cairo, in October 1991. The main objectives of the Action Plan were the protection and conservation of cetacean habitats, including feeding, breeding and calving grounds; and the protection, conservation and recovery of cetacean populations in the Mediterranean Sea Area. Within these two broad objectives, a number of general priorities were recommended, including: prohibition of deliberate taking; prevention and elimination of pollution; elimination of incidental catches in fishing gear; prevention of over-exploitation of fishery resources; protection of feeding, breeding and calving grounds; monitoring, research and data collection and dissemination with regard to biology, behavior, range and habitats of cetaceans; and educational activities aimed at the public at large and fishermen. Although the Action Plan remains an instrument of reference for the Mediterranean coastal States, it is of limited relevance now and has in any case effectively been superseded by the 1996 ACCOBAMS Agreement.

²¹² Article I(2).

²¹³ Defined as "animals, including individuals, of those species, subspecies or populations of Odontoceti and Mysticeti".

²¹⁴ Article II(1).

1. *The adoption and enforcement of national legislation.* Parties are to develop and implement measures to minimize the effects of fisheries activities on cetaceans, with a specific ban on the use of driftnets more than 2.5km in length; to introduce regulations to prevent discarded fishing gear becoming a hazard; to conduct impact assessment on activities affecting cetaceans and cetacean-watching; to regulate the discharge of pollutants and to endeavor to strengthen or create institutions to further implement the Agreement.
2. *Assessment and management of human-cetacean interactions.* Parties are required to co-operate in the collection of data and research into activities like fishing, tourism, industry and pollution.
3. *Habitat protection.* Parties must "endeavor to establish and manage specifically protected areas" relating to cetacean feeding grounds and habitats, which should be designated as protected under the framework of the Convention for the Protection of the Mediterranean Sea Against Pollution 1976.
4. *Research and monitoring.* Parties are to take coordinated action to monitor the status and trends in cetacean populations, especially for those species for which there is little scientific data currently available; determine migration routes, feeding and hunting areas to identify localities in which human activities may need to be restricted; evaluate the feeding requirements of cetaceans and adapt fishing activities accordingly; develop research programs for sick and wounded animals and develop passive acoustic techniques to monitor cetacean populations.
5. *Capacity building, collection and dissemination of information, training and education..* Parties are to co-operate in order to, *inter alia*, develop data collection schemes; prepare lists of national bodies with expertise in cetaceans; list the current and potential protected areas; compile a directory of applicable national and international laws; develop information-sharing initiatives on a sub-regional level; improve public awareness of cetacean issues and develop training programs for cetacean management.
6. *Responses to emergency situations.* Parties are to co-operate whenever possible and necessary to develop and implement emergency measures "when exceptionally unfavorable or endangering conditions occur". In particular they must prepare for an unexpected danger to cetaceans in the area, such as a major pollution incident; evaluate their capacity to rescue sick and wounded animals and prepare codes of practice. The parties may also receive advice from their relevant Co-ordination unit to develop mechanisms to give rapid protection to especially vulnerable cetacean populations should an emergency situation arise.

ACCOBAMS has committed to investigating competitive interactions between dolphins and fisheries; creating a by-catch database; developing pilot conservation and management actions for areas containing critical habitats for cetaceans; developing methods for evaluating habitat degradation; developing conservation plans for cetaceans of the Black Sea and for certain species in the Mediterranean Sea; conducting a survey of sperm whale populations in the Mediterranean; identifying sites of conservation importance for whales in the Mediterranean; and developing training and education schemes.

The International Sanctuary for Mediterranean Mammals

The Sanctuary was created by a tripartite agreement between the Governments of France, Italy and Monaco to mitigate the threats to cetaceans from bycatch (especially from the

increased use of driftnets), maritime traffic or urbanization and industrialization of coastal areas. The Agreement was signed on 25 November 1999 in Rome and entered into force in February 2002.

The agreement forming the Sanctuary coordinates the concerted actions taken by the three countries within the ACCOBAMS Agreement area. To ensure that all Mediterranean countries respect its objectives, the Sanctuary has been designated a Specially Protected Area of Mediterranean Importance under a protocol of the Barcelona Convention. The Sanctuary covers the Tyrrheneo-Corsican-Provencal part of the Mediterranean Sea and includes both littoral and pelagic waters.

Agreement on the International Dolphin Conservation Program (AIDCP)

The Agreement on the International Dolphin Conservation Program was signed in Washington on 15 May 1998 and entered into force on 15 February 1999, following ratification by four States, as required: Ecuador, Mexico, Panama, and the United States. To a large extent the agreement is simply a formalization of two earlier voluntary agreements (the La Jolla Agreement and the Panama Declaration). However, the 1998 agreement developed, extended and formalized the earlier agreements.

The purpose of the AIDCP is to ensure the long-term sustainability of tuna stocks in the eastern Pacific Ocean, as well as living marine resources related to the tuna fisheries; to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphin; progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; and to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem. [Preamble, Article II].

The Agreement applies to typical dolphins (family *Delphinidae*) associated with the yellowfin tuna fishery in the Agreement Area. [Article I(1) and (2)] In practice, the principal species concerned are spotted and, to a lesser extent, common and spinner dolphins, although other species, including striped and bottlenose dolphins, are also relevant. The convention area included The Eastern Pacific Ocean, specifically as bounded by the coastline of North, Central, and South America and by the following lines: (a) The 40°N parallel from the coast of North America to its intersection with the 150°W meridian; (b) the 150°W meridian to its intersection with the 40°S parallel; and (c) the 40°S parallel to its intersection with the coast of South America. [Article III, Annex I].

A system of dolphin mortality limits (DMLs) is the principal means by which dolphin mortality is reduced under the agreement. These work by setting a basic objective of limiting total incidental dolphin mortality in the purse seine tuna fishery to no more than 5,000 individuals annually and using the basic approach of allocating DMLs to vessels. The Agreement establishes per-stock per-year dolphin mortality caps with the objective of achieving a limit of 0.1 percent of the minimum estimated abundance of stocks (N_{min}) from the year 2001 onwards (an objective which was achieved). The Agreement contains various provisions which require parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use.

In addition to the DML system, the Agreement includes provisions for the establishment of a system that provides incentives to vessel captains to continue to reduce incidental dolphin mortality, with the goal of eliminating mortality; the establishment and implementation of a system for the tracking and verification of tuna harvested with and without mortality or serious

injury of dolphins; the exchange of scientific research data collected by the parties pursuant to the Agreement on a full and timely basis; and the conduct of research for the purpose of seeking ecologically sound means of capturing large yellowfin tuna not in association with dolphins.

The Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (SPAW)

The SPAW Protocol's purpose is to protect the marine environment of the Gulf of Mexico and Caribbean Sea, including the areas surrounding the U.S. mainland off the coast of Florida and the Gulf States and territories in the Caribbean region. This Protocol is an outgrowth of the Cartagena Convention, and is one of three Protocols called for by and developed under the Cartagena Convention. The Convention establishes general legal obligations for the protection and preservation of the marine environment of the Caribbean region. Geographically, it covers the marine environment of the Gulf of Mexico, the Caribbean Sea and areas primarily within 200 nautical miles of the Atlantic coasts of 20 countries and island territories. Twenty-eight countries of the Wider Caribbean Region are eligible to become Parties to the Cartagena Convention and its Protocols. Currently, 12 countries are Parties to the SPAW Protocol, while five others are non-Party Signatories.

The SPAW Protocol also encompasses internal waters extending up to the fresh water limit, and any related terrestrial areas (including watersheds) that a party may wish to designate. It requires parties to establish protected areas and to take specified protection and management measures therein, as necessary and appropriate to carry out the provisions of the Protocol, and in conformity with national laws and regulations and international law.

The United States ratified the SPAW Protocol on April 16, 2003, with two reservations and an understanding along with ratification. One of the reservations is needed to ensure that our application of Article 11 of the Protocol is consistent with provisions of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) that allow for the limited taking of species listed in Annex I and II for the purpose of public display, scientific research, rescue and rehabilitation, or as incidental catch related to fishing operations. The second reservation is to Article 13, which could be interpreted to require environmental assessments for non-Federal activities not covered by the National Environmental Policy Act of 1969, as amended (NEPA). The Understanding would state that the provisions of the Protocol do not apply to non-native species. There are three Annexes that contain the lists of 481 endangered and threatened species of flora and fauna covered by Article 11 of the Protocol. The United States notified the depositary that the Protocol will not apply to six species of fauna and flora that do not require the protection provided by the Protocol in U.S. territory. It is envisioned that the Annexes will be treated separately as an Executive Agreement.²¹⁵

Discussion of Regional Marine Mammal Agreements

The regional agreements relating to cetacean conservation are still very much in their infancy, but it is clear that ACCOBAMS is the superior instrument, in terms of both its scope and its potential for establishing strong and workable conservation measures in relation to cetaceans. Similarly, the U.N. Straddling Stocks Agreement and the conventions and RFMOs that have been created in its model provide the most precautionary, transparent, mandatory

²¹⁵ <http://www.state.gov/g/oes/rls/rm/2002/9991pf.htm>

frameworks. These agreements even provide mechanisms for coastal states to enforce regulations against fishing nations, a tool that gets around the historic weakness of consensual international agreements that have depended on flag state enforcement against its own vessels.

To date, the various ASCOBANS initiatives have proved largely ineffective, with few parties willing to adopt specific national measures to enforce these principles. One possible reason for ASCOBANS weaknesses may be that it was the first agreement of its type to deal with issues of cetacean management. As such, it may be experimental, and its limitations may act to guide the development of future agreements. Nevertheless, imperfect as it is, ASCOBANS should be commended for introducing a new tier of protection for small cetaceans, whose status under international law is vulnerable given the controversy surrounding the IWC's competence to regulate small cetaceans.

ACCOBAMS uses more prescriptive terms, imposes strong obligations on states to conserve *all* cetaceans in this area, requires the use of the precautionary principle, and works to acquire necessary scientific data about cetaceans in these waters. The initial implementation of the ACCOBAMS conservation plan shows a clear determination to introduce effective conservation measures within the convention area. In particular it has established clear and workable targets for bycatch reduction. ACCOBAMS will need to develop effective sanctions to deter noncompliance, especially with regard to fishing regulations where a number of range states have an alarming track record of noncompliance.²¹⁶

As for the future of regional cooperation in relation to the conservation and management of cetaceans, there is cause for tentative optimism. There have been some initial moves toward creation of a similar agreement for small cetaceans in West Africa, although this is a long way from becoming a reality. While the agreements do have the potential to prescribe far-reaching measures, much will depend upon the enthusiasm of the other range states that have yet to join; the current climate of indifference, however, does not auger well for this. Likewise, the expansion of the regional agreements into contiguous areas also looks unlikely, given the current attitudes of Iceland, Greenland, and the Faroe Islands in relation to the exploitation of cetaceans.

One eventual goal for the agreements is that they will form an interlocking series of regional initiatives to protect species of cetaceans around the planet. While there are undoubtedly localities in which the conditions for future expansion are favorable, such as Australasia and parts of South America, real questions remain about whether such Agreements may be concluded in the areas where they are most needed. There are currently moves under the auspices of the Bonn Convention to conclude an agreement for small cetaceans and sirenians in central and West Africa²¹⁷ and also for small cetaceans and dugongs of Southeast Asia.²¹⁸ At present, regional action would appear to be most needed in Asia where river dolphins are critically endangered, although the range states remain lukewarm to the idea of implementing conservatory measures for small cetaceans in particular. With populations of these animals now feared to have fallen to the low hundreds, the formation of a tessellating system of global minimum standards is arguably now more pressing than ever.

²¹⁶ "Sustaining Small Cetaceans: A Preliminary Evaluation of the ASCOBANS and ACCOBAMS Agreements" in Alan Boyle and David Freestone (eds.) *International Law and Sustainable Development*, (Oxford University Press, 1999) at 233, cited in, The conservation and management of small cetaceans in Europe: an analysis of the ASCOBANS and ACCOBAMS Agreements. Available online at <http://www.derechomaritimo.info/pagina>.

²¹⁷ Recommendation 7.3 adopted by the Conference of the Parties at its Seventh Meeting in September 2002.

²¹⁸ Recommendation 7.4, adopted at the same meeting.

International Agreements Related to the Marine Environment

UN Resolution Prohibiting Large-Scale Pelagic Driftnet Fishing²¹⁹

Large scale, high seas driftnets were recognized in the 1980's as a significant cause of incidental take of marine mammals, birds, turtles, and non-target fish species. This gear was banned internationally by United Nations resolutions in 1989, 1990 and 1991.²²⁰

Until they were outlawed, driftnets were used in the North Pacific and on the high seas where single vessels were capable of deploying driftnets ranging from up to 40 miles in length. In the North Pacific in the years from 1976 to 1989, 2 million miles (3.2 million km) of net were set per season.²²¹ With more than enough netting to encircle the earth set each night, not only were target fish caught (squid, tuna, and billfish) but approximately 100,000 dolphins and porpoises, hundreds of thousands of seabirds, sharks, sea turtles and salmon were also caught. (The Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean significantly reduced pelagic driftnet fishing and is discussed below in the section on regional fishery agreements.)

Although the driftnet fleet operated under requirements set by a multi-national agreement relating to salmon fishing, that agreement did not address incidental take of birds and marine mammals.²²² Additionally, the fleets were frequently found by U.S. enforcement to be catching salmon and steelhead in violation of the provisions of the governing treaty. In 1987, due to continued compliance problems with the Japanese, Koreans and Taiwanese, the U.S. Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act, (Driftnet Act) calling for negotiations with the nations driftnetting in the North Pacific to establish monitoring and enforcement agreements by June 29, 1989.²²³ If these nations refused to come to the bargaining table, they risked trade sanctions. The Driftnet Act required further research into the nature and extent of driftnet fishing to facilitate the development of effective solutions to the problem.²²⁴

The Driftnet Act also addressed the control of driftnet debris. Congress assigned the Secretary of Commerce with three responsibilities: establishment of controls for marking, registry, and identification of foreign driftnets so that the original vessel can be identified if their gear is lost, abandoned, or discarded; development of alternative materials for making driftnets "for the purpose of increasing the rate of decomposition," and the implementation of a bounty

²¹⁹ United Nations General Assembly Resolution 45/197 on Large Scale Pelagic Driftnet Fishing and Its Impact on the Living Marine Resources of the World's Oceans and Seas, New York, 1990. 21 December 1990. Took effect in 1992. Report: A/46/645/ADD.6.

²²⁰ UN Resolution A/RES/45/197, 21 December 1990. See also, UN Resolution A/RES/44/225, 22 December 1989.

²²¹ Simon P. Northridge with the United Nations Environment Programme. "Driftnet fisheries and their impacts on non-target species; a worldwide review." FAO 1991.

²²² Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7.

²²³ 16 U.S.C.A. § 1822.

²²⁴ 16 U.S.C.A. § 1826 (f) relating to 22 U.S.C.A. § 1978 authorizing, *inter alia*, the banning of the import of fish products from offending nations.

system, so that people who find, retrieve, and return to the Secretary of Commerce lost, abandoned, or discarded driftnets and other plastic fishing materials may receive payment.²²⁵

Driftnetting had also become a major concern in the South Pacific. After several nations had banned driftnet fishing in their waters, 20 nations in the South Pacific negotiated and signed the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (the Wellington Convention).²²⁶ This Convention endorsed a ban on driftnets as of May 1991, prevented the violators from crossing their waters, and denied access to food, fuel and facilities of the signing nations. The Wellington Convention set the stage for international efforts to end driftnetting.

On December 22, 1989, the United Nations General Assembly passed Resolution 44/225, promoted by the U.S. and New Zealand, calling for an end to driftnetting by June 30, 1992, and an end in the South Pacific by 1991.²²⁷

Although Resolution 44/225 is non-binding under international law, its strength lies in the fact that it demonstrates a global consensus on the issue. However, it does not carry any sanctions or mechanisms for monitoring driftnet operations.

Throughout early 1990 conflicts continued between driftnet fishing nations and nations opposed to the practice. Reports surfaced of the introduction of driftnets into new areas such as the Caribbean. In December of that year the United Nations passed Resolution 45/197 restating concern about the practice of driftnetting and calling for a report on driftnetting.²²⁸

In June 1991, the observer data from two previous years of driftnetting were compiled and experts met in British Columbia to discuss the results. The numbers confirmed fears of massive numbers of marine mammals, sea birds, and non-target fish being killed by the driftnet fishery. Armed with the new data, the United States submitted a report to the UN condemning the use of large-scale pelagic driftnets, and soon thereafter introduced a resolution mandating a ban on their use by June 1992. Japan introduced a resolution to study the problem further, again suggesting that there may be 'effective management measures' available to continue the fishery. December 20, 1991 the UN General Assembly passed Resolution 46/215, which stated, without exceptions, that large-scale high seas driftnetting end by 1992.²²⁹ The December 31, 1992 deadline affects the high seas of the world's oceans and seas, including enclosed seas and semi enclosed seas. It should be noted, though, that much driftnetting continues, within EEZs, in many nations including the U.S.

The UN reaffirmed its stance on driftnets in 1995, particularly in the context of unauthorized fishing in national zones, the effects of driftnets on bycatch mortality, and the adoption of the Code of Responsible Fishing, as the General Assembly again passed a driftnet resolution. The resolution reaffirms the global moratorium on high seas driftnet fishing, urges nations to take greater enforcement responsibility and to impose sanctions, refers to the Compliance

²²⁵ 16 U.S.C.A. § 1822 note, PL 100-220, 1987 HR 3674 Sec 4007 (b), (c).

²²⁶ The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Available at <http://www.oceanlaw.net/texts/summaries/wellington.htm>. Last visited 3 May 2007.

²²⁷ UN Resolution A/RES/44/225, 22 December 1989.

²²⁸ UN Resolution A/RES/45/197, 21 December 1990.

²²⁹ UN Resolution A/RES/46/215, 31 December 1992

Agreement and states' responsibilities under that convention, and makes a high priority of improvement of monitoring and enforcement.²³⁰

Convention on the Conservation of Antarctic Marine Living Resources

The principal instrument for management of fisheries in the Southern Ocean is the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).²³¹ By the time it came into force, CCAMLR had inherited significantly damaged fish stocks—12 of 13 assessed fish stocks were considered depleted.²³² The convention was established mainly in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on populations of krill and other marine life; particularly on birds, seals, whales, and fish, which mainly depend on krill for food.

Current members of the Commission are Argentina, Australia, Belgium, Brazil, Chile, the European Union, France, Germany, India, Italy, Japan, Namibia, Republic of Korea, Norway, New Zealand, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu have acceded to the convention, so are parties, but not members of the commission.

The purpose of CCAMLR is to ensure conservation of Antarctic marine living resources in the high seas within the area south of 60° S latitude and the Antarctic Convergence.²³³ Unlike most other conventions on fisheries, in Article II CCAMLR defines rational use to mean use in accordance with these conservation principles:

- Prevention of decreases in the size of any harvested population to levels below those which ensure stable recruitment;
- Maintenance of ecological relationships among harvested, dependent, and related populations of Antarctic marine living resources and the restoration of depleted populations;
- Prevention of changes or minimization of the risk of changes in the marine ecosystems that are not potentially reversible over two to three decades.²³⁴

A Commission coordinates research, gathers and analyzes catch and effort statistics, identifies and evaluates conservation measures, adopts conservation measures based on the best scientific evidence, and implements observer and inspection programs.²³⁵ The Commission, not states parties, places observers on fishing vessels. Commission membership is open to the original participants in the negotiations, and countries who have acceded to the

²³⁰ UN Resolution A/RES/50/25, 4 Jan 1996.

²³¹ CCAMLR, *supra* note 142.

²³² Kwame Mfodwo, Summaries and evaluations of selected regional fisheries management regimes. Prepared for the Pew Charitable Trusts. Unpublished manuscript. February 1998 (transcript available with the author).

²³³ CCAMLR, *supra* note 142 at Article I, II.

²³⁴ *Id.* at Article II (3).

²³⁵ *Id.* at Article X.

convention, upon approval of an application and indication of its willingness to abide by conservation measures that are in force under the convention.²³⁶

The Commission may designate open and closed seasons, quotas, and regulate gear.²³⁷ Decisions on matters of substance require a consensus. Observers from non-member countries and non-governmental organizations may attend most meetings with few restrictions, and may submit reports and views.

The Antarctic Scientific Committee includes representatives from countries that are members of the Commission. The Committee regularly assesses the status and trends of Antarctic marine living resources, the effectiveness of conservation measures, and has established programs such as developing precautionary measures for krill exploitation, ecosystem monitoring, and acquiring catch and effort data.²³⁸

In design, CCAMLR is considered one of the most advanced of fisheries conservation regimes in the world.²³⁹ The treaty is consistent in many respects with the UN Agreement on Straddling Stocks. Besides a conservation-based management goal, the treaty also includes significant elements of the precautionary approach, including conservation controls over exploratory and new fisheries.²⁴⁰ CCAMLR's observer and inspection programs are considered among the most developed in international fisheries management organizations. For example, members may board vessels of other members for the purposes of inspection; if a breach of CCAMLR rules is detected, the flag state must inform CCAMLR of the action it has taken against the offender.²⁴¹ CCAMLR also requires flag states to maintain an accessible registry of vessels, to insure that vessels are properly marked, and to report catch and other information in a timely fashion.²⁴²

CCAMLR has focused significant effort on the assessment and avoidance of incidental mortality of Antarctic marine mammals in commercial fisheries. However, the priority has been the reduction of seabird bycatch in longline fisheries, through establishment of the Ad hoc Working Group on Incidental Mortality Associated with Fishing.²⁴³ As part of its continued efforts to minimize seabird mortality in longline fisheries, in 1996 CCAMLR published an educational book for fishers that promotes practical ways in which longline fishers can reduce incidental catches of seabirds in bottom longline operations.²⁴⁴ The publication includes the CCAMLR conservation measures that establish seabird bycatch mitigation measures for longline fisheries. To date CCAMLR has not adopted bycatch mitigation strategies for small cetaceans.

²³⁶ CCAMLR. Website at <http://www.ccamlr.org>. Last updated May 2006. Accessed 3 May 2007.

²³⁷ *Id.* at Article IX(2).

²³⁸ *Id.* at Articles XIV, XV.

²³⁹ Mfodwo, *supra* note 222.

²⁴⁰ CCAMLR, *supra* note 142 at Article IX.

²⁴¹ *Id.* at Article XXIV.

²⁴² *Id.* at Article XX.

²⁴³ CCAMLR. Website at [WG-IMAF](#). Accessed 15 March 2007.

²⁴⁴ CCAMLR. Website at [Fish the Sea, Not the Sky](#). Accessed 15 March 2007.

Regional Agreements Related to the Marine Environment

South Pacific Regional Environment Program (SPREP) Agreement

SPREP, a regional organization established by the governments and administrations of the Pacific region, has existed for more than twenty years to protect and improve the South Pacific environment and to ensure sustainable development in that region. It has grown from a small program attached to the South Pacific Commission (SPC) in the 1980s into the Pacific region's major intergovernmental organization charged with protecting and managing the environment and natural resources. The U.S. territories of American Samoa, Guam and the Commonwealth of the Northern Mariana Islands, are located within the SPREP region. The State of Hawaii is also closely linked to the Pacific basin by geography, history, economics and politics. SPREP provides for increased cooperation among the United States, Australia, New Zealand, France and twenty-one island States and territories of the South Pacific region in addressing issues affecting the environment and development in the region.

SPREP's mandate is to promote cooperation in the Pacific islands region and to provide assistance in order to protect and improve the environment and to ensure sustainable development for present and future generations. SPREP's focus is on sustaining Pacific islands ecosystems.

In the Solomon Islands, locals hunt dolphins long-snouted oceanic forms, including spinner, pan-tropical spotted, striped, common and rough-toothed dolphins, along with false killer whales and other small cetaceans. The animals are herded into confined bays where they are killed, with the primary objective of obtaining their teeth and meat. Dolphin teeth have long served as currency throughout Malaita and Makira. They are also woven into collars or headbands used in blood bounties. Dolphins are also harvested for the aquarium trade. Dolphins are also captured in the Solomons for traditional shell money and there is the issue of bycatch in fishing fleets. At the moment SPREP has no specific requirements for bycatch reduction.

Regional Fishery Management Organizations

Commission for the Conservation of Antarctic Marine Living Resources
Commission for the Conservation of Southern Bluefin Tuna
Commission for Inland Fisheries of Latin America (FAO)
Fishery Committee for the Eastern Central Atlantic
Forum Fisheries Agency
General Fisheries Commission for the Mediterranean
Indian Ocean Tuna Commission
Inter-American Tropical Tuna Commission
International Baltic Sea Fishery Commission
International Commission for the Conservation of Atlantic Tunas
International Pacific Halibut Commission
North Atlantic Salmon Conservation Organization
Northeast Atlantic Fisheries Commission
Northwest Atlantic Fisheries Organization
North Atlantic Salmon Conservation Organization
North East Atlantic Fisheries Commission
North Pacific Anadromous Fish Commission
Pacific Salmon Commission
Latin American Fisheries Development Organization
South Pacific Permanent Commission
Southeast Asian Fisheries Development Center
Southeast Atlantic Fisheries Organization
Southwest Indian Ocean Fisheries Commission
Secretariat of the Pacific Community
Western Central Atlantic Fishery Commission
Western and Central Pacific Fisheries Convention

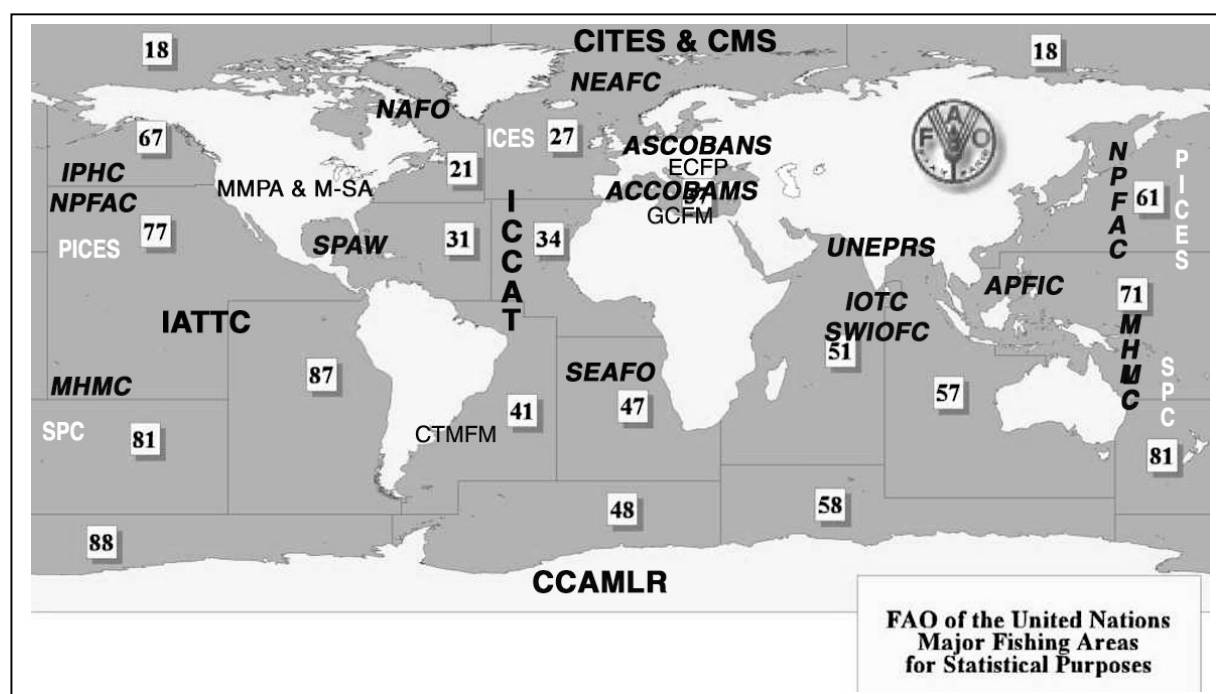
Regional Fisheries Agreements Having Potential to Address Bycatch

Although regional fishery management organizations have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the Straddling Fish Stocks Agreement, which call for creation of such bodies. In its Oceans Atlas, FAO editors point out that "under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish

stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation in their conservation and management.²⁴⁵ Specific regional agreements that may have potential to address cetacean bycatch are discussed in Chapter 5. The box lists regional fishery management organizations recognized by the FAO.

As of late 2006, there were 44 regional fishery bodies including RFMOs, advisory bodies and scientific bodies. These organizations have, among other responsibilities, collecting and distributing fishery statistics, stock assessment, setting catch quotas, limiting vessels allowed in the fishery, regulating gear, allocation, research oversight, monitoring and enforcement.²⁴⁶ Figure 5 shows areas where RFMOs operate.

Figure 5. Map of RFMO Areas of Operation



Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. The RFMOs are only as strong as the members make them, and rely on flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include inconsistent authority, failure by key fishing interests to join the RFMO or abide by its rules, illegal, unreported and unregulated fishing, lack of equity and disparate interests between developed states and developing states, conflicts of interest among parties, lack of funding and lack of political will.²⁴⁷

²⁴⁵ Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. <http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ>, updated 25 Aug. 2000, accessed 8 May 2006).

²⁴⁶ Devaney, P.L. Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw, eds. Harvard, 2005. Available at www.pon.org/downloads/ien14_Devaney.pdf. Last accessed 12 November 2006. See also, FAO Oceans Atlas, Regional Fishery Organizations. <http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ>. Last accessed 8 May 2007.

²⁴⁷ *Id.*

Devaney concludes that RFMOs could be made more effective through audits, performance review and improvements through neutral bodies such as the FAO. She recommends a stronger role for port states in enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.²⁴⁸

The following section describes one or two major regional fishery agreements or organizations in each of the North Atlantic, South Atlantic, North Pacific, South Pacific, Indian and Southern Ocean regions. The discussion is not exhaustive, but is provided as illustrative of agreements that may have potential to address cetacean bycatch. Additional agreements in the ocean regions are listed in boxes.

The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries

The convention established the Northwest Atlantic Fisheries Organization (NAFO).²⁴⁹ Although the convention applies to the whole of the northwest Atlantic, the regulatory powers of NAFO include only the high seas beyond the Exclusive Economic Zones of its members.²⁵⁰ This regulatory area is divided into six sub-areas. NAFO's members are Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States.²⁵¹

A general council oversees the organization and coordinates the legal, financial, and administrative affairs of NAFO.²⁵² A scientific council serves as a forum for analysis and consultation among

scientists from the member states.²⁵³ The Fisheries Commission decides on management and conservation measures, with the purpose of ensuring consistency in the EEZs of member states.²⁵⁴

Atlantic Ocean Agreements and Organizations

Convention for Fisheries & Conservation of Living Resources of the Black Sea
Convention on Conduct of Fishing Operations in the North Atlantic
Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries
EU Fisheries Agreement (Common Fisheries Policy)
General Fisheries Council for the Mediterranean
International Convention for the Conservation of Atlantic Tunas
International Convention for the Northwest Atlantic Fisheries
International Council for the Exploration of the Sea
North Atlantic Salmon Conservation Organization
Regional Convention on Fisheries Cooperation Among

²⁴⁸ *Id.*

²⁴⁹ *Supra*, note 145.

²⁵⁰ *Id.* at Article I.

²⁵¹ Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention. NAFO website at <http://www.nafo.int/about/frames/about.html>. Last accessed 17 November 2006.

²⁵² *Supra* note 145 at Article II (a).

²⁵³ *Id.* at Article II (b), VI.

NAFO has jurisdiction over all fishes in the Regulatory Area with the exception of salmon, tunas, marlin, and the sedentary species of the continental shelf.²⁵⁵ NAFO currently provides for the conservation and management of stocks of American plaice, yellowtail flounder, cod, witch flounder, redfish, Greenland halibut, capelin, and squid. Stocks that straddle the Regulatory Area and Canada's EEZ, such as cod, American plaice, redfish, flounder, and Greenland halibut, are regular objects of diplomatic tension.²⁵⁶ Conflicts also have arisen with the vessels of non-parties, including Chile, Malta, Mauritania, Mexico, Panama, St. Vincent and the Grenadines, and Venezuela. Some of these vessels have reflagged from member states of NAFO to non-member states.²⁵⁷

In addition to these regional agreements, there are management regimes for highly migratory species in the Atlantic Ocean, such as salmon and tuna, which cross national boundaries, and for which management requires international cooperation.²⁵⁸

International Convention for the Conservation of Atlantic Tunas

The International Convention for the Conservation of Atlantic Tunas (ICCAT), entered into force 21 March 1969.²⁵⁹ ICCAT was established to provide an effective program of international cooperation in research and conservation in recognition of the unique problems related to the highly migratory nature of tuna and tuna-like species. The Convention area is defined as all waters of the Atlantic Ocean, including the adjacent seas.

The treaty established a Commission to carry out the objectives of the Convention. The Commission is responsible for providing internationally coordinated research on populations of tuna and tuna-like species and such other species of fishes exploited in tuna fishing in the Convention area as are not under investigation by another international fishery organization.²⁶⁰ Unlike Inter-American Tropical Tuna Commission, ICCAT does not have its own scientific staff.²⁶¹ Instead, ICCAT, through its rules of procedure, established a scientific body, the Standing Committee on Research and Statistics, to advise the Commission on research needs, conduct stock assessments, and provide management advice. The SCRS is composed of scientists from the ICCAT membership. Although the Convention provides that the Commission

²⁵⁴ *Id.* at Article I (4).

²⁵⁵ *Id.* at Article I (4).

²⁵⁶ Mfodwo, *supra* note 222.

²⁵⁷ *Id.*

²⁵⁸ In general, highly migratory species (HMS) have a "wide geographic distribution, both inside and outside the 200-mile zone, and ... undertake migrations on significant but variable distances across oceans for feeding or reproduction. They are pelagic species (do not live on the sea floor)..." UNCLOS Annex I "includes 11 tuna, 12 billfish species, pomfrets, 4 species of sauries, dolphinfish (*Coryphaena* spp.), oceanic sharks and cetaceans (both small and large)." FAO, Fisheries and Aquaculture Department. Highly Migratory Species Fact Sheet. Available at <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=13686>. Last visited 3 May 2007. See also UNCLOS, *supra* note 139 at Annex 1 and Art. 64.

²⁵⁹ ICCAT, *supra* note 143.

²⁶⁰ *Id.* At Article IV(1).

²⁶¹ Michael L. Weber and Frances Spivy-Weber. "Proposed Elements for International Regimes to Conserve Living Marine Resources. Report in fulfillment of Marine Mammal Commission Contract no. T30916119. NTIS, Springfield, VA, October 1995.

may obtain technical and scientific information or services from any public or private individual or group, the Commission only rarely seeks scientific advice from other sources.²⁶²

With regard to conservation and management, the Commission may, on the basis of scientific evidence, make regulatory recommendations (Article VIII). With the decline in some large pelagic populations in the Atlantic Ocean, discussion and decisions within the Commission on stock management have become highly politicized.²⁶³

Promoting the conservation of large pelagics in the Atlantic Ocean under ICCAT can raise practical problems. For example, under the Atlantic Tunas Convention Act, the U.S. legislation that implements the Convention domestically, the U.S. government cannot alter a U.S. quota allocation adopted by ICCAT—even if the quota level agreed by ICCAT has been set at an unsustainable level.²⁶⁴ The U.S. can adopt more stringent measures, such as higher minimum sizes, larger closed areas, etc., however U.S. fishermen must be allowed the opportunity to catch their ICCAT quota.²⁶⁵ Although in its earlier years, ICCAT could not take action against non-members,²⁶⁶ in 2003, ICCAT adopted a comprehensive trade measures resolution that covers both members and non-members.²⁶⁷ Since the late 1990s, ICCAT has had quota compliance rules on the books that allow for the imposition of penalties, including trade sanctions, against members for quota overharvests in the swordfish and bluefin tuna fisheries.²⁶⁸ Sanctions have been applied to a member under the quota compliance rules once. The trade measures resolution has not yet been applied against an ICCAT member although several non-members have had sanctions placed against them under the 2003 measure and its predecessors.²⁶⁹

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean

Until the late 1990s, there were no regional management regimes for fisheries in the Southeast Atlantic. Angola, Namibia, and South Africa had formed the Southern Africa Development Community (SADC), which includes a Marine Fisheries Policy and Strategy. These three coastal states of the southeast Atlantic negotiated access agreements with distant water fleets. In the late 1990s, Namibia, South Africa, and the United Kingdom began talks on

²⁶² *Id.*

²⁶³ Carl Safina. 1997. North Atlantic Fishery Resources at Risk. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. 54 pages. See also, Carl Safina, *Song for the Blue Ocean*, Henry Holt and Co. (1997) at 92-99, which describes the difficulties of getting ICCAT members, especially Japan and Canada, to reduce quotas for bluefin tuna in 1992 despite scientific information showing a consistent 15-year decline.

²⁶⁴ The exact ATCA wording is "...no regulation promulgated under this section may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to the United States agreed to pursuant to a recommendation of the Commission." 16 U.S.C.A. 971(d)(c)(3).

²⁶⁵ *Id.*

²⁶⁶ Safina, *supra* note 253.

²⁶⁷ Resolution 94-9 by ICCAT on Compliance with the ICCAT Conservation and Management Measures (including Addendum). (Transmitted to Contracting Parties: January 23 1995).

²⁶⁸ Resolution 03-15 by ICCAT Concerning Trade Measures. (Transmitted to Contracting Parties: December 19, 2003).

²⁶⁹ Personal communication with Mark Wildman, NOAA Office of International Affairs, March 2007.

the formation of a new fisheries organization, called the Southeast Atlantic Fisheries Organization, for the conservation and management of deepwater straddling stocks. Eventually Angola, the European Community, Iceland, Namibia, Norway, Republic of Korea, South Africa, United Kingdom (on behalf of St. Helena and its dependencies of Tristan da Cunha and Ascension Islands) and the United States signed the agreement.²⁷⁰ States that have participated in the negotiations but have not signed the Convention are Japan, Russian Federation and Ukraine.

The Convention is one of the first regional fisheries agreements negotiated since the adoption of the UN Fish Stocks Agreement, and closely follows that model.²⁷¹ The convention seeks to ensure the conservation and sustainable management of the fishery resources of the Southeast Atlantic, and establishes the South-East Atlantic Fisheries Organization as the RFMO to implement the convention.²⁷²

The convention sets long-term conservation and sustainable use as a goal. Articles 2, 3, and 7 set out principles such as the precautionary approach, ecosystem management, protection of biological diversity, and protection of the marine ecosystem. Recognition of the special position of developing states is taken in Articles 12 and 21. Species covered are all but sedentary species within the coastal states' jurisdiction (Article 1). The geographic coverage of the convention is roughly FAO Statistical Area 47. The convention defines fishing more broadly than earlier instruments, taking in such activities as support operations, mother ships, transshipment and similar activities.²⁷³ The responsibilities of the Commission include setting quotas, allocating fishing rights, determining participants in the fishery and other management duties. The convention also creates a Scientific Committee and a Compliance Committee.²⁷⁴

Flag states are responsible for authorizing their vessels to fish in the convention area, for keeping a record of such authorizations, for reporting catches and monitoring compliance. In addition, port states are authorized to develop control measures, conduct inspections and deploy observers.

Other Atlantic Regional Regimes

There is some regional management structure in the southwest Atlantic, but not much. The Joint Technical Commission for the Argentina/Uruguay Maritime Front has regulatory authority to set quotas in the common fishing zone. The South Atlantic Fisheries Commission is a bilateral agreement between Argentina and the United Kingdom that manages fisheries through cooperative unilateral measures.

As in the southeast Atlantic, the principal managing organizations in the southwest Atlantic are national governments. Their programs may be summarized as follows:

²⁷⁰ Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. Done at Windhoek. 20 April 2001. Entered into force April 2003 (hereinafter the Southeast Atlantic Convention). Available at <http://www.seafo.org>

²⁷¹ Hedley, C. The South-East Atlantic Fisheries Organization (SEAFO) Convention: an initial review. OceanLaw On-Line Paper No. 2, April 2001. Internet guide to International Fisheries Law. Available at <http://www.intfish.net/ops/2.htm>. Last accessed 17 November 2006.

²⁷² Southeast Atlantic Convention, *supra* note 260 at Art. 5.

²⁷³ *Id.* at Art. 1(h).

²⁷⁴ *Id.* at Article 14.

The United Kingdom manages the fisheries around the Falkland Islands, principally the squid fishery. Management is based upon scientific advice and is carried out through limitations on fishing effort, including area restrictions and bidding for access rights. Fishing effort on the high seas is restrained by linking access to squid within the fishery zone to voluntary restraints on the high seas.

Fisheries in Argentina are managed by the Secretary of Agriculture, Fisheries, and Nutrition. Annual quotas are set based on advice of the National Institute of Fisheries Research and Development. Fisheries in Uruguay are the responsibility of the National Institute of Fisheries. The principal management concern is hake. The Agriculture Ministry in Brazil is responsible for fisheries, although management of fisheries is delegated to the states and municipalities in principle. Although legislation and regulations exist, they have little practical effect on fisheries.

North Pacific Anadromous Fisheries Commission (NPAFC)

Canada, Japan, the Russian Federation, and the United States are the primary states of origin for anadromous stocks in the North Pacific Ocean. Stocks from Asia and North America mix on the high seas, making discrimination among stocks very difficult. Generally, states of origin have claimed salmon from their streams as their property and have insisted that other states must receive their permission to catch these salmon. States whose fisheries within their own EEZ intercept salmon from another State's streams claim they have rights to any fish in their EEZs.

The North Pacific Anadromous Fisheries Convention, which came into force in 1993, replaced the International Convention for the High Seas Fisheries of the North Pacific Ocean, to which the United States, Japan, and Canada belonged.²⁷⁵ Within the older convention, Japanese fishing for salmon on the high seas was increasingly restricted in order to reduce the capture of salmon from North American streams.²⁷⁶ In 1989, the Soviet Union announced that, effective in 1992, it was withdrawing permission to fish for salmon in its EEZ that it had granted to Japan since the 17th century.

The Soviets also provided the United States with a draft international agreement to establish a new organization for conserving North Pacific anadromous stocks.²⁷⁷ This led to a series of negotiations that produced the North Pacific Anadromous Fisheries Convention, which came into force in February 1993. The Convention established the North Pacific Anadromous Fish Commission (NPAFC), whose purpose is to promote the conservation of anadromous stocks of fish throughout their migratory range in the high seas area of the North Pacific Ocean and adjacent seas. The Convention also proposes the conservation of ecologically related species that interact with anadromous fish, including various marine mammals, seabirds, and non-anadromous fish species.

²⁷⁵ Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess. Hereinafter North Pacific Anadromous Fisheries Convention.

²⁷⁶ Mfodwo, *supra* note 222.

²⁷⁷ *Id.*

Among other improvements, the new Convention increases at-sea enforcement powers, authorizes strict enforcement at the point of sale, includes all countries of origin and fishing countries under one organization, and incorporates Russian scientific expertise and knowledge of Japanese fishing patterns.²⁷⁸ The founding members are Canada, Japan, the Russian Federation, and the United States. Non-member parties may join at the invitation of existing member states.

Besides prohibiting fishing for anadromous stocks on the high seas, the Convention also requires minimizing incidental taking of anadromous fish. The member states individually or collectively may take appropriate measures to prevent trafficking in illegally harvested Pacific salmon. The member states also are to intervene with non-parties whose fishing activities may adversely affect North Pacific anadromous fish. Article IV calls for the member states to prevent the reflagging of their fishing vessels.

Impacts on other species, restoration of other species, minimization of pollution, discards, and bycatch, and biodiversity protection all are reflected at least partially. The Convention authorizes timely conservation and the language on enforcement is among the strongest and most advanced in the world. Member states may board the vessels of another member state on the high seas and seize the vessel if it is found in violation of the Convention. Besides providing authority to sanction non-parties that violate conservation measures, the Convention authorizes consultation with non-members.

Pacific Ocean Agreements and Organizations

Asia Pacific Fishery Commission

Asia-Pacific Economic Cooperation

Convention for a North Pacific Marine Science Organization

Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean

Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific Ocean

Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

Eastern Pacific Ocean Tuna Fishing Agreement

Inter-American Tropical Tuna Commission

International Convention for the High Seas Fisheries of the North Pacific Ocean

International Pacific Halibut Commission

Latin American Organization for Fisheries Development

North Pacific Anadromous Fisheries Convention

Pacific Salmon Treaty

Permanent South Pacific Commission

South Pacific Commission

South Pacific Forum Fisheries Agency Convention

Southeast Asian Fisheries Development Center

²⁷⁸ *Id.*

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea

The need for the Convention arose out of intensive fishing for pollock in an area of the Bering Sea that is outside the EEZs of the United States and the Russian Federation.²⁷⁹ Concerns about the impact of this fishing on pollock stocks within the EEZs of the United States and the Russian Federation led to a series of negotiations that began in 1991 and concluded in February 1994 among China, South Korea, Poland, the Russian Federation, and the United States.²⁸⁰ The convention's objectives are conservation, management, and optimum utilization of Bering Sea pollock, restoration of pollock to levels that will produce maximum sustainable yield, and cooperation in data gathering.

Rather than establishing a separate Secretariat, the Convention calls for annual meetings of the member states, between which the governments of the member states are to perform many of the functions of a Secretariat.²⁸¹ The only "internationalized" administrative structure is the Scientific and Technical Committee (STC), which is composed of at least one representative from each member state.²⁸² The STC is to provide the annual meeting of the member states with the assessments of Aleutian Basin pollock that are the basis for the harvest levels.

Principal functions of the annual meeting include setting the allowable harvest level for pollock in the area covered by the Convention and allocating this quota among the member states. The annual meeting also is to adopt other conservation and management measures, to establish terms and conditions for any trial fishing operations, to discuss cooperative enforcement measures, to review an observer program established by the member states, and to discuss scientific research in the region.²⁸³

All decisions of substance must be taken by consensus. If a member state considers a matter to be of substance, then it is to be voted upon in that way. Other decisions are taken by simple majority vote.

South Pacific Permanent Commission

The South Pacific Permanent Commission (CPPS) was established by the August 1952 Agreement of the Conference on the Use and Conservation of the Marine Resources of the South Pacific.²⁸⁴ The Agreement does not define a specific area of jurisdiction. The Agreement does state that the parties to the agreement—Ecuador, Peru and Chile—proclaim that each possesses sole sovereignty over the area of the sea and sea floor within 200 miles of its shores. A 1984 Declaration states that each state has responsibility for conservation and protection of living resources within their jurisdictions and beyond. The agreement applies to all living marine resources.

²⁷⁹ Suzanne Iudicello, Background Paper: Major Fisheries at Risk in the North Pacific Ocean. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. Transcript available with author.

²⁸⁰ Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27.

²⁸¹ Mfodwo, *supra* note 222.

²⁸² *Id.*

²⁸³ Iudicello, *supra* note 269.

²⁸⁴ 1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Available at <http://www.intfish.net/orgs/fisheries/cpps.htm>. Accessed June 30, 2007.

CPPS collaborates with FAO in collecting fisheries data for FAO Statistical Area 87. In 1985, CPPS signed an agreement with FAO to collaborate in research on living marine resources, staff training, dissemination of information, and scientific and technical meetings. Subsequent meetings of the parties resulted in an additional protocol, proposals for fishery regulation on the high seas adjacent to member countries, and a call for projects examining both artisanal and industrial fisheries.²⁸⁵

Forum Fisheries Agency

The Forum Fisheries Agency (FFA) was established by convention that went into force in July 1979. Members of the South Pacific Forum, as well as other states and territories on the recommendation of the Fisheries Committee, may join FFA.

According to the 1979 convention, the FFA was formed "to secure the maximum benefits from the living marine resources of the region for their peoples and for the region as a whole and in particular the developing countries," and "to facilitate the collection, analysis, evaluation and dissemination of relevant statistical scientific and economic information about the living marine resources of the region, and in particular the highly migratory species."²⁸⁶ FFA promotes harmonization of fisheries management in the region, cooperation regarding distant water fishing nations, cooperation in enforcement and surveillance, cooperation in marketing and in granting access to exclusive economic zones.

The sphere of influence of the FFA covers about 30 million square kilometers from the Republic of the Marshall Islands to New Zealand, and corresponds roughly to FAO statistical areas 74 and 81. The FFA addresses all living marine resources, but particularly highly migratory species.

In June 1988, the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States came into force. This agreement had been concluded in 1987 at Port Moresby, Papua New Guinea, and was renewed for ten years in 1993.²⁸⁷ Under the agreement, fishing vessels from the United States are permitted into the fisheries jurisdictions of the 16 FFA member countries that are party to this treaty. Fees paid for this access are divided among the parties. The treaty was innovative in requiring U.S. vessels to comply with the same reporting and enforcement provisions on the high seas as applied within the exclusive economic zones of the member countries.²⁸⁸

Upon discovering large-scale driftnetting operations in the area, a 1989 meeting of the FFA in Kiribati issued the Tarawa Declaration calling for the end of such driftnetting. This led later to the Convention for the Prohibition of Fishing With Long Driftnets in South Pacific, which was concluded at Wellington, New Zealand, in November 1989 and came into force in May 1991.

In July 1992, members of the FFA concluded the Niue Treaty on Cooperation in Fisheries Surveillance in the South Pacific Region, which entered into force in May 1993. The principal purpose of the Niue agreement is to overcome the difficulties of enforcement in so large an area of ocean by, among other things, permitting reciprocal and joint enforcement and surveillance of

²⁸⁵ See, Galapagos Agreement. Available at <http://www.intfish.net/orgs/fisheries/cpps.htm>. Accessed June 30, 2007.

²⁸⁶ Basic convention documents and agreements are available at FFA Website. <http://www.ffa.int/node/266> Last accessed June 30, 2007.

²⁸⁷ Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100.

²⁸⁸ *Id.* Articles 3-4.

measures adopted by individual countries. Subsequent agreements, annexes and projects have addressed tuna fishing, longline gear, surveillance and monitoring.

Asia Pacific Fishery Commission

The Asia Pacific Fishery Commission is an outgrowth of an agreement to establish the Indo-Pacific Fisheries Council in 1948 under the FAO. The commission, created in 1994, is to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations."²⁸⁹ The APFIC's jurisdiction includes a large part of the area, the Asia-Pacific (FAO Statistical Area 71). Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam. Membership in the APFIC is widely open.

APFIC acts as consultative forum that works in partnership with other regional organizations and arrangements and members. It provides advice, coordinates activities and acts as an information broker to increase knowledge of fisheries and aquaculture in the Asia Pacific region to underpin decision-making. Among its functions, the commission is to review the state of fishery resources and to recommend measures and carry out programs to increase the efficiency of the fishing and aquaculture industries. The Commission also is to conserve and manage resources and protect them from pollution.

The Asia Pacific Fishery Commission has yet to make the transition from fishery development and promotion to stock conservation and rebuilding. It has not amended its charter to undertake management or conservation actions, but relies on the governments of member countries to do so. In the area under the commission's purview, there is no management structure for adjacent, or straddling stocks of fish.

Convention for the Conservation of Southern Bluefin Tuna

The Commission for the Conservation of Southern Bluefin Tuna²⁹⁰ arose from annual trilateral meetings among Australia, Japan and New Zealand (Weber 1998). The three countries had operated under a voluntary management agreement, but negotiated the formal convention in response to continued heavy fishing that had resulted in significant declines of mature fish throughout the 1980s.²⁹¹

Concerned that activity of non-party nations in the fishery was reducing the effectiveness of members' conservation and management measures, the parties in 1996 asked Taiwan, South Korea and Indonesia to become parties. On 17 October 2001 the Republic

Indian Ocean Agreements & Organizations

Indian Ocean Fishery Commission

Indian Ocean Tuna Commission

Southwest Indian Ocean Fisheries
Commission

Western Indian Ocean Tuna Organization

²⁸⁹ APFIC Website at <http://www.apfic.org/>

²⁹⁰ Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT).

²⁹¹ Commission for the Conservation of Bluefin Tuna. Website available at www.ccbt.org/docs/about.html. Last accessed 17 November 2006.

of Korea joined the Commission. The Fishing Entity of Taiwan's membership of the Extended Commission became effective on 30 August 2002.²⁹²

In 2003, the commission created membership status for countries with an interest in the fishery to participate in its activities as formal cooperating non-members. These parties must comply with the management and conservation objectives and agreed catch limits of the convention and may participate in discussions, but cannot vote. The Philippines was accepted as a formal cooperating non-member in 2004, and parties continue discussions with Indonesia and South Africa.²⁹³

The convention goal is conservation and optimum utilization of bluefin tuna.²⁹⁴ Though the scope of the agreement limits its attention to bluefin tuna, definitions include consideration of all "ecologically related species."²⁹⁵ By definition, the convention covers not just fishing activity, but support operations as well. States parties are required to enforce the provisions of the agreement, provide information including scientific and catch statistics and effort data, exchange scientific and fishing information, and report fishing by non-parties. Member countries are legally bound by decisions on total allowable catch and other conservation and management measures. Enforcement is by the parties on their flag vessels. Significantly, the treaty requires parties to take action to prevent vessels from transferring registration to avoid compliance with Commission decisions.²⁹⁶ Member countries also must act to deter non-parties from activities that undermine the objectives of the treaty. The measures adopted by the CCSBT are not limited to the high seas, but apply to the EEZs of all member countries.

The commission's duties include gathering and disseminating scientific information, statistical data, and legal information. It adopts regulations, sets catch limits, allocates catch, and operates a monitoring system.²⁹⁷ All decisions are by unanimous vote.²⁹⁸ The convention created a Scientific Committee, and allows both non-party and NGO observers at meetings.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission

The IATTC convention²⁹⁹ defines its area of competence as the Eastern Pacific Ocean, but does not further define the area, although conservation and management measures contain their areas of application, generally out to 150°W. The IATTC focuses on skipjack tuna, yellowfin tuna, and fish used as bait, although staff has studied bigeye tuna, black skipjack, bluefin tuna, albacore tuna and billfishes, as well as dolphins, turtles and sharks. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook

²⁹² CCSBT *supra* note 280.

²⁹³ *Id.*

²⁹⁴ *Id.* at Article III.

²⁹⁵ *Id.* at Article II.

²⁹⁶ Mfodwo *supra* note 222.

²⁹⁷ CCSBT *supra* note 280 at Article VIII.

²⁹⁸ *Id.* at Article VII.

²⁹⁹ The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. (hereinafter IATTC).

Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.³⁰⁰

The IATTC is authorized to make recommendations to its members regarding measures that will maintain the fishes covered by the convention at levels that will permit maximum sustained catch. The Convention also calls for the IATTC to collect, analyze, and disseminate information regarding the catches and operations of vessels in the fishery. Unlike other tuna management regimes, the IATTC maintains an independent scientific staff that collects catch and other information and prepares recommendations for the member governments. IATTC has also carried out a program to estimate bycatch of non-target fishes and dolphins in the fishery.

At a September 1990 meeting in Costa Rica, representatives of Chile, Colombia, Costa Rica, Ecuador, El Salvador, France, Honduras, Japan, Mexico, Nicaragua, Panama, Spain, the United States, Vanuatu, and Venezuela agreed that the IATTC was the appropriate body to coordinate technical aspects of the program to reduce the incidental capture and mortality of dolphins in their exclusive economic zones and the adjacent high seas during purse seine operations. At a 1995 meeting, the member countries of the IATTC adopted a Declaration on Strengthening the Objectives and Operation of the IATTC, which called for implementing the UN agreement on straddling fish stocks and highly migratory fish stocks.

For comparison, see the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.³⁰¹ One of the first treaties developed after the UN Fish Stocks Agreement, it was the culmination of complex negotiations among 25 nations including small island nations and developed countries with active distant water fleets.³⁰² As of November 2004, Australia, China, Cook Islands, Federated States of Micronesia, Fiji Islands, Korea, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga and Tuvalu had ratified or acceded to the Convention.³⁰³

Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean creates the kind of regional organization foreseen in the Straddling Stocks Agreement.³⁰⁴ The 2000 Honolulu Convention covers much of the Pacific Ocean and governing territorial seas and exclusive economic zones as well as high seas areas. It creates a commission with authority to set catch limits and allocate catch quotas to fishing nations both within and outside the exclusive economic zones of coastal and island nations. Most significantly in relation to incidental capture of marine mammals, this fairly new treaty requires fishing of migratory species in the high seas to be compatible with the regulations that apply within adjacent exclusive economic zones. It relies on the precautionary approach as its basic foundation throughout. It is one of the new instruments that enables both flag-state and

³⁰⁰ IATTC website at <http://www.iattc.org/HomeENG.htm>. Accessed 17 November 2006.

³⁰¹ *Supra* note 144.

³⁰² See generally Violanda Botet, *Filling in one of the Last Pieces of the Ocean: Regulating Tuna in the Western and Central Pacific Ocean*, 41 VIRGINIA JOURNAL OF INTERNATIONAL LAW 787-813 (2001).

³⁰³ WCPF Convention, *supra* note 144.

³⁰⁴ Mfodwo *supra* note 222.

port-state enforcement, boarding and inspection rights, obligatory transponders on all high-seas fisheries, and regional observers on the vessels. President Bush requested advice and consent to ratification in May 2005,³⁰⁵ and the Senate Foreign Relations Committee held a hearing on it on September 29, 2005.³⁰⁶ Pending ratification, the U.S. has attended meetings in recent months as a “cooperating nonmember.”

The objective of the Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean, in accordance with the 1982 LOS Convention and the 1995 UN Fish Stocks Agreement. The Convention applies to the Western and Central Pacific Ocean.

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean was opened for signature in September 2000, and entered into force on 19 June 2004. The Convention applies to all species of highly migratory fish stocks (as defined as in Annex I of the Law of the Sea Convention) or otherwise decided by the Commission.

The Convention provides a list of general principles that are closely modeled on the general principles contained in the Fish Stocks Agreement. These principles, *inter alia*, are: adopt measures to ensure long-term sustainability of highly migratory fish stocks and promote their optimum utilization; maintain or restore stocks at levels capable of producing maximum sustainable yield, taking into account fishing patterns, the interdependence of stocks; apply the precautionary approach; assess the impacts of fishing, other human activities and environmental factors on target stocks, non-target species, and species belonging to the same ecosystem or dependent upon or associated with the target stocks; adopt measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, in particular endangered species and promote the development and use of selective, environmentally safe and cost-effective fishing gear and techniques; protect biodiversity in the marine environment; and take measures to prevent or eliminate over-fishing and excess fishing capacity. The general principles are to be applied by coastal States within areas under national jurisdiction in the Convention Area in the exercise of their sovereign rights for the purpose of exploring and exploiting, conserving and managing highly migratory fish stocks.

The Commission is also required to develop a regional observer program to collect verified catch data and other information, which is to consist of independent and impartial observers authorized by the Secretariat. All vessels which fish in the Convention Area, other than those which operate exclusively within waters under the national jurisdiction of the flag State, must be prepared to accept an observer from the regional observer program, if required by the Commission.

The Commission on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific has taken action to reduce the bycatch of non-target fish, seabirds and sea turtles, but has taken no action to reduce any small cetacean bycatch.

The U.S. was heavily involved in the negotiation of this convention, and in December 2006 received Senate advice and consent to ratification and secured implementing legislation through Congress.

³⁰⁵ Press Release, George W. Bush, Message to the U.S. Senate Regarding WCPF Convention (May 16, 2005), available at <<http://www.whitehouse.gov/news/releases/2005/05/20050516-7.html>> (visited Sept. 4, 2005).

³⁰⁶ 151 Cong. Rec. S D990 (daily ed. Sept. 29, 2005)

Regional Scientific Organizations

ICES

The International Council for the Exploration of the Sea (ICES) was established in 1902, and provides scientific advice to member states in the North Atlantic in both European and North American regions. The organization annually analyzes about 70 stocks of commercially exploited fishes (Marashi 1996). ICES is considered the premier international organization researching marine living resources through its Advisory Committee on Fishery Management (ACFM). ICES also conducts research on pollution through its Advisory Committee on Marine Pollution.

Current members are Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

ICES depends upon its members for much of the information that it collects, although there is no legal obligation on member states to provide information (Mfodwo 1998). It regularly conducts assessments of the state of the most important fish and shellfish stocks in the effective ICES area, the northeast Atlantic, including the Baltic but excluding the Mediterranean.

The principal decisionmaking body of ICES is the Council to which each member state may send two representatives. Member states provide most of ICES funding based on annual budgets approved by a majority vote. A Secretariat manages the day-to-day business of the commission and serves as a data center. ICES databases include a wide range of information on fisheries, including catch and effort data, discards, independent surveys, tagging data, and other matters.

ICES generally is viewed as a well-functioning organization with the capability of providing significant input into fisheries management where an appropriate political framework exists (Mfodwo 1998). It also has a highly developed ability to integrate environmental considerations into its fishery stock assessments, as through the recently established Working Group on the Ecosystem Effects of Fishing Activities. ICES also has begun evaluating the impacts of gear on the seabed of the northeast Atlantic and on marine mammals, seabirds, and benthic organisms.

PICES

After more than a decade of stop-and-start discussions, the Convention for a North Pacific Marine Science Organization (PICES) was established in December 1990. PICES's area of concern is the temperate and sub-Arctic region of the North Pacific Ocean northward of 30°N latitude. The purposes of PICES are:

- to promote and coordinate research on living resources in the North Pacific, including interactions with land and atmosphere, climate change, ecosystems, and the impacts of human activities;
- to promote collection and exchange of information.

Founding members are Canada, China, Japan, the Russian Federation, and the United States. Each member state appoints two delegates to the Governing Council, whose roles are as follows:

- to identify research priorities and problems as well as methods for the resolution of problems;
- to recommend coordinated research programs undertaken by the member states;
- to promote the exchange of scientific data, information, and personnel; and

- to consider requests to develop scientific advice.

The Governing Council may invite other states, organizations, and experts to attend scientific meetings as it wishes. Decisions are to be by consensus--considered as the absence of a formal objection--and where consensus is not possible, by a three-quarters majority vote. Constraints on the effectiveness of PICES include the non-binding nature of their recommendations and conflicts among the agendas of different member states.

SPC

The South Pacific Commission was established by an agreement signed at Canberra, Australia in 1947. The agreement came into force in 1948, was amended in 1952, 1954, and 1964, and was supplemented by protocols of understanding in 1974 and 1976. In November 1986, a Convention for the Protection of the Natural Resources of the South Pacific Region was adopted. In August 1995, the Convention came into force after Niue became the tenth party to ratify the agreement.

The Canberra agreement defined the area of competence as all those areas in the Pacific administered by the participating governments that lie wholly or in part south of the Equator, east from and including the Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

The Convention for the Protection of the Natural Resources of the South Pacific Region will apply to the 200-mile zone of 23 self-governing island nations and island territories, as well as those areas of high seas that are enclosed from all sides by these 200-mile zones.

The basic principle of the SPC has been "development relevant to need." Although the SPC addresses a wide range of issues, including agriculture and plant protection, rural development, education, health information and cultural exchanges, fisheries is its largest single activity. The SPC does not make management recommendations, although it does provide scientific advice to its members. It also provides a regional forum for discussion. Two Commission programs deal exclusively with tunas and billfishes, while five others deal with coastal fisheries. Many of these programs such as the observer program are carried out in cooperation with other entities.

The SPC has collected and analyzed catch statistics, and conducted research on tuna and billfish. The program includes observer activities, port sampling, collecting catch and effort data, and population assessment. The commission monitors catches of tuna and performs biological analysis of these data. It maintains a regional oceanic fisheries data base, and assesses interaction among regional oceanic fisheries, studies the population dynamics of ocean species, monitors the level of exploitation of tunas and billfishes and baitfishes, and assists countries in building expertise. TBAP also provides observers for foreign flag vessels.

CHAPTER 5. RISK ASSESSMENT ANALYSIS OF INTERNATIONAL SMALL CETACEAN BYCATCH AND TOOLS TO REDUCE BYCATCH

In this chapter, we attempt to further classify and rank problems and potential action mechanisms according to a set of criteria and to provide a clear rationale for each problem assigned high priority for funding and intervention. The problems are presented by region, as surfaced by the review of each of the FAO statistical areas evaluated in Chapter 2 and Appendix A. The tools also are presented by region and are drawn from the domestic tools presented in Chapter 3 and agreements evaluated in Chapter 4. Table 5.1 summarizes the analysis by showing species at risk in each statistical area. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. The narrative in Chapter 5 focuses on those species where the bycatch is unsustainable—where the bycatch exceeds two percent of the population estimate. Table 5.1 also summarizes gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The following species are at risk:

- Northwest Atlantic—harbor porpoise, northern right whale
- Northeast Atlantic—harbor porpoise, common and striped dolphins
- Western Central Atlantic—tucuxi
- Eastern Central Atlantic—humpback dolphin
- Mediterranean and Black Sea—striped and common dolphins, sperm whale, and harbor porpoise
- Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana
- Western Indian Ocean— Indian humpback dolphin, bottlenose dolphin, spinner dolphin, Risso's dolphin
- Eastern Indian Ocean—Ganges river dolphin and Irrawaddy dolphin
- North Pacific—Dall's porpoise and finless porpoise
- Sea of Japan—finless porpoise
- East and South China Seas and inland waters of Yangtze River—finless porpoise
- Yangtze River—baijis
- Western Central Pacific—bottlenose and spinner dolphins, Fraser's dolphin, Indopacific humpback dolphins and Irrawaddy dolphin
- Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River—Irrawaddy dolphins
- Eastern Central Pacific—False killer whale and Vaquita
- Southwest Pacific—Hector's dolphin and Maui's dolphin
- Southeastern Pacific—Dusky dolphin and Burmeister's porpoise

Analytical Approach

In our criteria we considered the following: (1) the level of risk—whether a species' or population's survival is unsustainable, approaching an unsustainable level, or at risk from bycatch; (2) available legal mechanisms for action—whether the problem is being addressed effectively through national legislation, bilateral agreements, or international conventions; (3)

feasibility of intervention, based on institutional capacity within the country or region to effectively implement bycatch mitigation strategies and quantitative assessments to verify the risk; and (4) fisheries in which a currently available solution (technical, socio-economic, or a combination) appears feasible. Also, in this chapter, we have noted where the U.S. has capacity to participate or where it is not a party nation to applicable agreements and may need to find alternative approaches such as training and technical assistance, scientific support, grants, or economic incentive approaches.

As we undertook our analysis, a number of issues and problems emerged that apply to several regions. First, in areas where developing nations have instituted legislation making bycatch illegal, monitoring becomes increasingly difficult because fishermen dispose of bycaught cetacean carcasses clandestinely rather than bringing them to shore. Furthermore, in many regions, bycaught cetaceans have acquired a market value and are therefore brought ashore and sold for human consumption or bait, blurring the distinction between bycatch and direct harvests. This may occur despite prohibitions against the sale of cetacean products.³⁰⁷

Except for North America, western Europe, Australia, and New Zealand, very few nations have observer programs designed to monitor cetacean bycatch; consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers.³⁰⁸ Such information can result in underestimates of bycatch. Innovative, rigorous analyses are necessary in all regions to secure credible estimates of bycatch levels and trends. Finally, in areas where there is intensive fishing effort, but little or no basic information on presence of cetacean species or their population abundance, bycatch may pose a serious conservation threat, yet the lack of quantitative observations makes it difficult to assess risk. Moreover, the fisheries in such areas are often small-scale and decentralized, making it difficult to evaluate fishing effort or to estimate or monitor cetacean bycatch rigorously.³⁰⁹ Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states.

³⁰⁷ Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–19. See also Van Waerebeek, K., Van Bresseem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godoes, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. Biological Conservation 81:43–49. Leatherwood, S., and Reeves, R.R., 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. Dolar, M.L.L., Leatherwood, S.J., Wood, C.J., Alava, M.N.R., Hill, C.L., and Aragonés, L.V. 1994. Directed fisheries for cetaceans in the Philippines. Report of the International Whaling Commission 44:439–449.

³⁰⁸ Leatherwood, S., and Reeves, R.R. 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. See also Zerbini, A.N., and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. Report of the International Whaling Commission 48:519–24. Bordino, P., and Albareda, D. 2004. Incidental mortality of franciscana dolphin *Pontoporia blainvillei* in coastal gillnet fisheries in northern Buenos Aires, Argentina. International Whaling Commission, Cambridge, UK. Scientific Committee Document SC/56/SM11.

³⁰⁹ Donovan, G.P., 1994. Developments on issues relating to the incidental catches of cetaceans since 1992 and the UNCED conference. Report of the International Whaling Commission (Special Issue) 15:609–613.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000- 2004)		NE (VU- over all)		II	BILATERAL	US-Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I & II	I&II	BILATERAL	US-Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Regional	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276- 64,083)		83/0.2%		VU		II	Regional	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Regional	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Regional	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240-1,430)				VU		II	Regional	CS/FS/PS	
Southwestern Baltic proper	599 (200-3,300)		13/2.1%		VU		II	Regional	CS/FS/PS	
Northern North Sea	98,564 (66,679- 145,697)		5,000/5%		VU		II	Regional	CS/FS/PS	Pingers (DMK) gillnet fishery

³¹⁰ For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

³¹¹ The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
										Aug - Oct
Southern & Central North Sea	169,888 (124,121- 232,530)		7,493/4.3%		VU		II	Regional	CS/FS/PS	
Celtic Sea	36,280 (12, 828- 102,604)		2,200/6.2%		VU		II	Regional	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Regional	CS/FS/PS	
<i>DELPHINUS DELPHIS</i> -COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Regional	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Regional	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 – 185,802)		356-835312 61313-200314/ 0.6-1.1%		LC	nl	II	Regional	CS/FS/PS	
<i>STENELLA COERULEOALBA</i> -STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-152315 /1.6-1.56%		LR/cd	nl	II	Regional	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-528316 44317/ 0.27-0.79%		LR/cd	nl	II	Regional	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										
<i>SOTALIA FLUVIATILIS</i> TUCUXI										
Cananea estuary	156-380				DD	I&II	II	Regional	CS (US)	Marine Mammal

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
	No estimate for rest of range									Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
<i>SOUSA TEUSZII</i> -ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Regional	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Regional	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Regional	CS	
Canal do Geba- Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Regional	CS	
South Guinea					DD	I&II	II	Int'l/Regional	CS	
Cameroon					DD	I&II	II	Int'l/Regional	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Regional	CS	
Angola	Considered small				DD	I&II	II	Int'l/Regional	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
<i>STENELLA COERULEOALBA</i> – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligurian Sea	25,614 (15,377 – 42,685)		51-326 (+/-146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Regional	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379- 214,800)		14-15/0.006%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	
<i>DELPHINUS DELPHIS</i> -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LC	nl	II	Regional	CS/FS/PS	Swordfish driftnet fishery banned
<i>PHYETER MACROCEPHALUS</i> —SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Regional	CS/FS/PS	Swordfish driftnet

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
										fishery banned
<i>PHOCOENA PHOCOENA</i> – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,403)				DD		II	Regional	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Regional	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Regional & National (EC Directive)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,137)				VU		II	Regional	CS/FS/PS	
Central Black Sea> waters Ukraine/Turkey	8,240 (1,714–39,605)				VU		II	Regional	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
<i>SOTALIA FLUVIATILIS</i> -TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
<i>LAGENORHYNCHUS OBSCURUS</i> – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/ .96%-2.7%		DD	nl	II			
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
<i>CEPHALORHYNCHUS COMMERSONII</i> – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/		DD	nl	I			

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
			.67%-1.0% 25-170/ .1%-8%							
Tierra del Fuego	14,000		5-30/.03%-.2%		DD	nl	I			
<i>PONTOPORIA BLAINVILLEI</i> FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694-2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360- 74,397)		651 (398-1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS										
AREA 51 – WESTERN INDIAN OCEAN										
<i>SOUSA CHINENSIS</i> – INDIAN HUMPBAC DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Regional	CS/FS	
Zanzibar (Tanzania)	71		5.6%		DD	I&II	II	Regional	CS/FS	
<i>TURSIOPS TRUNCATES</i> – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8-9%		DD		II	Regional	CS/FS	
Indian Ocean coast north of Natal S Africa	1,000		11-14/1-1.4%		DD		II	Regional	CS/FS	
<i>TURSIOPS ADUNCUS</i> – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Regional	CS/FS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
GRAMPUS GRISEUS – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Regional	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
ORCAELLA BREVIROSTRIS – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Regional	CS/FS	
PLATANISTA GANGETICA GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Regional	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
PHOCOENOIDES DALLI – DALL'S PORPOISE										
Western N Pacific	141,800		643-4,187/0.4-3.0%		LR		II	Regional	CS/FS	
NEOPHOCAENA PHOCAENOIDES – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Regional	CS/FS	
LIPOTES VEXILLIFER - BAIJI										
Yangtze	100-300		5/1.6-5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Regional	CS/FS/PS	
STENELLA LONGIROSTRIS – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Regional	CS/FS/PS	
Sulu Sea	30,000		1,500-3,000/5-10%		LR	nl	II	Int'l/Regional	CS/FS/PS	
LAGENODELPHIS HOSEI—FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Regional	CS/FS/PS	
SOUSA CHINENSIS—INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—Central Section Great Barrier Reef	200		11-100/5.5-50%		DD	I&II	I	Int'l/Regional	CS/FS/PS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS ³¹⁰			AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES ³¹¹ Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
					IUCN	CITES	CMS			
ORCAELLA BREVIOTRIS – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5-6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
PSEUDORCA CRASSIDENS – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6-2.5%					Reg'l/Nat'l legisl	FS (US)	
PHOCOENA SINUS – VAQUITA										
	567		35-39/6.2-6.9%		CR	I&II		Bilateral US/Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
CEPHALORHYNCHUS HECTORI – HECTOR'S DOLPHIN										
South Island east	1,900		16/8%		EN			National legis.	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							National legis	CS	Regs, pingers
CEPHALORHYNCHUS HECTORI MAUI – MAUI'S DOLPHIN										
North Island	100-150		3/3-2%		CR			National legis.	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l leg/Regional	CS/FS	
PHOCOENA SPINIPINNIS – BURMEISTER'S PORPOISE										
			450-200		DD		II	National legisl.	CS/FS	

Atlantic Ocean

Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Northwest Atlantic

In the Northwest Atlantic, the focal species for action is the North Atlantic right whale. The U.S. and Canada have developed a recovery plan for the species and have implementation teams; nevertheless, there is still a need for the U.S. to engage in bilateral discussions with Canada to achieve greater protection for the species. In addition, competent fishery bodies in the region that could play a role include the North Atlantic Fisheries Organization (NAFO) and the International Convention for the Conservation of Atlantic Tunas. Canada and the U.S., as well as fishing nations who operate in the area and might encounter right whales, are party to both those agreements³¹⁸ in the event of documentation of incidental catch outside the EEZs of U.S. and Canada. NAFO recently passed a resolution related to documentation of marine turtle bycatch in the region's fisheries³¹⁹ and might perform a similar function for additional documentation of cetacean bycatch.

Northeast Atlantic

In the Northeast Atlantic, harbor porpoise bycatch in bottom-set gillnets is estimated at nearly 15,000 animals per year. Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch; in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea where bycatch is at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas.

In this area, ASCOBANS provides a regional management framework for cetaceans. After its scientific documentation of bycatch problems, members of the agreement took a variety of actions to regulate fishing operations. Under the authority of the European Community Common Fisheries Policy, the EU imposed numerous bycatch reduction measures. In EU waters, closure of the albacore (*Thunnus alalunga*) driftnet fishery in the Bay of Biscay, Celtic Sea, and west of Ireland; prohibition of driftnets from 1 January 2004 (except in the Baltic Sea); and prohibition of

³¹⁸ U.S., Japan, Canada, France, Russia, United Kingdom, European Community, Iceland, Norway, Nicaragua, Guatemala, Senegal, Belize, Syria, St. Vincent, and the Grenadines.

³¹⁹ <http://www.nafo.int/publications/frames/general.html>

tuna purse-seine fishing on dolphins represent important measures to reduce bycatch.³²⁰ Denmark implemented a mandatory pinger program in certain North Sea bottom-set gillnet fisheries after undertaking rigorous studies of harbor porpoise (*Phocoena phocoena*) bycatch levels and conducting pinger trials.³²¹ In March 2004, the European Commission introduced a new regulation (Council Regulation [EC] No. 812/2004) aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. Beginning in the summer of 2005, pinger use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggeak and Kattegat region of the Baltic deployed from vessels greater than 12 m in length. Similar rules were to apply to the western English Channel and South Western Approaches from January 2006, and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea and off western Britain and Ireland, and from January 2006 in the North Sea and west Scotland.

However, within its framework for cooperation and research, ASCOBANS does not provide authority for actual regulation of fishing operations, even though it has documented how those operations affect cetacean bycatch. Action is up to individual parties of ASCOBANS for measures within their EEZs. Region-wide policy must come from the European Commission. Outside the EEZs of European countries, the North East Atlantic Fisheries Commission (NEAFC) and ICCAT govern fishery operations in international waters of the region. But these management regimes do not reach into coastal areas with documented bycatch. ICES, the International Commission for Exploration of the Seas, is the scientific arm for various management agencies in the Northeast Atlantic region; it assesses living marine species and monitors the health of the regional marine environment.

In order to address bycatch under a legally binding, Europe-wide management framework, either the EC or the members of ASCOBANS would have to establish legally accepted bycatch limits and enforcement strategies. Scientists generally agree that a PBR-type approach, incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is a useful means to determine critical bycatch mortality limits.³²² However, this would require the development of species-specific critical mortality limits for species other than harbor porpoises. More research investigating stock structure and maximum population growth rates is crucial to achieve this objective.

Scientists agree that it is necessary to carry out comprehensive surveys to estimate cetacean abundance, stock structure, and population growth rates in ASCOBANS waters at regular intervals.³²³ Additionally, monitoring cetacean entanglement is urgently needed for all bottom-set gillnet, single and pair pelagic trawling operations in British, French, Dutch, Danish, Norwegian, and German fisheries. Scientists within ASCOBANS recommend observer coverage

³²⁰ Kaschner, K. 2003. Review of small cetacean bycatch in the ASCOBANS area and adjacent waters – current status and future actions. Submitted to the Fourth Meeting of the Parties to ASCOBANS, Esbjerg, Denmark, 19–22 August 2003. Document MOP4/Doc.21 (S). Unpublished.

³²¹ Vinther, M. 1999. Bycatches of harbour porpoises (*Phocoena phocoena* L.) in Danish set-net fisheries. *Journal of Cetacean Research and Management* 1, 123–135. See also Larsen, F., and Rye Hansen, J. 2000. On the potential effects of widespread pinger use for the Danish North Sea gillnet fishery. IWC paper SC/52/SM27.

³²² CEC, 2002. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC (2002) 1134, Brussels, BL, Commission of the European Communities; 63.

³²³ *Id.*

of 5–10 percent of total fishing effort for all bycatch monitoring programs. Only then can the effectiveness of the various mitigation measures be evaluated and, if necessary, modified.

Given the existing mandated mitigation measures and the existence of ASCOBANS, U.S. action may not be necessary and indeed would be difficult because the U.S. is not party to any of the relevant agreements. Nevertheless, the Office of International Affairs staff could attend and observe the ASCOBANS meetings, serving in an advisory capacity, providing technology or information transfer from U.S. experience with similar problems (e.g., approaches developed through the MMPA's incidental bycatch–reduction teams).

Western Central Atlantic

In the Western Central Atlantic, it is difficult to assess the magnitude of the threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations. Published information on bycatch is scarce. There is a great need for a systematic survey effort in the Caribbean and tropical Atlantic to acquire cetacean population estimates and to identify the species most frequently involved in fishery interactions.

UNEP's Caribbean regional seas program has recently promulgated a regional marine mammal action plan. In addition, it has also established a Regional Activity Centre in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPA). The U.S. became a party to the agreement in 2003. It could work through SPAW to ensure the effective implementation of the marine mammal action plan, specifically those parts related to documenting the range and abundance of cetaceans and the impacts of fishery bycatch and directed catches on cetacean populations in the wider Caribbean. Particular emphasis should be given to investigating *tucuxis* (*Sotalia*) along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated a kill of more than 1,050 *tucuxis* in a single year. Along with franciscanas, *tucuxis* are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.³²⁴ The *tucuxi* may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

As a member of the agreement, the U.S. could encourage incorporation into the marine mammal action plan the objective of acquiring additional information on populations, fishing effort, and level of incidental bycatch. At this early stage, in the development of the agreement, emphasis on improving marine mammal science, technology transfer, and information sharing would be useful. The U.S. could hold a regional workshop to bring together scientists and managers within the wider Caribbean to specifically develop an action plan to assess cetacean populations and to document bycatch.

In addition, the U.S. is a member of the West Central Atlantic Fisheries Commission (WCAFC). This body was created in 1973 under FAO auspices, and in 1999 responded to an FAO review to take actions to strengthen its functions and responsibilities.³²⁵ It is advisory only, but the U.S. could encourage revamping this body or creating a new one in the Caribbean

³²⁴ Beltrán, S., 1998. "Captura accidental de *Sotalia fluviatilis* (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp. [In Portuguese] See also: Siciliano, S., 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. Report of the International Whaling Commission (Special Issue) 15, 241–250.

³²⁵ FAO. 1999. Progress Report on the Implementation of Conference Resolution 13/97 (Review of FAO Statutory Bodies and the Strengthening of FAO Regional Fishery Bodies) COFI/99/4. During this review the FAO abolished the Regional Fisheries Advisory Committee for the Southwest Atlantic (CARPAS) and the Inland Fishery Committee for Latin America and the Caribbean (COPESCAL). Available at <http://www.fao.org/docrep/meeting/x0361e.htm>

region in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. The Secretariat of the Caribbean Community made such a recommendation in 2003.³²⁶ The international provisions of both the MMPA and the M-SFCMA call for this type of leadership to increase the tools available to bring fishing into compliance with the most recent international standards. A successor to the WCAFC could be a venue to advance a resolution on cetacean bycatch similar to what has been done for sea turtles in other fisheries organizations.

Should any documentation arise related to incidental bycatch of cetaceans during fishing on highly migratory stocks such as tuna or swordfish in the region, provisions of the Straddling Stocks Agreement might be raised in the ICCAT forum.

Eastern Central Atlantic

In the Eastern Central Atlantic, the clymene dolphin (Ghanaians call it the “common dolphin”), bottlenose, pantropical spotted, Risso’s, long-beaked common, and rough-toothed dolphins; short-finned pilot whale, melon-headed whale, dwarf sperm, and Cuvier’s beaked whale³²⁷ may all be caught in large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. But the species most threatened by bycatch in West Africa is the Atlantic humpback dolphin. There is a significant need to document the bycatch of humpback dolphins in West African countries, especially in the coastal fisheries in Ghana and Togo, which have failed to yield a single record because of the severely depleted population.³²⁸ Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana’s Volta River region and western Togo. The Convention on Migratory Species could be used to encourage the Ghana and Togo fisheries and wildlife departments to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). Additionally, Ghana should be encouraged to protect humpback dolphins by adding this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps declare this site closed to gillnet fishing.

The U.S. is a party to the (relatively) new Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (SEAFO). This is one of the new agreements done in the model of the Straddling Stocks Agreement. It incorporates key measures such as the precautionary approach, ecosystem conservation, and bycatch reduction. It gives port states authority to develop control measures, conduct inspections, and deploy observers. That means the U.S. could place observers on vessels in these fisheries. The agreement calls for research to assess effects of fishing on non-target species. The U.S. could use this forum to advance a resolution requiring parties to document cetacean population abundance and bycatch and report back to the secretariat.

³²⁶ CARICOM Secretariat. 2004. A Common Fisheries Regime for the Caribbean Sea. July 2004.

³²⁷ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World’s Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

³²⁸ Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O., and Bamy, I.L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). Aquatic Mammals 30: 56–83.

Additionally, since at least the late 1960s, it has been speculated that dolphins are involved in the tuna purse-seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S. as well as several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.³²⁹ The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.)³³⁰ Tuna-whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.³³¹ Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of the bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess the cetacean bycatch is currently lacking. Section 16 USC 1385 (d)(1) of the MMPA sets up the conditions and documentation required in order to label tuna as “Dolphin Safe”. Fisheries outside the eastern tropical Pacific Ocean must provide certain documentation to import tuna into the U.S. if the “Secretary [of Commerce] has determined that a regular and significant association occurs between dolphins and tuna.”³³² The purpose of this language was to require the Secretary to investigate instances—such as the tuna-whale interactions suspected in the eastern tropical Atlantic where fisheries may be intentionally encircling, injuring, and possibly killing cetaceans—and use this information not only to govern the labeling of tuna, but also to bring about additional investigation and mitigation of any potential problem in forums such as ICCAT. Therefore, the U.S. can use both ICCAT and SEAFO to document the occurrence of intentional encirclement and, if necessary, devise and implement mitigation measures to bring the bycatch into compliance with the MMPA.

Mediterranean and Black Seas

In the Mediterranean, the focal species most affected by interactions with fisheries appear to be striped dolphin, common dolphin, harbor porpoise, and sperm whale. Both the Mediterranean and Black seas are covered by the ACCOBAMS agreement, and both have programs under the auspices of the UNEP Regional Seas Program. The Mediterranean UNEP program has more action plans and resources for cetacean conservation than does the Black Sea program, which is primarily focused on reversing decades of environmental degradation from pollution.

Incidental mortality of large numbers of sperm whales is known to have occurred in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high-seas swordfish driftnets kills between 7 and 14 sperm whales per year.³³³

³²⁹ Alverson, F.G., 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

³³⁰ Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr. Pêches Mouadhibou* **10**, 89–101.

³³¹ Alverson, *supra* note 321. F.G., 1991.

³³² Section 1385(d)(1)(B)(i).

³³³ International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern

With no estimates available, surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean and the impact of this mortality on the Mediterranean sperm whale population.

Likewise, large numbers (perhaps approaching the thousands) of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Incidental mortality may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.³³⁴

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.³³⁵ No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea. Other than the reported bycatch of 145 to 200 common dolphins in the Spanish swordfish driftnet fishery in 1993–1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

The Black Sea population of harbor porpoises is classified as vulnerable on the IUCN Red List. These animals are threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.³³⁶

The Black Sea needs a comprehensive effort to determine distribution patterns and estimate abundance of harbor porpoise as well as an effort, through interview surveys, visits to fish markets and landing sites, and on-board observer programs, to evaluate incidental catch

Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

³³⁴ International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

³³⁵ UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

³³⁶ Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.S.R (present Georgia, Russia and Ukraine), Bulgaria, and Romania and, in 1983, in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

and illegal hunting. Results of the population and threat assessments should lead to the development of a basin-wide conservation plan.

Work should be undertaken to determine the distribution and abundance of sperm whales and common and striped dolphins in the Mediterranean and Black seas and their connecting waters and efforts should be made to evaluate the extent and risk posed by incidental mortality in fishing operations. There may be several avenues to accomplish this basic assessment work.

Potential avenues for basic assessment work may exist under the UNEP Regional Seas, Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Entry into Force: 12 December 1999). Through the UNEP Regional Seas, the Mediterranean Program has linkages with the FAO and a host of other entities that have responsibility for fisheries, protected species, biodiversity, and migratory species. They all have action plans.³³⁷ The ACCOBAMS Secretariat and Mediterranean Action Programme (SPA/RAC) signed a memorandum of understanding to coordinate the joint implementation of ACCOBAMS and the Barcelona Convention Action Plan on cetaceans.³³⁸ In addition, the Secretariat of ACCOBAMS is on the advisory committee for the Strategic Action Program for Biodiversity (SAP BIO) to provide coordination for protection of threatened Mediterranean marine species and species management. Other frameworks that could provide support to Mediterranean coastal states for the acquisition of data and implementation of Action Plans, conservation of threatened species, and for species management include RAMSAR, the Bonn Convention and CITES.

ACCOBAMS has the authority to address bycatch of cetaceans in the Mediterranean and Black seas. ACCOBAMS came into force only in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS Secretariat should work with national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. It should establish scientifically sound bycatch limits and enforcement strategies. Without such estimates and a management framework, ACCOBAMS' ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished. Although the U.S. is not a party nation to ACCOBAMS³³⁹, it could monitor progress and provide advice as the convention develops the conservation and management framework needed to address the threat of fisheries bycatch.

The high mortality of cetaceans in large-scale drift gillnet fisheries on the high seas has been largely eliminated, at least in some ocean regions, through decisive action by the United Nations General Assembly, which declared a global ban beginning in 1993 (See Chapter 3). However, the reach of this driftnet ban did not extend to several key areas such as the

³³⁷ For example, FAO cooperates with MAP in relation to responsible fishing through the General Fisheries Commission for the Mediterranean (GFCM); they have a memorandum of cooperation signed in 2000 with the Convention on Biological Diversity Executive Secretary for the harmonized implementation of the CBD and SPA Protocol in the Mediterranean and for the better implementation of the CBD program on the conservation and sustainable use of marine and coastal biological diversity. See also programs for assessments (e.g., NATURA).

³³⁸ http://www.unep.org/regionalseas/Programmes/UNEP_Administered_Programmes/Mediterranean_Region/default.asp. Accessed 15 January 2006.

³³⁹ The U.S. declined to join either ACCOBAMS or the Bonn Convention that underlies it because of concerns about the federal-state management relationship related to migratory waterfowl in the U.S. It has, however, become a member of specific protocols or MOUs negotiated under the Bonn Convention. Pers. Comm., NOAA OIA, March 2007.

Mediterranean Sea³⁴⁰ and EEZs where cetacean bycatch remains significant and where illegal driftnet fishing poses a major threat to all of these species.

Pelagic driftnets have been prohibited in Spain since 1995. On 8 June 1998, the EU Fisheries Council adopted Council Regulation 1239/98 banning the use of driftnets by 1 January 2002 in all waters falling within the jurisdiction of Member States, as well as outside those waters. The EU driftnet ban entered into force on 1 January 2002. On 26 November 2003, ICCAT adopted, at its 18th Annual Meeting in Dublin, Ireland, Recommendation (03-04), which prohibits the use of driftnets in fisheries for large pelagic species in the Mediterranean by its Contracting Parties, Cooperating Non-Contracting Parties, Entities, and Fishing Entities. In practical terms, the recommendation prohibits driftnet fishing on the high seas or in territorial waters and closes a driftnet fishing loophole that could be used by countries that are members of ICCAT but not the EU. At the 20th Session of the General Fisheries Commission for the Mediterranean (GFCM) on 21–25 February 2005, the Commission adopted, as Recommendation GFCM/2005/3(A), ICCAT Recommendation 03-04 prohibiting the use of driftnets for fisheries of large pelagics in the Mediterranean Sea.

Despite these restrictions several nongovernmental organizations (NGOs) continued to assert that as many as 600 vessels with driftnets from 7–9 km in length, were operating throughout the Mediterranean Sea. World Wildlife Federation (WWF)—International claimed that the Moroccan driftnet fleet, with 177 vessels, was killing thousands of dolphins and other vulnerable species such as sharks and sea turtles in the Alboran Sea and around the Straits of Gibraltar. The WWF also alleged that Italian, French, Turkish, and most probably other fishing fleets were using driftnets in breach of existing legislation and the United Nations driftnet moratorium.³⁴¹

In 2005, the U.S. confirmed the existence of a Moroccan driftnet fleet and began to work with the country on a plan to phase out Morocco's driftnet fleet. The U.S. has earmarked funds to help with some aspects of Morocco's driftnet elimination program. That same year, the EU and Morocco signed a new fisheries partnership agreement whereby 119 EU vessels were to be allowed to fish in Moroccan waters in exchange for EU compensation of approximately \$42 million per year, the proceeds of which are designed to fund the conversion of the Moroccan driftnet fleet to more sustainable fishing activities.

Turkey, on the other hand, is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long with fishing nets that are 800–1,000 meters long, targeting swordfish off the southwest corner of Turkey. In order to accede to the EU, Turkey must, as a prerequisite, agree to adopt the common rules, standards, and policies that make up the body of EU law —this would include terminating its driftnet fleet.

Following an order of the U.S. Court of International Trade, the U.S., on 19 March 1999, identified Italy as a nation for which there was reason to believe its nationals or vessels were conducting large-scale driftnet fishing beyond the EEZ of any nation, pursuant to the U.S. High Seas Driftnet Fisheries Enforcement Act (the Act). This marked the second time the U.S.

³⁴⁰ Tudela, S., Guglielmi, P., El Andalossi, M., Kai Kai, A. and Francesc Maynou, A.H. 2003. Biodiversity impact of the Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). WWF Mediterranean Programme Office, Rome.

³⁴¹ Imbert, G., Gaertner, J.-C., and Laubier, L., 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonilles. 10e Conference Internationale sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract)

identified Italy pursuant to the Act (the first identification was in 1996). As a result of the identification, the U.S. began consultations with the government of Italy on 17 April 1999 to obtain an agreement to bring about the immediate termination of such activities. In July 1999, an agreement was reached. The 1999 driftnet agreement reiterated Italy's commitment to full implementation of the measures to combat large-scale high-seas driftnet fishing contained in the 1996 U.S.–Italy driftnet agreement. As a result of Italy's driftnet vessel conversion program (a product of the 1996 agreement), about 85 percent of Italy's driftnet fleet of 679 vessels were converted to other fishing methods or scrapped by March 2000. The Government of Italy expected the remaining vessels to continue to fish in Italian waters until the EU driftnet ban entered into force in 2002 (Italy is a member of the EU).

In 2003, the Italian government enacted legislation that required “compulsory dismissal or conversion” (boats could be scrapped or converted to another gear type) of the driftnet fishing licenses of the remaining 89 licensed driftnet vessels that did not participate in Italy's earlier driftnet conversion program. The legislation also seized and sealed the driftnets from all 89 vessels, cancelled the driftnet portions of the fishing licenses of all of the 89 remaining vessels, and deleted the names of those vessels from the EU Vessel Registry, which contains a unique registration number for each vessel.

Nevertheless, environmental groups continued to claim that Italian vessels were still fishing with driftnets in Mediterranean waters in 2005. In March 2005, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the Humane Society International (HSI) reported that nine Italian driftnet vessels were fishing illegally (three may have been fishing in international waters). Additionally, in 2004, they identified in Ischia harbor 15 Italian vessels equipped with driftnets estimated to range in length from 9 to 84 kilometers. Of all of the vessels detected, five had the same registration numbers as vessels that had accepted the EU conversion buyout funds prior to the EU ban on driftnet fishing. Meanwhile, Oceana identified 37 Italian fishing vessels in six Italian ports and at sea with driftnets on board. Oceana reported that 18 of the 37 had previously received subsidies from the government of Italy to stop using driftnet gear.

Based on this information, the U.S. embarked on a series of bilateral and multilateral efforts to address this issue. In response, Italy told the U.S. that it strongly opposes illegal driftnet activities and that it is working with the GFCM to ban the use of driftnets in the Mediterranean Sea by non-European countries. Italy submitted a report to the U.S. detailing more than 189 driftnet violations and the seizure of 402 km of driftnets through the end of July 2005.

On the multilateral level, the U.S. appealed to the EC to take appropriate steps to strengthen enforcement of its driftnet ban. At the U.S.–EC high-level fisheries bilateral meeting in Washington, D.C., on 27 June 2005, the representative of the Directorate-General assured the U.S. delegation that the EC was actively engaged on this issue.

To date, the U.S. has continued to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 USC 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

While the U.S. remains concerned by reports from conservation organizations in 2004 and 2005 that some Italian vessels and nationals may still be engaged in large-scale high-seas driftnet fishing; diplomatic actions and the threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various

international regulations banning driftnet fishing. The U.S. must continue efforts to work with Italy, the EC, and ICCAT to address this situation, but it should consider taking more aggressive action to sanction Italy under section 101 of the MMPA.

Southwestern Atlantic

The franciscana (*Pontoporia blainvillei*) is the most threatened species of small cetacean in the southwestern Atlantic Ocean. The tucuxis, dusky, and Commerson's dolphins also experience relatively high levels of incidental mortality; again, the impact on these populations is unknown. An estimated one to 10 percent of the population of franciscana is incidentally killed in gillnet fisheries (1,500–2,000 animals per year); most are juveniles aged one through three years.³⁴² There is still a great need to gather biological information on ecology, genetics, and mortality rates of franciscana. Additionally, range states should be encouraged to monitor and mitigate franciscanas bycatch.

Tucuxi are entangled in beach seines, shrimp and fish traps, and, more frequently, in set gillnets and driftnets throughout their range. They are frequently entangled in fishing gear, especially coastal gillnets in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter.³⁴³ In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries.³⁴⁴ Finally, pelagic trawls incidentally kill an estimated one percent to two percent of the populations of Commerson's and dusky dolphins, respectively.

There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently, further research is needed to identify and delineate cetacean management units and acquire up-to-date abundance estimates for all populations in this region. Range states should develop and test devices to prevent dolphins from entering trawls and, if possible, assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

An FAO advisory committee (CARPAS) was established in the region in the 1970s, but was abolished in 1997 because of a long period of inactivity. A bilateral joint commission exists for the fisheries off Uruguay and Argentina to conduct assessments, fishery research, and other activities for the two nations' EEZ fisheries that operate off the coast seaward of the Rio de Plata—the Joint Permanent Commission for the Argentina/Uruguay Maritime Front (CTMFM).³⁴⁵ This bilateral joint commission may be an avenue to encourage information collection under the auspices of this organization. Given the absence of any regional fishery management organization, the region may be a candidate for creation of a new RFMO under the standards of the Straddling Stocks agreement or an agreement for the region similar to ASCOBANS or ACCOBAMS. Certainly the fisheries in the area in question migrate along the EEZs of Uruguay, Argentina, and Brazil. Finally, the U.S. has recently instituted a trawl bycatch reduction team to

³⁴² Culik, B.M., (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

³⁴³ IWC (2000) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

³⁴⁴ IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

³⁴⁵ <http://www.ctmfm.org/>

develop mitigation measures to reduce the serious injury and mortality of pilot whales and other pelagic dolphin species in trawl fisheries to levels approaching the zero mortality rate goal. The measures adopted by the trawl bycatch reduction team may provide the foundation for bilateral discussion with Argentina whereby the U.S. might provide technical and financial assistance to further test and implement these measures in the Argentine trawl fishery.

Pacific Ocean (Including Indian Ocean)

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiamei paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan.

Western Indian Ocean

In the western Indian Ocean, the incidental mortalities of spinner (4,000), spotted (1,500), common (1,000), and Risso's dolphins (1,300); pygmy sperm whales (2,700); dwarf sperm whales (2,700); and bottlenose dolphins (500–1,250) are particularly high in the Sri Lankan fisheries. With the exception of the Risso's dolphin, the magnitude of this bycatch for each of these species unknown because abundance estimates do not exist. The bycatch of Risso's dolphins is unsustainable, representing between 10-24 percent of the population.

The accidental mortality of bottlenose and humpback dolphins in anti-shark nets used to protect bathers along the Natal coast is unsustainable, amounting to 11–23 and 7–8 animals, respectively, per year or 9 percent of the bottlenose and 4 percent of the humpback dolphin population.³⁴⁶ Additionally, off the coast of East Africa, observer programs estimated that the annual incidental fishing mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.

Sri Lanka and India fisheries deploy more than 1.5 million gillnets and incidentally entangle more than 12,000 to 27,000 cetaceans annually.³⁴⁷ In 1993, Sri Lanka instituted legal protections for cetaceans, but poor enforcement of these laws has made them virtually meaningless.³⁴⁸ Incidental mortality in fisheries is thought to be a significant conservation problem; thus, continued monitoring of the entanglement of dolphins along the Sri Lankan and Indian coast is very important as the expanding coastal gillnet fishery may greatly affect these dolphin species.

Reliable and current data on cetacean populations and mortality rates are nonexistent, for all practical purposes, making it impossible to assess the magnitude of the problem in this area

³⁴⁶ Jefferson, T.A., and Karczmarski, L., 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also Cockcroft, V.G., 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20**(2), 44–51.

³⁴⁷ Leatherwood, S., 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, G.P. Donovan, and J. Barlow (eds). *Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

³⁴⁸ Ilangakoon, A., 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, south-west and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges River dolphin occurs.

Eastern Indian Ocean

In the eastern Indian Ocean, recent information on marine mammal–fishery interactions is lacking entirely. A now-terminated Taiwanese shark and tuna gillnet fishery operating off Northern Australia caught bottlenose dolphin, spinner dolphin, spotted dolphin, humpback dolphin, and false killer whale; other gillnet fisheries likely catch finless porpoise and Irrawaddy dolphin. The driftnet fisheries operating further offshore in the Bay of Bengal and the southern Indian Ocean may catch spinner dolphin, spotted dolphin, spectacled porpoise, southern right whale dolphin, and common dolphin.

On the eastern coast of India, as far south as Vishakhapatnam, is the westernmost range of the Irrawaddy dolphin and the only known freshwater population—in Chilka Lake India. This population is caught in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for cetacean abundance surveys in rivers, lakes and along the east coast of this region as well as a rigorous monitoring program to document all cetacean mortality (especially of Irrawaddy dolphins in Chilka Lake). In general, this area would benefit from a regional management organization similar to ACCOBAMS, but for the entire Indian Ocean.

The Ganges River dolphin is listed as endangered by the IUCN and numbers 600-700 animals. Construction of 50 or more dams and barrages within the Ganges dolphin's historic range has drastically altered its habitat and fragmented the metapopulation. Deliberate killing of Ganges dolphins for meat and oil occurs in the middle Ganges near Patna, in the Kalni-Kushiyara River of Bangladesh, and in the upper reaches of the Brahmaputra.³⁴⁹ Bycatch estimates are not available and the demand for these products means that there is little incentive for fishermen to reduce the bycatch or to release dolphins that are still alive when found in nets. A particular problem is the use of dolphin oil as an attractant for catfish.

A regional management body could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. However, no such instrument exists in the region. The UNEP Regional Seas Programme has a set of action plans for the South East Asian region, which includes the Indian Ocean, but there is no convention yet, and the action plans to date have concentrated on building capacity in the region and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

A new regional fishery management organization—the South West Indian Ocean Fisheries Commission—was constituted under the auspices of the FAO in 2004, and its mandate is to concentrate on coastal fisheries of the region. In February 2006, parties were expected to

³⁴⁹ Smith, B.D. and Reeves, R.R. (eds.) 2000a. Report of the second meeting of the Asian river dolphin committee, 22–24 February 1997, Rajendrapur, Bangladesh. Pp.1–14 in: *Biology and Conservation of Freshwater Cetaceans in Asia* (eds. R.R. Reeves, B.D. Smith, and T. Kasuya). IUCN/SSC Occasional Paper No. 23, Gland, Switzerland and Cambridge, UK.

complete negotiations on an agreement for governing high-seas fisheries in the southern Indian Ocean (other than tuna, which are managed by the Indian Ocean Tuna Commission). The organization has set data collection as its highest priority, and it has responsibility for all living marine resources, not just fish. The organization will operate by the principles set out in the Code of Conduct for Responsible Fishing, including ecosystem approaches. The area of competence for the body, however, does not extend into the areas of the Indian Ocean adjacent to Sri Lanka, India, or other areas with critical issues of incidental bycatch.

Northwest Pacific

In the Northwest Pacific, incidental mortality in fisheries threatens Dall's porpoise, finless porpoise, and the Baiji. In the 1980s, the Japanese, Taiwanese, and South Korean squid driftnet fishery killed thousands to tens of thousands Dall's porpoise—reducing the Bering Sea population of Dall's porpoise to between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.³⁵⁰ Today, large numbers of Dall's porpoises still die in driftnets within national waters of Japan and Russia, where the U.N. ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period 1993 to 1999, ranging from 643 to 3149 on an annual basis.³⁵¹ In addition, more than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all caught in directed fisheries. The IWC Scientific Committee has expressed concern over the level of harvests of Dall's porpoise (14,992 from 1998 through 2002). These harvests highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

Fisheries incidental mortality in the Yangtze River threatens the continued existence of the baiji. Electrofishing is the greatest threat to this species where 5 of 12 documented deaths in the 1990s have been attributed to the practice.³⁵² Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range.

In the Yangtze, electrofishing also threatens finless porpoises. Additionally, China's extensive fishing fleets use gear such as gill and trawl nets, known to kill cetaceans, with the bycatch of finless porpoises being especially high.³⁵³ From 1985 through 1992, 114 finless porpoises were found off the coast of western and northeastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58;

³⁵⁰ Mangel M., 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. *Ecol App* 3: 221–229.

³⁵¹ IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 4 (Supplement), 325–338.

³⁵² Zhang, X., Wang Ding, Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji (*Lipotes vexillifer*) and its conservation in the Yangtze River, China. Pp. 41–53 in: [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

³⁵³ Parsons, E.C.M., and Wang, J.Y., 1998. A review of finless porpoises (*Neophocaena phocaenoides*) from the South China Sea. Pp. 287–306 in: *The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea*, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

surface gillnets killed 17; trapnets killed 7; trawl nets killed 1; and drifting ghost nets killed 1.³⁵⁴ Finless porpoises were also incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.³⁵⁵ There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and for better estimates of bycatch for this species.

Overall, given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a desperate need for both systematic bycatch assessments in these diverse fisheries and up-to-date abundance estimates. The region needs a competent management organization that could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch and direct harvest, establish science-based bycatch and direct harvest management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. Two scientific bodies and several regional advisory bodies might provide venues for basic assessment efforts or information exchange. The North Pacific Marine Science Organization (PICES) provides similar services to those of ICES in the North Atlantic. The Secretariat for the Pacific Community operates in the southern hemisphere, and likewise maintains data, collects scientific information, fishery data and so forth. Depending on U.S. interests and relationships, advisory bodies that might provide access include the Asia-Pacific Fisheries Commission, the South Pacific Forum Fisheries Agency, and the Asia Pacific Fisheries Commission. None of these bodies follows the currently preferred Straddling Stocks paradigm. This would be a region that deserves scrutiny under the rubric of the 2006 amendments to the M-SFCMA, either as a location where the U.S. would seek improved communication and information exchange, or identification and listing as nations that “fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States.”³⁵⁶

Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught at unsustainable levels in gillnet, driftnet, and purse-seine fisheries in the western central Pacific off the coast of Australia. Perhaps 5 to 50 percent of the population of Indo-Pacific humpback dolphins are incidentally captured in offshore driftnets and in inshore gillnets set to protect bathers from sharks north of Brisbane Australian and along the central section of the Great Barrier Reef. However, because poor population and bycatch estimates these percentages are suspect.

Spinner and Fraser’s dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser’s—were being killed each year, probably at unsustainable levels, by a fleet of five tuna purse-seiners using fish-aggregating devices.³⁵⁷ Scientists estimate that even more cetaceans may be caught in round-haul nets; one estimate for the eastern Sulu Sea was

³⁵⁴ Kasuy, T., 1999. Finless porpoise—*Neophocaena phocaenoides* (G. Cuvier, 1829). in: Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442 .

³⁵⁵ Yang G., Zhou, K, Xu, X, Leatherwood, S., 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

³⁵⁶ S.Rpt. 109-229 at 45.

³⁵⁷ Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

2,000–3,000 per year.³⁵⁸ Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus (*Nautilus pompilius*) fisheries in Palawan.³⁵⁹ Currently there are no total bycatch estimates for the Philippines, but preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.³⁶⁰

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphins. The species has been seriously depleted in parts of Thailand and the Philippines.³⁶¹ Recent surveys indicate dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.³⁶² Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered under IUCN. An average of three dolphins per year die from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.³⁶³ The Irrawaddy dolphins living at the head of Malampaya Sound in Palawan, Philippines, number approximately 77 individuals (CV 27.4 percent). Between February and August 2001, five dolphins were accidentally killed in bottom-set nylon gillnets used to catch crabs (called *matang quatro* nets locally).³⁶⁴ These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines.

Scientists have recommended that Irrawaddy dolphin mortality be eliminated or at least drastically reduced in these fisheries. This will require the development of socio-economic alternatives to help promote the conservation goal of reducing entanglement and that alternative gear or employment options be provided to gillnet fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in these areas.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, and the Mekong population is a high priority for Red List assessment.³⁶⁵ In the Mekong River from 2001 through 2003, an average of four deaths per

³⁵⁸ Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

³⁵⁹ *Id.*

³⁶⁰ Dolar, M.L.L., 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. Ph.D. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W. F., 2002. Problems of marine mammal conservation in Southeast Asia. Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science. Fisheries Science 68, Supplement 1:238–242.

³⁶¹ Andersen, M., and Kinze, C.C., 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

³⁶² IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **3** (Supplement), 263–291.

³⁶³ Krebs, D., 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

³⁶⁴ Dolar, M.L.L., Perrin, W.F., Gaudio, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L., 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology*, Supplement, 155–160.

³⁶⁵ Baird, I.G., and Mounsouphom, B., 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins (*Orcaella brevirostris* Gray) in Lao PDR. *Asian Marine Biology* **14**, 41–48.

year were attributed to gillnet entanglement, representing 5.8 percent of a population estimated to number only 69 individuals.³⁶⁶

Finally, this area needs further research efforts to collect basic information. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form). Comprehensive cetacean abundance and bycatch surveys are needed in order to develop effective mitigation strategies. This region needs a regional management body that could take the lead in coordinating efforts to undertake such assessments, as well as establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. There is also the need for capacity building, especially in the U.S. territories and small island nations, to sustain efforts to assess cetacean abundance, evaluate bycatch, and promote fishery conservation and management. The Western and Central Pacific Fisheries Commission may provide a mechanism to address and possibly mitigate the bycatch that has been documented in the tuna purse-seine fishery in the Philippines. Additionally, U.S. may make progress in documenting cetacean bycatch in the Western and Central Pacific through passage of a cetacean bycatch resolution with the Western and Central Pacific Fisheries Commission (See Appendix C).

Eastern Central Pacific

In the Eastern Central Pacific, the vaquita suffers the most significant incidental mortality in coastal gillnet fisheries and the false killer whale in longline fisheries.

The vaquita is threatened with extinction by gillnet fisheries. This porpoise, endemic to the upper Gulf of California, Mexico, numbers only in the low to mid-hundreds and may be declining as commercial and artisanal fisheries in the upper Gulf kill 35 to 40 vaquitas per year—6 percent to 7 percent of the population. The designation, in 1993, of a Biosphere Reserve in the Upper Gulf of California and Colorado River Delta has done little to protect vaquitas—despite the management plan calling for a ban on commercial fishing in its “nuclear zone.” Even the recommendations of the International Committee for the Recovery of the Vaquita have gone unheeded.

More recently the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita. Other recommendations were that gillnets and trawlers be phased out in the entire Biosphere Reserve, effective enforcement of fishing regulations begin immediately, acoustic surveys for vaquitas be initiated, research on alternative gear types be started, public outreach and education be developed, consideration be given to the compensation of fishermen for lost income, research be initiated on vaquita habitat, and international and nongovernmental cooperation be fostered.³⁶⁷

Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. In its bilateral talks with Mexico, the U.S. must develop an intergovernmental plan or bilateral agreement to

³⁶⁶ Beasley, I., Chooruk, S., and Piwpong, N., 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75–83.

³⁶⁷ Rojas-Bracho, L., and Jaramillo-Legorreta, A.M., 2002. Vaquita *Phocoena sinus*. Pp. 1277–1280 in: *Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

implement the recommendations of the International Committee. The U.S. will have to provide the necessary financial assistance to implement and enforce the agreement. The Commission on Environmental Cooperation (CEC) under the North American Free Trade Agreement (NAFTA) promotes the effective enforcement of environmental law in Canada, Mexico and the U.S. as part of its mandate under a side agreement to NAFTA, the North American Agreement on Environmental Cooperation. Until 2003, the Commission had a grants fund, but it is no longer operational. The CEC has been called upon to step in to compel the three North American nations to follow their own or cooperative environmental laws. In one case, citizens groups asked the CEC to make a determination about whether Canada was enforcing its own law regarding species at risk. The case is still open and under consideration by the CEC Secretariat.³⁶⁸

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. NMFS recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. Mortality and serious injury from the Hawaiian and Palmyra stocks have exceeded sustainable levels (1.6 percent to 2.5 percent of the population).³⁶⁹ Of even greater concern is the undocumented number of false killer whales caught by international fisheries—a bycatch that may be significant. The U.S. must use both the Inter-American Tropical Tuna Commission and the Western-Central Pacific Fisheries Commission Tuna Treaty, as well as the MMPA, to advocate documentation of the problem and take measures to reduce the incidental mortality of false killer whales in tuna longline fleets. Whatever mitigation strategies are developed through research or bycatch reduction teams should be implemented internationally through these two regional fisheries management organizations. International bycatch provisions of the 2006 amendments to the M-SFCMA also provide a mechanism to initiate discussions with flag states in this region.

In the eastern tropical Pacific portion of the Eastern Central Pacific, what few quantitative data are available, indicate the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is high.³⁷⁰ Due to the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation. An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4–9.5 percent.³⁷¹ Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins, *S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these

³⁶⁸ Species at Risk. Submission ID: SEM-06-005, Party concerned: Canada. Date filed: 10/10/2006 Status: Open Latest update: 8 Feb. 2007. Available online at <http://www.cec.org/citizen/submissions/details/index.cfm?varlan=english&ID=114>. Last accessed 14 March 2007.

³⁶⁹ The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

³⁷⁰ Vidal, O, Van Waerebeek K. and Findley L.T., 1994. Cetaceans and gillnet fisheries in Mexico, Central America and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233

³⁷¹ Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

populations are likely overrepresented, relative to their abundance, in the bycatch.³⁷² A NOAA–SWFSC report estimated annual incidental mortality in artisanal gillnets were 16,596 in Costa Rica and 3,581 in Panama.³⁷³ Information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species that are not restricted to U.S. territorial waters, and for which no cooperative management agreements exist with Mexico to address the bycatch in their coastal fisheries, present a particular problem. These artisanal gillnet fisheries are widely dispersed, involve many relatively small vessels, and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua; and local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a bilateral agreement with Mexico to cooperatively manage some of these cetacean species—especially the trans-boundary species. Additionally, the U.S. should consider developing a regional management organization of the “Americas” to conserve and manage cetaceans in Central and South America.

The U.S. should use its bilateral discussions with these nations, the existing Inter-American Tropical Tuna Commission (especially under the new provisions of the Antigua Convention) to advance proposals and resolutions to document cetacean abundance and bycatch. The U.S. should consider undertaking joint cetacean abundance surveys in Mexican waters and elsewhere throughout Central America. The U.S. could look for opportunities to engage in technology transfer and capacity building by partnering the staff of the Inter-American Tropical Tuna Commission, national universities, and the staff of NMFS Southwest Fisheries Science Center to conduct the need cetacean research and outreach to the fishing community.

Southwest Pacific

In the southwest Pacific, Hector’s dolphins number around 7,400, with 7,270 (CV 16.2 percent) distributed around New Zealand’s South Island³⁷⁴ and some 100 individuals (called Maui’s dolphins) off the west coast of North Island, New Zealand.³⁷⁵ According to IUCN, the species is listed as Endangered and the North Island population as Critically Endangered. In the South Island, the population is declining. The Banks Peninsula Marine Mammal Sanctuary, created in 1988 to reduce bycatch off the Canterbury coastline, has not achieved its goal—16 Hector’s dolphins (CV 39 percent) were captured in 1997–1998.³⁷⁶ Scientists have estimated

³⁷² Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

³⁷³ *Id.*

³⁷⁴ Slooten, E., Dawson, S., and Rayment, W., 2002. Quantifying abundance of Hector’s dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. <http://csl.doc.govt.nz/dsis35.pdf>.

³⁷⁵ Russell, K., 1999. “The North Island Hector’s dolphin: a species in need of conservation”. Unpublished M.Sc. thesis, University of Auckland.

³⁷⁶ Baird, S.J., and Bradford, E., 2000. Estimation of Hector’s dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

that, to meet the PBR-standard of the U.S., the north and south boundaries of the sanctuary must be extended 30 to 60 nautical miles.

For Maui's dolphin the situation is grave. Because Maui's dolphins have been reduced to such low levels, scientists concluded that human-induced mortality must be reduced to zero (from a bycatch of roughly three animals per year) to allow the North Island population to recover. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of the North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting. Even though Hector's and Maui's dolphins are species of concern, given the national laws and actions taken to date, there appears to be no role for the U.S. to take to promote greater conservation of this species.

Southeast Pacific

In the southeast Pacific, the dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are the species most frequently captured by a variety of fisheries. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins—this bycatch is large enough to cause serious concern for the continued existence of these species.³⁷⁷ The Peruvian bycatch of dusky dolphins and Burmeister's porpoise highlight the blurred boundaries between strictly incidental mortality and direct harvests for dolphin meat and blubber to be used as shark bait.³⁷⁸ Despite the Peruvian government's closure of markets for dolphin meat and other conservation laws, there is still an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; instead, they are usually hidden and sold clandestinely or transferred to shark-fishing boats at sea.³⁷⁹

The species of most concern continue to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise. In the 1990s, in Peru alone, the annual directed harvest of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. Over a 15-year period dusky dolphins have fallen from 78 percent of the total catch to only 40 percent.³⁸⁰ This continuous decline of dusky dolphins as a proportion of the overall cetacean bycatch, with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.³⁸¹

³⁷⁷ Van Waerebeek, K., Van Bresseem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bresseem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

³⁷⁸ *Id.*

³⁷⁹ *Id.*

³⁸⁰ Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bresseem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

³⁸¹ Van Waerebeek, *supra* note 369.

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters and for better information on stock structure and reliable estimates of abundance for the affected stocks. Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, the mortality of these species must be drastically reduced and the existing laws fully enforced.

The existing intergovernmental organizations in the region include the IATTC and the Permanent Commission for the South Pacific (CPPC). The Permanent Commission does have action plans for conservation of biodiversity and protection of marine mammals. It is difficult to ascertain the effectiveness of this action plan, but the U.S. could inquire about it and seek more details either in its bilateral discussions with Chile or within the IATTC. The Pacific in general, but also the west coast of Central and South America is in need of a regional management body that could require and coordinate efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. This regional management body should be developed along the model of the Straddling Stocks Agreement. The U.S. could use its M-SFCMA mandate to make international efforts to reduce bycatch as a mechanism to participate in such a regional organization. Finally, given Peru's reluctance to undertake additional measures, the Office of International Affairs might consider taking action under the embargo provisions under section 101 of the MMPA or making Peru aware of its obligations under the new provisions of the M-SFCMA.

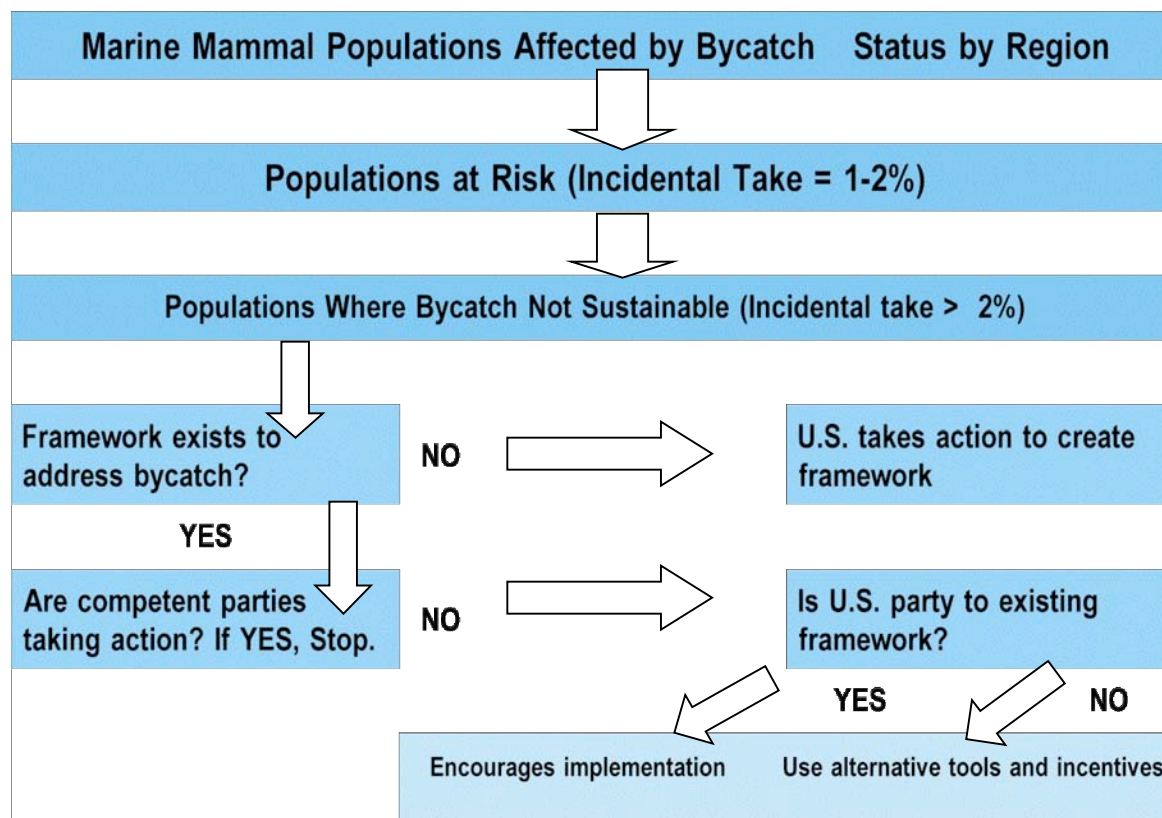
CHAPTER 6. RECOMMENDATIONS – ACTION PLAN

In Chapter 2, a review of the scientific literature summarized issues where incidental catch of marine mammals in fisheries is affecting populations already at risk. This summary highlighted needs that have been identified by scientific and management bodies such as national management agencies, the International Whaling Commission Scientific Committee, and nongovernmental organizations such as the IUCN. Chapter 5 further narrowed the scope of critical issues on a regional basis to populations where bycatch is unsustainable, where no regime exists to take action to reduce bycatch, or where measures exist, but have not been taken.

Table 5.1 points up where gaps occur in basic knowledge about abundance and bycatch, as well as gaps in the framework for management measures or implementation and enforcement of measures where a framework exists. Using the example of harbor porpoise in the Kiel & Mecklenburg Bight, it becomes clear that this animal has been assessed as vulnerable by the IUCN, but there is no recent abundance estimate, no estimate of bycatch mortality, and no mechanism to monitor bycatch in fisheries. Even though a regional agreement is in place, and though bordering states are parties to the agreement, no action has been taken to mitigate the effects of bycatch.

As illustrated by the above example, the analysis thus far has attempted to narrow the scope of possible U.S. action by starting with a description of all marine mammal problems that have been identified around the world, then examining the highest risk populations and the threats they face then focusing on threats posed by fishery bycatch. Further narrowing takes place by identifying whether competent parties are taking action, and if not, whether there is a role for the U.S. to play. Figure 6 illustrates how the narrowing of scope takes place.

Figure 6. Narrowing the Scope of Action Options



This chapter takes the gap analysis produced in Chapter 5, and examines the issues against legal pathways, rather than geographic regions, by posing the following questions:

- Does the United States have authority or capacity to act?
- Can the United States encourage action by relevant parties?
- Can the United States advocate amendment of an existing agreement or development of a new one?
- Can the United States use training and technical assistance, scientific cooperation, and similar actions in lieu of (or in addition to) legal action?

The recommendations provided in Chapter 6 are those of the authors, although they may also have been advocated by others and identified in Chapter 2. These recommendations represent actions to address not necessarily the most urgent problems, but the most urgent problems the U.S. has competence and capacity to address. Some of the recommendations have general application to the cetacean bycatch problem, and others are directed at specific areas and fishery interactions. The authors have made no assessment of whether fiscal resources exist to accomplish these actions.

The following narrative sections describe actions the U.S. could take to fill the gaps by using its own authority under MMPA or M-SFCMA, by engaging with its partners under international, bilateral or multilateral agreements, by encouraging the development of new agreements or new bycatch approaches under existing frameworks, and finally, where no treaty structure exists, by using incentives or other tools such as technology transfer. Proposed actions in the first sections have national mandates, legislative authority or U.S. policy behind them. The remaining set of proposals is a list of possibilities for actions that lie outside U.S. governmental authority, but might be advanced through the international community, diplomatic circles or public-private partnerships.

Without a doubt the one consistent need that permeates all species in all regions is the need for cetacean abundance and bycatch estimates. Estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Additionally, very low bycatch rates are difficult and costly to measure. Likewise, it is difficult and costly to obtain precise abundance estimates in low cetacean density areas. Capturing this information will require that fishery agencies, parties to international fisheries treaties, and regional fisheries management organizations incorporate bycatch monitoring and bycatch reduction measures into existing and future management regimes. Proposals for how this might be done are described below.

Actions Under MMPA Section 108

Section 108 (a)(1) of the MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals covered under the MMPA.

Actions to propose new international bycatch treaties or multilateral agreements

Section 108 (a)(2)(A) calls upon the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammals to develop bilateral and multilateral treaties with such countries to protect marine mammals. There are several areas that would benefit from a regional management agreement similar to ASCOBANS or ACCOBAMS. Such an agreement should be based on the precautionary approach and should establish internationally the goal

and objectives of Sections 117 and 118 of the MMPA. Any international agreement should contain provisions to: (a) estimate the population and stock discrimination/structure of cetaceans within an agreement area, (b) estimate cetacean bycatch (including information on the sex, relative age, or life-stage of bycaught animals) through an independent observer program, (c) document and monitor fishing effort and areas and times of operation, (d) provide mechanisms to test and develop new technologies to reduce bycatch, (e) institute mechanisms for participation of all stakeholders in the development and review of conservation and management measures, (f) establish a risk-averse science-based method for setting bycatch limits (g) develop effective means for enforcement, and (h) incentives and disincentives to bring about compliance.

Three areas are high priorities for action: the Indian Ocean, Pacific Ocean, and North, Central, and South America (the Americas).

Indian Ocean

As discussed in Chapter 5, the commercial fisheries in the Western and Eastern Indian Ocean capture spinner dolphins, Risso's dolphins, bottlenose dolphins, hump-backed dolphins, Ganges river dolphins, and Irrawaddy dolphins at unsustainable rates. Moreover, there are few national laws and virtually no international protection. There is an overwhelming need to assess the various marine mammal populations, estimate bycatch throughout the entire Indian Ocean, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, contribute to the enforcement of cetacean protective laws, estimate fishing effort, and describe the spatial and temporal characteristics of the fishery.

A regional management body could take the lead in coordinating and undertaking such efforts. The UNEP Regional Seas Programme does have a set of action plans for the South East Asian region, which includes the Indian Ocean. But there is no convention yet, and the action plans to date have concentrated on building capacity in the region, and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

The greatest challenge to the development of an Indian Ocean regional cetacean agreement is the lack of any role for the U.S. because it is not a range state for such an agreement. With limited U.S. involvement, creation of such an agreement could fall to Australia and would require careful collaboration to achieve an agreement.

There are fishery agreements in the region, but most relate to high seas fisheries such as tuna, and do not apply to the nearshore areas where much of the bycatch of cetaceans occurs. However, to the degree that any of the offshore fisheries had interactions with cetaceans, either the Straddling Stocks Agreement or provisions of the M-SA would provide the U.S. leverage to begin discussions with flag and coastal states.

Pacific Ocean

The Pacific Ocean is ripe for a regional multilateral treaty to protect cetaceans. In this region, Dall's porpoise, finless porpoise, baiji, spinner dolphins, Fraser's dolphins, Irrawaddy dolphins and false killer whales are threatened by commercial fisheries and in some cases, directed harvests. The western Pacific presents a particular challenge as it is a mixture of driftnet catches off Russia and Japan, directed harvests for Dall's porpoise off Japan, and small-scale incidental captures of critically endangered species such as the baiji in the Yangtze River of China. For the most part, the coastal fisheries of Japan, China, Korea, and Taiwan have not

been described in any detail. Moreover, bycatch estimates reported to the International Whaling Commission are suspect and possibly underreported.

The western central Pacific presents its own set of challenges. Here the coastal fisheries of the Philippines and other south Pacific islands capture thousands of spinner, spotted and Fraser's dolphins in commercial fisheries; further complicating matters are the directed harvests of other cetacean species. In a completely different habitat, the Irrawaddy dolphins of the freshwater rivers of the Mekong, Mahakam, and Malalmpaya Sound are critically endangered and continually threatened by entanglement in small gillnet fisheries.

In addition, incidental mortality in fisheries in the central Pacific, Eastern central Pacific, Southwest Pacific, and the Eastern Tropical Pacific (discussed below) could potentially be regulated as part of a Pacific regional cetacean multilateral agreement. Such an agreement would need to call upon parties to conduct comprehensive cetacean stock assessments throughout the entire Pacific, provide annual estimates of bycatch in all fisheries, provide annual reports of the number of cetacean captured in directed harvests, and provide detailed fisheries data including the number of vessels, gear, landings, area and times of operation.

There are several fishery management agreements that apply in the region, including some to which the U.S. is a party. These provide linkage either through the bycatch prevention directives of the Straddling Stocks Agreement or might be fisheries to evaluate and possibly list under the M-SA. Nevertheless, this area may benefit from a Pacific-wide regional management agreement dedicated to addressing the threats to cetaceans.

The Americas (Atlantic and Pacific)

The incidental capture of cetaceans on both the Pacific and Atlantic coasts of South America is cause for concern. Along the Pacific coast of South America, dusky dolphins and Burmeister's porpoise, Chilean dolphins and Commerson's dolphins are captured in large numbers. The Peruvian laws that prohibit the sale of small cetaceans go virtually unenforced. The scope of the take is probably underestimated since port surveys alone cannot provide an accurate bycatch estimate given the clandestine sale or undisclosed transfer of carcasses at sea. Bait fisheries in Chile and Peru still exist and incidental mortality in Ecuadorian coastal fisheries is poorly documented but is thought to number in the thousands. Off Mexico and Central America, the incidental mortality of cetaceans in coastal fisheries is undocumented but preliminary estimates for some areas such as Costa Rica number more than ten thousand.

On the Atlantic coast of South America, tucuxis, dusky dolphins and Commerson's dolphins are taken in coastal gillnet and trawl fisheries; and Atlantic coast estimates of both cetacean abundance and bycatch are completely lacking for Mexico and Central America.

A regional agreement for North, Central, and South America would promote international scientific research, technology transfer (e.g. pingers and trawl bycatch reduction measures), and better compliance with national laws. For example, franciscanas range across the borders of Brazil, Uruguay, and Argentina and although protected by law in all three countries, a regional agreement would ensure consistency in addressing the bycatch problem. In 1991, the governments of Colombia, Chile, Ecuador, Panama, and Peru approved an Action Plan for the Conservation of Marine Mammals in the Southeast Pacific; but it appears little progress has been made in implementing this plan. Overall, Central and South America are in need of improved abundance estimates, stock delineation, and bycatch estimates for all cetaceans that inhabit Central and South America. In addition, better descriptions of fishing effort, operational time and areas are still needed for much of this region.

There is little in the way of regional cooperation in fishery management in this region,

and most of the action is taken at a national level. If the U.S. determines that these nations have bycatch of protected species, it could use the M-SA listing provisions to certify and leverage discussions for action.

Area/Issues That Would Benefit From A Bilateral Approach

The MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations with foreign governments which are engaged in or which have persons or companies engaged in commercial fishing operations which are found by the Secretary of Commerce to be unduly harmful to any species or population stock of marine mammal, for the purposes of entering into bilateral and multilateral treaties with such countries to protect marine mammals...(16 U.S.C. 1378(a)(2)(A)). The Office of International Affairs should use its bilateral discussions to develop such agreements to reduce marine mammal bycatch. As a matter of priority are the bilateral discussions with Canada and Mexico.

U.S. – Mexico for vaquita and coastal gillnet fisheries

Since 1983, NMFS, NOAA, and the predecessor agency to the Mexican Secretaría de Mexico Ambiente, Recursos Naturales, y Pesca (SEMARNAP) have met annually to discuss bilateral fisheries issues. The countries have negotiated two active and one inactive memoranda of understanding (MOUs) between NMFS and SEMARNAP: (1) MEXUS-Gulf research program, (2) MEXUS-Pacífico research program, and an information exchange under an inactive MOU. The discussions have focused on conservation and management, including the protection of marine mammals and endangered species (especially turtles and mammals). Shark and shrimp management and bycatch reduction have also been discussed.³⁸²

Chapter 2 describes the long history of attempts to protect the vaquita. The most promising efforts are those of the International Committee (International Committee) for the Recovery of the Vaquita, which recommended that: the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and non-governmental cooperation be fostered.³⁸³ Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. Implementation of these recommendations, especially the ban, will require significant financial resources and must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. Perhaps as a result, the Mexican government seems to lack the political will to decisively implement these recommendations. Nevertheless there has been some progress through a newly decreed special protection zone, financial support from the Ministry of the Environment to assist fishermen, the voluntary agreement of fishermen to phase out nets with meshes of more than 6 inches (144mm), and investigations into alternative gears and fishing methods for the shrimp fishery. Socio-economic assistance is critical to bring about the necessary changes in fishing habits and to support the ongoing buy-out of the larger meshed nets.

³⁸² <http://www.nmfs.noaa.gov/ia/bilateral/docs/U.S.-Mexico%2005.doc>

³⁸³ Rojas-Bracho, L. and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp.1277–1280 in: *Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

In the course of bilateral discussions the U.S. could offer economic assistance and even consider a debt for conservation swap to provide the funds necessary to implement these recommendations and to create socio-economic opportunities that will enable Mexico to, in particular, implement the ban on gillnets and to enforce the restriction. The International Committee should be the body that puts together an action plan to implement their recommendations, including an estimate of the costs. The government to government bilateral could become the vehicle to officially adopt such provisions through a specific bilateral agreement.

Canada for right whales

The U.S. holds bilateral meetings with Canada under the authority of the Magnuson Fishery Conservation and Management Act, 16 U.S.C. 1822(a), which authorizes the Secretary of State to negotiate international fisheries agreements, and 16 U.S.C. 1855(d), which authorizes the Secretary of Commerce to promulgate regulations necessary to carry out the Magnuson Act. The focus of the discussions is bilateral, multilateral and global fisheries conservation and management issues of benefit to both parties. The U.S. and Canada discuss coordination with regard to conservation and management of shared stocks (such as Pacific albacore, Pacific hake, and species of mutual concern in the Gulf of Maine) and coordination and strategies for improving conservation and management within the Northwest Atlantic Fisheries Organization (NAFO). Global fisheries issues of interest to the U.S. and Canada include various international fisheries management agreements and initiatives (such as the FAO International Plans of Action for Seabirds, Sharks, Capacity and IUU Fishing and the UN Fish Stocks Agreement).³⁸⁴

As stated previously, the North Atlantic right whale is a transboundary species and thus it faces similar conservation challenges in both U.S. and Canadian waters. NOAA has stated that it, “intends, with the appropriate federal agency or agencies, to initiate the negotiation of a bilateral Conservation Agreement with Canada to ensure that, to the extent possible, protection measures are consistent across the border and as rigorous as possible in their protection of right whales.”³⁸⁵ To date no specific language of such an agreement has been published and it is uncertain whether NOAA has begun these discussions.

It has been recommended both in the North Atlantic Right Whale Recovery Plan and by noted marine mammal scientists that NOAA should engage in such bilateral discussions. Bilaterally agreed-upon management policy, regular joint meetings, and cooperative action are essential for the protection of this critically endangered migratory species.³⁸⁶ It is recommended that NMFS expedite these discussions and develop a joint plan.³⁸⁷

³⁸⁴ <http://www.nmfs.noaa.gov/ia/bilateral/docs/US-Canada%20-%202005.doc>

³⁸⁵ Silber, GK and Bettridge S. 2006. United States' Actions to Reduce the Threat of Ship Collisions With North Atlantic Right Whales Prepared for the International Whaling Commission's Working Group on Ship Strikes and Presented at the International Whaling Commission's Conservation Committee, St. Kitts, 9 June 2006. National Marine Fisheries Service. Silver Spring, Maryland.

³⁸⁶ Sayles JS and Green DM 2005 Bilateral Action for Right Whales **Science** 9 December 2005: Vol. 310. no. 5754, pp. 1616 – 1618.

³⁸⁷ Currently, two National Marine Fisheries Service staff are members on the Canadian Right Whale recovery team—one from Northeast Regional Office and one from Northeast Fishery Science Center.

Bilaterals related to free trade negotiations

The U.S. is currently engaged in bilateral discussions on living marine resource issues with many countries and fishing entities, including Chile, China, Japan, Russia, Vietnam, Taiwan, and the European Union. The Office of International Affairs should elevate cetacean bycatch issues highlighted in this report in each of these bilateral discussions and request that these nations provide estimates of bycatch in their commercial fisheries and cetacean abundance estimates for cetaceans that interact with these fisheries. The Office of International Affairs should use these bilateral discussions as a vehicle to make progress to gather information and urge development of conservation and management measures to reduce cetacean bycatch.

Actions to amend existing agreements

Section 108 (a)(4) mandates that the Secretary of Commerce through the Secretary of State initiate the amendment of any existing international treaty for the protection and conservation of any species of marine mammal to which the U.S. is a party in order to make such treaty consistent with the purposes and policies of the Act.

The Convention for the Regulation of Whaling is perhaps the only international treaty that meets this standard. For years, non-whaling nations have attempted to expand the purview of the International Whaling Commission by introducing such issues and subcommittees as the Subcommittee on Small Cetaceans, Subcommittee on Whalewatching, and Working Group on Estimation of Bycatch and Other Human-Induced Mortality. While these bodies are valuable sources of information and provide opportunities for scientific exchange and recommendations, they have no real power to bring about compliance with any of their recommendations. Until the Convention for the Regulation of Whaling is modified to explicitly provide the IWC with authority to regulate both the direct and incidental harvest of small cetaceans, progress to address these issues through the IWC will be limited. The major obstacles to such an undertaking are that the U.S. and other non-whaling, conservation-minded nations no longer have the three-quarters majority needed to amend the convention and a growing majority that support the viewpoint that the IWC does not have competence over small cetaceans. Nevertheless, the Office of International Affairs should consider how it might modify the Convention to broaden the IWC's authority to regulate bycatch and to make the Convention more consistent with the purposes and policies of the MMPA, as it relates to bycatch in commercial fisheries.

Actions Under MMPA Section 101

Mediterranean Driftnets

The nations that still continue to fish illegally with driftnets are Morocco, Turkey and Italy. It appears that Morocco and the U.S. have devised a plan to convert the Moroccan driftnet fleet to more sustainable fishing practices.³⁸⁸

Turkey on the other hand is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long, with fishing nets that are 800-1,000 meters long, targeting swordfish off the southwest corner of Turkey. On its face, it appears that Turkey may not be violating the UN Driftnet Moratorium.

³⁸⁸ 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Nevertheless, the U.S. must take action to better document and ascertain the scope and magnitude of this fishery. The U.S. should also require that Turkey provide documentary evidence under both Section 101(a)(2)(A) and (F).

Italy is still driftnet fishing, with reports of between 15 to 37 Italian vessels operating from six Italian ports illegally driftnet fishing. To date, the U.S. certified Italy under the Pelly Amendment but lifted that certification in 1997. The U.S. continues to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 U.S.C. 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

The U.S. has expressed its concern that some Italian vessels and nationals may still be engaged in large-scale high seas driftnet fishing. However, "The United States believes that the efforts now in progress [diplomatic discussions and Italian enforcement action] need some time to come to fruition and that the ultimate result of these efforts will be the complete elimination of any residual large-scale high seas driftnet fishing by Italian vessels and nationals that may still be occurring in the Mediterranean Sea."³⁸⁹

Italy's violation of the various driftnet bans has been ongoing for more than a decade and diplomatic actions and threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various international regulations banning driftnet fishing. The U.S. must take action under Section 101(a)(2) (16 U.S.C 1371(a)(2)) to ban the imports of fish and fish products from Italy, and it must certify and impose Pelly sanctions on Italy for violating the driftnet moratorium and the provisions of ICCAT which ban driftnets.

There are several fishery management agreements that apply in the region, such as ICCAT, to which the U.S. is a party. These provide linkage either through the relevant management commission or the bycatch prevention directives of the Straddling Stocks Agreement. The U.S. also could use the provisions of the M-SA to evaluate these driftnet fisheries and possibly certify Italy, Turkey and Morocco as nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the U.S., taking into account different conditions."

Takes in Peruvian Fisheries

Between 10,000 and 20,000 cetaceans die each year in Peruvian fisheries. This fishing mortality is causing the decline of Dusky dolphins and may also threaten the long-term survival of Burmeister's porpoise. Authorities in Peru remain unconvinced that any action beyond those already taken to prohibit commerce is needed to reduce the mortality of cetaceans in fisheries. Peru's enforcement of its national laws is poor and action is necessary to prohibit the capture of small cetaceans for bait and food. Additionally, efforts are needed to reduce the bycatch. The U.S. should take action, similar to that taken with Chile in regard to the Chilean crab fishery, to engage in bilateral discussions with Peru to devise a cooperative agreement to reduce cetacean bycatch and direct harvest. The trigger for such discussions could be the threat of an embargo of Peruvian fish products under Section 101(a)(2)(A).

³⁸⁹ 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available on line at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Actions Under M-SFCMA

Section 202(h)(1) of the Magnuson-Stevens Fishery Conservation and Management Act calls on the Secretary of State, in cooperation with the Secretary of Commerce, to seek to secure international agreements to establish standards and measures for bycatch reduction that are comparable to the standards and measures applicable to U.S. fishermen if they conclude that it is necessary and appropriate.

New provisions in the Magnuson-Stevens Act call for the U.S. to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.³⁹⁰ Among other provisions, the revised Act calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels

There are several regional fisheries management agreements that may be vehicles to request that parties to such agreements assess cetacean populations and stocks, estimate bycatch, take measures to reduce bycatch and report their findings and actions back to the regional fisheries management secretariat.

The purposes of RFMOs and UNEP regional seas agreements are different. However, using both approaches would enable managers to come at the bycatch problem from both the side of improving fishery performance by using best practices to reduce bycatch, and work in concert with planners in the regional seas program to engage conservation, protection, and mitigation measures in the action plans.

Global Plan of Action for Marine Mammals

In the early 1980s UNEP and the Food and Agriculture Organization of the UN finalized and adopted a Global Plan of Action for Marine Mammals (MMA), the central goal of which is to generate a consensus among governments on which to base their policies for marine mammal conservation under the auspices of UNEP. Several Regional Seas Programmes have incorporated marine mammal conservation into their Action Plans and protocols—the Mediterranean, South-East Pacific, Wider Caribbean and Eastern Africa regions. These plans include development of regional and national management plans for threatened species, research and monitoring programs and establishment of marine parks and protected areas. More to the point, a few regional seas conventions have established regional action plans dealing specifically with marine mammals.³⁹¹ Wherever regional seas conventions exist, the Office of International Affairs should seek to participate in those conventions and work to advance marine mammal/cetacean action plans that will result in creating the necessary infrastructure and process to reduce cetacean bycatch.

The MMA should be revised and retooled to increase its relevance and usefulness. UNEP is in the process of revising and reevaluating the present relevance of this action plan given that nearly three decades have passed since it was first developed in 1978. UNEP is retooling the Marine Mammal Action Plan in consultation with CMS, CITES, the Convention on Biological Diversity, the regional seas conventions and action plans and relevant partner

³⁹⁰ Section 207(a)

³⁹¹ Notably, the Mediterranean has adopted action plans for the Mediterranean monk seal and cetaceans. The South-East Pacific has an Action Plan for the Conservation of Marine Mammals in the region, and the Caribbean Environment Programme has a Regional Management Plan for the West Indian Manatee.

organizations, including IUCN, in order to present a revised MMAP to the Fourth Global Meeting of Regional Seas Conventions and Action Plans. The Office of International Affairs should monitor and participate in this process wherever possible to ensure that the revised MMAP embodies the purposes and policies of the MMPA.

South Pacific Regional Environment Program

A recently formed Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region provides an institutional umbrella for Pacific Island Countries (PICs) to conserve Pacific Island whales and dolphins (cetaceans) and their habitats. It was negotiated under the auspices of the Convention on Migratory Species (CMS), in close collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) based in Apia, Samoa and signed by Australia, Cook Islands, Federated States of Micronesia, Fiji, France, New Zealand, Niue, Samoa and Vanuatu. Contracting parties to CMS are Australia, Cook Islands, France, New Zealand and Samoa. The MoU's entry into effect is very timely and coincides with SPREP's review of its Whale and Dolphin Action Plan. The Action Plan will form an integral part of the MoU. The accompanying Action Plan calls upon signatories to reduce threats, respond to strandings and entanglements, and to protect habitat, including migratory corridors. Cooperation, information exchange, education and public awareness activities are also significant components of the Action Plan. In addition, signatories need to undertake more training, research and monitoring. Working towards sustainable and responsible cetacean-based tourism is another objective. The fisheries interaction objective is mostly focused on cetacean depredation of fish caught on longlines. An Action Plan from a SPREP Longline/Cetacean Interactions Workshop calls for further research into the species involved in depredation, extent of impact and possible methods for mitigation. To date, the signatories do not believe that bycatch and entanglement in fishing gear are a significant issue. The Office of International Affairs should work to expand this Action Plan to undertake the necessary cetacean abundance research and to more thoroughly document the frequency of cetacean bycatch.

Caribbean SPAW Protocol

The promulgation of a regional marine mammal action plan under UNEP's Caribbean regional seas program and the establishment in Guadeloupe of a Regional Activity Centre (RAC) for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW Protocol), provide the International Affairs Office a means to develop regional networks, collaborative studies and training activities to promote scientific understanding of the cetaceans and cetacean bycatch and to further develop the scientific and technical capacity of the region.

The body that might fill the role of a RFMO in the Caribbean is the West Central Atlantic Fisheries Commission (WCAFC). Because it is advisory only, the U.S. might encourage efforts to revamp it in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. This region might be a place to use the resources provided in the M-SA amendments to foster creation of a new regional management body, to bring fishing into compliance with the most recent international standards. This region is adjacent to the U.S., includes U.S. territory, and would be a logical place to extend diplomatic, technical and conservation efforts.

Northwestern Atlantic Fisheries Organization

Even though NAFO's focus is on the conservation and management of stocks of commercially valuable groundfish and other species, the members—Bulgaria, Canada, Cuba, Denmark, European Union, France, Iceland, Japan, Korea, Norway, and Russia—can provide information critical to understanding the bycatch of cetaceans in these fisheries. Given NAFO's

on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, the organization would be a likely partner in helping to reduce cetacean bycatch. In 2006, NAFO passed a resolution calling upon contracting parties to generally support adoption and implementation of the FAO Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations, to provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area. The resolution also calls upon NAFO Parties to consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

The U.S. should propose a similar resolution for cetaceans within NAFO with particular emphasis on the bycatch of harbor porpoise.

Southeast Atlantic Fisheries Organization

The Commission has a broad range of fishery conservation and management functions (See Chapter 4), however, the types of conservation and management measures anticipated under the Convention include measures relating to the quantity of any species that may be caught; the areas and periods in which fishing may occur; the size and sex of any species that may be taken; the fishing gear and technology which may be used; the level of fishing effort; and the designation of regions and sub-regions.

SEAFO includes in its convention provisions that take into account the impact of fishing operations on ecologically related species such as seabirds, cetaceans, seals and marine turtles. It calls for conservation and management measures for species belonging to the same ecosystem as, or associated with or dependent upon, the harvested fishery resources. Parties are to ensure that fishery practices and management measures take into account the need to minimize harmful impacts on living marine resources as a whole and to protect biodiversity in the marine environment. In addition, the Scientific Committee is provided with the authority to assess the status and trends of relevant populations of living marine resources. Finally, the convention also has provisions for an observer program.

Recognizing the threats to cetaceans from fisheries that occur off the west coast of Africa, SEAFO appears to offer the vehicle to make progress towards assessing the cetacean populations of this region, the bycatch of the fisheries that operate here, and adopt effective monitoring and mitigation measures. The Office of International Affairs should participate in this fisheries organization and offer a resolution similar to that discussed for NAFO (See Appendix D).

Western Central Pacific

The new regional convention in this area calls for the adoption of measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species, in particular endangered species. The agreement promotes the development and use of selective, environmentally safe and cost-effective fishing gear and techniques and protection of marine biodiversity. Of particular interest is the fact that this convention specifically provides for adoption of, "where necessary, conservation and management measures and recommendations for non-target species and species dependent on or associated with the target stocks, with a view to maintaining or restoring populations of

such species above levels at which their reproduction may become seriously threatened.” The scientific experts used by the Commission may also conduct assessments of highly migratory fish stocks, non-target species, and species belonging to the same ecosystem or associated with or dependent upon such stocks, within the Convention Area.

In short, the Western Central Pacific Fisheries Commission includes the provisions necessary to call upon Parties to assess cetacean populations, fisheries bycatch, and to develop and implement measures to reduce cetacean bycatch. In December 2005, the Commission adopted a resolution addressing sea turtle bycatch. The Office of International Affairs should put forward a resolution that calls upon nations to assess cetacean populations within their waters, estimate bycatch in their coastal fisheries, and provide this information to the Commission. An example of such a resolution is provided in Appendix C.

South West Indian Ocean

One of the newest commissions is the South West Indian Ocean Fisheries Commission (SWIOFC). Although it is only advisory at present, it will focus on coastal fisheries of East Africa and island states in the region, and has a mandate for responsible management and regional cooperation on fisheries policy. Its first priority will be data collection. There is not much leverage for the U.S. in this region.

Southeast Pacific Ocean

The Southeast Pacific region spans the entire length of the Pacific coast of South America from Panama to Cape Horn, encompassing tropical, sub-tropical, temperate and sub-antarctic systems and crossing the boundaries of five countries—Chile, Peru, Ecuador, Colombia and Panama. One of the initial activities in the region was the drafting of a regional diagnosis on the state of marine mammals based on the national consultation reports. The governments, with the purpose of enhancing the application in the South East Pacific of the Global Programme of Action for the Conservation, Management and Use of Marine Mammals, approved the Plan of Action for the Conservation of Marine Mammals in the South East Pacific. A meeting of experts held in Costa Rica in January 1995 resolved that there had been progress in terms of research, management and legislation to protect these species.

A Regional Course on Catch, Monitoring, Data Collection Techniques and Assessment of Marine Mammals Stocks took place in 1997, in Guayaquil, Ecuador. National studies have also been conducted on the development of techniques for monitoring marine mammal mortality rates. Several projects are currently being carried out to launch different campaigns with the purpose of increasing awareness among communities of artisanal fishermen and authorities.³⁹² Despite these many efforts, it is still difficult to determine what effect these assessments are having on the water to assess cetacean populations or monitor or reduce cetacean bycatch. This is an area where concrete information on the progress that has been made by each nation in implementing these action plans and assessments should be shared with the U.S. through bilaterals and through other regional fisheries management organizations such as the Inter-American Tropical Tuna Commission.

One approach that might be effective in this region is to create a forum for information exchange. At present, there is no nexus between the MMAP and the IATTC, nor is there feedback or data exchange between the regional seas program and the regional fishery management entity. The management structure in this area is well developed and has a long history of conservation and bycatch reduction through gear and best practices. The IATTC

³⁹² CPPS (2004) (Accessed 06/07/04) <http://www.cpps-int.org>. Last updated 21/05/04

would be an effective partner to engage in this region.

Actions Under MMPA Title III

Title III of the MMPA—International Dolphin Conservation Program—addresses the capture of dolphins in purse seine fisheries predominantly in the eastern tropical Pacific Ocean. However, Congress was concerned that the association, encirclement, and capture of dolphins in purse seine nets to capture tuna may occur in other oceans. References to this issue occur several times within this title. First, Congress states that it is the policy of the U.S. to “encourage observer coverage on purse seine vessels fishing for tuna outside of the eastern tropical Pacific Ocean in a fishery in which the Secretary has determined that a regular and significant association occurs between marine mammals and tuna, and in which tuna is harvested through the use of purse seine nets deployed on or to encircle marine mammals.” Likewise the Dolphin Protection Consumer Information Act’s labeling provisions state that it is unlawful to label a product ‘Dolphin Safe’ if it comes from a fishery where “the Secretary has determined that a regular and significant association occurs between dolphins and tuna (similar to the association between dolphin and tuna in the eastern tropical Pacific Ocean)...”³⁹³

Although neither Title III nor the Dolphin Protection Consumer Information Act explicitly require a determination and a list of fisheries for which the Secretary has determined that a regular and significant association occurs between dolphins and tuna, it is inferred that such determination should be made. Moreover, new language in the M-S reauthorization amendments also requires a determination to be made identifying and listing of nations that “fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States.” Insofar as was able to be determined, the NMFS has never taken action under Title III of MMPA. In the absence of such a determination, tracking and verification of tuna coming from other oceans than the ETP may be incomplete or flawed. The new international title of the M-SFCMA may provide needed impetus to investigate further. The paragraphs below summarize instances where the literature indicates some level of interactions with purse seine fisheries and cetaceans. The level and significance is poorly documented, but in most cases there are regional fishery management organizations that should be used to allocate the observer coverage necessary to define the scope and frequency of the interaction.

Western Central Pacific Ocean

In the Philippines, scientists estimated that about 2000 dolphins, primarily spinner, pantropical spotted, and Fraser’s, were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery in Negros Oriental was estimated at about 400.³⁹⁴ Similarly, there have been indications of dolphin bycatch immediately west of the 150°W Longitude, the line differentiating the eastern tropical Pacific and western central Pacific tuna treaties. The latter treaty should be the tool to investigate and mitigate the occurrence of bycatch in coastal purse seine fisheries like the Philippine purse seine fishery.

West Coast of Africa

For more than four decades scientists have speculated that dolphins are encircled and

³⁹³ 16 U.S.C 1385(d)(1)(B)(i)

³⁹⁴ Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355-363.

captured in tuna purse seine fisheries in the eastern tropical Atlantic Ocean, especially off the west coast of Africa. The levels of mortality, stock sizes, and even exact species involved are not known with certainty although the interactions most likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus spp.*).³⁹⁵ It has been suggested that dolphin mortality in this fishery could be up to 30,000 or more animals per year.³⁹⁶ Tuna/whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.³⁹⁷ Independent observer data are needed to define the composition and extent of the bycatch. The Office of International Affairs should work through ICCAT to either request that ecosystem working group of the Standing Committee on Research and Statistics SCRS to investigate, undertake a pilot study to conduct the research, or request greater levels of observer coverage necessary to define the extent of this problem.

Actions Under MMPA Title II

The Marine Mammal Commission was established under Title II of the MMPA. The Act calls upon the Commission to undertake a review and study of the activities of the U.S. pursuant to international conventions relating to marine mammals.³⁹⁸ The Commission is also required to recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals, and suggest appropriate international arrangements for the protection and conservation of marine mammals.³⁹⁹ Given these mandates, the Office of International Affairs might look to the Commission as a partner with whom to execute the recommendations in this report and to develop and further refine an annual strategy to reduce the international bycatch of cetaceans.

The Office of International Affairs might look to the Commission for its scientific expertise in developing international scientific programs or partnerships to begin to make progress on the research needs. The Office of International Affairs should also work with the Commission to develop resolutions and amendments to regional fishery management organizations that it might want the State Department to advance in these forums. Finally, the Commission might assist the Office of International Affairs in developing information for the reports mandated under the MMPA and Magnuson-Stevens Act. The Office of International Affairs could also work with the Commission to develop a strategy for each body to complete its mandates under both the MMPA and the Magnuson-Stevens Act.

Potential for New Legislation on Cetacean Bycatch

In the 109th Congress, Senator Barbara Boxer (D-CA) introduced S. 1224, the National Oceans Protection Act of 2005. The bill contains subtitle C—Cetacean and Sea Turtle Conservation Act of 2005 (Appendix E), which directs the Secretary of Commerce to enter into negotiations with countries that engage in commercial fishing operations that adversely impact

³⁹⁵ Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr. PêchesMouadhibou* **10**, 89–101.

³⁹⁶ Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110pp.

³⁹⁷ *Id.*

³⁹⁸ 16 U.S.C. 1402 (a)(1).

³⁹⁹ 16 U.S.C. 1402 (a)(5).

cetaceans or sea turtles that result in agreements requiring such countries to reduce bycatch of such animals to at least sustainable levels. The bill, supported by the environmental community, further demonstrates Congress' interest in international cetacean bycatch and their desire to make progress in addressing the issue. The bill was never acted upon, but since introduction, subtitles of the National Oceans Protection Act have either been included in other introduced bills or enacted elsewhere.

In Appendix F⁴⁰⁰, a proposed draft bill, patterned after the legislation in Appendix E, is provided. Section 5 of the draft bill calls for the negotiation of bilateral and multilateral agreements with foreign governments to reduce cetacean bycatch to sustainable levels. The bill also contains two critical provisions—establishment of a grant program and a bycatch database—the need for which will be discussed elsewhere in this chapter. The grant program provides foreign entities with funding to develop fishing gear and methods to reduce bycatch. But the more critical need is for assessments of abundance and bycatch monitoring. The bycatch database would create a sorely needed resource to collect information on cetacean bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce cetacean bycatch. This database could be linked to other databases that are being developed as part of the Integrated Ocean Observing System (IOOS) and the Global Earth Observing System of Systems (GEOSS). Finally, the bill authorizes sorely needed funds dedicated to this program at the level of ten million dollars annually for the implementation of this program.

The Office of International Affairs should consider developing similar legislation as an Administration bill. It is highly likely the conservation community could be enlisted to help advocate introduction and passage of such legislation.

Actions through the United Nations

In May 2007, President George W. Bush urged the U.S. Congress to ratify the United Nations Convention on the Law of the Sea (UNCLOS), a departure from more than 20 years of U.S. policy in opposition to the treaty. UNCLOS is described in detail in Chapter 4, but in general, it provides a legal framework within which countries may agree to carry out activities in the oceans and seas. The General Assembly of the United Nations convened the Third United Nations Conference on the Law of the Sea, which adopted UNCLOS in 1982, after several preceding negotiating sessions. The General Assembly annually considers and reviews ocean affairs and the law of the sea based on annual comprehensive reports prepared by the Secretary-General.

In November 1999, the General Assembly established an open-ended informal consultative process in order to facilitate the annual review by the General Assembly, which includes consideration of the Secretary-General's annual report on oceans, UNCLOS, the UN Straddling Stocks Agreement, and issues of particular interest as well as consideration of any particular resolution or decision of the General Assembly, any relevant special reports of the Secretary-General and any relevant recommendations of the Commission on Sustainable Development.

Since 2001 the General Assembly has passed two UNCLOS resolutions each year. One, typically referred to as the Oceans and Law of the Sea Resolution, recalls and reaffirms provisions related to the UNCLOS and highlights specific actions that the General Assembly

⁴⁰⁰ While the previous legislation contained provisions for both sea turtles and cetaceans, for purposes of this report the authors focused these provisions only on cetaceans. Nevertheless, the same issues are also of concern to sea turtles and any legislation that moves forward should include provisions to reduce sea turtle bycatch.

either encourages, urges, or requests parties to undertake.⁴⁰¹ Similarly, the sustainable fisheries resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific action.

For example, in 2006, the sustainable fisheries resolution:

Urges States, including those working through subregional or regional fisheries management organizations and arrangements, to implement fully the International Plan of Action for the Conservation and Management of Sharks, notably through the collection of scientific data regarding shark catches and the adoption of conservation and management measures, particularly where shark catches from directed and non-directed fisheries have a significant impact on vulnerable or threatened shark stocks, in order to ensure the conservation and management of sharks and their long-term sustainable use, including by banning directed shark fisheries conducted solely for the purpose of harvesting shark fins and by taking measures for other fisheries to minimize waste and discards from shark catches, and to encourage the full use of dead sharks;

Requests States and regional fisheries management organizations and arrangements to urgently implement, as appropriate, the measures recommended in the Guidelines to Reduce Sea Turtle Mortality in Fishing Operations 12 and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries of the Food and Agriculture Organization of the United Nations in order to prevent the decline of sea turtles and seabird populations by reducing by-catch and increasing post-release survival in their fisheries, including through research and development of gear and bait alternatives, promoting the use of available by-catch mitigation technology, and promotion and strengthening of data-collection programmes to obtain standardized information to develop reliable estimates of the by-catch of these species.⁴⁰²

The Office of International Affairs could work to include similar language in the sustainable fisheries resolution that calls upon states to implement the MMAP (preferably the revised version) and to take urgent action to assess cetacean population within their waters, document cetacean bycatch and reduce bycatch. This approach provides top-down support through the General Assembly for the recommended actions that have been made at the bottom-up regional fisheries management agreement/organization level.

Incentives

Incentives can be combined with mandates to provide impetus for compliance with international agreements. In the past, countries have used access agreements, favorable trade status, development grants and other economic assistance (such as aid for construction of freezer or dock facilities) to encourage coastal states or flag states to change fishing behavior. In the current world fishery situation, incentives that fall in the realm of fishery development are

⁴⁰¹ See, e.g. UNGA Resolution on Oceans and Law of the Sea A/RES/61/222 (16 March 2007).

⁴⁰² 2006 UNGA Resolution on Sustainable Fisheries. A/RES/61/105.

not a tool of choice, but incentives that relate to capacity reduction or effort limitation might be considered. Technology transfers or research grants might be useful incentives. The FAO has ongoing programs examining buyouts and other mechanisms for capacity reduction in which the U.S. has been participating.

Favorable price or favorable trading partner status is another type of incentive, but must be considered carefully in light of rules on tariffs and trade. This is the flip side of import restrictions, trade sanctions or requirements that importers provide proof of origin for some fish (see, for example, the ICCAT requirements outlined in Chapter 4). One mechanism the private sector has employed in an effort to provide a price benefit for seafood products is certification that fish was caught in a sustainable manner. This approach varies from consumer-oriented programs such as seafood cards that urge shoppers and restaurant diners to choose items labeled “green,” to more rigorous industry-oriented programs such as certification by the Marine Stewardship Council. In this latter approach, an applicant fishery sector must prove through responses to a set of criteria, that it can achieve a score that translates as “sustainable.” The certification is done by a third-party examiner, and follows a rigorous review process.⁴⁰³ The criteria already include an assessment of bycatch and interaction with protected species, but scoring guidelines are created for each fishery under examination. In cases where cetacean bycatch is an issue, it might be useful to work with the MSC to place emphasis on at-risk cetaceans during creation of scoring guidelines. Although to date most of the fisheries that have undergone MSC assessment have been large, industrial fisheries, the organization has devoted study to methods for assessing smaller, coastal and artisanal fisheries, and is currently developing guidelines for such approaches. These cases may have application for cetacean protection in areas with coastal fisheries such as Asia and Africa.

Labeling programs, whether “dolphin safe,” country of origin, MSC, or other certification that the product was caught according to a set of rules and standards, are only as good as the infrastructure necessary to conduct and enforce the tracking and compliance. To the degree that standards for avoidance of cetacean bycatch can be integrated into existing, required programs for seafood tracking, this incentive could be an effective tool.

An opportunity to further consideration of cetacean bycatch as an element of sustainable seafood certification and labeling could be to conduct a session on incentives at an international seafood show or conference. In recent months major seafood retailers such as Wal*Mart have made a show of pushing sustainable seafood. They join the ranks of Whole Foods and others who have been on the “green” bandwagon longer, but have less of an impact on the market. In some cases, these major players have foundations and sources of funding that might be applied to research or gear investigation or technology transfer. The tremendous influence that buyers such as Wal*Mart have on the supply chain is not to be underestimated.

New Technology

Ocean observing via satellites is an emerging technology whose applications are only beginning to be employed in resource conservation. Data on temperature, salinity, and other geophysical and oceanographic information can be related to fronts where predators and prey are most likely to be found. The data that fishing fleets use to figure out where fishing is most productive can be used to predict where marine mammals are most likely to be fishing, too. It might be possible to delineate avoidance areas by overlaying time/place/temperature information gathered through the International Ocean Observing System. The Global Earth

⁴⁰³ A description of the MSC certification process is available online at [. See also, Eco-labelling in Fisheries: what is it all about? B. Phillips, T. Ward & C. Chaffee, eds. Blackwell Science, Oxford, UK. 2003.](#)

Observation System of Systems⁴⁰⁴ provides a framework to integrate numerous data sets that may provide insight into the interaction of fishing fleets and cetaceans. These new technologies offer precision and potential to integrate data that have not been available heretofore. It is important to bring this potential to the attention of scientific committees in regional and international management bodies.

Building Capacity for Assessments and Mitigation

Capacity building is a term that refers to the enhancement of human capabilities through a combination of education and infrastructure improvement. Capacity building is crucial to providing local scientists with the skills necessary to undertake research to make progress on conservation efforts to reduce cetacean bycatch. The Office of International Affairs should seek opportunities to expand programs of scholarships to study abroad, transfer technology, engage in collaborative research, and continue programs of professional development. Any training effort should involve practical field experience that results in products such as formal population assessments, management plans, or bycatch estimates. In the end, training programs will only be successful if they are accompanied by the opportunities for local researchers to use the skills that they develop to conduct cetacean research and conservation and bycatch reduction in that region. In addition, the infrastructure necessary to aid researchers in applying these skills must be available or be able to be easily developed. The Office of International Affairs should look for opportunities to facilitate workshops that bring together researchers from a particular region to address a particular cetacean bycatch issue so they may identify and agree on priorities, coordinate research activities, standardize methodology, and enhance the analytical skills of participants.

Below are examples of ongoing programs with which the Office of International Affairs could partner to achieve some of the research needs identified throughout this report.

Programs to develop aid to undertake or establish population assessment, bycatch estimation, and bycatch reduction programs

International cetacean bycatch reduction efforts are affected by the adequacy of the science and management capacity of every coastal nation. Well-trained scientists and high-quality laboratories and equipment contribute to our understanding of cetacean bycatch. There are a variety of U.S. programs designed to assist in ocean and coastal science capacity building. The U.S. Agency for International Development, as part of its mission to expand democracy and improve the lives of citizens in the developing world, sponsors programs that promote natural resource management.

Sea Grant International—the Need for International Internships

In its 2004 report the U.S. Commission on Ocean Policy recommended that: “Congress should significantly expand the National Sea Grant College Program as part of doubling ocean and coastal research funding.” President Bush’s U.S. Ocean Action Plan states, “In response to direct requests from interested foreign governments and universities, the Administration will conduct a donors conference in Latin America, hold a workshop in Southeast Asia, and develop a technical assistance plan in North Africa in order to help introduce and adapt the successful U.S. Sea Grant system of applied research, extension, and education to countries in these regions. Sea Grant will help create a global network of institutions dedicated to applying the knowledge and technologies that lead to sustainable forms of coastal and marine resource

⁴⁰⁴ A description of GEOSS is available online at <http://www.epa.gov/geoss/>

development and conservation.”

This statement demonstrates the reach of The National Sea Grant College Program, but the international reach of this program has been limited. The Office of International Affairs should work with Congress and the National Sea Grant College Program to strengthen the international component of Sea Grant. Through international internships Sea Grant could evolve to become a marine environmental stewardship version of the Peace Corps—a Sea Corps. From the viewpoint of international bycatch reduction, students could undertake international internships to foster global capacity to reduce cetacean bycatch worldwide by adapting the Sea Grant model of applied research, extension and education to international contexts. These internships could become the mechanism to train international scientists and provide nations with the tools and personnel needed to assess cetacean population abundance, estimate bycatch, and test promising mitigation measures.

Partnerships with Academia and Environmental NGOs

World Wildlife Fund (WWF) bycatch reduction efforts

World Wildlife Fund undertakes several programs to address bycatch. WWF's first International Smart Gear Competition was held in 2005. The competition brings together the fishing industry, research institutes, universities, and government, to “inspire and reward practical, innovative fishing gear designs that reduce sea turtles, birds, marine mammals, cetaceans and non-target fish.”⁴⁰⁵ In 2006, the competition drew more than 80 entries from 26 countries. An international panel of gear technologists, fisheries experts, and representatives of the seafood industry, fishermen, scientists, researchers and conservationists judged the entries. The annual award has been between \$25,000 and \$50,000 and has gone to research to modify longline, gillnet, and shrimp trawl fisheries or gear.

In January 2002, WWF organized an international workshop that brought together the world's leading scientists on cetacean bycatch to formulate a plan for making progress toward solving the global bycatch problem. This workshop resulted in a plan for reducing cetacean bycatch, an international strategy, the formation of a network, and the creation of a virtual Resource Center, which aims to assist fishermen, scientists, environmentalists and the public in working together to address cetacean bycatch. Working closely with WWF, the International Cetacean Bycatch Task Force conducts research and training in areas with the most severe bycatch problems, works with fishermen to develop cetacean-safe fishing techniques and actively advocates for more resources and attention in international policy arenas.

Duke University

Duke Center for Marine Conservation, through the Nicolas School of Environment and Earth Sciences, is involved in a global assessment of the impact of fisheries bycatch on marine mammals, seabirds, and sea turtles. The overall goal of the program is to reduce fisheries bycatch of these vulnerable species and promote sustainable fisheries. Through synthesis of existing data, collaboration and coordination of ongoing research efforts, Duke hopes to develop new approaches to bycatch assessment looking across gear types and taxa and to place bycatch into an oceanographic context.

⁴⁰⁵ Information available on line at [bycatch](http://bycatch.org).

Society for Marine Mammalogy

In 1999 the International Society for Marine Mammalogy established a program to help support marine mammal research in economically disadvantaged countries. Individual awards of up to \$1000 may be made annually and each award may be renewed for up to three years. The grants are intended to support field research, the purchase of essential equipment, travel to field sites, or other fundamental research components.

Small grant programs

U.S. law has numerous provisions for grants and gear research. The Cetacean Conservation Act (Appendix E) contains provisions for a small grant program. The MMPA has provisions for research into gear development. In past years, the Saltonstall Kennedy Grant Program administered by NMFS has made bycatch avoidance research projects a themed priority. Although the program was cancelled in FY 2007 for lack of funding, it may be revived in the future. The annual budget and appropriations cycle usually spawns numerous line item projects that provide money for research into fishery bycatch of protected species. The Office of International Affairs should look for opportunities to either develop or use existing grant programs to fund the research needs identified in this report.

Additionally, the Office of International Affairs might look to develop a public/private partnership with external institutions and the fishing industry to either expand these existing programs or to initiate a new small grant program that would enable it to meet its obligations under the MMPA and the Magnuson-Stevens Act.

Additional Steps to Document Bycatch Worldwide

Workshop on bycatch similar to 1990 La Jolla event

In October 1990, the Workshop on Mortality of Cetaceans in Passive Fishing Nets and Traps was held in La Jolla, California. The idea for this workshop began six years earlier, but budget constraints delayed the workshop. The workshop included a symposium of contributed papers and consideration of incidental mortality in traps and other passive fishing gear. The International Whaling Commission Special Issue—Gillnets and Cetaceans that was published in 1994, remains a important, though dated, source of information on cetacean bycatch

The WWF workshop held in Annapolis in January 2002 produced a recommendation that was forwarded to the IWC Subcommittee on Small Cetaceans; that recommendation was that countries should develop formal national plans of assessment to estimate bycatch rates. "Such Plans would include collection and analysis of data to describe fishing fleets, including the size of the fleet (number of vessels), fishing methods, fishing areas and measures of fishing effort. They should also include where appropriate bycatch monitoring schemes based on independent observations when possible."

The IWC Subcommittee on Small Cetaceans has proposed a series of regional workshops, sponsored by the IWC, to advance assessment and mitigation of cetacean bycatches. "The main thrust of the workshops would be to conduct the necessary assessment, monitoring and mitigation functions that will lead, where necessary, to the reduction of bycatch and alleviation of the conservation threat to the population or species under consideration."⁴⁰⁶

⁴⁰⁶ Annex L, Report of the Subcommittee on Small Cetaceans, IWC 2004.

The Subcommittee recognized that many advances have been made in the assessment and mitigation of cetacean bycatch since the 1990 IWC workshop and they questioned whether another workshop of the scope and scale of the 1990 workshop was appropriate. Given the case-specific nature of the problem, the comments of the Subcommittee seemed to support the recommendation of either a national plan (such as the plans of assessment) or a series of broad-based regional workshops focusing on regions where bycatch problems have been identified as a priority.

The Office of International Affairs should take the lead in this effort. The workshops should not be held in the US but in regions where the bycatch problem occurs. The workshops should include an assessment of the problem and consideration of appropriate mitigation and monitoring measures. Workshop participants should include international scientists/experts on cetacean bycatch, invited experts on the biology of the most affected species, local scientists, fishery managers, representatives of the fishing industry and non-governmental organizations and government decision makers. The Office of International Affairs should collaborate with the Convention on Migratory Species, the Committee on Fisheries of the UN Food and Agriculture Organization, IUCN, relevant international and regional fishery organizations in the development and execution of these workshops. Finally, these workshops should not be a one-time occurrence but should be repeated every several years.

CHAPTER 7. PRIORITY RECOMMENDATIONS

Throughout this report the authors identify a combination of both research needs (Chapters 2 and 5) and recommendations for agency action (Chapter 6). With more than twenty recommendations, and limited agency resources (staff and budget), it is necessary to set some priorities among the recommendations. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria. The information in Table 7.1 illustrates how to score the recommendations against two types of measures.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

- Assists a critically endangered species;
- Assists a species at risk (listed under the IUCN Red List);
- Addresses unsustainable bycatch;
- Aids a trans-boundary species;
- Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

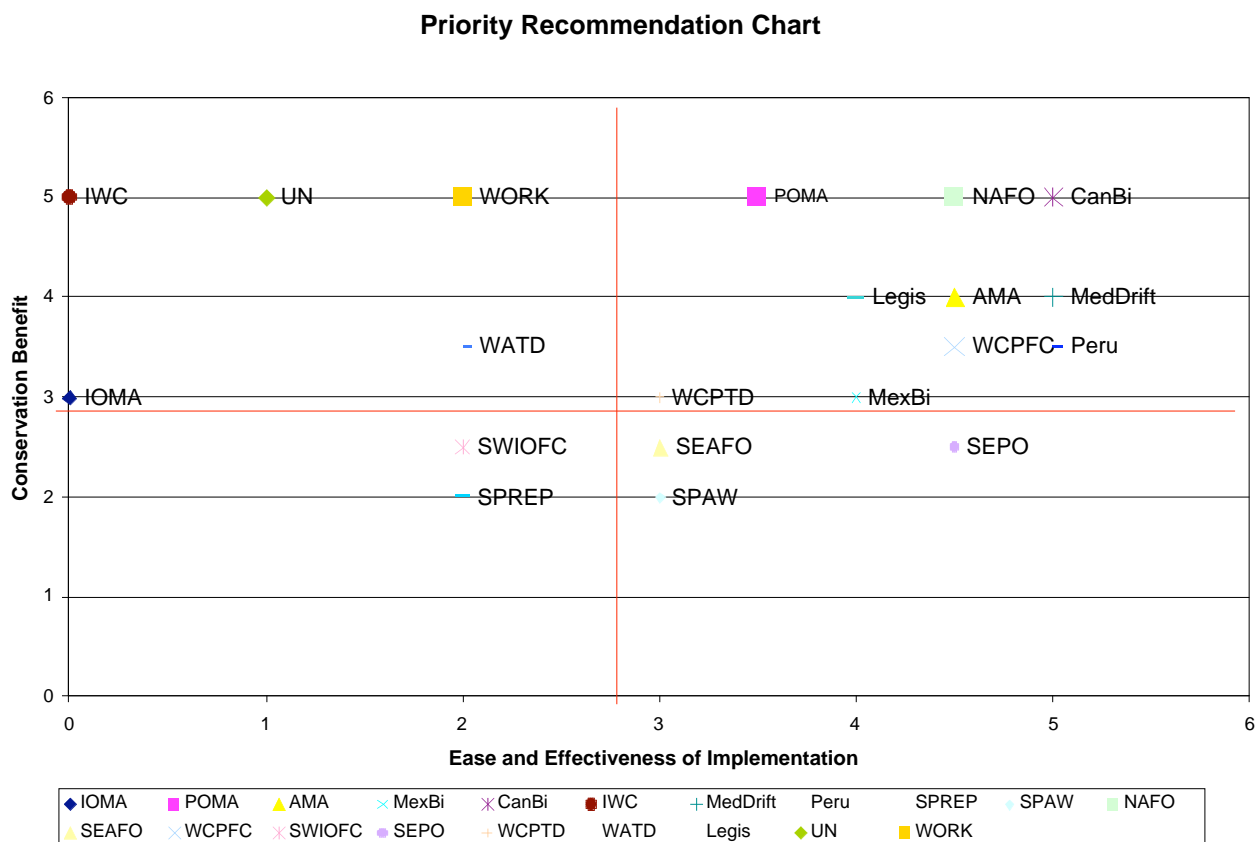
- Regional agreement is in place that can be used to implement the recommendation;
- Bilateral agreement is in place that can bring about prompt action;
- National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
- Mitigation strategies or possible solutions are available to be used or tested;
- Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. Those subcriteria denoted with a question mark indicate that, based on the literature, there is some level of uncertainty. In these situations, a half of a point was scored. The results of that evaluation are summarized in Table 7.1

Table 7.1 Analysis to Develop Priority Recommendations					
Recommendation Title	Acronym	Conservation Benefit Criteria	Total # of Pts	Ease/Effectiveness of Implementation Criteria	Total # of Pts
Indian Ocean Multilateral Agreement	IOMA	2,3,5	3		0
Pacific Ocean Multilateral Agreement	POMA	1,2,3,4,5	5	1,2,4,5(?)	3.5
Americas Multilateral Agreement	AMA	1,3,4,5	4	1,2,3,4,5(?)	4.5
US/Mexico Bilateral	MexBi	1,3,5	3	2,3,4,5	4
US/Canada Bilateral	CanBi	1,2,3,4,5	5	1,2,3,4,5	5
Amend IWC	IWC	1,2,3,4,5	5		0
Mediterranean Driftnets	MedDrift	2,3,4,5	4	1,2,3,4,5	5
Peruvian Fisheries Bycatch	Peru	2,3(?),4,5	3.5	1,2,3,4,5	5
South Pacific Regional Environment Program	SPREP	3,5	2	1,5	2
Caribbean SPAW Protocol	SPAW	3,5	2	1,4,5	3
Northwestern Atlantic Fisheries Organization	NAFO	1,2,3,4,5	5	1,2(?)3,4,5	4.5
Southeast Atlantic Fisheries Organization	SEAFO	3,4(?),5	2.5	1,2,4	3
Western Central Pacific Fisheries Commission	WCPFC	1,3,4,5(?)	3.5	1,2,3,4(?),5	4.5
Southwest Indian Ocean Fisheries Commission	SWIOFC	1,(?),3,5	2.5	1,3	2
Plan of Action for Marine Mammals in the Southeast Pacific Ocean	SEPO	3,4,(?),5	2.5	1,2,3,4,5(?)	4.5
Western Central Pacific--tuna/dolphin interactions	WCPTD	3,4,5	3	1,4,5	3
West Coast of Africa--tuna/dolphin interactions	WATD	2,3,4(?),5	3.5	1,4	2
Bycatch Legislation	Legis	1,2,3,4,5	4	1,2,4,5	4
United Nations General Assembly Resolution	UN	1,2,3,4,5	5	1	1
Workshops for Science and Technology Transfer	WORK	1,2,3,4,5,	5	4,5	2

The ranking is then graphed with Conservation Criterion on the y-axis and the Legal Framework Criterion on the x-axis. The following example demonstrates how the priorities may group into sectors that will serve as the basis for prioritization. Figure 7 shows the distribution of the various recommendations.

Figure 7. Priority Ranking Scheme



Discussion and Further Analysis of the Priorities

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions (WCPTD). NAFO and the WCPFC have

recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. Appendix C provides an example of a resolution that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also calls upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation (Legis) or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement (POMA) or the Americas Multilateral Agreement (AMA). The cetacean bycatch legislation referred to here and included in Appendix E has been introduced at least once in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model.⁴⁰⁷ One of the many measures called for in the Inter-American Convention is the “reduction, to the greatest extent practicable, of the incidental capture, retention, harm or mortality of sea turtles in the course of fishing activities, through the appropriate regulation of such activities, as well as the development, improvement and use of appropriate gear, devices or techniques, including the use of turtle excluder devices (TEDs)...”⁴⁰⁸ An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues

⁴⁰⁷ The Inter-American Convention is founded on the concepts of other critical international accords, such as the United Nations Convention on the Law of the Sea, the United Nations Conference on the Environment and Development and the Code of Conduct for Responsible Fisheries, adopted by the Conference of the Food and Agriculture Organization (FAO) of the United Nations in its 28th Session (1995). It complies with the measures established in other international instruments, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora and the World Trade Organization. The Inter-American Convention compliments the Bonn Convention or CMS. All species of sea turtles found in the western hemisphere are listed in both Appendix I and Appendix II of the Bonn Convention, and the text of CMS includes many concepts fundamental to regional conservation of migratory marine animals, such as sea turtles. In the same vein, the Protocol concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (known also as the Cartagena Convention) is totally complementary to the Inter-American Convention.

⁴⁰⁸ Article IV(h) of the Inter-American Convention to Protect and Conserve Sea Turtles.

such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority—at the top left corner of the graph—includes adoption of a United Nations General Assembly Resolution on cetacean bycatch (UN); workshop for science and technology transfer (WORK); an Indian Ocean Multilateral Agreement (IOMA); modifications to the International Whaling Commission to recognize its competence to manage small cetaceans (IWC); and investigations into West Coast of Africa tuna/dolphin interactions (WATD). While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific IOMA, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization (SEAFO); the Caribbean SPAW Protocol (SPAW); the Marine Mammal Action Plan in the Southeast Pacific Ocean (SEPO); and the South Pacific Regional Environment

Program (SPREP). SPAW, SEPO, and SPREP all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, IOMA, or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with the WORK recommendation.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis conducted in this chapter, Table 7.2 proposes four categories for priorities and lists the recommendations under each. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top- and second tier priorities.

Table 7.2 Priority Recommendations
<i>Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements</i>
US/Mexico Bilateral (MexBi)
US/Canada Bilateral (CanBi)
Mediterranean Driftnets (MedDrift)
Peruvian Fisheries Bycatch (Peru)
Workshops for Science and Technology Transfer (WORK)
<i>Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements</i>
Northwestern Atlantic Fisheries Organization (NAFO)
Western Central Pacific Fisheries Commission (WCPFC)
Western Central Pacific--tuna/dolphin interactions (WCPTD)
Southeast Atlantic Fisheries Organization (SEAFO)
West Coast of Africa--tuna/dolphin interactions (WATD)
Plan of Action for Marine Mammals in the Southeast Pacific Ocean (SEPO)
Caribbean SPAW Protocol (SPAW)
South Pacific Regional Environment Program (SPREP)
<i>Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements</i>
Pacific Ocean Multilateral Agreement (POMA)
Americas Multilateral Agreement (AMA)
Bycatch Legislation (Legis)
United Nations General Assembly Resolution (UN)
<i>Low Priority Recommendations</i>
Amend IWC (IWC)
Southwest Indian Ocean Fisheries Commission (SWIOFC)
Indian Ocean Multilateral Agreement (IOMA)

Appendix A. Review of Cetacean Incidental Mortality in International Fisheries

Increasing attention has been paid in the last decade or two to the ways in which fisheries may impact cetacean populations. Most research done recently has addressed the accidental killing of cetaceans in fishing operations, a source of mortality that has given rise to serious concerns about the status of several cetacean populations.¹ More than half of the fifty-seven initiatives recommended in the IUCN—The World Conservation Union’s Species Survival Commission Conservation Action Plan for the World’s Cetaceans deal with bycatch.² Conflicts between cetaceans and commercial fisheries are increasing in frequency and intensity because of increasing human populations and the demand for seafood as a protein source. However our knowledge about the global extent of cetacean bycatch is poor and fragmented and the significance of this bycatch to cetacean populations is lacking in most nations. Species including the baiji and the vaquita, and local populations of humpback dolphins, striped and bottlenose dolphins and the harbor porpoise were singled out as being unlikely to be able to sustain current catch levels.³

Conflicts between marine mammals and fisheries were reviewed on a worldwide basis in 1984 and 1991.⁴ Subsequently, numerous studies and investigations of marine mammal fishery interactions have been implemented around the world.⁵ The purpose of this Appendix is to summarize subsequent publications on this subject, and to demonstrate the overall scale of such conflicts. The International Whaling Commission estimates that kill rates of as low as 2 percent of a cetacean population may not be sustainable, depending on the life history of the species and the age and sex composition of the kill. Likewise the US Congress established as part of the MMPA the potential biological removal level (PBR), which establishes a sustainable bycatch limit for cetaceans at less than 2 percent of a cetacean population.⁶ These numbers were used as our benchmarks. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. Species where the bycatch is unsustainable are those where the bycatch exceeds two percent of the population estimate.

¹ In January 2002 a group of experts on marine mammal bycatch concluded that “incidental capture in fishing operations is the major threat to whales, dolphins, and porpoises worldwide. Several species and many populations will be lost in the next few decades if nothing is done. Urgent national and international action is needed.” Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. <http://cetaceanbycatch.org/intlstrategy.cfm>.

² Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World’s Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

³ Id. See also. Andrew J. Read, Phebe Drinker, Simon Northridge (2006) Bycatch of Marine Mammals in U.S. and Global Fisheries *Conservation Biology* 20 (1), 163–169.

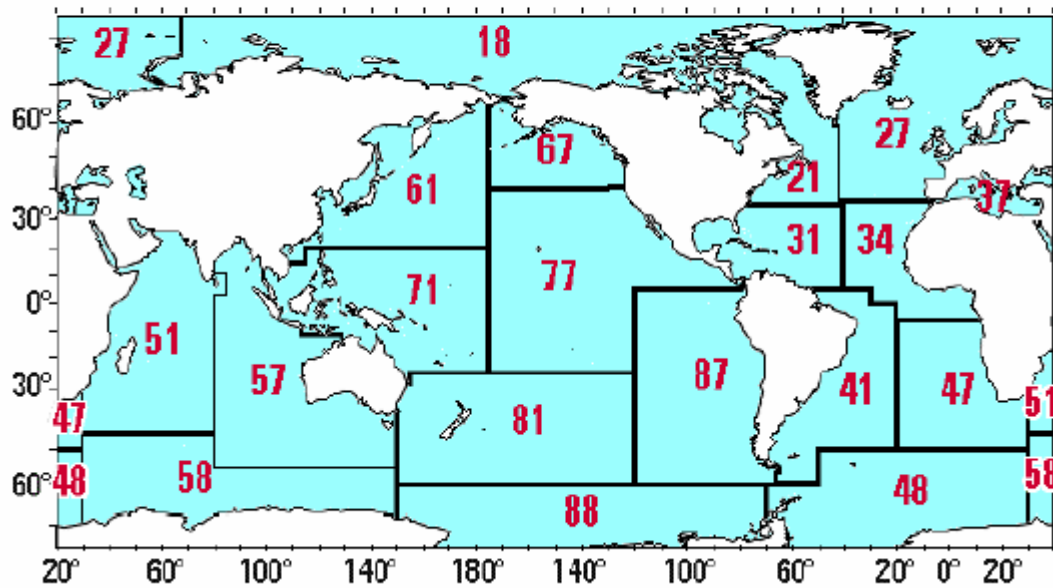
⁴ Northridge, S.P., [1991] An updated world review of interactions between marine mammals and fisheries. FAO Fish. Tech. Paper 251 (Suppl 1). 58pp.

⁵ Northridge, S.P. and Hofman, R.J. 1999. Marine mammal interactions with fisheries. Pp.99–119 in: *Conservation and Management of Marine Mammals* (eds. J.R. Twiss, Jr. and R.R. Reeves). Smithsonian Institution Press, Washington, DC. See also Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. <http://cetaceanbycatch.org/intlstrategy.cfm>.

⁶ Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. *Marine Mammal Science* 14:1-37

The interactions are considered on the basis of FAO statistical areas, which are shown on the map below. The use of FAO statistical areas to discuss regional bycatch issues is carried throughout the report. Appendix A presents, in tabular format, for each cetaceans species for which there are documented bycatch records, estimates of species abundance and bycatch, as well as information on the type of fisheries that interact with or accidentally catch that cetacean species. The information in this Appendix provides the foundation for further analysis that are undertaken in Chapters 2 and 5 of this report.

Food and Agriculture Organization (FAO) Statistical Areas



AREA 21 NORTHWEST ATLANTIC

The Northwest Atlantic includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	<i>Eubalaena glacialis</i> Northern right whale
Abundance Estimate	300
Fisheries	Right whales are entangled in cod trap, lobster trap lines, groundfish gillnets, herring weirs. A mother and calf were released from a herring weir in 1976.
Estimated Annual Mortality	1.2/yr 2000-2004

Species	<i>Balaenoptera physalus</i> Fin whale.
Abundance Estimate	2,814 (Georges Bank to mouth of Gulf of St. Lawrence)
Fisheries	Fin whale entangled in lobster trap lines (3), groundfish gillnets (6), a herring weir and a squid trawl (1) since 1976. ⁷
Estimated Annual Mortality	No recent estimates of mortality for fin whales outside the US EEZ are available. Up to 3 fin whales per year have been reported entangled in inshore fishing gear in Newfoundland, of those 5 out of 12 fin whales caught in inshore fishing gear in Newfoundland were dead. ⁸

Species	<i>Balaenoptera acutorostrata</i> Minke whale.
Abundance Estimate	Canadian East Coast (Georges Bank to the mouth of the Gulf of St. Lawrence) ⁹ 2,998 west Greenland central North Atlantic ¹⁰ 60,000 northeastern North Atlantic 120,000
Fisheries	Read reported interactions between minke whales and gillnets in Newfoundland and Labrador, cod traps in Newfoundland, and herring weirs in the Bay of Fundy. ¹¹

⁷ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int. Whal. Commn Special Issue 15: 133-147.

⁸ NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

⁹ NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

¹⁰ IUCN Red List

¹¹ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int.

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Estimated Annual Mortality¹² From 1991 through 1996 scientists observed no minke whales taken in fishing vessels operating in Canadian waters.¹³ During 1997 to 2001, there were no confirmed mortalities or serious injuries in Canadian waters as reported by the various, small-scale stranding and observer data collection programs in Atlantic Canada. No additional information is available on Canadian mortalities from 2002 to present. During 1980 to 1990, 15 of 17 minke whales were released alive from herring weirs in the Bay of Fundy. During January 1991 to September 2002, 26 minke whales were trapped in herring weirs in the Bay of Fundy. Of these 26, 1 died and several (number unknown) were released alive and unharmed.¹⁴

Species ***Megaptera novaeangliae* Humpback whale.**

Abundance Estimate Barents and Norwegian Sea 889

Fisheries Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) was reported annually between 1979 and 1988, and 12 of 66 humpback whales that were entangled in 1988 died.¹⁵ Between 1979 and 1992, Newfoundland and Labrador, cod traps caused the most entanglements and entanglement mortalities--21% of humpbacks. Between 1975 and 1990, gillnets are primarily responsible for 20% of humpback

Whal. Commn Special Issue 15: 133-147.

¹² Additional, but somewhat dated information indicates that Lien et al (1987) estimated average entanglement rates of around 11 minke whales per year in Newfoundland's inshore fisheries. Between 1979 and 1985 58% of such entanglements were in cod traps and 21% in gillnets (O'Hara et al 1986). Lien et al report that around 75% of such entanglements are mortalities. Read suggests some possible mortality in Gulf of St. Lawrence set gillnet fisheries, and also reports two minke whale deaths in Bay of Fundy herring weirs between 1980 and 1990.

Other Fisheries--Six minke whales were reported entangled during 1989 in the now non-operational groundfish gillnet fishery in Newfoundland and Labrador. One of these animals escaped and was still towing gear, the remaining 5 animals died. Salmon gillnets in Canada, now no longer being used, had taken a few minke whales. In Newfoundland in 1979, one minke whale died in a salmon net. In Newfoundland and Labrador, between 1979 and 1990, it was estimated that 15% of the Canadian minke whale takes were in salmon gillnets. A total of 124 minke whale interactions were documented in cod traps, groundfish gillnets, salmon gillnets, other gillnets and other traps. The salmon gillnet fishery ended in 1993 as a result of an agreement between the fishermen and North Atlantic Salmon Fund (Read 1994). Five minke whales were entrapped and died in Newfoundland cod traps during 1989. The cod trap fishery in Newfoundland closed in 1993 due to the depleted groundfish resources (Read 1994).

¹³ Hooker, S.K., R.W. Baird and M.A. Showell. 1997. Cetacean strandings and bycatches in Nova Scotia, Eastern Canada, 1991-1996. Meeting document SC/49/O5 submitted to the 1997 International Whaling Commission meeting in Bournemouth, UK. Hooker *et al.* (1997) summarized bycatch data from a Canadian fisheries observer program that placed observers on all foreign fishing vessels operating in Canadian waters, on between 25% and 40% of large Canadian fishing vessels (greater than 100 feet long), and on approximately 5% of smaller Canadian fishing vessels. During 1991 through 1996, no minke whales were observed taken.

¹⁴ NOAA (2006) at 31

¹⁵ Lein, J., W. Ledwell, and J. Naven. 1988. Incidental entrapment in inshore fishing gear during 1988: A preliminary report to the Newfoundland and Labrador Department of Fisheries and Ocean, 15 pp.

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entanglements and entanglement mortalities in the Gulf of Maine.¹⁶

Estimated Annual
Mortality 0.6/yr 2000-2004

Species ***Stenella coeruleoalba* Striped dolphin**

Abundance Estimate Maryland to the Bay of Fundy 52,055 (CV = 0.57)

Fisheries Gillnet, trap, and trawl fisheries

Estimated Annual
Mortality In review of Canadian gillnet and trap fisheries, no mortalities were documented.¹⁷ However, Baird reported two records of incidental mortality; in the late 1960's and early 1970's, two mortalities each, were reported in trawl and salmon net fisheries.¹⁸ Between January 1993 and December 1994, 36 Spanish deep-water trawlers, covering 74 fishing trips (4,726 fishing days and 14,211 sets), were observed off the Grand Bank. A total of 47 incidental catches were recorded, which included two striped dolphins. The incidental mortality rate for striped dolphins was 0.014/set.¹⁹

Species ***Delphinapterus leucas* White whale.**

Abundance Estimate ²⁰	North Water (Baffin Bay)	28,000
	West Greenland	2,000
	Cumberland Sound	485
	Frobisher Bay	No info
	Ungava Bay (endangered)	<50
	West Hudson Bay (not at risk)	25,100
	Foxe Basin	1,000
	South Hudson Bay	1,299
	James Bay	3,300
	East Hudson Bay	1,014
	St. Lawrence River (endangered)	1,238

¹⁶ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

¹⁷ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

¹⁸ Baird, R.W., S. K. Hooker, H. Whitehead, and R. Etcheberry. 1997. A Review of records of striped dolphins (*Stenella coeruleoalba*) from Canadian waters. IWC Doc. SC/49/SM4, 10 pp.

¹⁹ Lens, S. 1997. Interactions between marine mammals and deep water trawlers in the NAFO regulatory area. ICES CM 1997/Q:8. 10 pp.

²⁰ IWC (2000) Report of the Scientific Committee from its Annual Meeting 3-15 May 1999 in Grenada J. Cetacean Res. Manage 2(Suppl).

Worldwide Cetacean Bycatch/Appendices

Fisheries Entanglement in inshore fisheries in Newfoundland, including entrapments in Gulf of St Lawrence groundfish gillnets, and in Canadian cod traps.²¹

Estimated Annual Mortality No Mortality Estimates

Species ***Globicephala melaena* Longfinned pilot whale**

Abundance Estimate Maryland to the Bay of Fundy 15,728²²

Fisheries An unknown number of pilot whales have been entangled in Newfoundland, Labrador, and Bay of Fundy groundfish gillnets; Atlantic Canada and Greenland salmon gillnets; and Atlantic Canada cod traps.²³

Estimated Annual Mortality Between January 1993 and December 1994, 36 Spanish deep-water trawlers, were observed off the Grand Banks, they incidentally caught 1 long-finned pilot whale for an incidental mortality rate of 0.007 pilot whales /set.

From 1991-1996, Canadian fisheries observer data indicated that long-finned pilot whales were bycaught (number of animals in parentheses) in bottom trawl (65); midwater trawl (6); and longline (1) gear. Recorded bycatches by year were: 16 in 1991, 21 in 1992, 14 in 1993, 3 in 1994, 9 in 1995 and 6 in 1996. Pilot whale bycatches occurred in all months except January-March and September.²⁴

Species ***Lagenorhynchus acutus* Atlantic white-sided dolphin.**

Abundance Estimate Gulf of Maine Stock 51,640 (CV 0.38)²⁵

Gulf of St. Lawrence Stock 11,740 (CV=0.47)

Labrador Sea Stock No Abundance Estimate

Fisheries White-sided dolphins were entangled in gillnet fisheries, longlines, herring weirs and trawls

Estimated Annual Mortality There is little information available that quantifies fishery interactions involving white-sided dolphins in Canadian waters. Two white-sided dolphins were reported caught in groundfish gillnet sets in the Bay of Fundy during 1985 to 1989, and 9 were reported caught in West Greenland between 1964 and 1966 in the now non-operational salmon drift nets. Several (number not specified) were also caught during the 1960's in the now non-operational Newfoundland and Labrador groundfish gillnets. From 1965 to 1982, a few (number not specified) were caught in

²¹ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

²² Current estimate includes short-finned pilot whales as the two species cannot be differentiated during surveys.

²³ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

²⁴ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

²⁵ NOAA (2006) at 85

an experimental drift gillnet fishery for salmon off West Greenland.²⁶

From 1991 through 1996, an estimated 6 white-sided dolphins were observed entangled. One animal was from a longline trip south of the Grand Banks in November 1996 and the other 5 were captured in the bottom trawl fishery off Nova Scotia in the Atlantic Ocean; 1 in July 1991, 1 in April 1992, 1 in May 1992, 1 in April 1993, 1 in June 1993 and 0 in 1994 to 1996.²⁷

Canada is working on an estimation of small cetacean bycatch for Newfoundland fisheries using data collected during 2001 to 2003. White-sided dolphins were reported to have been caught in the Newfoundland nearshore gillnet fishery and offshore monkfish/skate gillnet fisheries.

One animal was caught but released alive in a herring weir.

Species	<i>Phocoena phocoena</i> Harbour porpoise.	
Abundance Estimate	Gulf of Maine/Bay of Fundy Stock	89,700 (CV = 0.22) ²⁸
	Gulf of St. Lawrence Stock	21,700 (CV=0.38) ²⁹
	Newfoundland and Greenland	No Abundance Estimate
Fisheries	Gulf of Maine/Bay of Fundy harbor porpoise entanglements have been in the Canadian Bay of Fundy groundfish sink gillnet and herring weir fisheries	
Estimated Annual Mortality	In Canada, the total average annual mortality between 2000 -2004 is 55 animals. The average annual mortality in the Canadian groundfish sink gillnet fishery (2000 – 2004) is 51 harbor porpoise The average annual mortality in the Canadian Herring Weir fishery (2000 – 2004) is 4.4 harbor porpoise. ³⁰	
	<i>Bay of Fundy Sink Gillnet</i>	
	During the 1980's, Canadian harbor porpoise bycatch in the Bay of Fundy sink gillnet fishery, was estimated at 94-116 in 1986 and 130 in 1989. ³¹ In 1993, an observer program provided a total bycatch estimate of 424 harbor porpoises (± 1 SE: 200-648) from 62 observed trips, (approximately 11.3% coverage of the Bay of Fundy trips); and in 1994, the bycatch estimate was 101 harbor porpoises (95% confidence limit: 80-122), from 171 observed trips (covering 49% of the gillnet trips). ³²	

²⁶ Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

²⁷ NOAA (2006) at 89

²⁸ NOAA (2006) at 111

²⁹ NOAA (2006) at 111

³⁰ NOAA (2006) at 111

³¹ Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (*Phocoena phocoena*) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 53:1294-1300.

³² Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (*Phocoena phocoena*) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 53:1294-1300.

During 1995, due to groundfish quotas being exceeded, the gillnet fishery was closed from July 21 to August 31. During the open fishing period of 1995, 89% of the trips were observed, approximately 30% of observed trips used pingered nets, and the estimated bycatch was 87 harbor porpoises.³³ During 1996, the Canadian gillnet fishery was closed during July 20-31 and August 16-31 due to groundfish quotas and the estimated bycatch was 20 harbor porpoises.³⁴ Trippel estimated that during 1996, gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 68% over nets without alarms.³⁵ During 1997, groundfish quotas again closed the fishery during portions of July and August, and a harbor porpoise time-area closure was implemented in September in the Swallowtail area- the estimated bycatch was 43 animals.³⁶ Again, in 1997, Trippel estimated that gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 85% over nets without alarms in the Swallowtail area of the lower Bay of Fundy.³⁷ For the years 1998-2001, the estimated annual mortality was 38 for 1998, 32 for 1999, 28 for 2000, and 73 for 2001.³⁸ Estimates of variance are not available. From 2002 to 2004 there is no bycatch estimate due to a lack of an observer program.

33 Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (*Phocoena phocoena*) by the gillnet fishery in the lower Bay of Fundy. *Can. J. Fish. Aquat. Sci.* 53:1294-1300.

34 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (*Phocoena phocoena*) bycatch in the gillnet fishery in the lower Bay of Fundy. *Can. J. Fish. Aquat. Sci.* 56:113-123.

35 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (*Phocoena phocoena*) bycatch in the gillnet fishery in the lower Bay of Fundy. *Can. J. Fish. Aquat. Sci.* 56:113-123.

36 DFO [Department of Fisheries and Oceans]. 1998. Harbour porpoise bycatch in the lower Bay of Fundy gillnet fishery. DFO Maritimes Regional Fisheries Status Report 98/7E. [Available from Department of Fisheries and Oceans, Resource management Branch, P.O. Box 550, Halifax, NS B3J 2S7, Canada.]

37 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (*Phocoena phocoena*) bycatch in the gillnet fishery in the lower Bay of Fundy. *Can. J. Fish. Aquat. Sci.* 56:113-123.

38 Trippel, E.A., and Shepherd, T.D. 2004. By-Catch of Harbour Porpoise (*Phocoena phocoena*) in the Lower Bay of Fundy Gillnet Fishery from 1998-2001. DFO Res. Doc. 2004/2521.

39 Smith, G.J.D., A.J. Read, and D.E. Gaskin. 1983. Incidental catch of harbor porpoises, (*Phocoena phocoena*) in herring weirs in Charlotte County, New Brunswick, Canada. *Fish Bull.*, U.S. 81(3):660-2

40 Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. *Rep. int. Whal. Commn. Special Issue* 15: 133-147.

41 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (*Phocoena phocoena*) in herring weirs in the Bay of Fundy, Canada. *J.Cet. Res. Manag.* 6(1):7-17.

42 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (*Phocoena phocoena*) in herring weirs in the Bay of Fundy, Canada. *J.Cet. Res. Manag.* 6(1):7-17.

43 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (*Phocoena phocoena*) in herring weirs in the Bay of Fundy, Canada. *J.Cet. Res. Manag.* 6(1):7-17.

44 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at <http://www.dfo-mpo.gc.ca/csas/>

45 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at <http://www.dfo-mpo.gc.ca/csas/>

Herring Weirs

Harbor porpoises are caught in Canadian herring weirs, but there have been no recent efforts to observe bycatch. In the 1980's, approximately 70 harbor porpoises became trapped annually and, on average, 27 died each year.³⁹ In 1990, at least 43 harbor porpoises were trapped in Bay of Fundy weirs.⁴⁰ In 1993, a cooperative program between fishermen and Canadian biologists was initiated; as a result, between 1992 and 1994, 206 of 263 harbor porpoises caught in herring weirs were released alive.⁴¹ Mortalities (and releases) were 11 (and 50) in 1992, 33 (and 113) in 1993, and 13 (and 43) in 1994.⁴² Since that time, an additional 682 harbor porpoises have been documented in Canadian herring weirs, of which 637 were released or escaped, 36 died, and 9 had an unknown status. Mortalities (and releases and unknowns) were 5 (and 60) in 1995; 2 (and 4) in 1996; 2 (and 24) in 1997; 2 (and 26) in 1998; 3 (and 89) in 1999; 0 (and 13) in 2000, 14 (and 296) in 2001, 3 (and 46 and 4) in 2002, and 1 (and 26 and 3) in 2003, and 4 (and 53 and 2).⁴³

Gulf of St. Lawrence gillnet

This fishery interacts with the Gulf of St. Lawrence harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Using questionnaires to fishermen, scientists determined a total of 2,180 (95% CI 1012-3802) and 2,478 (95% CI 1591-3464) harbor porpoises were entangled in 2000 and 2001, respectively.⁴⁴ The largest takes were in July and August around Miscou and the North Shore of the Gulf of St. Lawrence. An at-sea observer program, conducted during 2001 and 2002, concluded that resulting bycatch estimates were unreliable, due to low observer coverage that was not representative of the fishing effort.⁴⁵

Newfoundland gillnet

This fishery interacts with the Newfoundland harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Estimates of incidental catch of harbor porpoises are currently being calculated for 2001- 2003 for the Newfoundland nearshore cod and Greenland halibut fisheries, and the Newfoundland offshore fisheries in lumpfish, herring, white hake, monkfish and skate.

AREA 27 NORTHEAST ATLANTIC

There are very few recent comprehensive studies on cetacean abundance or population sizes in this area. The most recent abundance estimates are provided in the tables below. Note that the estimate of cetacean abundance in a specified survey region is not equivalent to an estimate of population size, as biological populations may extend over wider areas, or conversely may be contained within a sub-area of the survey region. Very little is actually known about stock structure in this region. Since abundance estimates are usually snapshots of animal density and abundance over a short period of time, the actual density or abundance of these highly migratory cetaceans within a survey region may vary considerably either seasonally or inter-annually if those animals range outside the survey area. For animals with seasonal migrations, an estimate of abundance in one part of the range should not be used as an indication of abundance throughout the year.

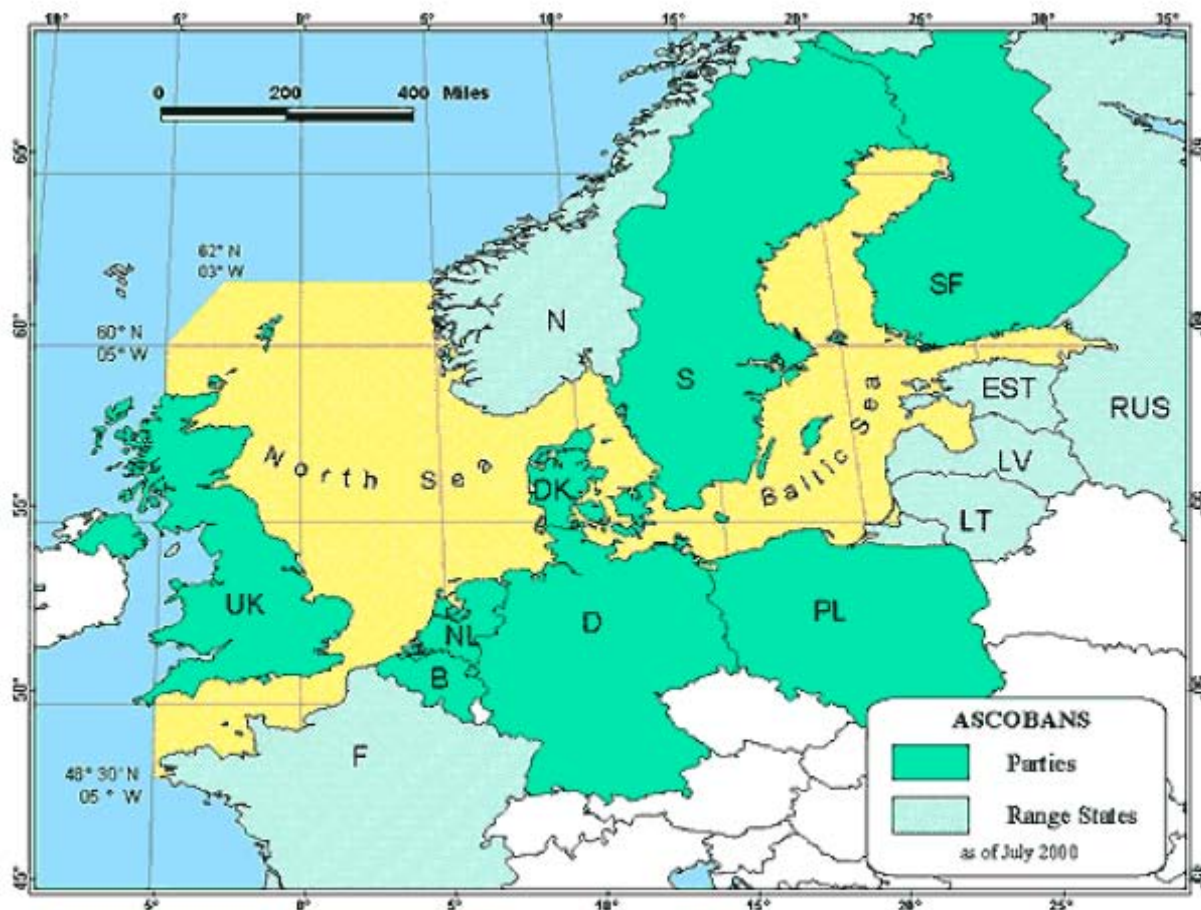


Fig. 1 – Area currently covered by the ASCOBANS agreement and ASCOBANS Parties and Range States

Species	<i>Phocoena phocoena</i> Harbor porpoise.		Fisheries	Mortality Est./% Take
Abundance Estimate ⁴⁶	Northern and Central North Sea	61,335	Danish, UK gillnet fisheries for various species	2,700 ⁴⁷ /4.1%
	Kattegat and Oeresund	36,046 (20,276- 64,083)	German, Danish, Swedish gillnet fisheries	83 ⁴⁸ / .2%

⁴⁶ Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. *Journal of Applied Ecology* 39:361-376.

⁴⁷ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

⁴⁸ Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

Worldwide Cetacean Bycatch/Appendices

Skagerrak	4,738	Swedish gillnet fisheries for cod & Pollock	114 ⁴⁹ /2.4%
Kattegat	4,009	Swedish gillnet fisheries for cod & pollock	50 ⁵⁰ /1.2%
Kiel & Mecklenburg Bight	588 (240-1,430)	Included in Kattegat & Oeresund estimate above	
Southwestern Baltic proper	599 (200-3,300)	Danish, Finish, Polish & Swedish drift & bottom-set gillnet fisheries	13 ⁵¹ /2.1%
Northern North Sea	98,564 (66,679-145,697)	(north of 56°N) Danish, UK gillnet fisheries for various species	5,000 ⁵² /5%
Southern & Central North Sea	169,888 (124,121-232,530)	Danish, Swedish, UK, Belgian, Dutch, German gillnet fisheries for various species	7,493 ⁵³ /4.3%
Celtic Sea	36,280 (12, 828-102,604)	Irish gillnet fishery for hake (14- 22m vessels), UK gillnet fishery for hake (> 15 m vessels)	2,200 ⁵⁴ /6.2%

49 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary.

Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

50 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83

51 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

52 Mean Annual Estimated Take between 1987-2001. Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

53 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

54 Bycatch mortalities do not include other set net fisheries or other fisheries in the same area. UK & Irish fishing effort decreased in recent years, CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

Worldwide Cetacean Bycatch/Appendices

North Sea	268,800	Danish gillnets for cod, turbot, hake	2,971 ⁵⁵	1.3%
		UK gillnets for cod, skate, turbot, sole	436	

Species	<i>Lagenorhynchus acutus</i> Atlantic white-sided dolphin			
Abundance Estimate ⁵⁶	Celtic Shelf ⁵⁷	833	(159- 4,360)	
	Central North Sea ⁵⁸	9,242	5,344-15,981)	
	Northern North Sea ⁵⁹	1,685	(690 – 4,113)	
	Northern North Sea	74,626	(35,000–160,000)	
	West of Ireland	490	(1,134–10,015)	
Fisheries	White-side dolphins are susceptible to capture in mid-water trawl fisheries.			
Estimated Annual Mortality	<p>In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 2 and 15 white-sided dolphins.⁶⁰</p> <p>Approximately 196 (5 – 493) white-sided dolphins have been caught in pelagic trawl fisheries for horse mackerel and mackerel southwest of Ireland.⁶¹ Small numbers have been taken by Spain in the deep water trawl fishery for Greenland halibut.</p> <p>In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of two Atlantic white-sided dolphins.⁶²</p>			

⁵⁵ CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83. Impact based on combined current bycatch estimates of all Danish and most UK gillnet fisheries, does not include Norwegian, Dutch, Belgian, German and other UK fleets and is therefore likely an underestimate.

⁵⁶ Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbor porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental factors: implication for marine management (Ph.D.). London: University of Greenwich.

⁵⁷ Estimate is for white-sided and white-beaked dolphins

⁵⁸ Estimate is for white-sided and white-beaked dolphins

⁵⁹ Estimate is for white-sided and white-beaked dolphins

⁶⁰ Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at <http://www.dfo-mpo.gc.ca/csas/>

⁶¹ Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at <http://www.dfo-mpo.gc.ca/csas/>

⁶² BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

Species	<i>Tursiops truncatus</i> Bottlenose dolphin.	
Abundance Estimate	Moray Firth ⁶³	129 (110- 174)
	Brittany ⁶⁴	30
	Mont St. Michel ⁶⁵	6
	Arachon ⁶⁶	60
	French Coast ⁶⁷	250-300
	Cornwall ⁶⁸	15
	Dorset ⁶⁹	5
	Cardigan Bay ⁷⁰	135 (85-214)
	Shannon Estuary ⁷¹	113 (94-161)
	Dingle Bay ⁷²	12
Fisheries	Bottlenose dolphins have been reported caught in gillnets in the south of England in very small numbers, some mortality in Irish driftnet fisheries, and occasional captures in French fisheries.	
Estimated Annual Mortality	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 6 and 45 bottlenose dolphins. ⁷³	
	From 2000 to 2003, French reported between 9 – 10 bottlenose dolphins	

⁶³ Wilson B, Hammond PS, Thompson PM, 1999. Estimating size and assessing trends in a coastal bottlenose dolphin population. *Ecological Applications* 9:288-300.

⁶⁴ ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

⁶⁵ ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

⁶⁶ ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

⁶⁷ ICES, 2002. Report of the Working Group on Marine Mammal Population Dynamics and Habitat (CM 2002/ACE:02). ICES; 27.

⁶⁸ ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

⁶⁹ White R, Webb A, 1995. Coastal birds and marine mammals of mid Dorest. Peterborough, UK, Joint Nature Conservation Committee; 48.

⁷⁰ Baines ME, Reichelt M, Evans PGH, Shepherd B, 2002. Comparison of the abundance and distribution of harbor porpoise (*Phocoena phocoena*) and bottlenose dolphins (*Tursiops truncatus*) in Cardigan Bay, UK (Abstract). Liege, Belgium, ECS.

⁷¹ Ingram SN, 2000. The ecology and conservation of bottlenose dolphins in the Shannon estuary (Ph.D.). Cork, Ireland: University College.

⁷² ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

⁷³ Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

⁷⁴ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

⁷⁵ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

incidentally caught in French fisheries in the Atlantic⁷⁴

From 2000 to 2003, Spain reported between 2 – 8 bottlenose dolphins incidentally caught in Spanish fisheries in the Atlantic⁷⁵

Species	<i>Delphinus delphis</i> Common dolphin.	
Abundance Estimate	Celtic Sea ⁷⁶	75,449 (22,900 - 284,900)
	Bay of Biscay ⁷⁷	61,888 (35,461 - 108,010)
	Celtic Sea & Western Waters ⁷⁸	101,205 (55125 – 185802)
Fisheries	Common dolphins are caught in Irish salmon driftnets, mackerel purse seines in the southwest of Britain, English midwater trawl research cruises in the Channel, and unidentified type of trawl in the Channel. There is a considerable accidental catch of small cetaceans in the English bottom set net fishery off the southwest coast of England. Catches of common dolphins in various French fisheries continue, and large numbers of animals with evidence of entanglement have washed up on French Atlantic coasts in the past few years. There is also a large French gillnet fishery in this area operating along similar lines to the English one, as well as several trawl fisheries.	
Estimated Annual Mortality ⁷⁹	Dutch horse mackerel	101 (4-214)
	French hake	203 (4-529)
	French tuna	95 (3-287)
	French bass	25 (1-83)
	French tuna driftnet	415 (265 – 564)
	UK tuna driftnet	61 (16 – 106)
	Celtic Sea hake gillnet	200 (4 – 500)

⁷⁶ Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. *Journal of Applied Ecology* 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental factors: implication for marine management (Ph.D.). London: University of Greenwich.

⁷⁷ Goujon M, 1996. Captures accidentelles du filet maillant dérivant et dynamique des populations de dauphins au large du Golfe de Gascogne. Rennes Cedex, France: Ecole Nationale Supérieure Agronomique de Rennes. See also: Goujon M, Antoine L, Collet A, Fisas S, 1993. Approche de l'impact écologique de la pêche thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

⁷⁸ Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

⁷⁹ Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* 48: 453-459

The French driftnet fishery for albacore in the northeast Atlantic in the early 1990s caught between 420– 460 dolphins, apparently both white-sided and striped dolphins (1992, 410 (325-495); 1993, 419 (266-572)).

On the North coast of Spain, 7 common dolphins were caught in fishing gear between 1977 and 1987 and 11 common dolphins were caught in fishing nets in Portugal in 1980. Common dolphins are frequently caught in coastal Portuguese fisheries: 47% of those reported were from gillnet fisheries.

In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 356 and 2,522 common dolphins.⁸⁰

In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of 127 common dolphins.⁸¹

From 1999-2001, bycatch in the pelagic trawl fisheries for mackerel, herring, bass, sprats, pilchards, blue whiting, and anchovy was 53 common dolphins—all of which were in the bass fishery in the Channel.

From 2000 to 2003, French reported from 41 – 218 common dolphins incidentally caught in French fisheries in the Atlantic.⁸²

From 2000 to 2003, Ireland reported from 1 – 16 common dolphins incidentally caught in Irish trawl fisheries in the Atlantic.⁸³

From 2000 to 2003, Spain reported from 3 – 77 common dolphins incidentally caught in Spanish fisheries in the Atlantic.⁸⁴

From 2000 to 2003, the United Kingdom reported between 12 – 72 common dolphins incidentally caught in UK trawl fisheries in the Atlantic.⁸⁵

⁸⁰ Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

⁸¹ BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

⁸² Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

⁸³ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

⁸⁴ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

⁸⁵ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

Species	<i>Stenella coeruleoalba</i> Striped dolphin	
Abundance Estimate	Bay of Biscay ⁸⁶	73,843 (36,113–150,990)
	Celtic Sea & Western Waters ⁸⁷	66,824 (37,583 - 118,813)
Fisheries	Striped dolphins are recorded “sporadically” in fishing gear in northern Spain, and in French and Portuguese Atlantic fisheries.	
Estimated Annual Mortality	Estimates of catches in the French albacore driftnet fishery for 1992/3 were 1,172 striped dolphins. ⁸⁸ In 1992, the fishery caught 1,193 (946-1440) striped dolphins and in 1993, it killed 1,152 (732-1572) dolphins. ⁸⁹	
	In 1995, the UK driftnet fishery for albacore caught 104 striped dolphins (38 – 169). ⁹⁰	
	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 136 and 964 striped dolphins. ⁹¹	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight Striped dolphins. ⁹²	
	From 2000 to 2003, French incidentally caught between 9 – 16 striped dolphins in French fisheries in the Atlantic ⁹³	

⁸⁶ Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

⁸⁷ Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

⁸⁸ Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459 See also: Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

⁸⁹ Goujon estimates that the French driftnet fishery for tuna caught 1,722 (1365-2079) common, striped and bottlenose dolphins, and long-finned pilot whales in 1992; and 1,654 (1115-2393) common, striped and bottlenose dolphins, and long-finned pilot whales in 1993. Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

⁹⁰ Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459

⁹¹ Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

⁹² BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

⁹³ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

Species	<i>Globicephala melaena</i> Long-finned pilot whale.	
Abundance Estimate ⁹⁴	East Greenland, Iceland, Jan Mayen, Faroe Islands, & Western Coast of the British Islands	778,000
	Bay of Biscay	80,867
	East of 15°W	12,235 (3,924–38,148)
	West of 15°W	128,080 (45,241–362,640)
Fisheries	Pilot whales are commonly killed in gillnet, purse seines, trawl, and longline fisheries	
Estimated Annual Mortality	<p>An estimated 50-100 pilot whales are killed in gillnets off the coast of France⁹⁵ One was reported drowned in a lobster creel line in Orkney in 1984, 1 in a purse seine off Scotland in 1986, three were reported in set gillnets off Cornwall (2 released alive), and there have been further unconfirmed reports of captures in purse seines off Cornwall and even a possible record of one in a demersal trawl in the same area.⁹⁶</p> <p>In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 8 and 59 pilot whales.⁹⁷</p> <p>In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight long-finned pilot whales.⁹⁸</p> <p>From 2000 to 2003, French report between 1 – 2 pilot whales incidentally caught each year in French fisheries in the Atlantic.⁹⁹</p>	

Species	<i>Lagenorhynchus albirostris</i> White-beaked dolphin	
Abundance Estimate ¹⁰⁰	North Sea	7,856

⁹⁴ Buckland ST, Cattanch KL, Hobbs RC, 1993b. Abundance estimates of Pacific white-sided dolphin, Northern right whale dolphin, Dall's porpoise and Northern fur seal in the North Pacific, 1987-1990. International North Pacific Fisheries Commission Bulletin:387-407.

⁹⁵ International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15

⁹⁶ Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

⁹⁷ Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

⁹⁸ BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

⁹⁹ Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

¹⁰⁰ Øien N, 1993. Abundance of killer whales (*Orcinus orca*) in waters off Norway. Reykjavik, Iceland, (unpublished).

Worldwide Cetacean Bycatch/Appendices

Fisheries	White-beaked dolphins are caught in mid-water herring trawls and salmon driftnet fisheries
Estimated Annual Mortality	There is an unknown mortality of white-beaked dolphins off the Yorkshire coast (northeast England) every summer when Dutch midwater herring trawlers operate in that region. ¹⁰¹ There are also unconfirmed reports that this species is caught in Irish salmon driftnet fisheries.

AREA 31 WESTERN CENTRAL ATLANTIC

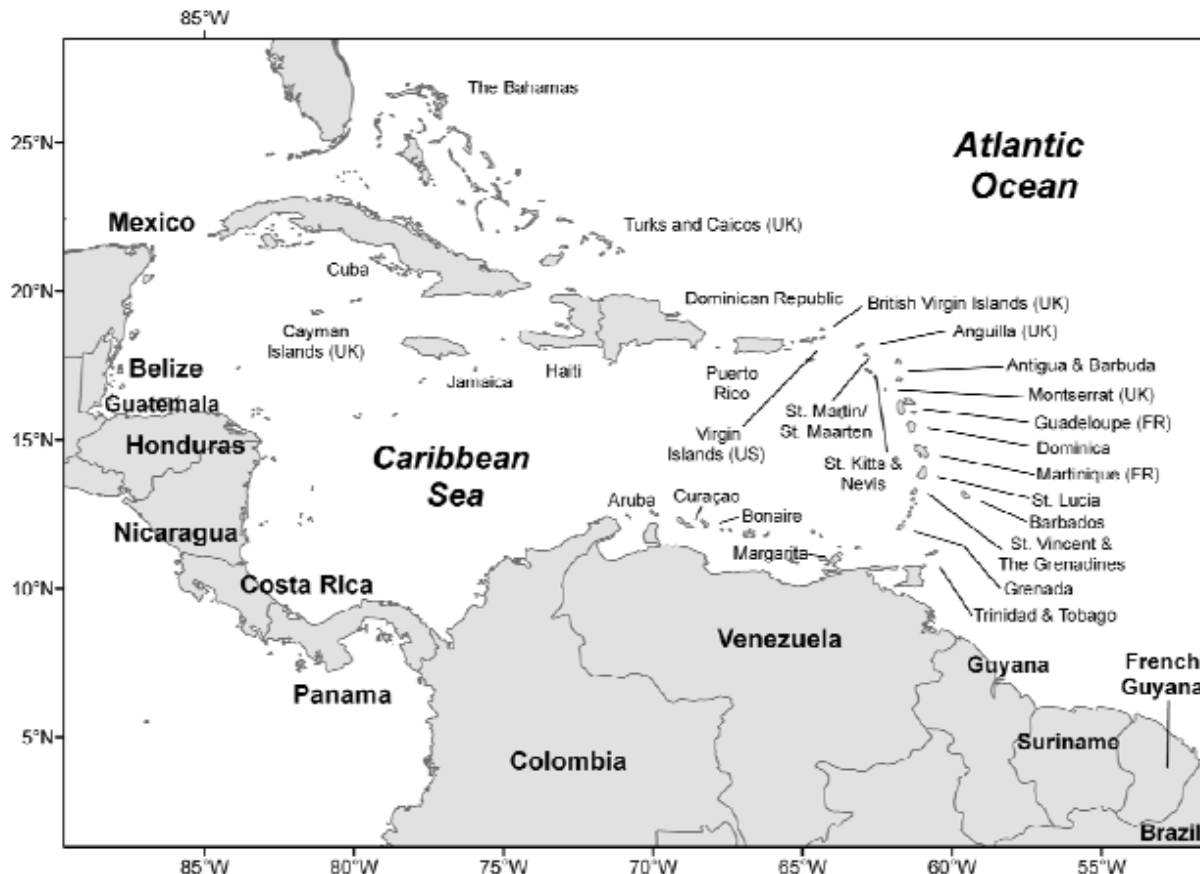


Fig. 2 Detailed map of the Caribbean Sea

Species	<i>Kogia breviceps</i> Pygmy sperm whale
Abundance Estimate	No Abundance Estimate
Fisheries	Entanglement mortality has been reported in Colombia and Puerto Rico. There was the capture of one individual taken in a coastal gillnet fishery in the Gulf of Morrosquillo, Colombia, in 1988

¹⁰¹ Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

Worldwide Cetacean Bycatch/Appendices

Estimated Annual Mortality No Estimate of Mortality

Species ***Sotalia fluviatilis* Tucuxi**

Abundance Estimate Cananéia estuary of Brazil 156-380

No Abundance Estimate for Any Other Region

Fisheries Dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are also captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.

Estimated Annual Mortality Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona

An estimated 938 animals were taken in drift nets from the port of Arapiranga during the summer of 1996 and a further 125 taken during the winter.¹⁰²

Species ***Pseudorca crassidens* False killer whale.**

Abundance Estimate No Abundance Estimate

Fisheries These whales are caught in coastal gillnets off southern and southeastern Brazil. They also interact with longline fisheries in southern Brazil.

Estimated Annual Mortality No Estimate of Mortality

Species ***Orcinus orca* Killer whale**

Abundance Estimate No Abundance Estimate

Fisheries A killer whale drowned in a driftnet in Trinidad waters of the Gulf of Paria. Killer whales interact with longline fisheries for swordfish, tuna and sharks off Brazil and some hooking and entanglement are known to occur.

Estimated Annual Mortality No Estimate of Mortality

Species ***Globicephala macrorhynchus* Short-finned pilot whale.**

Abundance Estimate No Abundance Estimate

Fisheries Pilot whales interact with longline fisheries off Brazil

Estimated Annual Mortality No Estimate of Mortality

¹⁰² IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

Worldwide Cetacean Bycatch/Appendices

Species	<i>Peponocephala electra</i> Melon-headed whale
Abundance Estimate	No Abundance Estimate
Fisheries	A melon-headed whale that stranded at Los Roques, Venezuela had net marks on its body.
Estimated Annual Mortality	No Estimate of Mortality

Species	<i>Tursiops truncatus</i> Bottlenose dolphin
Abundance Estimate	Margarita Islands off northern Venezuela 50
	Gandoca-Manzanillo Wildlife Refuge, Costa Rica 82
	Bocas del Toro, Panama 50
Fisheries	Bottlenose dolphins have been entangled in both gillnet and trawl fisheries in Honduras, Colombia, French Guiana, Trinidad, and Venezuela. There is evidence of bycatch of bottlenose dolphins in gillnets along much of the Brazilian coastline, where it is common for people to use dolphin meat as shark bait. Scientists have reported a possibly large incidental capture of small cetaceans, in the Brazilian gillnet fishery off of French Guiana that included bottlenose dolphins. ¹⁰³ A bottlenose dolphin was captured in a gillnet in a Colombian coastal fishery. Other gillnet fisheries in Mexico, for example may also be expected to impact bottlenose dolphins in this area.
Estimated Annual Mortality	No Estimate of Mortality

Species	<i>Grampus griseus</i> Risso's dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	Risso's dolphins are entangled and interact with longline fisheries in deep offshore waters of southern Brazil and with trawl and gillnet fisheries in Colombia
Estimated Annual Mortality	No Estimate of Mortality

Species	<i>Stenella coeruleoalba</i> Stripped dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	Bycatch has been reported in coastal gillnet fisheries in Brazil
Estimated Annual Mortality	No Estimate of Mortality

¹⁰³ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

Mortality

Species ***Stenella longirostris* Spinner dolphin.**

Abundance Estimate Fernando de Noronha Archipelago 700 (photo id)

Fisheries Spinner dolphins interact with driftnet fisheries off southern Brazil

Estimated Annual Mortality No Estimate of Mortality

Species ***Stenella frontalis* Atlantic spotted dolphin.**

Abundance Estimate No Abundance Estimate--considered abundant

Fisheries Spotted dolphins are incidentally captured in gillnets throughout much of its range off Brazil, Venezuela and Colombia-- particularly high bycatch occurs in coastal gillnets in southern Brazil.

Estimated Annual Mortality No Estimate of Mortality

Species ***Delphinus delphis* Common dolphin.**

Abundance Estimate No Abundance Estimate

Fisheries Common dolphins may be regularly caught in northeastern Venezuela and in coastal gillnets and driftnets in southern and southeastern Brazil

Estimated Annual Mortality No Estimate of Mortality

Species ***Sousa teuszii* Atlantic humpback dolphin**

Abundance Estimate¹⁰⁴ Dakhla Bay Considered small in size

Parc National du Banc d' Arguin in Mauritania.¹⁰⁵ Considered small in size

Saloum delta, Senegal¹⁰⁶ 100

¹⁰⁴ Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. and Bamy, I. L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). *Aquatic Mammals* 30: 56-83.

¹⁰⁵ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

¹⁰⁶ Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80pp.

	Canal do Geba-Bijagos ¹⁰⁷	Considered the largest stock, perhaps < a thousand animals
	South Guinea ¹⁰⁸	Unknown
	Cameroon	Unknown
	Gaboon Estuaries	Unknown
	Angola	Considered small
Fisheries	Atlantic humpback dolphins are caught in beach seines and shark nets in Senegal. Artisanal fisheries are diversifying and expanding rapidly in Dakhla Bay, southern Morocco/Western Sahara. Interactions with fisheries, possible depletion of food resources (through fisheries), competitive interactions with bottlenose dolphins, and population fragmentation may all be contributing to wipe out <i>S. teuszii</i> from Dakhla Bay and perhaps throughout southern Morocco. ¹⁰⁹	
Estimated Annual Mortality	No Estimate of Mortality In 1996, Senegal's Saloum Delta three carcasses, found together on a remote island, had rope tied around their tail stocks.	

AREA 37 MEDITERRANEAN AND BLACK SEA

Abundance estimates for the western Mediterranean basin were obtained in 1991-1992. Although dated, it is an improvement over the southern and eastern parts of the Mediterranean where abundance estimates are completely lacking. Other species known to occur in this area, but for which information on abundance estimates and fishery interactions are sparse include:

- *Pseudorca crassidens* False killer whale.
Di Natale refers to 2 false killer whales taken by longlines, in the Tyrrhenian Sea off the Calabrian coast.¹¹⁰
- *Megaptera novaeangliae* Humpback whale
There are four instances of humpback whale bycatch: (1) 1992, Gulf of Gabes, Tunisia; (2) 1993, Cavalaire, France; (3) 2004 Corfu Island, Greece; and (4) Siracusa, Sicily, Italy, (released alive).¹¹¹

¹⁰⁷ Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

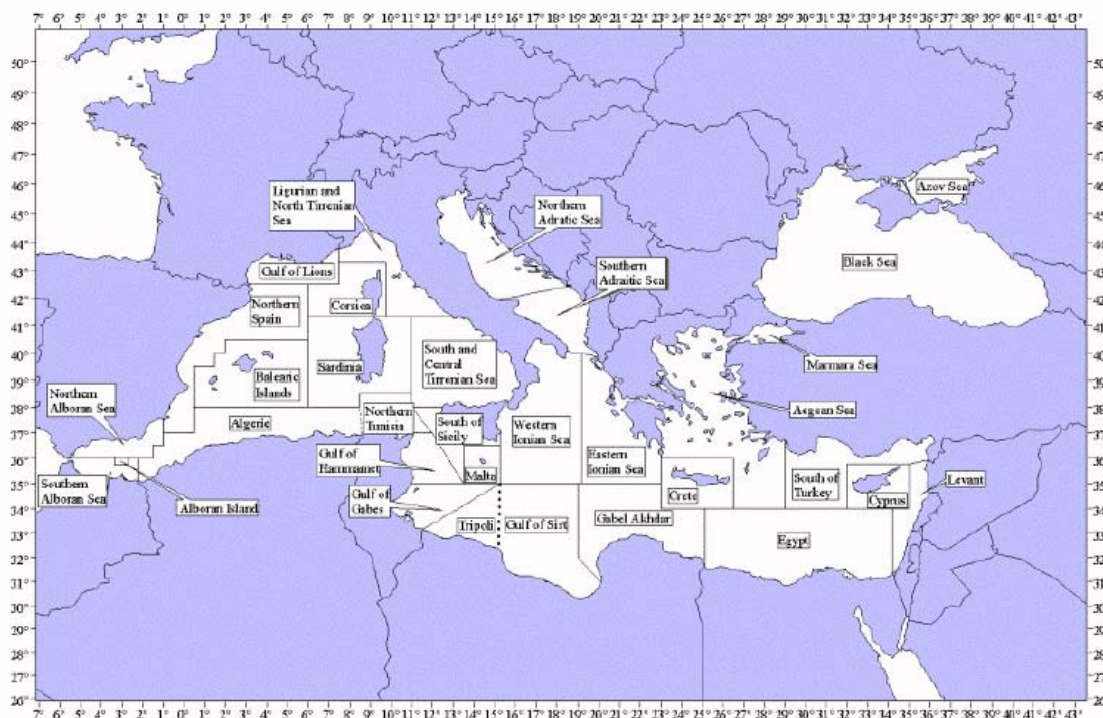
¹⁰⁸ Although the species' range may have been continuous historically, gaps in distribution are increasingly apparent. Ironically, although the species was discovered in the Cameroon Estuary in 1892, its presence in the northern Gulf of Guinea, a coastline of more than 2,000 km, has not been confirmed since then. Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

¹⁰⁹ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

¹¹⁰ Di Natale A., Mangano A. 1983. Killer whale, *Orcinus orca* (Linnaeus) and false killer whale, *Pseudorca crassidens* Owen, in the Italian seas. Rapports de la Commission Internationale de la Mer Méditerranée 28(5):181-182.

¹¹¹ Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

- *Steno bredanensis* Rough-toothed dolphin
There are two instances of bycatch involving rough-toothed dolphins: (1) 2002, Atlit shore, Israel, juvenile stranded after being bycaught; (2) 2003, Carmel Beach, Haifa, Israel, calf entangled in gillnet.



Species	<i>Globicephala melaena</i> Longfinned pilot whale		
Abundance Estimate	Strait of Gibraltar	260 – 270	
Fisheries	Uncertain		
Estimated Annual Mortality	Between 1978 and 1982, 26 pilot whales were caught in fishing and other gear in the western Mediterranean, at least 3 of them in tuna nets. ¹¹² Pilot whales are caught in the swordfish driftnet fishery--7% of animals recorded by Notobartolo di Sciara were pilot whales.		
Species	<i>Balaenoptera acutorostrata</i> Minke whale.		
Abundance Estimate	No Abundance Estimate		
Fisheries	Minke whales are caught in driftnets.		
Estimated Annual Mortality	1978-1981	Italian seas	2 different records of incidental capture in driftnets, involving 4 whales ¹¹³

¹¹² Northridge S. P. 1984. World review of interactions between marine mammals and fisheries. Fisheries Technical paper 251. Food and Agriculture Organization of the United Nations, Rome. 191 pp.

¹¹³ Di Natale A., Mangano A. 1981. Report of the progress of Project Cetacea. VI. July 1978 – October 1981. Memorie di biologia marina e di oceanografia. N. 5. Vol. 11. 49 pp.

Worldwide Cetacean Bycatch/Appendices

1998	Near Giens Peninsula, France	Standed after being caught in a net ¹¹⁴
1998	Toulon Region, France	Bycaught whale ¹¹⁵
2000	Akko, Israel	Calf found entangled in net ¹¹⁶
2002-2003	Al Hoceima, Morocco	Adult bycaught in pelagic driftnet ¹¹⁷
2004	Haifa, Israel	Calf found entangled in net ¹¹⁸

Species	<i>Ziphius cavirostris</i> Cuvier's beaked whale.
Abundance Estimate	No Abundance Estimate
Fisheries	Cuvier's beaked whales are occasionally incidentally caught in driftnets and longlines in the Mediterranean Sea.
Estimated Annual Mortality	The Spanish Mediterranean longlining fleet entangled (and released alive) only one unidentified beaked whale out of 798 sets. ¹¹⁹ In Italy, 13 whales were bycaught between 1986 and 1997. ¹²⁰
Species	<i>Physeter macrocephalus</i> Sperm whale.
Abundance Estimate	No Abundance Estimate, but likely in the hundreds of thousands and declining
Fisheries	Sperm whales are caught in the high-seas swordfish driftnet fishery.
Estimated Annual Mortality	Since the mid-1980s, entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality. ¹²¹ The number of sperm whales found dead or entangled from 1971 to 2004 in Spain,

¹¹⁴Robineau D. 2005. Cétacés de France. Fédération Française des Sociétés de Sciences Naturelles, Paris. 646 pp.

¹¹⁵Macé M., Bompar J.-M., Fabre J.-L., Bourcaud-Baralon C., Petit C. 1999. The minke whale, *Balaenoptera acutorostrata*, a new candidate for Mediterranean endemic species? European Research on Cetaceans 13:369.

¹¹⁶Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

¹¹⁷Tudela S., Kai Kai A., Maynou F., El Andalosi M., Guglielmi P. 2004. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alborán Sea (SW Mediterranean). Biological Conservation 121:65-78.

¹¹⁸Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

¹¹⁹Valeiras J., Camiñas J. A. 2001. Captura accidental de mamíferos marinos en las pesquerías españolas de palangre de pez espada y túnidos en el Mediterráneo. II Simposium de la Sociedad Española de Cetáceos. SEC. Noviembre, Valsain, Segovia.

¹²⁰Centro Studi Cetacei. 1998. Cetacei spiaggiati lungo le coste italiane. XII. Rendiconto 1997. Atti. Soc. Ital. Sci. Nat. Museo civ. Stor. Nat. Milano, 139(II): 213-226.

¹²¹International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

France and Italy (combined) was 229.¹²²

The large majority of the strandings in Italy and Mediterranean Spain were caused by entanglement in driftnets, as evident from the presence of net fragments or characteristic marks on the whales' bodies¹²³ From 1986 to 1990, 56 sperm whales stranded due to entanglement.¹²⁴

Despite international and national regulations banning driftnets from the Mediterranean, illegal or quasi-legal driftnetting continues in the western Mediterranean (e.g., in France, Italy, and Morocco) and in the eastern basin (e.g., Greece and Turkey), continuing to threaten the species' survival in the region.

Species

***Tursiops truncatus* Bottlenose dolphin.**

Abundance
Estimate¹²⁵

No Abundance Estimate—may be in the low 10,000s

Probably declining, reduced by 30% over the last 60 yrs.

Strait of Gibraltar	258 (CV 0.08) (226 – 316)
Alboran Sea (Spain)	584 (CV 0.28) (278-744)
Almeria (Spain)	279 (CV 0.28) (146–461)
Asinara Island National Park (Italy)	22 (CV 0.26) (22–27)
Balearic Islands & Catalonia (Spain)	7,654 (CV 0.47) (1,608-15,766)
Balearic Islands (Spain)	1,030 (CV 0.35) (415-1,849)
Alboran sea and Murcia	1288
Gulf of Vera (Spain)	256 (CV 0.31) (188–592)
Valencia (Spain)	1,333 (CV 0.31) (739-2,407)
Ionian Sea	48
Amvrakikos Gulf	152 (136-186)
Central Adriatic Sea (Kornati & Murtar Sea, Croatia)	14
North-eastern Adriatic Sea (Kvarneric, Croatia)	120

¹²² International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

¹²³ Lazaro F., Martin V. 1999. Sperm whales and drifting nets in the Mediterranean Sea: the example of the Balearic Islands. In: European Research on Cetaceans - 13. Proc. 13th Ann. Conf. ECS, Valencia, 20-24 April, 1999, pp. 118.

¹²⁴ Cagnolaro L., Notarbartolo di Sciara G. 1992. Research activities and conservation status of cetaceans in Italy. Boll. Mus. Ist. Biol. Genova, 56-57:53-85.

¹²⁵ Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

	North Adriatic Sea (Gulf of Trieste, Slovenia)	47
Fisheries	Bottlenose dolphins are incidentally caught in trammel, set gillnets, and drift gillnets	
Estimated Annual Mortality	In some Mediterranean areas the incidental mortality rates are probably unsustainable. ¹²⁶	
	Bycatch in trawl nets is relatively uncommon in most Mediterranean areas; but high mortality in bottom trawls has been reported from the coast of Israel. ¹²⁷	
	Dolphins die incidentally in purse seines and longlines, but the relative importance of mortality from these gear types on Tursiops at the basin level is probably low.	
	In 1991, 30 bottlenose dolphins were caught by artisanal gear and trawlers in the Balearic area. ¹²⁸	
Species	<i>Tursiops truncatus ponticus</i> Black Sea Bottlenose dolphin.	
Abundance Estimate ¹²⁹	No Abundance Estimate—may be in the low 10,000s	
	Probably declining, reduced by 30% over the last 60 yrs.	
	Turkish Straits System	495 (203–1,197)
	(Bosphorus, Marmara Sea and Dardanelles)	468 (184–1,186)
	Kerch Strait	76 (30–192)
		88 (31–243)
		127 (67–238)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters	4,193 (2,527–6,956)
	NE shelf area of the Black Sea	823 (329–2,057)
Fisheries	<i>T. t. ponticus</i> are captured in bottom-set gillnets for turbot (<i>Psetta maotica</i>), spiny dogfish (<i>Squalus acanthias</i>), sturgeon (<i>Acipenser</i> spp.) and sole (<i>Solea</i> spp.), purse seines for mullet (<i>Mugil</i> spp. and <i>Lisa</i> spp.) and anchovy (<i>Engraulis encrasicolus ponticus</i>), trammel nets and trap nets. Bottom-set gillnets take significant numbers, especially during the turbot fishing season between April and June.	
Estimated Annual	Although <i>T. t. ponticus</i> constituted no more than 3% of the totals in the reports from Black Sea countries during the 1990s, at present, incidental	

126 Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, *Tursiops truncatus*, interacting with fisheries in the Balearic Islands, Spain. *European Research on Cetaceans* 6:32–34.

127 Goffman O., Kerem D., Spanier E. 1995. Dolphin interactions with fishing-trawlers off the Mediterranean coast of Israel. Abstract. 11th Biennial Conference on the Biology of Marine Mammals, Orlando, FL. 14–18 December 1995.

128 Silvani, L., Raich, J. and Aguilar, A. 1992. Bottle-nosed dolphins, *Tursiops truncatus*, interacting with local fisheries in the Balearic Islands, Spain. *European Research on Cetaceans*: 32–33.

129 Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

Worldwide Cetacean Bycatch/Appendices

Mortality mortality in fishing gear is probably one of the main threats to *T. t. ponticus*.¹³⁰ At least 200-300 bottlenose dolphins were incidentally killed in Turkish fisheries each year.¹³¹ The estimated annual mortality of *T. t. ponticus* in gillnet fisheries in the Mediterranean is 110 to 455.¹³²

Species ***Grampus griseus* Risso's dolphin**

Abundance Estimate No Abundance Estimate

Fisheries Risso's dolphins are caught in longlines and gillnets in Spain and Italy.

Estimated Annual Mortality In the Mediterranean Sea, Risso's dolphins are among the cetacean species frequently entangled in fishing gear--catches in longlines (two individuals), set nets (in France) and driftnets in Italy.¹³³

Species ***Stenella coeruleoalba* Striped dolphin**

Abundance Estimate¹³⁴ Alboran Sea 14,736 (6,923 – 31,366)¹³⁵

Western Mediterranean 117, 880 (68,379-214,800)

Corso-Ligurian basin 25,614 (15,377 – 42, 685)

No Abundance Estimate for the Eastern Mediterranean

Population trend is uncertain

Fisheries Striped dolphins are caught in the pelagic driftnet fishery

Estimated Annual Mortality Italian, Greek and Moroccan pelagic drift fishing vessels have high levels of incidental mortality.

In 1993 and 1994, the Swordfish driftnet fishery in the Eastern Gibraltar Straits captured 366 (268 – 464) and 286 (283 – 340) striped and common dolphins¹³⁶

The Spanish driftnet fishery in the Alborán Sea reportedly killed 145-183 striped dolphins per season in the early 1990s, this fishery was halted in

¹³⁰ Birkun A. Jr. 2002b. Interaction between cetaceans and fisheries: Black Sea. Pp. 98-107 in: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: State of knowledge and conservation strategies. ACCOBAMS Secretariat, Monaco, 219pp.

¹³¹ Öztürk B. (Comp.) 1999. *Black Sea Biological Diversity: Turkey*. United Nations Publ., New York. 144 pp.

¹³² Perrin WF, Donovan GP, and Barlow J (1994). Gillnets and Cetaceans. Report of the International Whaling Commission Special Issue 15. 629pp.

¹³³ Notarbartolo di Sciara G. 1990. A note on the cetacean incidental catch in the Italian driftnet swordfish fishery, 1986-1988. Rep. Int. Whal. Commn 40:459.

¹³⁴ Forcada J., Aguilar A., Hammond P.S., Pastor X., Aguilar R. 1994. Distribution and numbers of striped dolphins in the western Mediterranean Sea after the 1990 epizootic outbreak. Mar. Mammal Sci. 10(2):137-50.

¹³⁵ Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

¹³⁶ Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

1995.¹³⁷

Moroccan driftnet vessels kill more than 3,600 dolphins (striped and common, combined) in the Alborán Sea per year.¹³⁸

The Italian drift net (spadare) fishery is estimated to have killed thousands of striped dolphins per year through the early 1990s (1149 in 1990 and 1363 in 1991).¹³⁹ The Italian driftnet fishery in the Ligurian Sea has been banned since 1992, but illegal fishing may still contribute to striped dolphin fishery mortality in Italian waters.

In 2000, the French thonaille drift net fishery killed 326 (180-472) striped dolphins.¹⁴⁰

In 1994, the Spanish pelagic purse seine fishery off the SE Spanish Mediterranean coast had a bycatch of 300 striped dolphins.¹⁴¹

There are also reports of (but no estimates) widespread and significant striped dolphin mortality in at least pelagic purse seines, longlines, trawl, harpoon fishery and gillnets.¹⁴²

Species	<i>Delphinus delphis</i> Common dolphin.
Abundance Estimate	Alboran Sea 14,736 (6,923 – 31,366) ¹⁴³
Fisheries	Common dolphins appear to be regularly taken as bycatch in driftnets
Estimated Annual Mortality	Approximately 165 to 145 common dolphins were caught in 1993 and 1994 in the swordfish driftnet fishery representing 1.2% of the estimated population. Since then Spanish driftnetting has been banned but the Moroccan driftnetting effort increased from 200 to 400 vessels. ¹⁴⁴

¹³⁷ Silvani L., Gazo M., Aguilar A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biol. Conserv. 90:79-85.

¹³⁸ Tudela S., Kai Kai A., Maynou F., El Andalossi M., Guglielmi P. 2005. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). Biol. Conserv. 121:65-78.

¹³⁹ Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

¹⁴⁰ Imbert, G., Gaertner, J.-C. and Laubier, L. 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16-18 nov. 2001 (Abstract)

¹⁴¹ Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

¹⁴² Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

¹⁴³ Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

¹⁴⁴ Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale

No other estimate of mortality exist for other parts of the Mediterranean

Species	<i>Phocoena phocoena</i> Harbor porpoise
Abundance Estimate ¹⁴⁵	No Total Abundance Estimate—at least several thousands maybe 10,000-12,000 Probably declining
	Azov Sea in total 2,922 (1,333–6,403)
	Kerch Strait 54 (12–245)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters 1,215 (492–3,002)
	SE Black Sea within Georgian territorial waters 3,565 (2,071–6,137)
	Central Black Sea beyond territorial waters of Ukraine and Turkey 8,240 (1,714–39,605)
Fisheries	Almost all (>99%) of the porpoises are caught in bottom-set gillnets for turbot (<i>Psetta maeotica</i>), spiny dogfish (<i>Squalus acanthias</i>) and sturgeon (<i>Acipenser</i> spp.). The peak occurs from April–June during the turbot season in the Azov Sea and Kerch Strait and throughout the shelf area of the Black Sea.
Estimated Annual Mortality	At present, incidental mortality in fishing nets is the most serious threat to harbor porpoise, with the majority (95%) of recorded cetacean entanglements being porpoises. Mortality estimates are not available; however, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands. ¹⁴⁶

A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

¹⁴⁵Birkun A. Jr., Glazov D., Krivokhizhin S., Mukhametov L. 2002. Distribution and abundance of cetaceans in the Sea of Azov and Kerch Strait: Results of aerial survey (July 2001). P.73 in: Abstr. 16th Annual Conf. of the European Cetacean Society (Liege, 7-11 April 2002). See also: Birkun A., Jr., Glazov D., Krivokhizhin S., Nazarenko E., Mukhametov L. 2003. Species composition and abundance estimates of cetaceans in the Kerch Strait and adjacent areas of the Black and Azov Seas: The second series of aerial surveys (August 2002). Pp.271-272 in: Abstr. 17th Annual Conf. of the European Cetacean Society (Las Palmas de Gran Canaria, 9-13 March 2003).

¹⁴⁶ Commercial hunting of Black Sea cetaceans, including harbour porpoises, was banned in 1966 in the former USSR (present Georgia, Russia and Ukraine), Bulgaria and Romania, and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002 it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

AREA 41 SOUTHWEST ATLANTIC

In the southwest Atlantic, the problem of marine mammal bycatch has not been addressed by fisheries management authorities. A complicating factor in some countries is that cetaceans taken incidentally are frequently used for human food, oil, and bait and in fact the distinction between incidental and direct catch has been blurred. In many of these nations (especially Brazil), information is still almost entirely lacking on the scale and species composition of the bycatches, fishery characteristics, and fleet dynamics.

Species	<i>Sotalia fluviatilis</i> Tucuxi	
Abundance Estimate	Cananéia estuary of Brazil	156-380
	No Abundance Estimate For Any Other Region	
Fisheries	Tucuxi are reported to become entangled in beach seines and, more frequently, in set gillnets and driftnets throughout their range. These dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.	
Estimated Annual Mortality	Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter. ¹⁴⁷ In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries. ¹⁴⁸	
Species	<i>Globicephala melas</i> Long finned pilot whale	
Abundance Estimate	No Abundance Estimate	
Fisheries	Pilot whales are entangled in longline, driftnet fisheries, and purse seines	
Estimated Annual Mortality	The pelagic shark driftnet fishery off southern Brazil incidentally caught 15 long-finned pilot whales in 1995 and 1997. ¹⁴⁹ Between 1980 and 1985, 6 pilot whales were entangled taken on longlines in Brazilian waters. ¹⁵⁰	

Species ***Lagenorhynchus obscurus* Dusky dolphin.**

¹⁴⁷ IWC (2000) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

¹⁴⁸ IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

¹⁴⁹ Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

¹⁵⁰ Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

Worldwide Cetacean Bycatch/Appendices

Abundance Estimate	Patagonian coast ¹⁵¹	7,252
	Punta Ninfas and Cabo Blanco, Argentina	6,628
Fisheries	Dusky dolphins are entangled in mid-water trawls for shrimp, squid, and hake, driftnet fisheries, longline fisheries, and purse seines	
Estimated Annual Mortality	Mid-water trawls for shrimp, squid, and hake off the Patagonian coast incidentally caught between 442-560 dusky dolphin in 1984. From 1992 to 1994, 70 to 200 dusky dolphins were incidentally killed in Patagonian trawl fisheries--the number decreased to 36 in 1994. ¹⁵² The catch was 70% mature or pregnant females and in the mid-1980s the bycatch represented 8% of the present population estimate. ¹⁵³	
	Dusky dolphins are caught in a purse seine fishery off the Argentine coast near Necochea; 50–100 dusky and common dolphins per year may be killed. An unknown number also becomes entangled in a similar purse seine fishery at Mar del Plata. ¹⁵⁴	
Species	Lagenorhynchus australis Peale's dolphin	
Abundance Estimate	No Abundance Estimate	
Fisheries	Peale's dolphins are caught in mid-water trawls and coastal gillnets	
Estimated Annual Mortality	Peale's dolphins have been caught in set nets in Tierra del Fuego, but the overall numbers involved are unknown. ¹⁵⁵	
	Peale's dolphins have been harpooned for crab bait in Argentina.	
Species	<i>Delphinus delphis</i> Common dolphin.	
Abundance Estimate	No Abundance Estimate	
Fisheries	Common dolphins are caught in mid-water trawls, coastal gillnets, and purse seines	
Estimated Annual Mortality	Common dolphins are caught with dusky dolphins, at a combined rate of about 50–100 a year in a purse seine fishery off Necochea, Argentina and in mid-water trawls on the Patagonia shelf. ¹⁵⁶	

¹⁵¹ Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703.

¹⁵² Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. *J. Northw. Atl. Fish. Sci.*, Vol. 22: 189–207

¹⁵³ Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703

¹⁵⁴ Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

¹⁵⁵ Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

¹⁵⁶ Id.

Species	<i>Cephalorhynchus commersonii</i> Commerson's dolphin
Abundance Estimate	Recent aerial surveys suggest that there are approximately 21,000 Commerson's dolphins along the entire coast, with 7,000 between 42-48°S and 14,000 in Tierra del Fuego. ¹⁵⁷
Fisheries	Commerson's dolphins are caught in mid-water trawls (in Chubut, Tierra del Fuego and Peninsula Valdez) and coastal gillnets.
Estimated Annual Mortality	<p>Total bycatch estimates are not available, but 5-30 Commerson's dolphins die each year in nets set perpendicular to shore in eastern Tierra del Fuego; this fishery type also captures dolphins in the Argentinean provinces north of Tierra del Fuego and in the eastern strait of Megellan.¹⁵⁸</p> <p>From 1992 to 1994, the average annual mortality of Commerson's dolphins in mid-water trawls was 25-170 animals.¹⁵⁹</p> <p>In the 1999/2000, fishing season in the region of La Angelina and Ria Gallegos, Argentinean artisanal setnet fisheries killed 179 (141 – 212).¹⁶⁰</p> <p>Commerson's dolphins are also used as crab bait.</p>
Species	<i>Phocoena spinipinnis</i> Burmeister's porpoise
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are caught in coastal or shark gill net fisheries
Estimated Annual Mortality	Total bycatch estimates are not available, but about 10–15 Burmeister's porpoises are reported killed annually in shark nets set at around 50m off Necochea. Some are also killed in set nets in Tierra del Fuego, and in coastal gillnets around Buenos Aires. In Uruguay, eight Burmeister's porpoises were drowned in shark gillnets since 1974. ¹⁶¹

¹⁵⁷The South American form of Commerson's dolphin is endemic to Patagonia in waters between 42°S and 55°S; its actual distribution is restricted to particular areas within that range. Pedraza, S.N., A.C.M. Schiavini, E.A. Crespo, S.L. Dans, and M.A. Coscarella. In review. Abundance of Commerson's dolphins (*Cephalorhynchus commersonii*) in the coasts of Patagonia (Argentina). *Journal of Cetacean Research and Management*.

¹⁵⁸ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages. Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. *J. Northw. Atl. Fish. Sci.*, Vol. 22: 189–207

¹⁵⁹ Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. *J. Northw. Atl. Fish. Sci.*, Vol. 22: 189–207 See also: Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

¹⁶⁰ Iniguez MA, Hevia M, Gasparrou C, Tomsin AL and Secchi ER. (2003) Preliminary estimate of incidental mortality of Commerson's dolphin (*Cephalorhynchus commersonii*) in an artisanal setnet fishery in La Angelina beach and Ria Gallego, Santa Cruz, Argentina. *LAJAM* 2(2) 87-94. See also: Annex H, Small Cetacean Subcommittee (2004)

¹⁶¹ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages. Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. *J. Northw. Atl. Fish. Sci.*, Vol. 22: 189–207

Species	<i>Australophocoena dioptrica</i> Spectacled porpoise.		
Abundance Estimate	No Abundance Estimate		
Fisheries	Spectacled porpoise are caught in coastal or shark gill net fisheries		
Estimated Annual Mortality	Total bycatch estimates are not available, but at least 34 animals were incidentally killed between 1975 and 1990 in coastal gill nets set in Tierra del Fuego. ¹⁶² There is also mortality in bottom and mid-water trawls off the coast of Chubut, Argentina.		
Species	<i>Inia geoffrensis</i> Boto		
Abundance Estimate	No Abundance Estimate		
Fisheries	Lampara seine nets and gillnets are most frequently responsible for incidental captures of Boto.		
Estimated Annual Mortality	Total bycatch estimates are not available or known, but are thought to have increased with increased fishing effort.		
Species	<i>Pontoporia blainvillei</i> Franciscana.		
Abundance Estimate ¹⁶³	FMA I	No Abundance Estimate	Total annual bycatch = 110
	FMA II	No Abundance Estimate	Total annual bycatch = 375
	FMA III	42,078 (33,047 – 53,542) ¹⁶⁴	Total annual bycatch = 1374 (694-2215)
	FMA IV	34,131 (16,360-74,397)	Total annual bycatch = 651 (398-1097)
Fisheries	The franciscana is caught in fairly large numbers in gillnets set for sharks along most of its coastal range.		
Estimated Annual Mortality	Between 2.1 – 10.8 % of the population is removed each year by the fishery. The total estimated mortality throughout the range could be in the order of 1,500-2,000 animals per year. Most bycaught animals are juveniles with an average age of one year and 64% of the individuals		

¹⁶² Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages. Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

¹⁶³ The IWC has divided, for management purposes, franciscana population into four Franciscana Management Units (FMUs) according to ecological, morphological, and genetic information. At least three populations have been differentiated genetically (FMU 1, 2, and 3-4). Levels of bycatch mortality are generally high throughout the franciscana's range. Removal rates, estimated by dividing the mean bycatch by the mean abundance, have ranged from 1.6% for FMU 4 to 3.3% for FMU 3. Secchi, E. R., Danilewicz, D. and Ott P. H. 2004. Applying the phylogeographic concept to identify franciscanas dolphin stocks: implications to meet management objectives. Journal of Cetacean Research and Management 5:61-68.

¹⁶⁴ Secchi, E.R., Ott, P.H., Crespo, E.A., Kinas, P.G., Pedraza, S.N., and Bordino, P. 2001. A first estimate of franciscana (*Pontoporia blainvillei*) abundance off southern Brazil. *Journal of Cetacean Research and Management* 3, 95–100.

were under three years.¹⁶⁵

Uruguay gillnet fisheries incidentally killed 235 franciscana in 1992-93 and 28 in 1998.¹⁶⁶

In Rio Grande do Sul and Buenos Aires fisheries, an estimated 700 and 500¹⁶⁷ franciscana are captured each year.¹⁶⁸ Incidental mortality of franciscana in coastal gillnet fisheries in northern Buenos Aires, Argentina from September to April, during a four-year period from 2000 – 2004 was 312 dolphins—seventy-one percent of these bycaught franciscanas were female and most (56%) were immature.¹⁶⁹

In 2000, Brazilian fisheries killed 1496 franciscana.¹⁷⁰

In a small-scale survey of fishers operating from the post of Rio Grande, logbook data obtained from 9 – 10% of the fleet, estimated the total number of dolphins taken as bycatch by the entire fleet to be 946 dolphins (CI 467 – 1525) in 1999 and 719 (CI 248 – 1413) in 2000. This data was further extrapolated to all of the fishing area, giving a total estimated bycatch of 1106 (578 – 1915) in 1999 and 992 (475 – 1832) in 2000.¹⁷¹

¹⁶⁵ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

¹⁶⁶ The reason for the decline is a decline in fish stocks and the fisheries that use nets with larger mesh (32-34 and 20-22 mm) have reduced their effort and nets with small mesh are being used instead. Also Uruguayan legislation protecting franciscana (Law 9481 and Decrees 26, 1/78, 586/79 and 565/81 are being enforced.

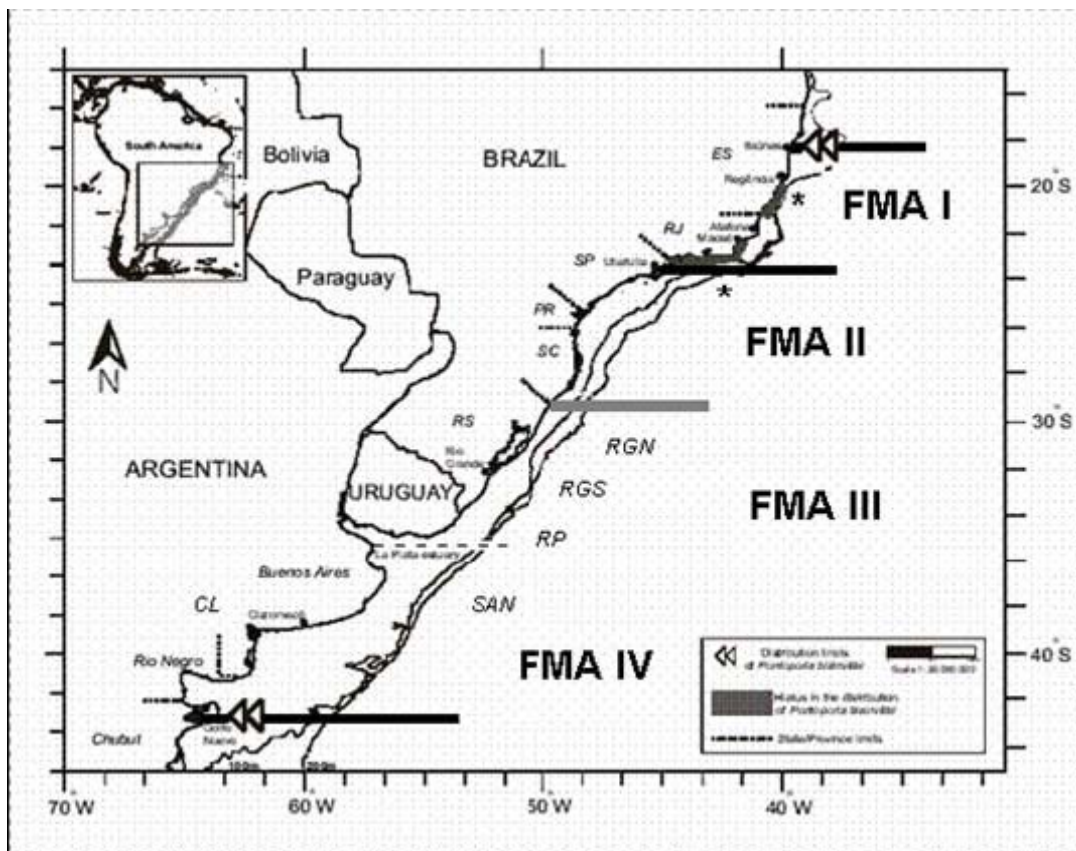
¹⁶⁷ From 2000 to 2003 Argentinean fisheries killed between 160 to 893 animals annually.

¹⁶⁸ Crespo EA (2002) Franciscana—*Potoporia blainvillei* In: Encyclopedia of marine mammals (Perrin WF, Wursig B, Thewissen JGM eds) Academic Press, San Diego, pp482-487

¹⁶⁹ Annex H, Small Cetacean Subcommittee (2004)

¹⁷⁰ Annex H, Small Cetacean Subcommittee (2004) Figures composed as follows: >850 (55) Caught in Southern Brazil – Gillnet. (It is only a rough estimate based on extrapolation. For the whole fleet. Data from only nine boats from a fleet of about 140-150) + 646 (48) from Rio Grande, southern Rio Grande do Sul.

¹⁷¹ Annex H, Small Cetacean Subcommittee (2004)

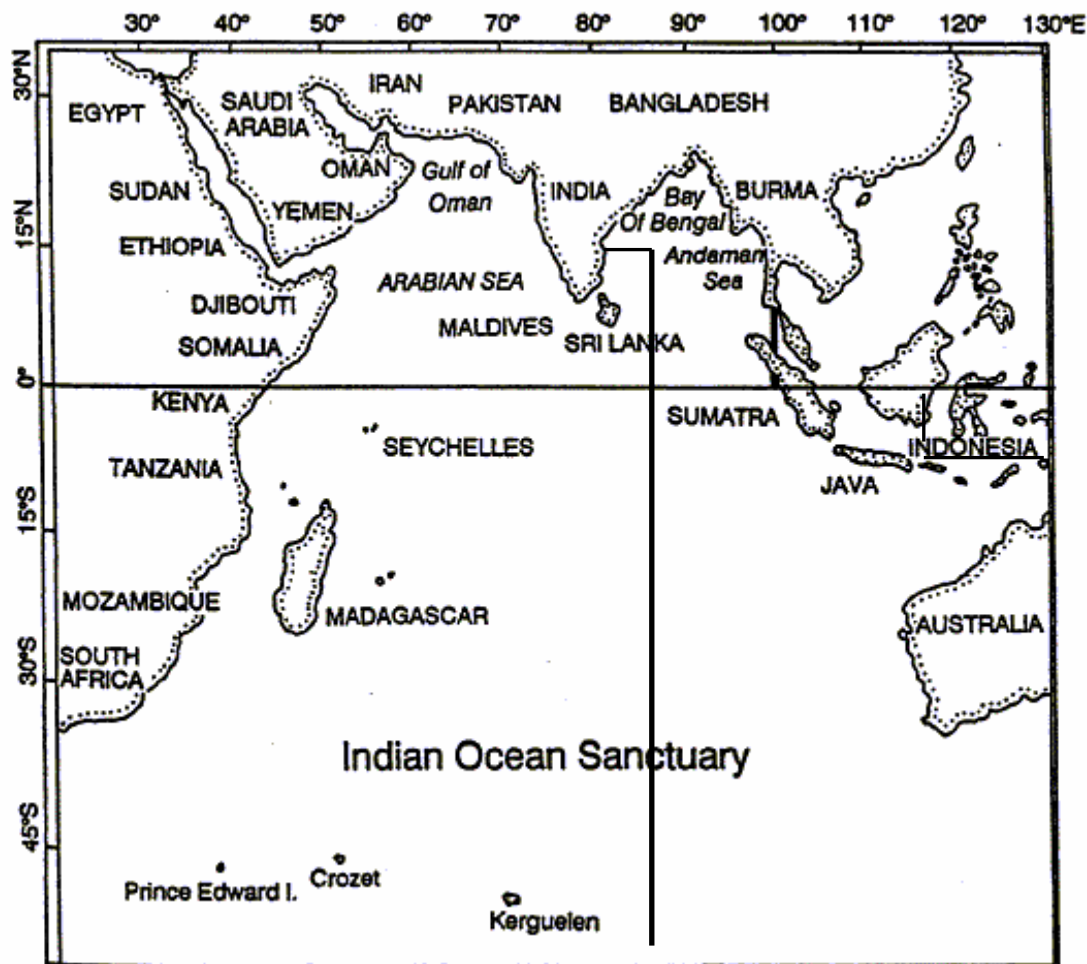


AREA 47 SOUTHEAST ATLANTIC

Species	<i>Cephalorhynchus heavisidii</i> Heaviside's dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Heaviside's dolphins are entangled in inshore gillnets off South Africa and Namibia. There are unconfirmed reports of animals taken in bottom trawl fisheries and beach seine nets
Estimated Annual Mortality	The estimated total kills of dolphins in 7,013 sets of Namibia in 1983 were 67 (<i>C. heavisidii</i> and <i>Lagenorhynchus obscurus</i> combined); whereas 57 were killed in South Africa. Other sources of incidental mortality were set nets close to the shore of Namibia, and a bottom trawl fishery. ¹⁷²

¹⁷² Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

AREA 51 WESTERN INDIAN OCEAN



Species	<i>Kogia breviceps</i> Pygmy sperm whale.
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Pygmy sperm whales are one of the major cetacean species caught in the Sri Lankan driftnet fisheries. Up to 6% of the landed catch consists of pygmy sperm whales, the total annual catch for all cetaceans has been estimated at 15,000 to 25,000, and therefore, total annual catches may reach 2,700 animals. ¹⁷³ Population impact of this catch is unknown. The IWC, in 1994, estimated that more than 80 pygmy sperm whales are

¹⁷³ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

¹⁷⁴ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

killed each year off the coast of Sri Lanka.¹⁷⁴

Species	<i>Kogia simus</i> Dwarf sperm whale.
Abundance Estimate	No Abundance Estimate
Fisheries	Dwarf sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Dwarf sperm whales may represent up to 6% of the cetacean bycatch in the Sri Lankan driftnet fisheries. Therefore, total annual catches may reach 2,700 animals. ¹⁷⁵ The IWC, in 1994, estimated that more than 230 dwarf sperm whales are killed each year off the coast of Sri Lanka. ¹⁷⁶

Species	<i>Steno bredanensis</i> Rough-toothed dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-toothed dolphins are caught in Sri Lankan coastal gillnet fisheries
Estimated Annual Mortality	This dolphin is taken in the Sri Lankan driftnet fishery in small numbers only, (5 recorded in total) with a maximum of only 2% in one sample, suggesting a catch of perhaps a few hundreds per year. ¹⁷⁷ The IWC, in 1994, estimated that more than 50 rough-toothed dolphins are killed each year off the coast of Sri Lanka. ¹⁷⁸

Species	<i>Sousa plumbea/chinensis</i> Indian humpback dolphin.
Abundance Estimate	No Total Abundance Estimate
	Plettenberg Bay, South Africa 25 ¹⁷⁹
	Natal coast 200 ¹⁸⁰
	Zanzibar (Tanzania), East Africa 71 (48-94) ¹⁸¹

¹⁷⁵ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

¹⁷⁶ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

¹⁷⁷ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

¹⁷⁸ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

¹⁷⁹ Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Sousa chinensis* (Osbeck, 1765), *Sousa plumbea* (G. Cuvier, 1829) and *Sousa teuszii* (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

¹⁸⁰ Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Sousa chinensis* (Osbeck, 1765), *Sousa plumbea* (G. Cuvier, 1829) and *Sousa teuszii* (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

¹⁸¹ Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

	South Eastern Cape coast of South Africa	466 ¹⁸²
	Bazaruto Archipelago, Mozambique	60 ¹⁸³
	Indus Delta	500 ¹⁸⁴
Fisheries	Indian humpback dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, and gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	<p>Entanglements in gillnets have been reported from Djibouti, the Arabian Gulf, Indus delta and the south-west coast of India. This species also becomes entangled in Indian shark and catfish gillnet fisheries along the east coast of India.</p> <p>Between 1980 and 1988, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7-8 animals per year.¹⁸⁵</p> <p>2.2 animals per year are captured in the Calicut gillnet fishery. Humpback dolphins are commonly entangled in coastal driftnet fisheries for seerfish and tunas on the Indian west coast, and in set nets and driftnets.</p> <p>The IWC, in 1994, estimated that more than 100 hump-back dolphins died each year in fisheries off the Sri Lankan coast¹⁸⁶ and more than 7.5 hump-back dolphins died annually in fisheries off the Indian Ocean coast of Africa.¹⁸⁷</p>	
Species	<i>Peponocephala electra</i> Melon-headed whale.	
Abundance Estimate	No Abundance Estimate	
Fisheries	Melon-headed whales are caught in Sri Lankan coastal gillnet and driftnet fisheries	
Estimated Annual Mortality	Three melon-headed whales were caught in the Sri Lankan driftnet fishery ¹⁸⁸ The IWC, in 1994, estimated that less than 10 melon-headed whales were caught annually in fisheries in the northern Indian Ocean. ¹⁸⁹	

182 Karczmarski, L., Winter, P.E.D., Cockcroft, V.G., and McLachlan, A. 1999. Population analyses of Indo-Pacific humpback dolphins *Sousa chinensis* in Algoa Bay, Eastern Cape, South Africa. *Marine Mammal Science* 15, 1115–1123.

183 Ross GJB, Heinsohn GE, Cockcroft VG 1994. Humpback dolphins-*Sousa chinensis* (Osbeck, 1765), *Sousa plumbea* (G. Cuvier, 1829) and *Sousa teuszii* (Kukenthal, 1892). In: *Handbook of Marine Mammals* (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

184 Ross GJB, Heinsohn GE, Cockcroft VG 1994. Humpback dolphins-*Sousa chinensis* (Osbeck, 1765), *Sousa plumbea* (G. Cuvier, 1829) and *Sousa teuszii* (Kukenthal, 1892). In: *Handbook of Marine Mammals* (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

185 Jefferson, T.A. and Karczmarski, L. 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) 655, 9pp. See also. Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

186 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

187 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

188 Leatherwood, S. and Reeves, R.R. (eds.). 1989. *Marine mammal research and conservation in Sri Lanka 1985–1986*. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

189 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Species	<i>Feresa attenuata</i> Pygmy killer whale.
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Although they comprise less than 2% of all cetaceans caught in gillnet fisheries in Trincomalee, Sri Lanka and in villages on the southwest coast of Sri Lanka, fishery mortality may be 300-900 animals annually. ¹⁹⁰ The IWC, in 1994, estimated that less than 170 pygmy killer whales were killed annually in fisheries off the coast of Sri Lanka. ¹⁹¹

Species	<i>Pseudorca crassidens</i> False killer whale.
Abundance Estimate	No Abundance Estimate
Fisheries	False killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 1 false killer whale died in shark nets to protect bathing beaches along the Natal coast, South Africa. ¹⁹² Catches in the Sri Lankan fishery included false killer whales representing up to 6% of one sample. ¹⁹³ The IWC, in 1994, estimated that more than 125 false killer whales were killed annually in fisheries off the coast of Sri Lanka. ¹⁹⁴

Species	<i>Lagenodelphis hosei</i> Fraser's dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Fraser's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 2 Fraser's dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa. ¹⁹⁵

190 Ross GJB, Leatherwood S 1994. Pygmy killer whale—*Feresa attenuata*. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds) Vol. 5: The first book of dolphins. Academic Press, London, pp 387-404.

191 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

192 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

193 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

194 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

195 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

196 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

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One Fraser's dolphin was caught in the Sri Lankan driftnet fishery¹⁹⁶

The IWC, in 1994, estimated that more than 10 Fraser's dolphins were killed annually in fisheries off the coast of Sri Lanka.¹⁹⁷

Species	<i>Tursiops truncatus</i> Bottlenose dolphin	
Abundance Estimate	No Total Abundance Estimate	
	Zanzibar (Tanzania), East Africa	161 (144-177) ¹⁹⁸
	Indian Ocean coast, South Africa, south of Natal	250
	Indian Ocean coast, South Africa, north of Natal	1,000
Fisheries	Bottlenose dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, gillnets in Madagascar, and there are unquantified entanglements in medium and large mesh gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	<p>Between 1980 and 1988, 271 bottlenose dolphins died in shark nets to protect bathers.¹⁹⁹ Scientists suggested that current catch rates may approach 5% of the local population and therefore may threaten it.²⁰⁰</p> <p>Catches in India are reported quite frequently, and formed 33% of the total catch of cetaceans recorded in the gillnet fishery at Calicut.²⁰¹ Bottlenose dolphins are one of the commonly caught dolphins in seerfish and tuna driftnet fisheries on the west coast of India, and in coastal gillnet fisheries for pomfrets and other species too. In Sri Lanka, this species was found to consist of between 5 and 25% of the total cetacean catch in four different surveys amounting to 1,250 to 10,000 animals.²⁰²</p> <p>Although national legislation prohibits the capture of cetaceans, which were formerly taken with harpoons²⁰³ an estimated 200-300 bottlenose</p>	

¹⁹⁸ Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

¹⁹⁹ Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

²⁰⁰ Peddemors, V.M., Cockcroft, V.G., and Wilson, R.B. 1991. Incidental dolphin mortality in the Natal shark nets: a preliminary report on prevention measures. Pp.129–137 in: *Cetaceans and Cetacean Research in the Indian Ocean Sanctuary* (eds. S. Leatherwood and G.P. Donovan). UNEP Marine Mammal Technical Report No. 3. Nairobi, Kenya.

²⁰¹ Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

²⁰² Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp. See also Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

²⁰³ Leatherwood, S. 1986. *Whales, Dolphins and Porpoises of the Indian Ocean Sanctuary. A Catalogue of Available Information*. Hubbs Marine Research Centre Technical Report No. 87-197. San Diego: Hubbs Marine Research Center. 207pp.

²⁰⁴ De Lestang, J.N. 1993. Status of marine mammals in the eastern African region. Report to UNEP; *Regional Seas Reports and studies series*.

²⁰⁵ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

dolphins are still killed annually by the Seychelles schooner fleet of some 20 vessels fishing at the edge of the Mahe Plateau and the outlying islands of the Seychelles group²⁰⁴

The IWC, in 1994, estimated that more than 500 bottlenose dolphins were caught in fisheries off the coast of Sri Lanka, 20-23 were killed in fisheries off the Indian Ocean coast of South Africa south of Natal, and 11-14 were killed in fisheries off the Indian Ocean coast of South Africa north of Natal.²⁰⁵

Species	<i>Grampus griseus</i> Risso's dolphin.
Abundance Estimate	5,500 to 13,000 ²⁰⁶
Fisheries	Risso's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	<p>In Sri Lanka, Risso's dolphins are the second most commonly bycaught cetacean in fisheries, providing fish and meat for human consumption and fish bait--stocks may be adversely affected.</p> <p>Risso's dolphins are caught frequently in the Sri Lankan fishery--between 6% and 16% of the total cetacean catch--or roughly 1,300 dolphins.²⁰⁷</p> <p>The IWC, in 1994, estimated that more than 1,300 Risso's dolphins were killed in fisheries off the coast of Sri Lanka.²⁰⁸</p>

Species	<i>Stenella longirostris</i> Spinner dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	Spinner dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries. This species is caught in Pakistani offshore deepwater gillnet fisheries and is commonly entangled in coastal driftnet fisheries for seerfish and tunas on the west coast of India, and is also entangled in other gillnet fisheries for sharks, pomfrets and other species.
Estimated Annual Mortality	Spinner dolphins are the most frequently caught species in the Sri Lankan fishery, where they formed between 33 and 47% of the total cetacean catch in for different surveys, or roughly 7,050-11,750 dolphins per year. ²⁰⁹

²⁰⁶ Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

²⁰⁷ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

²⁰⁸ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

²⁰⁹ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

²¹⁰ Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44-51.

²¹¹ Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329-346.

A single animal is reported from the Natal shark nets,²¹⁰ while in India, spinner dolphins made up more than 50% of the cetacean catch in the gillnet fishery.²¹¹

The IWC, in 1994, estimated that more than 4,000 spinner dolphins were entangled in fisheries off the coast of Sri Lanka.²¹²

Species	<i>Stenella coeruleoalba</i> Striped dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	Striped dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, Indian ocean coastal gillnets, and unquantified catches in the offshore gillnet fisheries of Pakistan.
Estimated Annual Mortality	Between 1980 and 1988, 3 dolphins were entangled in the Natal shark nets to protect bathing beaches along the Natal coast, South Africa ²¹³ Striped dolphins are frequently entangled in the Sri Lankan driftnet fishery where between 6 and 11% of all cetaceans landed were found to be this species—900 to 2,750 ²¹⁴ The IWC, in 1994, estimated that more than 700 striped dolphins were killed in fisheries off the coast of Sri Lanka. ²¹⁵

Species	<i>Stenella attenuata</i> Pantropical spotted dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Up to 27% of all cetaceans landed in Sri Lanka are spotted dolphins, suggesting a total annual catch between 4,050 and 6,750. ²¹⁶ The IWC, in 1994, estimated that more than 1,500 spotted dolphins were killed in fisheries in the Northern Indian Ocean. ²¹⁷

Species	<i>Delphinus delphis</i> Common dolphin.
Abundance Estimate	No Abundance Estimate

²¹² Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

²¹³ Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

²¹⁴ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

²¹⁵ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

²¹⁶ Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

²¹⁷ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

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Fisheries	Common dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries and Indian ocean coastal gillnets. Common dolphins also become entangled in driftnets and bottom set gillnets for pomfrets and other species in Indian.
Estimated Annual Mortality	<p>Common dolphins form around 8% of the total cetacean catches in the Calicut gillnet fishery (14 were recorded in 5 years).²¹⁸</p> <p>The IWC, in 1994, estimated that more than 1,000 common dolphins were killed in fisheries in the Southwestern Indian Ocean, and 33 were entangled in fisheries the Indian Ocean coast of South Africa.²¹⁹</p>
Species	<i>Neophocaena phocaenoides</i> Finless porpoise.
Abundance Estimate	No Abundance Estimate
Fisheries	Finless porpoise are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, and Indian ocean coastal gillnets. This species is commonly caught in seerfish and tuna driftnet fisheries throughout the west coast of India. Finless porpoises have been caught in a shrimp trawl in Pakistan in 1989, entangled in beach seines and stake nets for shrimp, and entangled in small and medium mesh finfish gillnets in shallow inshore waters of Pakistan.
Estimated Annual Mortality	No Estimate of Mortality

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Species	<i>Platanista gangetica</i> Ganges river dolphin.
Abundance Estimate	600-700 ²²⁰
Fisheries	Ganges river dolphins are entangled in gillnets. The dolphin was deliberately killed for its meat and oil, but that may have decreased. ²²¹
Estimated Annual Mortality	No Estimate of Mortality
Species	<i>Sousa plumbea/chinensis</i> Indian humpback dolphin.
Abundance Estimate	No Abundance Estimate-may be declining in Australian waters
Fisheries	Humpback dolphins are entangled in coastal gillnet and driftnet fisheries, gillnets set for sharks This species also becomes entangled in Indian

²¹⁸ Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) **15**, 329–346.

²¹⁹ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

²²⁰ Reeves RR, Chaudhry AA. 1998. Status of the Indus River dolphin *Platanista minor*. *Oryx* 32: 35-44.

²²¹ Dolphin meat, intestines, and oil are used as fish attractant in the Ganges and Brahmaputra rivers of India and Bangladesh. In the Brahmaputra River, fishermen trail bound pieces of dolphin body parts alongside small boats while sprinkling the water with a mixture of oil and minced dolphin flesh. Small unbaited hooks are used to catch the fish as they come to the surface within the oil slick

Worldwide Cetacean Bycatch/Appendices

shark and catfish gillnet fisheries along the east coast of India.

Estimated Annual Mortality No Estimate of Mortality

Species ***Orcaella brevirostris* Irrawaddy (snubfin) river dolphin**

Abundance Estimate No Total Abundance Estimate

Chilka Lake, India 20-30

Fisheries Irrawaddy dolphins are incidentally captured in driftnet fishing nets in Bangladesh and India.

Estimated Annual Mortality No Estimate of Mortality

Species ***Tursiops truncatus* Bottlenose dolphin**

Abundance Estimate No Total Abundance Estimate

south-eastern Shark Bay²²² 400

Cockburn Sound, Western Australia²²³ 150

Fisheries Bottlenose dolphins are entangled in shark nets in Australia, in anti-predator nets set around tuna feedlots in Port Lincoln, South Australia, and in shark and catfish gillnet fisheries off the east coast off India.

Estimated Annual Mortality No Estimate of Mortality

Species ***Stenella longirostris* Spinner dolphin.**

Abundance Estimate No Abundance Estimates

Fisheries Spinner dolphins are entangled in coastal gillnet and driftnet fisheries in the eastern Indian Ocean and shark and catfish gillnet fisheries in Indian waters.

Estimated Annual Mortality No Estimate of Mortality

Species ***Delphinus delphis* Common dolphin.**

Abundance Estimate No Abundance Estimate

Fisheries Common dolphins are entangled in Indian ocean coastal gillnets and Indian catfish and shark gillnet fisheries.

²²² Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government <http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf>

²²³ Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government <http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf>

Worldwide Cetacean Bycatch/Appendices

Estimated Annual Mortality No Estimate of Mortality

Species ***Neophocaena phocaenoides* Finless porpoise.**

Abundance Estimate No Abundance Estimate

Fisheries Finless porpoise are caught in Indian ocean coastal gillnets for shark and catfish and other coastal gillnet fisheries.

Estimated Annual Mortality No Estimate of Mortality

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Species ***Berardius bairdii* Baird's beaked whale.**

Abundance Estimate ²²⁴	Japanese Pacific coast	5,029/1.0%
	Sea of Japan	1,260/0.6%
	Okhotsk Sea	660/0.3%

Fisheries Baird's beaked whales have been caught in Japanese salmon driftnets and trap fisheries

Estimated Annual Mortality Historically, Japan's coastal whaling stations killed up to 40 Baird's beaked whales per year--now the industry operates with a quota of 8 for the Sea of Japan, 2 for the southern Okhotsk Sea and 52 for the Pacific coasts.²²⁵.

Over a 5 year period (1986 to 1990), at least 2 Baird's beaked whales were incidentally killed in Japanese trap nets.

From 1998 to 2003, Japan reported killing 62 Baird's beaked whales each year in directed hunts.²²⁶

In 1999, 2001, and 2002, Korea reported killing 1 Baird's beaked whales each year in gillnet fisheries in the East sea.²²⁷

Species ***Ziphius cavirostris* Cuvier's beaked whale.**

Abundance Estimate No Abundance Estimate

Fisheries Cuvier's beaked whales are caught in purse seine and gillnets fisheries

²²⁴ Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522.

²²⁵ Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522

²²⁶ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²²⁷ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Worldwide Cetacean Bycatch/Appendices

Estimated Annual Mortality In 1985 and 1986, two Cuvier's beaked whales were incidentally captured off the coast of Japan.

Species ***Pseudorca crassidens* False killer whale.**

Abundance Estimate Coastal waters of China and Japan 16,000²²⁸

Fisheries False killer whales are caught in trawl, gillnet and stow gear and are occasionally killed in Japan for food.²²⁹

Estimated Annual Mortality In 1988, two false killer whales were caught in Japanese trap nets.²³⁰
Chinese coastal fisheries may capture hundreds of false killer whales.
From 1998 to 2002, Japan reported killing 45, 5, 8, 26, and 7 false killer whales in directed hunts.²³¹
In 2000 and 2002, Korea reported killing 1 false killer whale in gillnet fisheries in the East sea.²³²

Species ***Globicephala macrorhynchus* Short-finned pilot whale.**

Abundance Estimate Northern form of short-finned pilot whales 5,300²³³
Southern form of short-finned pilot whales 53,000²³⁴

Fisheries Short-finned pilot whales are caught in Japanese gillnet fisheries and are occasionally harvested in Japan for food.²³⁵

Estimated Annual Mortality From 1984 to 1988, pilot whales were killed in gillnets, primarily Japanese driftnets, at a rate of approximately 4 per year, and at a slightly

²²⁸ Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

²²⁹ The largest documented fisheries interaction is in the waters around Iki Island, Japan, where over 900 false killer whales were killed in drive fisheries from 1965 to 1980 in an attempt to reduce interactions with the yellowtail fishery. Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

²³⁰ Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

²³¹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²³² IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²³³ Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

²³⁴ Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

²³⁵ In 1982, the Japanese drive fishery at Taiji expanded and harpooning of the northern form was resumed off Sanriku and Hokkaido. Between 1982 and 1985, 1,755 whales of the southern form were killed, and 519 of the northern form were taken during this same period. From 1985 to 1989, Japan took a total of 2,326 short-finned pilot whales. The drive fishery in Japan and the harpoon fishery continue today. In 1997, Japan recorded a catch of 347 short-finned pilot whales. Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

Worldwide Cetacean Bycatch/Appendices

Mortality	<p>lower rate in trap nets.²³⁶</p> <p>Between 350 and 750 pilot whales die annually in passive nets and traps set by the Japanese fishery.²³⁷</p> <p>From 1998 to 2002, Japan reported killing 229, 394, 304, 342, 176 short-finned pilot whales each year in directed hunts.²³⁸</p>
Species	<i>Steno bredanensis</i> Rough-toothed dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-tooth dolphins are caught in driftnet, purse seine and gillnet fisheries and are killed in drive fisheries at Okonawa in the Ryukyus and in the home islands of Japan. ²³⁹
Estimated Annual Mortality	One rough-toothed dolphin was killed in an unspecified Japanese fishery in 1985.
Species	<i>Lagenorhynchus obliquidens</i> Pacific white-sided dolphin.
Abundance Estimate	No Abundance Estimate
Fisheries	White-sided dolphins were caught in gillnet fisheries, longlines and trawls. Japanese drive and harpoon fisheries kill hundreds or even thousands of Pacific white-sided dolphins. ²⁴⁰
Estimated Annual Mortality	In 1989, the estimated total bycatch for the Japanese squid driftnet fishery was approximately 6,100; in 1990, the total estimate for all driftnet fisheries combined was 5,759. ²⁴¹ In January 1993, a United Nations moratorium on these high seas driftnet fisheries went into effect.

²³⁶ Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

²³⁷ Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

²³⁸ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²³⁹ From 1976 – 1981, 23 rough-tooth dolphins were captured in Okinawa. Miyazaki N. Perrin WF 1994. Rough-tooth dolphin *Steno bredanensis* (Lesson, 1828). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

²⁴⁰ Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

²⁴¹ Hobbs RC, Jones LL 1993. Impacts of high seas driftnet fisheries on marine mammal populations in the North Pacific. Int North Pacific Fish Comm Bulletin 53: 409-434.

²⁴² Brownell RL, Walker WA, Forney KA 1999. Pacific white-sided dolphin—*Lagenorhynchus obliquidens*. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp57-84

²⁴³ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁴⁴ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Smaller catches of white-sided dolphins are reported in the Japanese land-based salmon driftnet fishery and in seine, set nets, and trap nets around Japan.²⁴²

From 1998 to 2002, Japan reported incidentally killing approximately one white-sided dolphin per year—no directed hunts were reported.²⁴³

From 1998 to 2003, Korea reported killing 7, 3, 4, 41, 53, and 18 Pacific white-sided dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East sea.²⁴⁴

Species	<i>Tursiops truncatus</i> Bottlenose dolphin	
Abundance Estimate	Northwest Pacific	316,935 ²⁴⁵
Fisheries	Bottlenose dolphins are killed in drive fisheries in Taiwan and Japan for human consumption and bait. ²⁴⁶	
Estimated Annual Mortality	<p>Incidental catches in Chinese fisheries reach several hundred per year.</p> <p>Incidental catches of bottlenose dolphins are roughly 6 per year in Japanese fisheries</p> <p>From 1998 to 2002, Japan reported killing 245, 658, 1,426, 247, and 729 bottlenose dolphins year in directed hunts—no incidental mortality was reported.²⁴⁷</p> <p>From 2000 to 2003, Korea reported killing 12, 3, 4, and 1, bottlenose dolphins each year in gillnets, set nets, trawl and purse-seine fisheries in the East and South Sea.²⁴⁸</p>	
Species	<i>Grampus griseus</i> Risso's dolphin	
Abundance Estimate	105,000	
Fisheries	In Japan, Risso's dolphins are killed for food and fertilizer in set nets and as a limited catch in the small-type whaling industry. ²⁴⁹	
Estimated Annual Mortality	<p>Incidental catches in Chinese fisheries reach several hundred per year.</p> <p>About 2 Risso's dolphins per year are reported killed in fishing gear in</p>	

²⁴⁵ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁴⁶ The Japanese drive fishery off Iki Island and the Kii Peninsula takes several hundred bottlenose dolphins annually. Reported catches in Japanese drive fisheries of bottlenose dolphins were 230 in 1986; 1,813 in 1987; and 828 for 1988. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁴⁷ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁴⁸ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁴⁹ Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

Japan. From 1998 to 2002, Japan reported killing 442, 489, 506, 474, and 386 Risso's dolphins each year in directed hunts—one Risso's dolphin was incidentally take in 2001 and 2002.²⁵⁰

From 1998 to 2003, Korea reported killing 7, 2, 20, 25, 2, and 2 Risso's dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East Sea.²⁵¹

Species *Stenella longirostris* Spinner dolphin

Abundance Estimate No Abundance Estimate

Fisheries In Japan, spinner dolphins were killed in drive fisheries in Japan.²⁵²

Estimated Annual Mortality Eleven dolphins were killed in Japanese gillnets in 1985--no spinner dolphins were reported caught between 1998 and 2003.²⁵³

Species *Stenella coeruleoalba* Striped dolphin

Abundance Japanese Pacific coast 821,000

Estimate²⁵⁴ 20° and 30° N 7,000

30° and 40° N 350,000

Near-shore Japanese waters 2,300

Fisheries The Japanese have both drive and hand-harpoon fisheries for striped dolphins at several locations that date back to 1868-1912.²⁵⁵ Striped dolphins are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.

Estimated Annual Mortality From 1998 to 2002, Japan reported killing 449, 596, 300, 484, and 642 striped dolphins a year in directed hunts—no incidental mortality was reported.²⁵⁶

²⁵⁰ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁵¹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁵² Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

²⁵³ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁵⁴ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁵⁵ The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

²⁵⁶ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Species	<i>Stenella attenuata</i> Pantropical spotted dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are caught in coastal gillnet and driftnet fisheries
Estimated Annual Mortality	From 1998 to 2002, Japan reported killing 460, 38, 39, 10, and 418 spotted dolphins a year in directed hunts—one incidental mortality was reported in 2002. ²⁵⁷ No other mortality estimates are available.
Species	<i>Delphinus delphis</i> Common dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan, common dolphins were caught in gillnet fisheries in Japan.
Estimated Annual Mortality	Common dolphins are reported killed by Japanese vessels at a rate of approximately 20 per year, mainly in gillnets (IWC 1986–90). Catches are known to occur at a higher rate than this in the squid driftnet fishery, so presumably not all are reported. No common dolphins were reported taken by Japan between 1998 and 2003. ²⁵⁸ From 1998 to 2003, Korea reported killing 17, 25, 29, 62, 76, and 113 common dolphins each year in gillnets, set nets, trap nets, driftnet, and purse seine fisheries in the East Sea. ²⁵⁹
Species	<i>Lissodelphis borealis</i> Northern right whale dolphin.
Abundance Estimate	North Pacific 400,000
Fisheries	In Japan and Russia, northern right whale dolphins are caught in purse-seine operations and in salmon drift-net operations.
Estimated Annual Mortality	In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000–24,000 per year and this mortality is considered to have depleted the population to 24–73% of its pre-exploitation size. ²⁶⁰ In January 1993, a United Nations moratorium on these high seas

²⁵⁷ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁵⁸ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁵⁹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁶⁰ Mangel M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221–229

²⁶¹ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁶² IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

driftnet fisheries went into effect.

The total reported bycatch of northern right whale dolphins by Japan in 1987 was 261 individuals.²⁶¹

Reports of northern right whale dolphin accidental mortalities have increased since 1984, notably in gillnet fisheries, from 8 to 268 in 1988. About 2 more per year are reported caught in trapnet fisheries, but no northern right whale dolphins were reported bycaught between 1998 and 2003.²⁶²

Species	<i>Phocoenoides dalli</i> Dall's porpoise. ²⁶³	
Abundance Estimate ²⁶⁴	North Pacific and Bering Sea	1,186,000 ²⁶⁵
	Western North Pacific	141,800
	Off Japan (.50% truei-type)	104,000
	Sea of Okhotsk (all three stocks)	2,150
Fisheries	The Japanese have both drive and hand-harpoon fisheries for Dall's porpoise at several locations that date back to 1868-1912. ²⁶⁶ Dall's porpoise are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.	
Estimated Annual Mortality	<p>Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in the years prior to the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.²⁶⁷</p> <p>In addition, a large-scale hand-harpoon hunt for Dall's porpoises has existed in Japanese waters for many decades.</p> <p>During the 1980s, this hunt intensified reportedly to compensate for the shortage of whale meat (due to the IWC whaling moratorium) and the reduced catch of striped dolphins (due to depletion from over-exploitation; see above). Between 1986 and 1989, approximately 11,500</p>	

²⁶³ Two subspecies are recognized based on geographical variation in color patterns. *Dalli*-type animals (*P. d. dalli*) predominate in most of the species' range, except in a limited area of the western Pacific (between approximately 35°N and 54°N) where *truei*-type animals (*P. d. truei*) are more common. As many as eleven stocks have been proposed, each centered on what are thought to be major calving grounds

²⁶⁴ Houck WJ, Jefferson TA 1999. Dall's porpoise—*Phocoenoides dalli* (True, 1885) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp443-472

²⁶⁵ Buckland ST, Cattanach KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

²⁶⁶ The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

²⁶⁷ IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* 42, 51–270.

Dall's porpoises were removed each year by hunting from two stocks centered in the Okhotsk Sea.²⁶⁸ In 1989, the Japanese government established regulations for the hand-harpoon hunt, as a result reported catch levels decreased to fewer than 11,500 in 1992.²⁶⁹ Thereafter, the quota was increased to 17,700 per year, and the reported catch reached above 18,000 in 1997.²⁷⁰ The IWC has expressed concerns that this level may not be sustainable by populations in the western Pacific and adjacent seas.

Large numbers of Dall's porpoises die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. For the period 1993 to 1999, the estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 and ranged from 643–3149 on an annual basis.²⁷¹

The Bering Sea population is estimated to have been reduced to somewhere between 78% and 94% of its pre-exploitation size, and the Western Pacific population to between 66% and 91% of its original size. In 1994, the IWC estimated that 741-4,187 animals were killed each year in the Western North Pacific.²⁷²

From 1998 to 2002, Japan reported killing 11,385, 14,807, 16,171, 16,650, and 15,949 Dall's porpoise a year in directed hunts, two and 169 incidental deaths were reported in 1998 and 1999 respectively.²⁷³

In 2001 and 2002, Korea reported killing 2 and 1 Dall's porpoise respectively in gillnets, set net, and driftnet fisheries in the East Sea.²⁷⁴

Species	<i>Phocoena phocoena</i> Harbor porpoise.
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan and Russia, harbor porpoises are caught in trap and gillnet fisheries.
Estimated Annual Mortality	Harbor porpoises are reported killed in Japanese trap net fisheries, at a rate of approximately 20–30 per year, and in 1988, 71 were also reported bycaught in gillnets.

²⁶⁸ A total of 10,534 Dall's porpoise were taken in 1986, 13,406 in 1987, and 39,000 in 1988 from a population of approximately 105,000. IWC. 1991. Report of the scientific committee. *Report of the International Whaling Commission* 41, 51–219.

²⁶⁹ IWC. 1994. Report of the scientific committee. *Report of the International Whaling Commission* 44, 41–201.

²⁷⁰ IWC. 1999. Planning workshop to develop a research program to investigate pollutant cause-effect relationships in cetaceans – "Pollution 2000+." *Journal of Cetacean Research and Management* (Special Issue) 1, 55–72.

²⁷¹ IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 4 (Supplement), 325–338.

²⁷² Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

²⁷³ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁷⁴ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Harbor porpoises are also caught in the salmon driftnet fishery at a much lower rate than Dall's porpoise, possibly in the tens of animals per year.

One harbor porpoise was incidentally killed in 2001 and 2 were incidentally killed in 2002.²⁷⁵

Species	<i>Neophocaena phocaenoides</i> Finless porpoise	
Abundance	Yangtze	2,700
Estimate ²⁷⁶	Inland Sea of Japan	4,900/1.7%
	Ariake/Tachibana Bay	3,100
	Omura Bay	200
Fisheries	The Japanese hunted finless porpoises in the East China Sea. The species is sold for human consumption in Korea. ²⁷⁷ Finless porpoises are entangled in a variety of nets in Japan.	
Estimated Annual Mortality	<p>From 1985 to 1992, 114 finless porpoises were incidentally killed off the coast of western and north-eastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1 and drifting ghost nets killed 1.²⁷⁸</p> <p>Finless porpoises were incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.²⁷⁹</p> <p>In 1994, the IWC estimated that 10-20 animals were killed each year in the Yangtze.²⁸⁰</p> <p>From 1998 to 2002, 6, 1, 20, 8, and 8 finless porpoises were incidentally taken in Japanese fisheries.²⁸¹</p> <p>From 1998, 1999, 2001 to 2003, Korea reported killing 2, 14, 7, 14, and 82 finless porpoises in gillnets and set net fisheries the East, South, and</p>	

²⁷⁵ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁷⁶ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁷⁷ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

²⁷⁸ Kasuy T. 1999. Finless porpoise--*Neophocaena phocaenoides* (G Cuvier, 1829). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp411-442

²⁷⁹ Yang G, Zhou K, Xu X, Leatherwood S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713-716

²⁸⁰ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

²⁸¹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

²⁸² IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Yellow Sea.²⁸²

Species	<i>Lipotes vexillifer</i> Baiji	
Abundance Estimate ²⁸³	Yangtze	13-100 with the annual rate of population decline at 10%
Fisheries	Baiji are incidentally killed in longline fisheries—electric fishing	
Estimated Annual Mortality	45.5% of known Baiji deaths have been caused by accidental catches on longlines which are intensively used in the winter throughout much of the Baiji's range. Interactions with fisheries appear to be a major threat to the survival of this species.	

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The Northeast Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	<i>Eschrichtius robustus</i> Gray whale.	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07) ²⁸⁴
Fisheries	Gray whales are caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively. ²⁸⁵ During that same period more than 3.6 gray whales died each year in unknown gillnet fisheries. ²⁸⁶ Since there are no Canadian observer programs, few data concerning the mortality of gray whales incidental to Canadian commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Canadian waters, though thought to be small, are not readily available or reliable which results in an underestimate of the annual mortality for this stock. The estimated minimum annual mortality rate incidental to US commercial fisheries is 6.7 animals. ²⁸⁷	

Species	<i>Balaenoptera acutorostrata</i> Minke whale.	
Abundance Estimate	Alaska Stock	No Available Estimate

²⁸³ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

²⁸⁴ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

²⁸⁵ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

²⁸⁶ Id.

²⁸⁷ Id.

Worldwide Cetacean Bycatch/Appendices

Fisheries	Fisheries include purse seine, gillnets, and pot fisheries	
Estimated Annual Mortality	<p>In 1989, one minke whale mortality (extrapolated to 2 mortalities) was observed in the Bering Sea/Gulf of Alaska joint-venture groundfish trawl fishery, the predecessor to the current Alaska groundfish trawl fishery.</p> <p>The Bering Sea/Aleutian Islands groundfish trawl fishery incurred one mortality of a minke whale in 2000; this extrapolates to an estimated 2 minke whale mortalities for that year. The total estimated mortality and serious injury incurred by this stock as a result of interactions with commercial fisheries is 0.32 (CV = 0.61).²⁸⁸</p> <p>Since there are no Canadian observer programs, few data concerning the mortality of minke whales incidental to Canadian commercial fisheries are available.</p>	
Species	<i>Megaptera novaeangliae</i> Humpback whale.	
Abundance Estimate	Western North Pacific	394 (CV = 0.08) ²⁸⁹
	Central North Pacific	4,004 (CV = 0.095) ²⁹⁰
	CNP—Southeast Alaska	961 (CV = 0.12)
Fisheries	<p>Humpback whales are caught in purse seines, trawl, gillnet, and pot fisheries. Between 2000 and 2004, there were incidental serious injuries and mortalities of Western North Pacific humpback whales in Bering Sea/Aleutian Islands Pollock trawl and Bering Sea/Aleutian Islands sablefish pot fisheries.</p> <p>In the Central North Pacific, in 1994, the incidental entanglement of a humpback whale was reported in the Southeast Alaska salmon purse seine fishery. Another humpback whale is known to have been incidentally entangled in this fishery in 1989. In 1996, a humpback whale was reported entangled and trailing gear as a result of interacting with the Southeast Alaska drift gillnet fishery. This whale is presumed to have died. Together, these two mortalities result in an annual mortality rate of 0.4 (0.2 + 0.2) humpback whales based on self-reported fisheries information.</p>	
Estimated Annual Mortality	<p>There were 33 reports of human-related mortalities or injuries to humpback whales from the Central North Pacific stock from 2001 to 2005. Of these, there were 24 incidents which involved commercial fishing gear, and 13 of those incidents involved serious injuries or mortalities. This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found, reported, or cause of death determined.²⁹¹ Average annual mortality from</p>	

²⁸⁸ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 206

²⁸⁹ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 178

²⁹⁰ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 187

²⁹¹ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 189

observed fisheries was 0.20 humpbacks from the Western North Pacific stock.²⁹²

The estimated fishery-related minimum mortality and serious injury rate incidental to US commercial fisheries for the northern portion of the stock is 2.0 humpback whales per year, based on observer data from Alaska (0.20), stranding records from Alaska (1.8) The estimated minimum mortality and serious injury rate incidental to the commercial fisheries in Southeast Alaska is 1.0 humpback whales per year, based on stranding records from Alaska (1.0).²⁹³

Species	<i>Delphinapterus leucas</i> White whale.		
Abundance Estimate ²⁹⁴	Beaufort Sea Stock	39,258 (CV = 0.229)	
	Eastern Chuckchi Sea Stock	3,710	
	Eastern Bering Sea Stock	18,142 (CV = 0.24)	
	Bristol Bay Stock	1,888 (CV = .20)	
	Cook Inlet Stock	357 (CV = 0.107)	
Fisheries	Fisher self-reports in the Bristol Bay salmon set gillnet and drift gillnet fisheries, from 1990 to 2000, recorded 1 mortality in both 1990 and 1991 from these fisheries. Larger fishery-related mortalities resulting from these fisheries have been recorded in the past. During the summer of 1983 the Alaska Department of Fish and Game documented 12 beluga whale mortalities in Bristol Bay related to drift and set gillnet fishing. ²⁹⁵		
Estimated Annual Mortality	No Estimates Available for Beaufort Sea Stock, Eastern Chuckchi Sea Stock, Eastern Bering Sea Stock, Cook Inlet Stock		
Species	<i>Orcinus orca</i> Killer whale.		
Abundance Estimate ²⁹⁶	Alaska Resident stock (includes Southeast AK, Prince William Sound, & Western AK)	1,123	
	Eastern North Pacific Northern Resident Stock	216	

²⁹² Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 180 Note, however, that the stock identification is uncertain and the mortality may have involved a whale from the central North Pacific stock of humpback whales. Thus, this mortality is assigned to both the central and western stocks.

²⁹³ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p at 194

²⁹⁴ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

²⁹⁵ Frost, K. J., L. F. Lowry, and R. R. Nelson. 1984. Belukha whale studies in Bristol Bay, Alaska. Pp. 187-200 *In* Proceedings of the workshop on biological interactions among marine mammals and commercial fisheries in the Southeastern Bering Sea. Oct. 18-21, 1983, Anchorage AK. Alaska Sea Grant Rep. 84-1.

²⁹⁶ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

	Gulf of Alaska, Aleutian Islands and Bering Sea Transient Stock	314
	West Coast Transient Stock	314
Fisheries	Although only small numbers of killer whales are caught in Bering Sea fisheries and there are no observed mortalities or serious injuries in the Gulf of Alaska, there are other interactions between the whales and the fisheries. Interactions between killer whales and longline vessels have been well documented. ²⁹⁷ Data collected from the Japan/U. S. cooperative longline research surveys operating in the Bering Sea indicate that interactions may be increasing and expanding into the Aleutian Islands region. ²⁹⁸ Since 1990, there have been no reported fishery-related standings of killer whales in Canadian waters and there are not reliable estimates of mortality in Canadian fisheries.	
Estimated Annual Mortality	The mean annual (total) mortality rate for all US fisheries for 1999-03 was 2.5 (CV = 0.37). The estimated minimum mortality rate incidental to the Bering Sea-Aleutian Islands (BSAI) flatfish trawl, BSAI Pollock trawl, BSAI Greenland turbot longline, and the BSAI Pacific cod longline is 2.3 animals per year, based exclusively on observer data. ²⁹⁹ The mean annual mortality rate incidental to U.S. commercial fisheries for the west coast transient stock is zero. ³⁰⁰	
Species	<i>Lagenorhynchus obliquidens</i> Pacific white-sided dolphin.	
Abundance Estimate	Central North Pacific	26,880 ³⁰¹
Fisheries	White-sided dolphins are caught in gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	Between 1978 and 1991, thousands of Pacific white-sided dolphins were incidentally killed each year in high seas fisheries. Pacific white-sided	

²⁹⁷ Dahlheim, M. E. 1988. Killer whale (*Orcinus orca*) depredation on longline catches of sablefish (*Anoplopoma fimbria*) in Alaskan waters. NWAFC Processed Report 88-14, 31 pp. (available upon request -Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115). See also Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372.

²⁹⁸ Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372. Killer whale predation on sablefish catch has been fairly consistent since 1988, and has occurred mainly east of 170° W in the eastern Bering Sea, and to a lesser extent in the northeast Aleutians. Sigler, M.F., C. R. Lunsford, J. T. Fujioka, and S. A. Lowe. 2002. Alaska Sablefish Assessment for 2003. In: Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Bering Sea/Aleutian Islands Regions. North Pac. Fish. Mgmt. Council, Anchorage, AK, Section 5:229-294.

²⁹⁹ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 91 As the animals which were taken incidental to commercial fisheries have not been identified genetically, it is not possible to determine whether they belonged to the Eastern North Pacific Alaska Resident or the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient killer whale stock. Accordingly, these same mortalities are also reported for the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock.

³⁰⁰ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 113

³⁰¹ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 117

³⁰² Note that no observers have been assigned to several of the gillnet fisheries that are known to interact with this

dolphins were frequently caught in the high seas squid driftnet fishery. Results from the 1989 Joint Observer Program indicated an observed catch rate on a sample of vessels which, if extrapolated, suggest a total catch of approximately 10,000 animals or more. The impact of this level of catch on the population is unknown. However, these fisheries have not operated in the central North Pacific since 1991.

There were no serious injuries or mortalities incidental to observed U.S. commercial fisheries from 2000-04.³⁰²

Species	<i>Phocoenoides dalli</i> Dall's porpoise.	
Abundance Estimate	Central North Pacific	83,400 (CV = 0.1) ³⁰³
Fisheries	Dall's porpoise were taken from gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	<p>From 1997-2001, the mean annual (total) mortality of Dall's porpoise was 5.4 (CV = 0.18) for the Bering Sea groundfish trawl fishery, 0.3 (CV = 0.61) for the Gulf of Alaska groundfish trawl fishery, and 0.2 (CV = N/A) for the Bering Sea groundfish longline fishery. In 1990, in the Alaska Peninsula and Aleutian Island salmon driftnet fishery, one Dall's porpoise mortality was observed which extrapolated to an annual (total) incidental mortality of 28 Dall's porpoise. Combining the estimates from the Bering Sea and Gulf of Alaska fisheries presented above (5.4 + 0.3 + 0.2 = 5.9) with the estimate from the Alaska Peninsula and Aleutian Island salmon drift gillnet fishery (28) results in an estimated annual incidental kill of 33.9 porpoise per year from the Alaska stock.³⁰⁴</p> <p>Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in some years before the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.³⁰⁵</p>	

Species	<i>Phocoena phocoena</i> Harbour porpoise.	
Abundance Estimate	Southeast Alaska	17,076 (CV = 0.265) ³⁰⁶
	Gulf of Alaska	41,854 (CV=0.224) ³⁰⁷

stock, making the estimated mortality unreliable.

³⁰³ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 135

³⁰⁴ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 136

³⁰⁵ IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270. at 212, 213.

³⁰⁶ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 137

³⁰⁷ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 141

	Bering Sea	66,078 (CV = 0.232) ³⁰⁸
Fisheries	Harbor porpoise have been caught in gillnet fisheries	
Estimated Annual Mortality	<p>During the period between 1990 and 1998, fisher self-reports from the Southeast Alaska salmon drift gillnet fishery resulted in an annual mean of 3.25 mortalities from interactions with commercial fishing gear. No mortalities from the Southeast Alaska stock of harbor porpoise incidental to commercial groundfish fisheries have been observed.</p> <p>Observers also monitored the Prince William Sound salmon drift gillnet fishery in 1990 and 1991, recording 1 mortality in 1990 and 3 mortalities in 1991. These mortalities extrapolated to 8 (95% CI 1-23) and 32 (95% CI 3-103) kills for the entire fishery, resulting in a mean kill of 20 (CV = 0.60) animals per year for 1990 and 1991. Logbook reports from Prince William Sound salmon drift gillnet fishery detail 6, 5, 6, and 1 harbor porpoise mortalities in 1990, 1991, 1992, and 1993, respectively. The extrapolated (estimated) observer mortality accounts for these mortalities.</p> <p>In 1999 and 2000, observers were placed on the Cook Inlet salmon set and drift gillnet vessels, one harbor porpoise mortality was observed in 2000--the mortality extrapolates to an estimated mortality level of 31.2 for that year, and an average of 15.6 per year when averaged over the two years of observer data.³⁰⁹</p> <p>In 2002, observers were placed on Kodiak Island set gillnet vessels. Two harbor porpoise mortalities were observed in this fishery. These mortalities extrapolate to an estimated mortality of 32.2 animals per year. Therefore, the estimated minimum annual mortality incidental to commercial fisheries is 68.³¹⁰</p> <p>One harbor porpoise mortality was observed in 2001 in the Bering Sea/Aleutian Islands flatfish trawl. The mean annual (total) mortality resulting from observed mortalities was 0.35 (CV = 0.65).³¹¹ During the period from 1981 to 1987, 7 harbor porpoise mortalities have resulted from gillnet entanglement in the area from Nome to Unalakleet, 3 were reported near Kotzebue from 1989 to 1990, and some take of harbor porpoise is likely in the Bristol Bay gillnet fisheries (Barlow et al. 1994). A similar set gillnet fishery conducted by subsistence fishers incidentally took 6 harbor porpoise in 1991 near Point Barrow, Alaska. When averaged over the period from 1981 to 1990, the resulting annual mortality attributable to subsistence gillnets is 1.4 porpoise $((7 + 3 + 6)/11 = 1.4)$.³¹²</p>	

³⁰⁸ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 146

³⁰⁹ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

³¹⁰ Id.

³¹¹ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

³¹² Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 132

AREA 71 WESTERN CENTRAL PACIFIC

Species	<i>Sousa chinensis</i> Indopacific humpback dolphin	
Abundance Estimate	Moreton Bay, Brisbane Aus	119-163
	Central Section Great Barrier Reef	200
Fisheries	Humpback dolphins are incidentally captured in inshore gillnets set across rivers and estuaries to catch barramundi and other fish; they are also captured in offshore driftnet fisheries.	
Estimated Annual Mortality	<p>Shark nets killed 18 humpback dolphins between 1968 and 2001, 11 of which were from nets at Townsville and Cairns ³¹³</p> <p>One animal was reported in a Taiwanese driftnet fishery for Spanish mackerel, tunas and sharks operating off northern Australia between 1974 and 1986.³¹⁴</p> <p>The IWC, in 1994, estimated that more than 100 humpback dolphins are killed in this area.³¹⁵</p>	
Species	<i>Pseudorca crassidens</i> False killer whale	
Abundance Estimate	No Abundance Estimate	
Fisheries	False killer whales are incidentally captured in Taiwanese pelagic gillnet fisheries in Australian territorial waters off northern Australia; Current threats include culling to protect finfish fisheries off western Japan. False killer whales are also incidentally captured in tuna purse-seine and other net and long-line fisheries elsewhere in Pacific Ocean including possible entanglement in driftnets lost or discarded in international waters.	
Estimated Annual Mortality	<p>A single animal was reported in the Taiwanese driftnet fishery off Northern Australia.³¹⁶</p> <p>The IWC, in 1994, estimated that more than 11 false killer whales are incidentally killed in this area.³¹⁷</p>	
Species	<i>Tursiops aduncus</i> Bottlenose dolphin	

³¹³ Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa chinensis* (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

³¹⁴ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

³¹⁵ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

³¹⁶ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

³¹⁷ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Worldwide Cetacean Bycatch/Appendices

Abundance Estimate ³¹⁸	Moreton Bay, Brisbane Aus	334
	inshore waters off North Stradbroke Is	321
	open coastal waters off North Stradbroke Is.	700-1000
Fisheries	Bottlenose dolphins are incidentally captured, (possibly substantial) in the Taiwanese gillnet fishery and shark nets to protect bathers. Bottlenose dolphins are also caught in driftnet fisheries in Malabuan, Siaton, and Negros Island.	
Estimated Annual Mortality	From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Seas, northern Australia, incidentally caught an estimated 8400 <i>T. aduncus</i> , which comprised 60% of the total dolphin bycatch. ³¹⁹ The annual mortality perhaps exceeded 2000 animals—severely impacting local populations. As a result the fishery was closed in 1986. The IWC, in 1994, estimated that more than 1700 bottlenose dolphins are incidentally killed in this area. ³²⁰	
Species	<i>Stenella longirostris</i> Spinner dolphin	
Abundance Estimate ³²¹	Southern part of the Sulu Sea northeastern Malaysian waters	4,000
	Eastern Sulu Sea	30,000
Fisheries	Spinner dolphins are incidentally caught in gillnet fisheries, purse seine fisheries and driftnet fisheries in Malabuan, Siaton, and Negros Island, and shark nets in Queensland. A small cetacean fishery kills some spinner Dolphins in the Solomon Islands, and they are incidentally killed in Thailand by shrimp trawls. ³²²	
Estimated Annual Mortality	Commercial and municipal purse seine fisheries based in the Philippines annually caught an estimated 1,500-2,000 and 2,000 to 3,000 dolphins respectively, including spinner dolphins. ³²³ Spinner dolphins comprised 35% of the identified cetaceans in the catch of the Taiwanese driftnet fishery in Northern Australian waters, suggesting a total mortality of at least 4900 spinner dolphins over 54	

³¹⁸ Ross, GJB. 2006 Review of the conservation status of Australia's smaller whales and dolphins. Australian Government <http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf>

³¹⁹ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

³²⁰ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

³²¹ Dolar ML 1999. Abundance, distribution and feeding ecology of small cetacean in the Eastern Sulu Sea and Tanon Strait, Philippines. PhD Thesis, U of Cal, San Diego, USA

³²² Bannister, J.L., Kemper, C.M. and Warneke, R.M. (1996). *The Action Plan for Australian Cetaceans*. Australian Nature Conservation Agency: Canberra vii 242 pp.

³²³ Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission (Special Issue)* **15**, 355–363.

³²⁴ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

³²⁵ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

months between 1974 and 1986.³²⁴ Total annual mortality for spinner dolphins numbered around 1000 and 20 dolphins in the purse seine and driftnet fisheries respectively.

The IWC, in 1994, estimated that more than 1000 spinner dolphins are incidentally killed in this area.³²⁵

Species	<i>Stenella attenuata</i> Pantropical spotted dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are incidentally captured in northern Australian fisheries; in Taiwanese gillnet fisheries, purse-seine fisheries in the Philippines, and in nets set to capture sharks for the protection of bathers.
Estimated Annual Mortality	<p>From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Sea, operating within (northern)Australia's Economic Exclusion Zone (EEZ), incidentally killed an estimated 560 <i>S. attenuate</i>, which comprised 4% of the total dolphin bycatch from that gillnet fishery.³²⁶</p> <p>Directed fisheries and incidental catch kill large numbers of spotted dolphin in the Philippines, where they used for human consumption. Spotted dolphins were caught in purse seine fisheries and a smaller driftnet fishery (for clupeids and needlefish) in the Visayan Sea in the Philippines. Total annual spotted dolphins mortality was <1000 animals in these three fisheries.³²⁷</p> <p>Spotted dolphins are caught in inshore shark nets in low numbers in Qld and NSW. There is also a drive fishery which operates in the Solomon Is. where Pantropical dolphins are the preferred catch.</p> <p>The IWC, in 1994, estimated that more than 130 spotted dolphins are incidentally or directly killed in this area.³²⁸</p>

Species	<i>Lagenodelphis hosei</i> Fraser's dolphin.
	Eastern Sulu Sea 8,700
Fisheries	Fraser's dolphins are caught in two purse seine fisheries and a small driftnet fishery in the Visayan Sea in the Philippines.
Estimated Annual Mortality	<p>Fraser's dolphins are incidentally captured in gillnet fisheries in the Philippines (second most frequently caught species there); they are also killed in harpoon fisheries in Indonesia and Taiwan</p> <p>They may also be incidentally and illegally captured within Australian</p>

³²⁶ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

³²⁷ Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission (Special Issue)* 15, 355-363

³²⁸ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

³²⁹ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

waters in northern Australia and entangled in driftnets set outside Australian Territorial Waters.³²⁹

Species	<i>Orcaella brevirostris</i> Irrawaddy (snubfin) dolphin	
Abundance Estimate	No Total Abundance Estimate	
	Mahakam River, Indonesia	34-50 ³³⁰
	Semayang Lake	100-150 ³³¹
	Malampaya Sound in Palawan, Philippines	77 ³³²
	North Queensland, Australia	38-46 ³³³
	Gulf of Carpentaria (Blue Mud Bay)	1,000 ³³⁴
	Mekong River	69
Fisheries	Irrawaddy dolphins are incidentally captured in northern Australian fisheries, in barramundi nets, for which little data on take is available, and in nets set to capture sharks for the protection of bathers.	
Estimated Annual Mortality	<p>From 1997-1999 an average of three dolphins died per year from gillnet entanglements, representing between 6 and 8.8 percent of the population.³³⁵</p> <p>In the Mekong River from 2001-2003, an average of four deaths per year were attributed to gillnet entanglement representing 5.8% of a population estimated to number only 69 individuals.³³⁶</p> <p>In Songkhla Lake, from 1990-2003, at least 15 Irrawaddy dolphins were killed accidentally in gillnets from a population that may number as few as 8-15 individuals.³³⁷</p>	

³³⁰ Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

³³¹ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

³³² Dolar, M.L.L., Perrin, W.F., Gaudio, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology*, Supplement, 155–160.

³³³ Freeland WJ, Bayliss P. 1989. The Irrawaddy River dolphin (*Orcaella brevirostris*) in coastal waters of the Northern Territory, Australia: Distribution, abundance and seasonal changes. *Mammalia* 53: 49-58

³³⁴ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

³³⁵ Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

³³⁶ Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, *Raffles Bulletin of Zoology*, Supplement 10: 75-83.

³³⁷ Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, *Raffles Bulletin of Zoology*, Supplement 10: 75-83.

³³⁸ Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the International Whaling Commission*. 37: 363-367.

Two dolphins were caught by the Taiwanese net fishery in the early 1980s.³³⁸

AREA 77 EASTERN CENTRAL PACIFIC

The Eastern Central Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	<i>Eschrichtius robustus</i> Grey whale.	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07) ³³⁹
Fisheries	Gray whales are incidentally caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	<p>From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively.³⁴⁰ During that same period more than 3.6 gray whales died annually in unknown gillnet fisheries.³⁴¹</p> <p>Since there are no Mexican observer programs, few data concerning the mortality of gray whales incidental to Mexican commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Mexican waters is thought to be small. The estimated minimum annual mortality incidental to US commercial fisheries is 6.7 animals.³⁴²</p>	

Species	<i>Megaptera novaeangliae</i> Humpback whales	
Abundance Estimate	Eastern North Pacific Stock	1,391 (CV = 0.22) ³⁴³
Fisheries	Humpback whales are incidentally caught in purse seine, gillnet, and pot fisheries.	
Estimated Annual Mortality	Numbers killed in international shark and swordfish driftnet fisheries are unknown, but, in view of the size of the population in this area (1000+ animals), any increase in driftnetting could cause a problem.	

Species	<i>Pseudorca crassidens</i> False killer whale.	
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³³⁹ Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

³⁴⁰ Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

³⁴¹ Id.

³⁴² Id.

³⁴³ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 167

Worldwide Cetacean Bycatch/Appendices

Abundance Estimate	Hawaiian Stock	236 (CV = 1.13) ³⁴⁴
	Eastern Tropical Pacific	47,921 (CV = 0.29) ³⁴⁵
Fisheries	False killer whales are captured in longlines and troll fisheries.	
Estimated Annual Mortality	Average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 6.8 (CV = 0.36) false killer whales outside of U.S. EEZs, 4.2 (CV = 0.43) within the Hawaiian Islands EEZ, and 1.8 (CV = 0.53) within the EEZ of Palmyra Atoll. ³⁴⁶	
	Total estimated annual mortality and serious injury for all U.S. EEZs combined averaged 6.0 (CV = 0.35) between 2000 and 2004. ³⁴⁷	
	No estimates of mortality are available for international fisheries. This mortality may not be sustainable.	

Species ***Steno bredanensis* Rough-toothed dolphin.**

Abundance Estimate	Hawaiian Stock	19,904 (CV = 0.52) ³⁴⁸
	Eastern Tropical Pacific	47,921 (CV = 0.29) ³⁴⁹
Fisheries	Rough-toothed dolphins are captured in gillnet fisheries, purse seine fisheries, longlines, and trawls.	
Estimated Annual Mortality	Rough-toothed dolphins are taken in small number in the tuna purse seine fishery—21 were estimated killed during the period 1970-75 and 36 died in a single net haul in 1982. However, in recent years the mortality has been significantly less, in 1998, 1999, and 2001 there was no mortality and in 2000 and 2002, 27 and 5 rough-toothed dolphins died in the ETP purse-seine fishery. ³⁵⁰	

Species ***Globicephala macrorhynchus* Short-finned pilot whale.**

Abundance Estimate	California/Oregon/Washington Stock	304 (CV = 1.02) ³⁵¹
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³⁴⁴ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 228

³⁴⁵ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁴⁶ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

³⁴⁷ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

³⁴⁸ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 196

³⁴⁹ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁵⁰ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁵¹ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 135

Worldwide Cetacean Bycatch/Appendices

	Hawaiian Stock	8,846 (CV = 0.49)
	Eastern Tropical Pacific	160,000
Fisheries	Pilot whales are caught in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pilot whales.	
Estimated Annual Mortality	<p>The average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 3.6 (CV = 0.69) short-finned pilot whales outside of the U.S. EEZs, and 0.6 (CV = 1.00) within the U.S. EEZ of Johnston Atoll.³⁵²</p> <p>Pilot whales are also caught in small numbers in the tuna purse seine fishery, one was captured in 2000 and 2002.³⁵³</p> <p>No estimates of mortality are available for international fleets</p>	
Species	<i>Grampus griseus</i> Risso's dolphin.	
Abundance Estimate	California/Oregon/Washington Stock	16,066 (CV = 0.28) ³⁵⁴
	Hawaiian Stock	2,351 (CV = 0.65) ³⁵⁵
	Eastern Tropical Pacific	76,595 (CV = 0.21) ³⁵⁶
Fisheries	Risso's dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Risso's dolphins	
Estimated Annual Mortality	<p>Rarely entangled in the tuna purse seine fishery in the eastern tropical Pacific. The last reported mortality in the tuna purse seine fishery was of 3 Risso's dolphins in 1999.³⁵⁷</p> <p>Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 8.2 (CV = 0.66) Risso's dolphins outside of U.S. EEZs, and none within the Hawaiian Islands EEZ.³⁵⁸ No estimates of mortality are available for other international longline fleets.</p>	

³⁵² Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p.

³⁵³ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁵⁴ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 91

³⁵⁵ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 199

³⁵⁶ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁵⁷ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁵⁸ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 200

Species	<i>Lagenorhynchus obliquidens</i> Pacific white-sided dolphin.	
Abundance Estimate	California/Oregon/Washington Stock	59,274 (CV = 0.50) ³⁵⁹
	North Pacific	931,000 ³⁶⁰
Fisheries	Pacific white-sided dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pacific white-sided dolphins	
Estimated Annual Mortality	Pacific white-side dolphins are rarely capture in the tuna purse seine fishery in the eastern tropical Pacific because most of the fishing takes place south of the range of these dolphins; there have been no reported entanglements in this fishery from 1999 though 2003. ³⁶¹ No other estimates of mortality are available.	

Species	<i>Lagenodelphis hosei</i> Fraser's dolphin.	
Abundance Estimate	Hawaiian Stock	16,836 (CV = 1.11) ³⁶²
	Eastern Tropical Pacific	289,500 ³⁶³
Fisheries	Fraser's dolphins are captured in gillnet fisheries, purse seine fisheries, longlines pot fisheries, and trawls.	
Estimated Annual Mortality	Fraser's dolphins are captured in small number in the tuna purse seine fishery; however, from 1999 to 2003 there have been no reported entanglements in this fishery. ³⁶⁴ In 2005, one dolphin was captured; ³⁶⁵ but no other estimates of mortality are available.	

Species	<i>Tursiops truncatus</i> Bottlenose dolphin	
Abundance Estimates	Eastern Tropical Pacific	277,568 (CV = 0.25) ³⁶⁶

³⁵⁹ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 87

³⁶⁰ Buckland ST, Cattanch KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

³⁶¹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁶² Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 219

³⁶³ Gerrodette, T, Wade, PR. 1991. Monitoring Trends in Dolphin Abundance in the Eastern Tropical Pacific Analysis of 1989 data. (IWC SC/42/SM-42). Rep Int Whal Comm 41:511-515

³⁶⁴ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁶⁵ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁶⁶ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

Worldwide Cetacean Bycatch/Appendices

	Hawaiian Stock	3,263 (CV = 0.60) ³⁶⁷	
Fisheries	Bottlenose dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture bottlenose dolphins.		
Estimated Annual Mortality	Bottlenose dolphins are rarely caught in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 29, 9, 4, 1, 10, and 4 deaths of bottlenose dolphins in this fishery. ³⁶⁸ In 2005, 7 bottlenose dolphins were incidentally killed in the tuna purse seine fishery. ³⁶⁹ Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 5.8 (CV = 1.00) bottlenose dolphins outside of U.S. EEZs, and none within U.S. EEZs. ³⁷⁰ No other estimates of mortality are available.		
Species	<i>Stenella longirostris</i> Spinner dolphin.		
Abundance Estimate	Hawaiian Stock	2,805 (CV = 0.66) ³⁷¹	2005 Mortality 0
	Eastern spinner dolphin	616,662 (CV = 0.22) ³⁷²	274/<0.04%
	Whitebelly spinner dolphin	441,711 (CV = 0.45) ³⁷³	115/0.03%
Fisheries	Spinner dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spinner dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of eastern spinner dolphins ranged between 224 and 469 animals, with an average of 356. ³⁷⁴		

³⁶⁷ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

³⁶⁸ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁶⁹ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁷⁰ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

³⁷¹ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 212

³⁷² Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

³⁷³ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁷⁴ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁷⁵ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

Between 1996 and 2005, annual fishing mortality of whitebelly spinner dolphins ranged between 115 and 498 animals, with an average of 271.³⁷⁵

Species	<i>Stenella coeruleoalba</i> Striped dolphin.		
Abundance Estimate	California/Oregon/Washington Stock	13,934 (CV = 0.53) ³⁷⁶	
	Hawaiian Stock	10,385 (CV = 0.48) ³⁷⁷	
	Eastern Tropical Pacific	1,470,854 (CV = 0.15) ³⁷⁸	
Fisheries	Striped dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Striped dolphins		
Estimated Annual Mortality	Striped dolphins are captured in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 24, 5, 11, 3, 2, and 11 deaths of striped dolphins in this fishery. ³⁷⁹ In 2005, 15 striped dolphins were incidentally killed in the tuna purse seine fishery. ³⁸⁰		

Species	<i>Stenella attenuata</i> Spotted dolphin.		
Abundance Estimate	Hawaiian Stock	10,260 (CV = 0.41) ³⁸¹	2005 Mortality 0.8
	Northeastern offshore spotted	736, 737 (CV = 0.15) ³⁸²	271/<0.03%
	Western/southern offshore spotted dolphin	627,863 (CV = 0.31) ³⁸³	99/0.01%
	Coastal spotted dolphins	149,393 (CV = .027) ³⁸⁴	3/<0.01%

³⁷⁶ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 103

³⁷⁷ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 216

³⁷⁸ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁷⁹ IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

³⁸⁰ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁸¹ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 208

³⁸² Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

³⁸³ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

³⁸⁴ Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

Worldwide Cetacean Bycatch/Appendices

Fisheries	Spotted dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spotted dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northeastern spotted dolphins ranged between 260 and 818 animals, with an average of 435. ³⁸⁵ Between 1996 and 2005, annual fishing mortality of western/southern spotted dolphins ranged between 99 and 1,044 animals, with an average of 383. ³⁸⁶

Species	<i>Delphinus delphis</i> Short-Beaked Common dolphin		
Abundance Estimate	California/Oregon/Washingt on Stock	449,846 (CV = 0.25) ³⁸⁷	2005 Mortality N/A
	Long-Beaked Common Dolphin	43,360 (CV = 0.72)	N/A
	Northern Common Dolphins	449,464 ³⁸⁸	114/<0.01%
	Southern Common Dolphins	1,525,207 ³⁸⁹	154/0.01%
	Central Common Dolphins	577,048 ³⁹⁰	57/<0.01%
Fisheries	Common dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture common dolphins		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, 'northern common dolphins' have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins) ranged between 9 and 261 animals, with an average of 105. ³⁹¹ Although it is unclear whether these animals are part of the same population as short-beaked common dolphins found off California, they are managed separately--specifically		

³⁸⁵ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁸⁶ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁸⁷ Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 108

³⁸⁸ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁸⁹ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁹⁰ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁹¹ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁹² Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

³⁹³ Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

for the management of dolphins involved in eastern tropical Pacific tuna fisheries.

Between 1996 and 2005, annual fishing mortality of central common dolphins ranged between 51 and 223 animals, with an average of 125.³⁹²

Between 1996 and 2005, annual fishing mortality of southern common dolphins ranged between 1 and 222 animals, with an average of 66.³⁹³

Species	<i>Phocoena sinus</i> Vaquita.		
Abundance Estimate	567 ³⁹⁴		
Fisheries	Vaquita are incidentally killed in coastal gillnet fisheries totoaba, sharks, rays, mackerels, croaker, and shrimp and shrimp trawls.		
Estimated Annual Mortality	143 Vaquita were killed in various fishing operations between March 1985 and January 1994 with an annual incidental mortality of 35. From January 1993 to January 1995, the total estimated incidental mortality caused by the fleet of El Golfo de Santa Clara was 39 vaquitas per year, which is over 17% of the most recent estimate of population size. ³⁹⁵		
Species	<i>Phocoenoides dalli</i> Dall's porpoise.		
Abundance Estimate	California/Oregon/Washington Stock	449,846 (CV = 0.25) ³⁹⁶	
Fisheries	Dall's porpoise are entangled in gillnet fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Dall's porpoise.		
Estimated Annual Mortality	No Estimates of Mortality		

³⁹⁴Jaramillo Legorreta AM, Rojas Bracho L. Gerrodette T. 1999. A new abundance estimate for vaquitas: First step for recovery. Mar Mamm Sci 15: 957-973. In 1986-1993, line-transect boat surveys yielded an estimate of 503; in 1986-1989, aerial surveys yielded 885, 1991 aerial surveys yielded 572 animals, and 224 from a ship survey in 1993.

³⁹⁵Vidal O, Brownell RL, Findley LT 1999. Vaquita—*Phocoena sinus* Norris and McFarland, 1958. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol 6: The second book of dolphins and porpoises, pp 357-378

³⁹⁶Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 82

AREA 81 SOUTHWEST PACIFIC

Species	<i>Hyperoodon ampullatus</i> Southern bottlenose whale.	
Abundance Estimate	South of the Antarctic Convergence	599,300 ³⁹⁷
Fisheries	Southern bottlenose whales are entangled in driftnets in the Tasman Sea	
Estimated Annual Mortality	No Estimates of Mortality	
Species	<i>Delphinus delphis</i> Common dolphin	
Abundance Estimate	No Abundance Estimate--considered numerous	
Fisheries	Common dolphins are entangled in New Zealand trawl fisheries. Common dolphins may also be captured in the albacore driftnet fishery in the Tasman Sea	
Estimated Annual Mortality	In New Zealand, In 1994, 1996, and 1997 fisheries incidentally captured 9, 2, and 4 common dolphins respectively. ³⁹⁸	
Species	<i>Lagenorhynchus obscurus</i> Dusky dolphin	
Abundance Estimate	12,000 to 20,000	
Fisheries	Unknown numbers of dusky dolphins are caught in set nets in New Zealand.	
Estimated Annual Mortality	Current catches in set nets appear to have decreased from those of the 1970s and 1980s but are estimated at one port to be 100-200 animals per year. ³⁹⁹ In New Zealand, in 1996 and 1997, fisheries incidentally captured 1 dusky dolphin each year. ⁴⁰⁰	
Species	<i>Cephalorhynchus hectori</i>. Hector's dolphin⁴⁰¹	
Abundance	South Island—east coast ⁴⁰³	1900

³⁹⁷ Kasamatsu, F. and Joyce, G.G. 1995. Current status of odontocetes in the Antarctic. *Antarctic Science* 7, 365–379.

³⁹⁸ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

³⁹⁹ Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

⁴⁰⁰ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

⁴⁰¹ Considered Endangered under the IUCN Red List

⁴⁰² Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. <http://csl.doc.govt.nz/dsis35.pdf>.

Worldwide Cetacean Bycatch/Appendices

Estimate ⁴⁰²	South Island—west coast	5400
Fisheries	Hector's dolphins are caught in coastal gillnets. While there are no quantitative estimates, several dolphins are killed each year in recreational gillnets, and there are at least occasional catches in trawl nets. ⁴⁰⁴	
Estimated Annual Mortality	In the mid-1980s an average of 57 Hector's dolphins were caught each year in gillnets in the Canterbury region. Between 1984 and 1988, incidental captures around the Banks Peninsula amounted to at least 223. In 1997-1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula was 16 Hector's dolphins (CV 39%). ⁴⁰⁵ In New Zealand, in 1994 and 1997 fisheries incidentally captured 8 and 2 Hector's dolphins respectively. ⁴⁰⁶	
Species	Cephalorhynchus hectori maui Maui's dolphin ⁴⁰⁷	
Abundance Estimate	Critically endangered	100-150
Fisheries	Set net fishing poses a major threat to Maui's dolphins. A significant number of Maui's dolphins have been caught and killed in gill nets since 1987 when the New Zealand Department of Conservation began investigating dolphin deaths. In the early 2000s over a 20 month period, six Maui's dolphins showed signs of having been entangled in nets.	
Estimated Annual Mortality	No estimates of mortality are available, but New Zealand has banned set netting along part of the North Island west coast and the Manukau Harbor entrance.	
Species	<i>Orcaella brevirostris</i> Irrawaddy (snubfin) river dolphin	
Abundance Estimate	No Abundance Estimate	
Fisheries	Irrawaddy dolphins are incidentally captured in driftnet fisheries and shark nets to protect bathers.	
Estimated Annual Mortality	In the Townsville area alone, 41 Irrawaddy (Snubfin) dolphins were caught in shark nets between 1968 and 1990; this number is almost certainly an underestimate, for another 55 unidentified "dolphins" or "porpoises" were caught in the nets in the same period, some of which are likely to be <i>Orcaella</i> . ⁴⁰⁸	

403 In 1989 the New Zealand government created the Banks Peninsula Marine Mammal Sanctuary off the east coast of the South Island.

404 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

405 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

406 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

407 Formerly known as North Island Hector's dolphin

408 Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa*

AREA 87 SOUTHEAST PACIFIC

Species	<i>Mesoplodon peruvianus</i> Peruvian beaked whale
Abundance Estimate	No Abundance Estimate
Fisheries	Peruvian beaked whales are entangled in the driftnet fishery for sharks off Peru ⁴⁰⁹
Estimated Annual Mortality	Ten Peruvian beaked whales have been recorded, at least 9 of which appear to have been captured in the Peruvian coastal driftnet fishery. ⁴¹⁰ No Estimates of Mortality

Species	<i>Physeter macrocephalus</i> Sperm whale
Abundance Estimate	Eastern Tropical Pacific and Ecuadorian EEZ 1,179
Fisheries	Sperm whales may be entangled in swordfish driftnets in Chile. Off north-central Chile, sperm whales are known to be attracted to longliners, reportedly to scavenge the targeted Patagonian toothfish (<i>Dissostichus eleginoides</i>), and fishermen shoot at them and use other means of deterrence. ⁴¹¹
Estimated Annual Mortality	Between 1987 and October of 1994, twenty strandings of sperm whales were recorded along the Ecuadorian coast, 11 cases involved interactions with fishing gear amounting to 1.4 whales per year; ⁴¹² however, no mortality estimates are available.

Species	<i>Kogia breviceps</i> Pygmy sperm whale
Abundance Estimate	No Abundance Estimate
Fisheries	There is a report a specimen from Peru which had apparently been captured by fishermen. ⁴¹³
Estimated Annual Mortality	No Estimates of Mortality

chinensis (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

⁴⁰⁹Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

⁴¹⁰Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

⁴¹¹ Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans*. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 69

⁴¹² Haase B and Felix F. 1994. A note on the incidental catches of sperm whales (*Physeter macrocephalus*) in Ecuador. Report of the International Whaling Commission (Special Issue) 15:481-483.

⁴¹³ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

Species	<i>Feresa attenuata</i> Pygmy killer whale.
Abundance Estimate	No Abundance Estimate
Fisheries	A pygmy killer whale was killed in Peruvian coastal gillnets. ⁴¹⁴
Estimated Annual Mortality	No Estimates of Mortality
Species	<i>Globicephala macrorhynchus</i> Short finned pilot whale
Abundance Estimate	No Abundance Estimate
Fisheries	Short finned pilot whales are caught in gillnet and driftnet fisheries.
Estimated Annual Mortality	During the 1990s, the IWC estimated that less than 10 pilot whales died each year in coastal Peruvian fisheries. ⁴¹⁵ At least 5 pilot whales have died in driftnets in Peru in 1988/89. ⁴¹⁶ No total estimates of mortality are available.
Species	<i>Lagenorhynchus obscurus</i> Dusky dolphin
Abundance Estimate	No Abundance Estimate (Off the Peruvian coast, the Dusky dolphin is the third most abundant cetacean species.) ⁴¹⁷
Fisheries	Dusky dolphins are taken in Peruvian coastal gillnets.
Estimated Annual Mortality	In 1988 and 1989, 1,725 and 1,893 dusky dolphins were landed at the port of Pucusana, Peru. ⁴¹⁸ In 87 days during January-August 1994, 722 cetaceans were captured in multi-filament gillnets and landed at Cerro Azul, central Peru, of those 82.7% or 597 were dusky dolphins. ⁴¹⁹

⁴¹⁴ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴¹⁵ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

⁴¹⁶ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴¹⁷ Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. Inf Inst Mar Peru 135: 163-179

⁴¹⁸ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴¹⁹ The total kill estimate for a seven-month period, stratified by month, was 1,567 cetaceans. Peruvian fisheries both directed and incidental have killed thousands each year since 1985. In 1991-1993 period, an estimated 7000 animals per year were captured. Circumstantial evidence suggests that, after 1994, increasing enforcement reduced directed takes and illegal trade in meat, but also hampered monitoring.

⁴²⁰ Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

⁴²¹ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

Between 1990 and 1993, Peruvian fisheries landed 3,144 dusky dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.⁴²⁰ In 1994, Peruvian fisheries incidentally killed 1,272 dusky dolphins.⁴²¹ In conclusion, during the 1990s, the IWC estimated that more than 1,800 dusky dolphins died each year in coastal Peruvian fisheries.⁴²²

Between November 1991 and June 1998, 510 dusky dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.⁴²³

Data collected at 16 other ports showed high levels of dolphin and porpoise mortality persisted in coastal Peru at least until August 1994 when an unimplemented 1990 ban on small cetacean exploitation was renewed.

In 2000 and 2001 reported catches of dusky dolphins were 12 and 2 respectively.⁴²⁴ The lack of an abundance estimate precludes any assessment of population level impacts.⁴²⁵

Species	<i>Lagenorhynchus australis</i> Peale's dolphin
Abundance Estimate	No Abundance Estimate (Off the Falkland Islands and Chile coast, the Peale's dolphin is the most abundant cetacean species. ⁴²⁶ There has been a marked decrease in the number of sightings in areas of the extreme south where crab fishing takes place. ⁴²⁷
Fisheries	Peale's dolphins are entangled in nets off the coast of Chile and in Peruvian coastal gillnets.
Estimated Annual Mortality	Dolphins in Beagle Channel, the Magallanes, and southern Tierra del Fuego have been harpooned for crab bait since the 1970s. The scale of this killing was great enough to cause reduced abundance by the late 1980s. However, recent evidence suggests that this exploitation has declined and that some recovery may be occurring. ⁴²⁸ Information on

⁴²² Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

⁴²³ Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

⁴²⁴ Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

⁴²⁵ Van Waerebeek, K., Van Bresseem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godos, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. *Biological Conservation* 81, 43–49.

⁴²⁶ Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. *Inf Inst Mar Peru* 135: 163-179

⁴²⁷ Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

⁴²⁸ Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

population structure and the extent to which Peale's dolphins may still be used as crab bait is unknown. No estimates of total incidental mortality are available, however, the scale of Peale's dolphins entanglement in nearshore gillnets is not considered large.⁴²⁹

Species	<i>Tursiops truncatus</i> Bottlenose dolphin
Abundance Estimate	No Abundance Estimate
Fisheries	In Peru, coastal fisheries kill <i>Tursiops</i> for human consumption, using gillnets, purse seines, and harpoons. ⁴³⁰
Estimated Annual Mortality	<p>Bottlenose dolphins are entangled in gillnets in Peru; catches at Pucusana were estimated to total 30 in 1987.⁴³¹ In 1988 and 1989, 18 and 31 bottlenose dolphins were landed at the port of Pucusana, Peru.⁴³² Between 1990 and 1993, Peruvian fisheries landed 120 bottlenose dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.⁴³³ In 1994, Peruvian fisheries incidentally captured 42 bottlenose dolphins.⁴³⁴</p> <p>Between November 1991 and June 1998, 75 bottlenose dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.⁴³⁵</p> <p>In 1994, Ecuadorian fisheries incidentally killed 227 bottlenose dolphins.⁴³⁶</p>

⁴²⁹ There is also concern that the proliferation of salmon-culture facilities in southern Chile, especially along the indented coastline of Chiloé Island, is having a negative effect on Peale's dolphins. Morton, A.B. and Symonds, H.K. 2002. Displacement of *Orcinus orca* (L.) by high amplitude sound in British Columbia, Canada. *ICES Journal of Marine Science* 59, 71–80.

⁴³⁰ Although direct killing has noticeably decreased since dolphin hunting was banned by law in 1996, around a thousand dolphins and other small whales are still falling victim annually to fishermen to supply bait meat for the shark fishery. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

⁴³¹ Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 in: *The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

⁴³² Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴³³ Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

⁴³⁴ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

⁴³⁵ Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

⁴³⁶ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 221

⁴³⁷ Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

In 2000 and 2001 reported catches of bottlenose dolphins were 6 and 1 respectively.⁴³⁷ No estimates of total incidental mortality are available.

Species ***Grampus griseus* Risso's dolphin.**

Abundance Estimate No Abundance Estimate

Fisheries Risso's dolphins are entangled in coastal gillnets.

Estimated Annual Mortality At least one animal was landed at Pucusana in Peru.⁴³⁸

No Estimates of Mortality

Species ***Lissodelphis peronii* Southern right whale dolphin.**

Abundance Estimate No Abundance Estimate--considered very common off Chile

Fisheries Southern right whale dolphins are incidentally caught in driftnets off Peru and Chile. They are infrequently caught off the coasts of Peru and Chile where they are used for human consumption and crab bait.⁴³⁹

Estimated Annual Mortality During the 1990s, the IWC estimated that more than 5 southern right whale dolphins died each year off the Pacific coast of South America.⁴⁴⁰

No Estimates of Mortality

Species ***Delphinus delphis* Common dolphin.**

Abundance Estimate No Abundance Estimate

Fisheries Common dolphins are incidentally caught in coastal gillnets off Peru and Chile.

Estimated Annual Mortality The estimated catches of common dolphins in coastal driftnets in Peru, were 264 in 1987, 155 in 1988 and 57 in 1989.⁴⁴¹ During the 1990s, the IWC estimated that 50 to 150 common dolphins died each year in coastal Peruvian fisheries.⁴⁴²

Between 1990 and 1993, Peruvian fisheries landed 1087 common dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.⁴⁴³

⁴³⁸ Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 in: *The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

⁴³⁹ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

⁴⁴⁰ Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

⁴⁴¹ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴⁴² Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

⁴⁴³ Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

Species	<i>Cephalorhynchus eutropia</i> Chilean dolphin.
Abundance Estimate	No Abundance Estimate available--total population appears to be very small (low thousands at most).
Fisheries	The crab bait fishery in southern Chile and a variety of other fisheries (particularly coastal gillnet fisheries) are potentially serious threats. Some shooting and harpooning also occurs, and the dolphins are used for bait or human consumption. The species' status is uncertain. In addition to the mortality caused by entanglement and hunting, Chilean dolphins may now be excluded by salmon aquaculture operations from some of the bays and fiords that they traditionally inhabited. ⁴⁴⁴
Estimated Annual Mortality	In 1989, 51 Chilean dolphins were caught in Chilean bottom set gillnets. At Queule, near Valdivia, Chilean dolphins account for 45.8% of the dolphins caught in gillnets, translating into a catch of 65-70 animals at this port. ⁴⁴⁵ No estimates of total incidental mortality are available.
Species	<i>Cephalorhynchus commersonii</i> Commerson's dolphin
Abundance Estimate	No Abundance Estimate--thought to be abundant
Fisheries	Commerson's dolphin are caught in mid-water trawls and coastal gillnets. Commerson's dolphins are also used as crab bait.
Estimated Annual Mortality	No Estimates of Mortality
Species	<i>Phocoena spinipinnis</i> Burmeister's porpoise
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are frequently killed in set and drift gillnets. Some are killed deliberately in the Peruvian multi-species fishery that employs both gillnets and harpoons to take cetaceans for human consumption ⁴⁴⁶ and additional animals may be taken at least occasionally for crab bait in southern Chile. ⁴⁴⁷
Estimated Annual Mortality	Mortality in Peru is estimated at more than 450 animals per year and may be as high as 2,000 animals. ⁴⁴⁸ In 1988 and 1989, 383 and 331

⁴⁴⁴ Claude, M., Oporto, J., Ibáñez, C., Brieva, L., Espinosa P.C., and Arqueros, W.M. 2000. *La ineficiencia de la salmonicultura en Chile*. Aspectos sociales, económicos y ambientales. Registro de Problemas Públicos, Informe N° 1.

⁴⁴⁵ Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

⁴⁴⁶ Van Waerebeek, K. and Reyes, J.C. 1994. Post-ban small cetacean takes off Peru: a review. *Report of the International Whaling Commission* (Special Issue) 15, 503–519.

⁴⁴⁷ Lescrauwaet, A.-C. and Gibbons, J. 1994. Mortality of small cetaceans and the crab bait fishery in the Magallanes area of Chile since 1980. *Report of the International Whaling Commission* (Special Issue) 15, 485–494.

⁴⁴⁸ Reyes JC 2002. Burmeister's porpoise. In: Encyclopedia of marine mammals (Perring WF, Wursig B, Thewissen JGM, eds) Academic Press, San Diego pp 177-179

Mortality

Burmeister's porpoise were landed at the port of Pucusana, Peru.⁴⁴⁹ Between 1990 and 1993, Peruvian fisheries landed 552 Burmeister's porpoise at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.⁴⁵⁰ In 1994, Peruvian fisheries incidentally captured 224 Burmeister's porpoise.⁴⁵¹ In 2000, 2001, and 2003 reported catches of Burmeister's porpoise were 39, 14, and 125 respectively.⁴⁵² Scientists consider these levels unsustainable.

In 1989, 57 Burmeister's porpoise were caught in Chilean bottom set gillnets.

⁴⁴⁹ Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

⁴⁵⁰ Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

⁴⁵¹ Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

⁴⁵² Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

APPENDIX B. Parties to International Treaties

Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.) As of June 2007, 155 countries were parties to the Law of the Sea. A chronological list of ratifications of, accessions and successions to the convention is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 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. U.N. Doc. A/Conf./164/37. A list of the 66 nations signatory to the Straddling Stocks Agreement is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T. 3476. The original 12 contracting parties were United Kingdom, South Africa, Belgium, Japan, United States, Norway, France, New Zealand, Russia, Poland, Argentina, and Australia. Additional members are Brazil, Chile, European Community, Germany, India, Italy, Republic of Korea, Namibia, Spain, Sweden, Ukraine, and Uruguay. States Party to the Convention but not Members of the Commission are Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu.

International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T. 2887. Algeria, Angola, Barbados, Brazil, Canada, Cape Verde, China, Cote d'Ivoire, Croatia, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Ghana, Guatemala, Guinea-Conakry, Honduras, Iceland, Japan, Korea (Republic), Libya, Mexico, Morocco, Namibia, Nicaragua, Norway, Panama, Philippines, Russian Federation, Sao Tome and Principe, South Africa, Trinidad and Tobago, Tunisia, Turkey, United Kingdom (Anguilla, Bermuda, St. Helena, Turks and Caicos), United States, Uruguay, Vanuatu, Venezuela.

Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Entered into force 19 June 2004. Nineteen states signed the convention. Australia, Cook Islands, Federated States of Micronesia, Fiji, Republic of Kiribati, Republic of the Marshall Islands, Republic of Nauru, New Zealand, Niue, Papua New Guinea, Independent State of Samoa, Solomon Islands, Kingdom of Tonga and Tuvalu and the United States have ratified it.

Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.) Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States. Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention.

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. Done at Windhoek. 20 April 2001. Entered into force April 2003. Angola, Iceland, Namibia, Norway, Republic of Korea, South Africa, the United Kingdom (on behalf of St. Helena and its dependencies, Tristan Da Cunha and Ascension Island), the United States and the European Community.

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27. Parties: China, South Korea, Poland, the Russian Federation, and the United States.

International Convention for the Regulation of Whaling, Done at Washington, 2 November 1946. 4

Worldwide Cetacean Bycatch/Appendices

Bevans 248, TIAS 1849. The original signatories to the convention were Argentina, Australia, Brazil, Canada, Chile, Denmark, France, Netherlands, New Zealand, Norway, Peru, Russia, United Kingdom, United States, Union of South Africa. Additional signatories since then are Antigua & Barbuda, Austria, Belgium, Belize, Benin,

Cambodia, Cameroon, China, People's Rep of, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Dominica, Ecuador, Finland, Gabon, The Gambia, Germany, Greece, Grenada, Guatemala, Guinea-Bissau, Guinea, Rep of, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Kenya, Kiribati, Korea, Rep of, Laos, Luxembourg, Mali, Marshall Islands, Rep of Mauritania, Mexico, Monaco, Mongolia, Morocco, Nauru, Nicaragua, Oman, Palau, Panama, Portugal, San Marino, St. Kitts & Nevis, St. Lucia, St. Vincent & The Grenadines, Senegal, Slovak Republic, Slovenia, Solomon Islands, Spain, Suriname, Sweden, Switzerland, Togo, Tuvalu.

Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249) A list of 172 contracting parties in order of entry into force is available at <http://www.cites.org/eng/disc/parties/chronolo.shtml>

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994. Parties include Albania, Bulgaria, Croatia, Cyprus, France, Georgia, Greece, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Portugal, Romania, Spain, Syria, Tunisia, Ukraine.

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001. Parties are Belgium, Denmark, European Community, Finland, Germany, Netherlands, Poland, Sweden, United Kingdom.

Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7. United States and Canada.

The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Parties are Australia, Cook Islands, Federated States of Micronesia, Fiji, France, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tuvalu, United States, Vanuatu.

Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Ecuador, Peru and Chile.

Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100. The Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America is a unique instrument in international fisheries law, being the only multilateral agreement between a distant-water fishing nation, on the one hand, and a group of coastal States, on the other hand, concerning access to the latter's fisheries zones. Thus, although multilateral in form, the agreement is in many respects bilateral in nature. Consultation is conducted through the South Pacific Forum Fisheries Agency, which has an open membership. As of 2005 members were Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa.

Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT). Australia, Japan and New Zealand Taiwan, South Korea. The Philippines was accepted as a formal cooperating non-member in 2004, and parties

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continue discussions with Indonesia and South Africa.

Asia Pacific Fisheries Commission. Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

ICES: Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

PICES: Canada, United States, Japan, People's Republic of China, Russian Federation, Republic of Korea.

SPC: Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

APPENDIX C. Sample Cetacean Bycatch Resolution

RESOLUTION TO ASSESS AND MITIGATE THE IMPACT OF FISHING ON WHALES AND DOLPHINS

The Commission [insert name of the regional fisheries management organization]

In accordance with the Convention [insert the name of the convention under which the rfmo operates]:

Recognizing the ecological and cultural significance of all species of whales and dolphins in the convention area;

Noting the recent international scientific studies indicate that bycatch in commercial fisheries is one of the greatest threats facing whales and dolphins;

Recognizing the need to assess population abundance of and evaluate the incidental mortality of dolphins and whales during fishing operations in the convention area;

Aware that measures to reduce bycatch may require modified or new procedures, technologies, or management measures;

The [insert name of convention] Convention, resolves as follows:

1. Contracting Parties (CPs) [or other appropriate terminology for the Convention or Agreement] should collect, and provide to the Secretariat, all available information on whale and dolphin abundance and stock structure within their waters and within the Convention Area.
2. CPs should collect, and provide to the Secretariat, all available information on interactions with whales and dolphins in fisheries within the Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.
3. Each CP should provide all information on its national legislation and international efforts to which it is a party to conserve whales and dolphins.
4. CPs should, as appropriate, individually and collectively, continue to enhance the implementation of their existing whale and dolphin mitigation measures using best available scientific information on mitigation techniques.
5. Beginning in 2008, CPs should provide to the Secretariat a detailing of whale and dolphin population and fishery interaction data (e.g., species identification, fate and condition at

release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by [Name of the Convention] in the Convention Area and any marine mammal-specific training provided to these observers. This information will be compiled by the Secretariat and reported to the [Name of the Scientific Body or Bycatch Body within the Convention].

6. [Name of the Convention] should cooperate with other regional, subregional and global organizations to share data on whale and dolphin bycatch and to develop and apply compatible bycatch reduction measures as appropriate, given the migration patterns of many species of
7. As the [Name of the Convention] develops its regional observer program and considers improving observer coverage in the Convention Area, existing observer programs should be reviewed to ensure that the appropriate information on whale and dolphin interactions is being collected (e.g. species identification, fate and condition at release, relevant biological information and gear configuration).
8. The Secretariat, in cooperation with the [Name of the Scientific Body or Bycatch Body within the Convention], should develop a centralized bycatch and observer database to obtain better estimates of total catch and mortality of whales and dolphins by fisheries within the Convention Area.
9. The [Name of the Scientific Body or Bycatch Body within the Convention] should develop a program that includes: abundance research and research and development of gear alternatives, promotion of the use of available bycatch mitigation technology, promotion and strengthening of data collection programs to obtain standardized information to develop reliable estimates of the bycatch of whales and dolphins, biological research on whales and dolphins, including the identification of migration routes or other areas of spatial or temporal importance, industry education, development and promotion of safe handling techniques and other techniques to improve whale and dolphin conservation.
10. The [Name of the Scientific Body or Bycatch Body within the Convention] shall take practical steps necessary to improve monitoring and reporting of whales and dolphins interactions in the Convention Area, including the development of data standards and specifications and reporting requirements.
11. [Name of the Convention] will monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the [Name of the Convention] in 2009. Information produced as a result of this resolution will be provided by the Secretariat to the FAO.

APPENDIX D. Sea Turtle Resolution Adopted at NAFO

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Proposal by the United States of America and Japan

Background/Explanatory Memorandum:

At its 26th Annual Symposium on Sea Turtle Biology and Conservation, the members of the International Sea Turtle Society (ISTS) adopted a resolution calling upon the world's regional fisheries management organizations (RFMOs) to urge their members to adopt and implement the FAO "Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations" (the FAO Guidelines). This ISTS resolution was forwarded to NAFO with a request for action.

It is generally agreed that RFMOs can play a valuable role in support of global adoption and implementation of the FAO Guidelines. Given NAFO's on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, NAFO should support global implementation of the FAO Guidelines as appropriate. As the waters of the Convention area include critical foraging habitat for the leatherback turtle (*Dermochelys coriacea*), adoption and implementation of the FAO Guidelines would be both proactive and precautionary.

Thus, it is proposed that, in addition to generally supporting adoption and implementation of the FAO Guidelines, NAFO Contracting Parties should provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area.

NAFO should also consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

Draft Proposal:

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Preamble:

Recognizing the cultural and ecological significance of sea turtles in the Northwest Atlantic Ocean;

Recognizing that the FAO Committee on Fisheries (COFI) endorsed “Guidelines to Reduce Sea Turtle Mortality in Fishing Operations” at its Twenty-sixth Session, held in March 2005, and that these guidelines are directed towards members and non-members of FAO, fishing entities, subregional, regional and global organizations, whether governmental or non-governmental concerned with fisheries management and sustainable use of aquatic ecosystems;

Further recognizing that implementation of these guidelines should be consistent with the Code of Conduct for Responsible Fisheries as well as with the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem with regard to ecosystem considerations and based on the use of the best available science;

Taking into account the importance placed by the guidelines on research, monitoring, the sharing of information, and public education on sea turtles;

The Contracting Parties of NAFO resolve as follows:

1. NAFO Contracting Parties (CPs) should, as appropriate, individually and collectively implement the FAO “Guidelines to Reduce Sea Turtle Mortality in Fishing Operations” (the Guidelines) to reduce the incidental catch of sea turtles and ensure the safe handling of all turtles that are captured.
2. NAFO CPs should continue to enhance the implementation of their existing turtle mitigation measures using best available scientific information on mitigation techniques.
3. NAFO should encourage CPs to collect, and provide to the NAFO Secretariat, all available information on interactions with sea turtles in fisheries managed by NAFO in the NAFO Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.
4. NAFO should cooperate with other regional, subregional and global organizations to share data on sea turtle bycatch and to develop and apply compatible bycatch reduction measures as appropriate.
5. Beginning in 2007, CPs should provide to the NAFO Secretariat a detailing of sea turtle fishery interaction data (e.g., species identification, fate and condition at release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by NAFO in the NAFO Convention Area and any sea turtle-specific training provided to these observers. This information will be compiled by the NAFO Secretariat and reported to the Scientific Council and to the Fisheries Commission.

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6. The Fisheries Commission should monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the Commission in 2008. Information produced as a result of this resolution will be provided by the NAFO Secretariat to the FAO.

APPENDIX E. National Oceans Protection Act of 2005 (S. 1224)

National Oceans Protection Act of 2005 (Introduced in Senate)

Subtitle C--Cetacean and Sea Turtle Conservation

SEC. 331. SHORT TITLE.

This subtitle may be cited as the `Cetacean and Sea Turtle Conservation Act of 2005'.

SEC. 332. PURPOSES.

The purposes of this subtitle are--

- (1) to restore and perpetuate healthy populations of cetaceans and sea turtles by reducing bycatch of cetaceans and sea turtles to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;
- (2) to increase the technical capacity, financial resources, and political will necessary to reduce bycatch of cetaceans and sea turtles to sustainable levels globally;
- (3) to promote international standards and guidelines to reduce bycatch of cetaceans and sea turtles; and
- (4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 333. DEFINITIONS.

In this subtitle:

- (1) APPROPRIATE FISHING GEAR AND METHODS- The term `appropriate fishing gear and methods' means gear and methods used in fishing operations that are proven to be effective in reducing bycatch of cetaceans or sea turtles to sustainable levels.
- (2) BYCATCH - The term `bycatch' means the incidental mortality or serious injury of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.
- (3) CETACEAN - The term `cetacean' means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins, and porpoises.
- (4) INDEPENDENT EXPERTS- The term `independent experts' means individuals with expertise in issues related to cetaceans or sea turtles including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.
- (5) POPULATION- The term `population' means a distinct group of

individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.

(6) SEA TURTLE- The term `sea turtle' means a member of--

(A) the family Cheloniidae; or

(B) the family Dermochelyidae.

(7) SUSTAINABLE LEVELS- The term `sustainable levels' means, with respect to bycatch , a level of bycatch that, in combination with other mortality caused by humans, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 334. INTERNATIONAL AGREEMENTS AND STANDARDS.

(a) International Agreements- The Secretary, with the consent of the President and in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans or populations of sea turtles for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans or sea turtles to at least sustainable levels.

(b) Standards- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans or sea turtles that--

(1) require such operations to use appropriate fishing gear and methods; and

(2) are intended to reduce bycatch of cetaceans and sea turtles to at least sustainable levels.

(c) United Nations- The Secretary may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 335. RESEARCH AND DEVELOPMENT GRANTS.

(a) Authority- The Secretary is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use--

(1) in the North Sea, where harbor porpoise bycatch is severe;

(2) in Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned;

(3) in the east coast of South America, including waters off the coasts of

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Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species; or

(4) in areas where bycatch of sea turtles associated with longline fishing has been found to occur frequently, as follows:

- (A) The central Pacific Ocean.
- (B) The southern Pacific Ocean.
- (C) The southern Atlantic Ocean.
- (D) The Mediterranean Sea.

(b) Definitions- In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES- The term `appropriate congressional committees' means the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED- The term `foreign person' means--

- (A) an individual who is not a United States citizen;
- (B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or
- (C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION- The term `Marine Mammal Commission' means the Marine Mammal Commission established by section 201 of the Marine Mammal Protection Act of 1972 (16 U.S.C. 1401).

(c) Eligibility-

(1) IN GENERAL- The Secretary shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) Application- A person seeking a grant under this section shall submit an application to the Secretary at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) Terms and Conditions-

(1) IN GENERAL- A recipient of a grant or other financial assistance provided by the Secretary under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION- The Secretary shall consult with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

(f) Report- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary shall submit a report to the appropriate

congressional committees on the grants and other assistance provided under this section.

SEC. 336. BYCATCH DATABASE.

(a) Requirement for Database- The Secretary shall establish a database of bycatch data for cetaceans and sea turtles from fisheries around the world for the purpose described in subsection (b).

(b) Purpose of Database- The purpose of the database is to make information related to bycatch , including cetacean or sea turtles species affected by bycatch , the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans and sea turtles, available to scientists, resource managers, and the public.

(c) Availability- The Secretary shall make the database established pursuant to subsection (a) available by public posting through an Internet Web site.

SEC. 337. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated \$5,000,000 for each fiscal year 2005 through 2008 to carry out the provisions of this subtitle.

APPENDIX F. Sample Cetacean Bycatch Legislation

110th Congress

1st Session

S.

To promote the conservation of cetacean species, and for other purposes.

IN THE SENATE OF THE UNITED STATES

introduced the following bill; which was read twice and referred to the Committee on _____

A Bill

To promote the conservation of cetacean species, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE

This Act may be cited as the “Cetacean Conservation Act of 2007.”

SEC. 2. FINDINGS.

Congress makes the following findings:

- (1) Cetaceans are a group of approximately 80 species of whales, dolphins, and porpoises that occur worldwide and are a biologically significant global resource. In the United States marine mammals are provided protection under the Marine Mammal Protection Act; some species are included on the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). A number of species are listed as endangered by international agreements.
- (2) The maintenance of healthy cetacean populations is essential to the maintenance of healthy ocean ecosystems.
- (3) Cetaceans often inhabit international waters and are highly migratory, resulting in the management of a population of cetaceans frequently being shared by 2 or more countries.
- (4) Eco-tourism based on whale watching, enjoyed by millions of people around the world, has grown into more than a \$1,000,000,000 a year industry.
- (5) Many species of cetaceans are threatened with extinction. Bycatch of cetaceans in fishing

operations is a major threat to cetaceans worldwide. Several species and many populations of cetaceans could be lost in the next few decades if nothing is done.

- (6) The final report of the United States Commission on Ocean Policy (2004) identifies the severity of threats to cetaceans posed by accidental capture in fishing gear. The Report states that the greatest threat to marine mammals worldwide is the accidental capture or entanglement in fishing gear, with hundreds of thousands of such mammals unintentionally killed each year.
- (7) The Report recommends that the United States use international agreements and other diplomatic means to strengthen protections for marine mammals, sea turtles, and other endangered marine species, including through the development and adoption of bycatch reduction methods.
- (8) Considerable advances have been made in a few fisheries to address the problem of cetacean bycatch. However, progress to address this problem in other fisheries has been slow or non-existent throughout much of the world, in many cases due to a lack of technical capacity, financial resources, and political will to combat the problem. Fishing pressure on cetaceans is increasing with the expansion of fishing fleets and the establishment of new fisheries.
- (9) From 1993 through 2006, the United States implemented measures that reduced cetacean bycatch in United States fisheries to less than one-third the previous rate of such bycatch.
- (10) It is appropriate for the United States to build on its success in reducing cetacean bycatch by leading an international effort to implement measures to reduce such bycatch around the world and to promote an international regulatory framework in which countries adopt standards for reducing bycatch that are comparable to the standards adopted by the United States.
- (11) Commercial fishing operations that are subject to United States regulations to reduce cetacean bycatch may be at a competitive disadvantage because, while the operations are required to mitigate such bycatch and bear the costs for doing so for most fisheries, the United States continues to allow the importation of fisheries products from countries that do not require comparable mitigation. U.S. longline fishermen represent at most no more than 2 percent of the total number of global pelagic longline fishermen.
- (12) Global standards and international agreements to reduce such bycatch would help remedy this imbalance, and the United States can be instrumental in providing guidance and support toward this goal.
- (13) Many developing countries require technical and financial assistance in order to effectively reduce cetacean bycatch.
- (14) Bycatch of cetaceans is occurring at unsustainable levels in many locations, including-----
--
 - (A) the North Sea, where harbor porpoise bycatch is severe;
 - (B) Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned; and
 - (C) The east coast of South America, including waters off the coasts of Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species.
- (15) An international effort led by the United States to increase technical capacity, financial resources, and political will necessary to reduce cetacean bycatch to sustainable levels globally and to develop international standards and guidelines to reduce such bycatch is necessary to ensure the conservation of cetaceans for the health of the world's oceans, the economic security of commercial fishing in the United States, and the enjoyment of future

generations.

SEC. 3. PURPOSES

The purposes of this Act are---

- (1) to restore and perpetuate healthy populations of cetaceans by reducing bycatch to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;
- (2) to increase the technical capacity, financial resources and political will necessary to reduce bycatch of cetaceans to sustainable levels globally;
- (3) to promote international standards and guidelines to reduce bycatch of cetaceans; and
- (4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 4. DEFINITIONS

In this Act:

- (1) APPROPRIATE FISHING GEAR AND METHODS.---- The term “appropriate fishing gear and methods” means gear and methods used in fishing operations that are proven to be effective in reducing cetacean bycatch to sustainable levels.
- (2) BYCATCH--- The term “bycatch” means the incidental mortality, serious injury, injury, or capture of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.
- (3) CETACEAN--- The term “cetacean” means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins and porpoises.
- (4) INDEPENDENT EXPERTS--- The term “independent experts” means individuals with expertise in issues related to cetaceans including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.
- (5) POPULATION--- The term “population” means a distinct group of individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.
- (6) SUSTAINABLE LEVELS--- The term “sustainable levels” means, with respect to bycatch, a level of bycatch that, in combination with other mortality, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 5. INTERNATIONAL AGREEMENTS AND STANDARDS

(a) INTERNATIONAL AGREEMENTS—The Secretary of Commerce, [with the consent of the President and] in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans to at least sustainable levels.

(b) STANDARDS.--- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans that---

- (1) require such operations to use appropriate fishing gear and methods; and
- (2) are intended to reduce bycatch of cetaceans to at least sustainable levels.

(c) UNITED NATIONS.--- The Secretary of Commerce may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 6 RESEARCH AND DEVELOPMENT GRANTS.

(a) AUTHORITY---The Secretary of Commerce is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use in areas that the Secretary deems as priorities for such research.

(b) DEFINITIONS.---In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES.---The term “appropriate congressional committees” means the Committee on Commerce, Science and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED.---The term “foreign person” means—

- (A) an individual who is not a United States citizen;
- (B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or
- (C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION.--- The term “Marine Mammal Commission” means the Marine Mammals Commission established by section 201 of the Marine Mammals Protection Act of 1972 (16 U.S.C. 1401).

(c) ELIGIBILITY.---

(1) IN GENERAL.---The Secretary of Commerce shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) APPLICATION---A person seeking a grant under this section shall submit an application to the Secretary of Commerce at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) TERMS AND CONDITIONS.---

(1) IN GENERAL--- A recipient of a grant or other financial assistance provided by the Secretary of Commerce under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION---The Secretary of Commerce shall consult

with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

- (f) REPORT--- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary of Commerce shall submit a report to the appropriate congressional committees on the grants and other assistance provided under this section.

SEC. 7. BYCATCH DATABASE

(a) REQUIREMENT FOR DATABASE--- The Secretary of Commerce shall establish a database of bycatch data for cetaceans from fisheries around the world for the purpose described in subsection (b).

(b) PURPOSE OF DATABASE--- The purpose of the database is to make information related to bycatch, including cetacean species affected by bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans, available to scientists, resource managers, and the public.

(c) AVAILABILITY--- The Secretary of Commerce shall make the database established pursuant to subsection (a) available by public posting through an Internet website.

SEC.8. AUTHORIZATION OF APPROPRIATIONS

There are authorized to be appropriated \$10,000,000 for each fiscal year 2007 through 2012 to carry out the provisions of this Act.

APPENDIX F

LITERATURE CITED FOR INITIAL REGULATORY FLEXIBILITY

ANALYSIS AND REGULATORY IMPACT REVIEW

Literature Cited

- Agnew, D.J. and C.T. Barnes. 2004. Economic Aspects and Drivers of IUU Fishing: Building a Framework. OECD. Fish Piracy. Combating Illegal, Unreported and Unregulated Fishing. OECD, Paris. Pp.19-49.
- Bray, K. 2000. A Global Review of Illegal, Unreported and Unregulated (IUU) Fishing. Report prepared for the FAO. Rome, FA). 7p.
- Campling, L., E. Havice, and V. Ram-Bidesi. 2007. Pacific Island Countries, the Global Tuna Industry and the International Trade Regime – A Guidebook. Forum Fisheries Agency. Online publication: <http://www.ffa.int/node/891>. Last accessed November 13, 2007.
- Clark, L. 2006. Perspectives on Fisheries Access Agreements: Developing Country View. OECD Directorate for Food, Agriculture and Fisheries Development Co-operation Directorate. COM/AGR/DCD/PCDF(2006)2.
- CBO. 2006. The Economic Costs of Disruptions in Container Shipments. Congressional Budget Office Report. March 29, 2006.
- Doulman, D.J. 2000. Illegal, Unreported and Unregulated Fishing: Mandate for an International Plan of Action. FAO. Document AUS: IUU/2000/4. 16p.
- Evans, D.W. 2000. The Consequences of Illegal, Unreported and Unregulated Fishing for Fishery Data and Management. FAO. Document AUS:IUU/2000/12. 9p.
- Fanning, C. (2007). Personal Communication.
- FAO. 2007. Combating Illegal, Unreported, and Unregulated Fishing Through Monitoring, Control and Surveillance, Port State Measures and Other Means. Twenty-seventh session of the Committee on Fisheries. COFI/2001/7. Rome, FAO.
- Freeman, A.M. III. 1993. The Measurement of Environmental and Resource Values: Theory and Methods. Resources for the Future. Washington, DC. 516pp.
- FUS. 2006. Fisheries of the United States 2006. Current Fishery Statistics No. 2006. Editor Elizabeth Pritchard. Commerce Dept., NOAA, National Marine Fisheries Service, Office of Science and Technology, Fisheries Statistics Division. February 2007.
- Genter (2008). Economic Analysis of International Fishery Trade Measures. **Unpublished.**
- Glitnir (2007). U.S. Seafood Industry Report. March 2007. Glitnir Seafood Team. 46p.
- Glitnir (2007a). Tuna Seafood Industry Report. August 2007. Glitnir Seafood Team 62p.

- Griggs, L. and G. Lugten. 2007. Veil Over the Nets (Unraveling Corporate Liability for IUU Fishing Offences). *Marine Policy*. 31(2007):159-168.
- Hageman, R. 1985. Valuing Marine Mammal Populations: Benefit Valuations in a Multi-Species Ecosystem. Administrative Report LJ-85-22. Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA.
- Hamm, D. 2007. Personal Communication. National Marine Fisheries Service. Pacific Islands Fisheries Science Center.
- Hamnett, M.P and W.S. Pintz. 1996. The Contribution of Tuna Fishing and Transshipment to the Economies of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. SOEST 96-05, JIMAR Contribution 96-303, Pelagic Fisheries Research Program. Joint Institute for Marine and Atmospheric Research, NOAA, University of Hawaii.
- Hatcher, A. 2004. Incentives for Investment in IUU Fishing Capacity. OECD. Paper presented at the IUU Workshop, April 19-20, 2004. AGR/FI/IUU(2004)4. 19p.
- Kirkley, J.E. (2006). Potential Economic Ramifications of Reissuing the Rule to Implement the Fish and Seafood Promotion Act of 1986. Reported prepared for NOAA Fisheries, Office of Constituent Services, Silver Spring, MD.
- Kleiber, E. 2002. The Impact of the Regulations Resulting from the Events of September 11th on the Transshipment of Fresh Fish in the American Pacific. Western Pacific Regional Fishery Management Council. Internal Report.
- Le Gallic, B. (2007). The Use of Trade Measures Against Illicit Fishing” Economic and Legal Considerations. *Ecological Economics*, doi:10.106/j.ecolecon.2007.05.01.
- Loomis, J. and D. Larson. 1991. Total Economic Values of Increasing Gray Whale Populations: Results from a Contingent Valuation Survey of Visitors and Households. *Marine Resource Economics*. 9:275-286.
- MARAD, 2007. U.S. Port Calls by Port and Vessel Type, 2002-2005. U.S. Department of Transportation, Maritime Administration.
- MARAD, 2000. U.S. MARAD Port Kit. Model develop for MARAD by the Center for Urban Policy Research, Rutgers and A. Strauss-Wieder, Inc. U.S. Department of Transportation, Maritime Administration.
- OECD. 2006. Making Sure Fish Piracy Doesn’t Pay. Policy Brief. OECD Observer. January 2006.
- OECD. 2005. Why fish piracy persists: the economics of illegal, unreported and unregulated fishing. Paris: OECD.

- Samples, K., and J. Hollyer. 1990. Contingent Valuation of Wildlife Resources in the Presence of Substitutes and Complements. In: R. Johnson and G. Johnson, eds., *Economic Valuation of Natural Resources: Issues, Theory, and Application*. Westview Press, Boulder, CO.
- Sumaila, U.R., J. Alder, and H. Keith 2006. Global Scope and Economics of Illegal Fishing. *Marine Policy*. 30(2006) 696-703.
- Tokrisna, R. WTO-Consistent Trade-Related Measures to Address IUU Fishing – Developing Country Issues. Expert Consultation on Illegal, Unreported and Unregulated Fishing Organized by the Government of Australia in Cooperation with FAO. AUS:IUU/2000/17. 10p.
- Vince, J. 2007. Policy Responses to IUU Fishing in Northern Australian Waters. *Marine Policy*. 50 (2007): 683-698.
- Whitehead, J. 1992. Ex Ante Willingness to Pay with Supply and Demand Uncertainty: Implications for Valuing a Sea Turtle Protection Programme. *Applied Economics*, 24: 981-988.
- Whitlow, J. 2004. The Social Dimension of IUU Fishing. Paper Submitted to the IUU Workshop April 19-20. OECD AGR/FI/IUU(2004)15. 9p.

Finding of No Significant Impact for Final Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis for a Final Rule to Establish Identification and Certification Procedures for Nations under the High Seas Driftnet Fishing Moratorium Protection Act

National Marine Fisheries Service

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

Response: No, the proposed action cannot reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in fishery management plans. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for illegal, unreported, and unregulated (IUU) fishing and bycatch of protected living marine resources.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: No, the proposed action is not expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response: No, the proposed action cannot reasonably be expected to have a substantial adverse impact on public health or safety. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: No, the proposed action cannot be reasonably be expected to adversely affect endangered or threatened species; their critical habitat, marine mammals, or other non-target species. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources..

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: No, there are no significant social or economic impacts interrelated with natural or physical environmental effects of the proposed action. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources. The regulations have the potential to bring more stocks into sustainable management and increase economic returns to U.S. industries.

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: No, the effects on the quality of the human environment are not likely to be highly controversial. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: No, the proposed action will not reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: No, the effects on the human environment are not likely to be highly uncertain or involve unique or unknown risks. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No, the proposed action is not related to other actions with individually insignificant, but cumulatively significant impacts. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: No, the proposed action is not likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: No, the proposed action cannot reasonably be expected to result in the introduction or spread of a nonindigenous species. The regulations are procedural and administrative in nature

and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Response: No, the proposed action is unlikely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: No, the proposed action cannot reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: No, the proposed action cannot reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. The regulations are procedural and administrative in nature and set forth procedures to identify and certify nations for IUU fishing and bycatch of protected living marine resources.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for Final Rule to Establish Identification and Certification Procedures for Nations under the High Seas Driftnet Fishing Moratorium Protection Act, it is hereby determined that the final rule will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.



Rebecca Lent,
Director of the NMFS Office of International Affairs

10/4/10

Date