Bycatch Provisions in the Reauthorized Magnuson-Stevens Act

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Introduction

The United Nations Food and Agriculture Organization (FAO) estimates that in recent years the world's fisheries annually discarded 7.3 million metric tons of marine life (Kelleher, 2005). This statistic accounts for just a portion of the marine life incidentally caught or harmed by fishing gear (i.e., bycatch), because some of these organisms are kept for consumption or sale, or are not brought on board fishing vessels after encountering gear. Without proper measures in place to address bycatch, fishing can harm marine ecosystems, reduce biodiversity, and lead to injury or mortality of protected species. Bycatch also can have severe economic implications for fisheries due to foregone fishery revenue associated with discards, damage to fishing gear, and increased sorting time on deck.

One example of potential foregone fishery revenue associated with discards is the Bering Sea pollock, *Theragra chalcogramma,* fishery, which faces hard caps on Chinook salmon, *Oncorhynchus tshawytscha,* as a result of the final rule to implement Amendment 91 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area, which published in the Federal Register on 30 August 2010 (NOAA, 2010). Economic analyses in Amendment 91 indicate that total potentially foregone pollock wholesale gross revenue could be as much as $453 million if high levels of Chinook salmon bycatch occur in the fishery in a given year (NMFS, 2009a). Such potential losses in fishing revenues, along with the serious biological impacts of bycatch, make bycatch a central challenge to address in U.S. and international fisheries.

Since the creation of fishing nets and fishing hooks there has been bycatch in fisheries, but efforts to reduce bycatch are relatively recent. Records of selective fishing practices date back several centuries, but the science of fishing selectively did not begin until the end of the 19th century. This initial work focused on selecting large sizes of commercial fish by adjusting the shape and size of meshes and placing grids into the codends of trawls (Chopin et al., 1996; Prado, 1997). Later research sought to address the issue of separating species in multispecies fisheries. Rising public interest in charismatic species during the 1960's led to the development of capture prevention and escape technology for marine mammals, sea turtles, and seabirds beginning in the 1970's (Coe, 1984). Most recently, researchers

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ABSTRACT—Bycatch can harm marine ecosystems, reduce biodiversity, lead to injury or mortality of protected species, and have severe economic implications for fisheries. On 12 January 2007, President George W. Bush signed the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA). The MSRA required the U.S. Secretary of Commerce (Secretary) to establish a Bycatch Reduction Engineering Program (BREP) to develop technological devices and other conservation engineering changes designed to minimize bycatch, seabird interactions, bycatch mortality, and post-release mortality in Federally managed fisheries. The MSRA also required the Secretary to identify nations whose vessels are engaged in the bycatch of protected living marine resources (PLMR's) under specified circumstances and to certify that these nations have 1) adopted regulatory programs for PLMR's that are comparable to U.S. programs, taking into account different conditions, and 2) established management plans for PLMR's that assist in the collection of data to support assessments and conservation of these resources. If a nation fails to take sufficient corrective action and does not receive a positive certification, fishing products from that country may be subject to import prohibitions into the United States. The BREP has made significant progress to develop technological devices and other conservation engineering designed to minimize bycatch, including improvements to bycatch reduction devices and turtle excluder devices in Atlantic and Gulf of Mexico trawl fisheries, gillnets in Northeast fisheries, and trawls in Alaska and Pacific Northwest fisheries. In addition, the international provisions of the MSRA have provided an innovative tool through which the United States can address bycatch by foreign nations. However, the inability of the National Marine Fisheries Service to identify nations whose vessels are engaged in the bycatch of PLMR's to date will require the development of additional approaches to meet this mandate.

are examining the survival of organisms after interactions with gear (Prado, 1997; Wilde, 2009).

The bycatch of fishery resources, marine mammals, sea turtles, seabirds, and other living marine resources has become a central concern of the commercial and recreational fishing industries, resource managers, conservation organizations, scientists, and the public—both nationally and globally. Recognizing the negative impact of this problem, the international community has called for bycatch levels to be reduced in agreements such as the United Nations Fish Stocks Agreement in 1995 and several measures in Regional Fisheries Management Organizations (RFMO's).

For example, the Code of Conduct for Responsible Fisheries (FAO, 1995) is an international agreement that advocates the reduction of discards and bycatch. Article 8, paragraph 8.5.1, declares, "States should require that fishing gear, methods and practices, to the extent practicable, are sufficiently selective so as to minimise waste, discards, catch of nontarget species…impacts on associated or dependent species…" In addition, Article 7.6.9 asserts, "States should take appropriate measures to minimise waste, discards, catch by lost or abandoned gear, catch of nontarget species, both fish and nonfish species, and negative impacts on associated or dependent species, in particular endangered species . . . States and sub-regional or regional fisheries management organisations or arrangements should promote, to the extent practicable, the development and use of selective and environmentally safe gear and techniques."

Several RFMO's have adopted measures to reduce sea turtle bycatch with support from the United States. For example, at its 75th meeting in June 2007, the Inter-American Tropical Tuna Commission adopted a resolution to mitigate the impact of tuna fishing on sea turtles. The resolution called on the contracting parties, cooperating nonparties, fishing entities, and regional economic integration organizations to implement the FAO guidelines to reduce the bycatch, injury, and mortality of sea turtles in fishing operations and to ensure the safe handling of all captured sea turtles.

In addition, the Western and Central Pacific Fisheries Commission adopted a conservation and management measure in December 2008 requiring commission members, cooperating nonmembers, and participating Territories (CCM's) to implement the FAO guidelines as appropriate, ensure safe handling of all captured sea turtles to improve survival, report on sea turtle interactions, use proper mitigation techniques, and utilize safe handling and release equipment, among other things (CMM 2008-03).

Most recently, the International Commission for the Conservation of Atlantic Tunas (ICCAT) adopted a measure in November 2010 requiring each contracting party, cooperating noncontracting party, entity, or fishing entity to collect and annually report to ICCAT information on the interactions of its fleet with sea turtles in ICCAT fisheries. The United States often has played a leadership role toward advancing bycatch reduction measures in international fora.

In addition, the Food and Agriculture Organization of the United Nations in January 2011 released the first global guidelines for bycatch management and the reduction of fishing discards. The guidelines covered bycatch management planning, improvement of fishing gear, fisheries closures, economic incentives for adoption of bycatch-reduction measures, monitoring, research and development, and capacity-building for developing states to facilitate their ability to follow the guidelines.

The United States was also one of the first nations to address domestic bycatch. During the past 37 years, the National Marine Fisheries Service (NMFS); its predecessor, the Bureau of Commercial Fisheries; and (after 1976) the regional fishery management councils (hereafter the Councils) have responded to this concern by taking a variety of actions. The actions have included research to develop better methods for monitoring and reducing bycatch, outreach programs to explain the bycatch problem and search for solutions, and regulatory actions to monitor and decrease bycatch.

Many of NMFS' efforts grew from Congressional mandates to address bycatch, especially the Marine Mammal Protection Act (MMPA) of 1972, the Endangered Species Act (ESA) of 1973, and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976. The MSA restricted the definition of bycatch to mean "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."

Since the original passage of the MSA, Congress has twice passed major amendments to this statute. In 1996, Congress amended the Act with the Sustainable Fisheries Act (SFA). Among other things, the SFA added three new National Standards, one of which specifically addresses bycatch. National Standard 9 states that "Conservation and management measures shall, to the extent practicable, A) minimize bycatch and B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." In 1998, NMFS developed a Bycatch Plan that reviewed existing bycatch activities, developed national bycatch objectives, and made recommendations for how to achieve these objectives (NMFS, 1998). In 2003, NMFS assessed its progress toward achieving the objectives specified in the Bycatch Plan. The assessment was part of the National Bycatch Strategy, which detailed five additional components for reducing bycatch, including international approaches (Benaka and Dobrzynski, 2004).

Also included in the 1996 amendments to the MSA was a requirement that the U.S. Government work toward securing agreements with other countries to promote bycatch reduction technologies and techniques that are comparable to those found in the United States. This amendment, found in Section 202(h)(l) of the MSA, promoted a consistent policy in addressing bycatch, as similar provisions are contained in

both the MMPA and ESA. To fulfill this new requirement, NMFS convened an International Bycatch Reduction Task Force (Task Force). The Task Force developed a Plan of Action that implements a strategy to promote international agreements that reduce sea turtle bycatch in foreign longline fisheries. The Plan of Action also promotes the implementation of the Food and Agriculture Organization of the United Nations (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.

On 12 January 2007, President George W. Bush signed the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA). Among the amendments to the MSA were requirements to build on and improve current bycatch reduction efforts through establishment of a new program and processes. Specifically, Section 316 of the MSRA required the Secretary of Commerce, in cooperation with the Councils and other affected interests, and based upon the best scientific information available, to establish a Bycatch Reduction Engineering Program (BREP), including grants, to develop technological devices and other conservation engineering changes designed to minimize bycatch, seabird interactions, bycatch mortality, and post-release mortality in Federally managed fisheries.

Also, Section 403 of the MSRA requires the Secretary to identify nations whose vessels are engaged in the bycatch of protected living marine resources (PLMR's) under specified circumstances and to certify that these nations have 1) adopted regulatory programs for PLMR's that are comparable to U.S. programs, taking into account different conditions, and 2) established management plans for PLMR's. If a nation fails to take sufficient corrective action and does not receive a positive certification, fishing products from that country may be subject to import prohibitions into the United States.

Importantly, the scope of Section 403 is quite broad. Section 403 defines PLMR's as "1) nontarget fish, sea turtles, or marine mammals that are protected under U.S. law or international agreement, including the Marine Mammal Protection Act, the Endangered Species Act, the Shark Finning Prohibition Act, and the Convention on the International Trade in Endangered Species of Wild Flora and Fauna, but 2) does not include species, except sharks, managed under the Magnuson-Stevens Fishery Conservation and Management Act, the Atlantic Tunas Convention Act, or any international fishery management agreement." The current draft list of PLMR's contains many species of marine mammals, sharks, coral, eel, and sea turtles. Table 1 contrasts the concept of bycatch as defined in the domestic and international sections of the MSRA.

Table 1.—Differences in the concept of bycatch between the domestic and international sections of the MSRA.

Category of resource or activity	Considered bycatch in domestic sections of MSRA?	Considered bycatch in international sections of MSRA?
Managed fish	Yes	No (except sharks)
Nontarget fish	Yes	Yes
Economic and regulatory discards	Yes	Yes
Fish released in catch and release programs	No	No
Mortality to marine resources caused by derelict fishing gear	No	No
Sea turtles	Yes	Yes
Marine mammals	No	Yes
Seabirds	No	No
Practices other than fishing	No	Yes

In January 2009, NMFS issued the first annual Report to Congress on its implementation of Section 316 of the reauthorized MSA and development of the BREP (NMFS, 2009b). In January 2009 and subsequently in January 2011, NMFS issued its first two biennial Reports to Congress on implementation of Section 403, which included detailed information on NOAA's efforts to address bycatch globally. This paper discusses in detail the implementation process for Sections 316 and 403 of the reauthorized MSA as well as the final regulations for these sections. This paper also briefly discusses the Shark Conservation Act and its implications.

Bycatch Reduction Engineering Program

This section describes Section 316 of the MSA. This section also describes how Section 316 has been implemented.

Summary of Section 316

Section 316 of the MSA contains four sections, which are entitled a) Bycatch Reduction Engineering Program, b) Incentives, c) Coordination on Seabird Interactions, and d) Report. These subsections are described in the following paragraphs.

Section 316(a) required the Secretary of Commerce, in cooperation with the Councils and other affected interests, to establish the BREP by mid January 2008. According to the MSA, the BREP was to:

1) Be regionally based;
2) Be coordinated with projects conducted under the cooperative research and management program established under MSRA;
3) Provide information and outreach to fishery participants that will encourage adoption and use of technologies developed under the BREP; and
4) Provide for routine consultation with the Councils in order to maximize opportunities to incorporate results of the BREP in fishery management plans (FMP's) developed by the Councils.

Section 316(b) includes authorization language stating that any FMP developed by a Council or the Secretary of Commerce may establish a system of incentives to reduce total bycatch and seabird interactions, amounts, bycatch rates, and post-release mortality in fisheries under the Council's or Secretary's jurisdiction. Such incentives, according to Section 316(b), could include:

1) Measures to incorporate bycatch into quotas;

2) Measures to promote the use of gear with verifiable and monitored low bycatch and seabird interactions and rates; and
3) Measures that will reduce bycatch and seabird interactions, bycatch mortality, post-release mortality, or regulatory discards.

Section 316(c) also includes authorization language stating that the Secretary of Commerce, in coordination with the Secretary of Interior, is authorized to undertake projects in cooperation with industry to improve information and technology to reduce seabird bycatch. Such projects could include:

1) Outreach to industry on new technologies and methods;
2) Projects to mitigate for seabird mortality; and
3) Actions at appropriate international fishery organizations to reduce seabird interactions in fisheries.

Section 316(d) requires the Secretary of Commerce to transmit an annual report to Congress that describes:

1) Funding provided to implement Section 316;
2) Developments in gear technology achieved under this section; and
3) Improvements and reduction in bycatch and seabird interactions associated with implementing this section, as well as proposals to address remaining bycatch or seabird interaction problems.

Establishment of the BREP

On 30 April 2007, a NMFS working group consisting of representatives from three headquarters offices, three science centers, and one regional office met in Miami to draft terms of reference for the BREP. The terms of reference were approved in the form of NMFS Policy Directive 01-107, signed on 11 January 2008 by the NOAA Acting Assistant Administrator for Fisheries. The mission of the BREP, as stated in the terms of reference, is:

> "to develop technological solutions and investigate changes in fishing practices designed to minimize bycatch of fish and protected species (including marine mammals, seabirds, and sea turtles) as well as minimize bycatch mortality (including post-release mortality)."

According to the BREP terms of reference, the BREP includes a National Coordinator in the NMFS Office of Sustainable Fisheries. The Office of Sustainable Fisheries, in consultation with the NMFS Offices of Protected Resources, Science and Technology, and International Affairs, provides policy oversight and overall coordination of activities through the National Coordinator. National coordination activities include providing staff support to the BREP, documenting BREP activities, managing the annual spending plan process, serving as primary point of contact for the annual BREP Report to Congress, and any other activity deemed necessary by the BREP or NMFS leadership.

In addition to the National Coordinator, the BREP consists of the following NMFS program representatives who will have expertise in fisheries bycatch, protected resources interactions, management, and science:

- One representative with hands-on bycatch reduction engineering and post-release injury and mortality experience from each regional fisheries science center/regional office (i.e., six total regional representatives);
- The NMFS Sea Grant Liaison (or other Sea Grant designee);
- The NMFS National Seabird Program Coordinator;
- One representative each from the headquarters Offices of Protected Resources, Science and Technology, and International Affairs; and
- One representative from the Highly Migratory Species Management Division in the Office of Sustainable Fisheries.

When nominating representatives, the Regional Administrator/Science Center Director also nominates an alternate representative with expertise in protected resources interactions or fisheries bycatch, depending on the expertise of the primary representative. According to the BREP terms of reference, the regional representatives serve as liaisons between the BREP and already existing Regional Bycatch Committees and Action Teams, to the extent such committees and teams are active.

Since its creation, the BREP has met several times over the phone and from 2009 to 2011 met in person on an annual basis. These meetings are designed to discuss challenges in administering the BREP, share developments regarding BREP research, and plan for future BREP growth.

BREP Projects

Since the establishment of the BREP in 2008, the BREP has funded a wide range of conservation engineering projects. Because the BREP was funded at relatively low levels compared to the BREP's "100% requirements" as determined by a 2006 informal agency analysis, the BREP did not use its funding to conduct a competitive grant program until 2012. However, the internal funds allocated by the BREP have engaged numerous industry, state, academic, and environmental group partners through contract vehicles and other collaborative research arrangements.

Funding to implement the BREP totaled $847,394 in 2008. This funding came from a NOAA budget line item entitled "Reducing Bycatch," which has appeared in the NOAA budget since 2004. Since 2004, $300,000 of Reducing Bycatch funds has been permanently allocated at the direction of NMFS leadership to the Southeast Fisheries Science Center (SEC) to fund the gear technology program at its Pascagoula, Miss., Laboratory. In addition, approximately $225,000 has been permanently allocated at the direction of NMFS leadership to fund the National Seabird Program (NSP), the coordinator of which is located at the NMFS Alaska Regional Office. Remaining BREP funds have been allocated through an internal agency competitive proposal process. All BREP funds are accounted for through its annual report to Congress. Funding levels from 2004 to

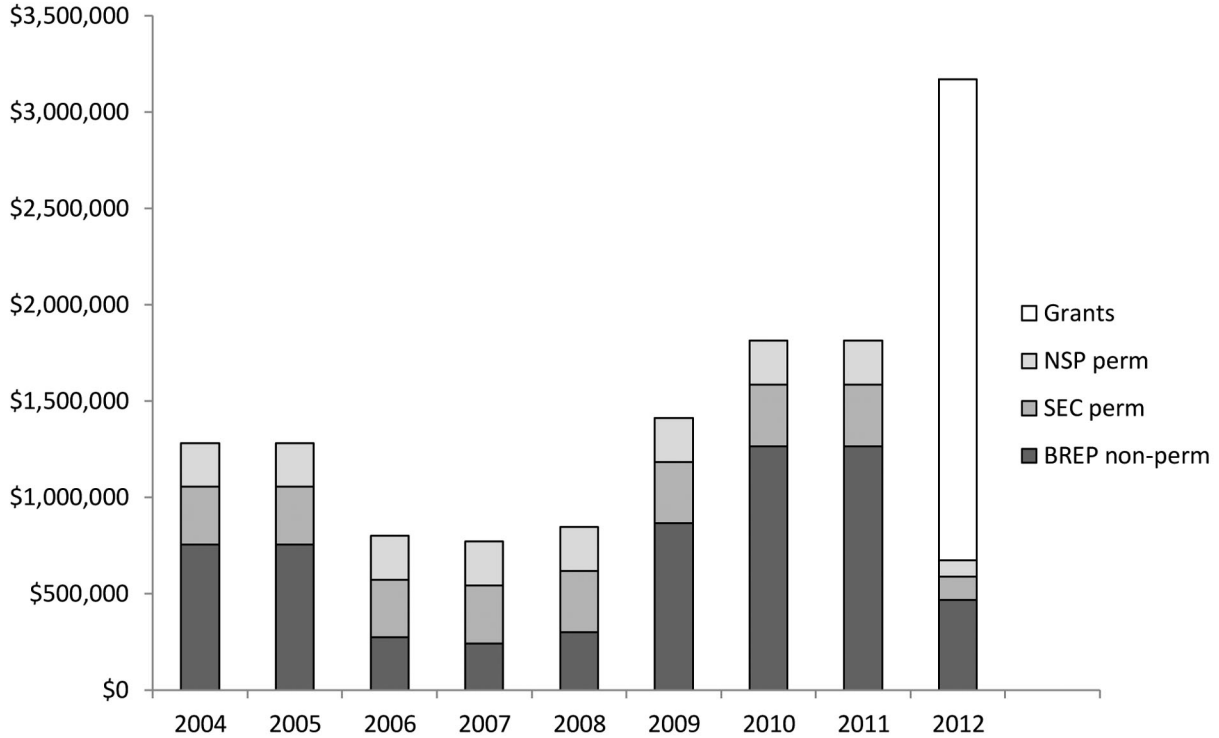

Figure 1.—NOAA Reducing Bycatch line funding, 2004–12 ($K, NSP perm = National Seabird Program permanent funding, SEC = Southeast Fisheries Science Center permanent funding, and BREP non-perm = Bycatch Reduction Engineering Program competitive funding).

2012 from NOAA's Reducing Bycatch budget line related to the BREP and previous bycatch gear research, as well as the breakdown among SEC, NSP, and other allocations, is shown in Figure 1. The 2008 BREP projects resulted in several accomplishments to help reduce bycatch, including:

- Evaluation of bycatch reduction devices in shrimp trawls;
- Transfer of turtle excluder device (TED) and bycatch reduction device technology in the Southeast Region;
- Evaluation of weaker circle hooks to release bluefin tuna, *Thunnus thynnus,* in the yellowfin tuna, *Thunnus albacares,* longline fishery;
- Estimation of seabird bycatch in Northeast commercial fisheries;
- Seabird bycatch avoidance in West Coast groundfish fisheries;
- Monitoring of seabird distribution and abundance in the California Current;
- Gear modifications to reduce harbor porpoise, *Phocoena phocoena,* interactions in the commercial Atlantic gillnet fisheries;
- Conservation engineering to reduce trawl bycatch in Alaska fisheries;
- Reduction of post-release mortality for common thresher sharks, *Alopias vulpinus,* captured in the Southern California recreational fishery;
- Reduction of shark bycatch with electropositive metals in Hawaii-based fisheries; and
- Partial funding of a gear technician at the NMFS Northwest Fisheries Science Center (NMFS, 2009a).

Funding to implement the BREP totaled $1,421,707 in 2009 due to an increase of $567,000 in the FY2009 President's budget for NOAA. These BREP projects once again resulted in several accomplishments to help reduce bycatch, including:

- A pilot study of a bycatch reduction device to reduce salmon, *Oncorhynchus* spp., and rockfish, *Sebastes* spp., bycatch in the Pacific whiting, *Merluccius productus,* fishery, which resulted in a 62% reduction in salmon catch;
- Generation of crab mortality rates after encounters with Bering Sea bottom trawls;
- Testing a new bycatch reduction device in the Gulf of Mexico shrimp fishery that resulted in a 36% reduction in finfish catch with only a 4% reduction in shrimp catch;
- Testing a TED for the flynet fishery that resulted in a target catch loss of only 6.7% but a reduction in the unwanted catch of spiny dogfish, *Squalus acanthias,* and clearnose skates, *Raja eglanteria,* of 40% and 63%, respectively;
- Experiments to determine the effects of Neodymium/Praseodymi-

um allows on longline gear, which resulted in a 58% decrease in the catch rate of unwanted scalloped hammerhead sharks, *Sphyrna lewini*;
- Deployment of satellite tags to thresher sharks, which resulted in determination of a post-release mortality rate of 26% for this important species; and
- The successful completion of the first NMFS National Seabird Workshop, which will help NMFS prioritize its seabird bycatch reduction efforts (NMFS, 2010).

For 2010, NMFS allocated an additional $400,000 to the BREP to fund projects related to Annual Catch Limit (ACL) restrictions due to bycatch. Funding to implement the BREP totaled $1,820,648 in 2010, and projects included research on:
- Turtle bycatch reduction in the Gulf of Mexico bottom longline reef fish fishery;
- Gear modifications to reduce butterfish, *Peprilus triacanthus,* bycatch in the offshore Atlantic squid, *Loligo* spp. fishery;
- Gear modifications to reduce Atlantic sturgeon, *Acipenser oxyrinchus,* bycatch and harbor porpoise takes in the Atlantic monkfish, *Lophius americanus,* fishery;
- Post-release survival of large Pacific blue marlin, *Makaira nigricans,* captured in Pacific longline fisheries;
- Effects of trailing gear in the California recreational thresher shark fishery;
- TED's and bycatch reduction devices for the shrimp trawl fishery; and
- Marine mammal depredation in the California halibut, *Paralichthys californicus,* trawl fishery.

Funding to implement the BREP totaled $1,963,490 in 2011, and projects included research on:
- Acoustic observations of false killer whales, *Pseudorca crassidens,* in the Hawaii-based tuna longline fishery;
- Estimates of snow crab, *Chionoecetes oplilio,* morality as a function of weather conditions;
- Selectivity of bottom trawls to reduce bycatch of Pacific halibut, *Hippoglossus stenolepis,* in the West Coast groundfish trawl fishery;
- Ability of Southern California deepwater rockfish to survive barotraumas following in-situ recompression;
- Green-stick gear bycatch characterization in the northern Gulf of Mexico Atlantic tuna fishery;
- Effectiveness of skimmer trawl TED's in North Carolina inshore waters; and
- Methods to monitor seabird bycatch in Northeast commercial fisheries.

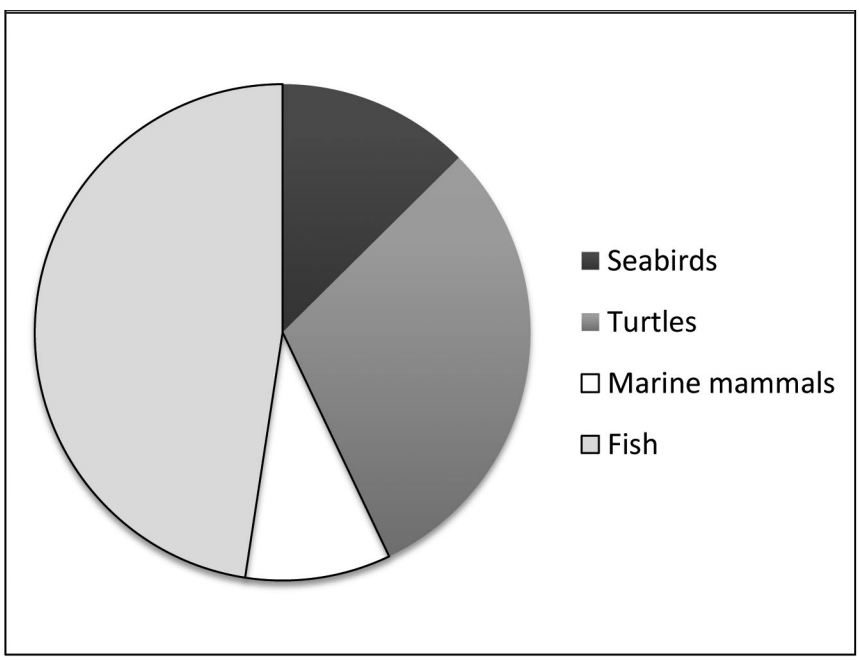

Figure 2.—2010 BREP funding by subject matter.

In 2012, the U.S. Senate directed NMFS to make $2.5M of Reducing Bycatch budget line funds available for competitive grants to non-Federal researchers working with U.S. fishermen on the development of innovative gear technologies. This change increased total BREP funding to a little over $3M for FY12 (with the addition of some funds for a few internal agency BREP projects) from almost $2M in FY11. Although the competitive grants have not yet been awarded as of this writing, the few internal BREP projects in FY12 focused on the bycatch of sea turtles, Atlantic sturgeon, salmon, false killer whales, sharks, and Pacific halibut. This change in direction of the BREP from funding internal agency projects to funding grants to non-Federal researchers has severely limited several regional NMFS bycatch reduction engineering programs that had been developed over the past several years of BREP funding.

Figures 2 and 3 show how BREP funds have been generally distributed among projects addressing seabird takes, turtles bycatch/marine mammals takes, and finfish bycatch. The proportion of projects addressing finfish bycatch increased to the greatest extent in 2011.

The following criteria are used to select BREP projects for funding, whether they are internal agency projects or non-Federal grant projects:
- Importance and relevance to Regional and Atlantic Highly Migratory Species Bycatch Implementation Plans, Council research priorities, Endangered Species Act research priorities, and/or

Marine Mammal Protection Act Take Reduction Plan research priorities;
- Level of fishing industry involvement;
- Whether the projects build upon successful research previously funded by the BREP; and
- Project evaluation by NMFS bycatch reduction experts.

Overall, the language in Section 316 of the MSA served to formally recognize various efforts being conducted by parts of NMFS to reduce bycatch since around 2003. By creating a nationally coordinated program with an annual report to Congress, Congress ensured that some important NMFS bycatch reduction efforts will be conducted more systematically and with greater accountability than in the past.

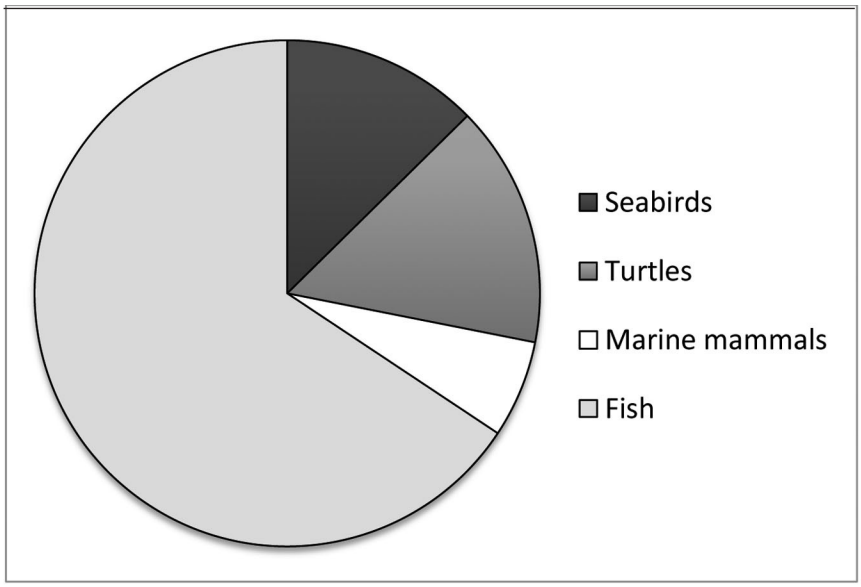

Figure 3.—2011 BREP funding by subject matter.

International Bycatch Provisions

This section summarizes Section 403 of the MSA. This section also describes regulations promulgated to implement Section 403.

Summary of Section 403

Among its provisions, Section 403 of Title IV of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (P.L. 109-479) amends the High Seas Driftnet Moratorium Protection Act (Moratorium Protection Act)(P.L. 104-43) by adding four sections (sections 607, 608, 609, and 610) of new international provisions. Section 608 to the Moratorium Protection Act requires the Secretary of Commerce, in consultation with the Secretary of State and in cooperation with relevant regional Councils and any relevant advisory committees, to take actions to improve the effectiveness of international fishery management organizations in conserving and managing stocks under their jurisdiction.

Section 607 of the Moratorium Protection Act requires the Secretary to submit to Congress a biennial report describing NOAA's actions to implement the international provisions of the reauthorized MSA. Specifically, the report must:

1) Discuss the status of international living marine resources shared by the United States or subject to treaties or agreements to which the United States is a party;
2) List nations that have been identified for having vessels engaged in illegal, unreported, and unregulated (IUU) fishing or bycatch of PLMR's, respectively;
3) Describe efforts by nations on those lists to take appropriate corrective action and evaluate the progress of those efforts;
4) Describe progress to strengthen the efforts of international fishery management organizations to end IUU fishing; and
5) Discuss efforts by the Secretary to encourage the adoption of international measures comparable to those of the United States to reduce impacts of fishing and other practices on PLMR's.

Section 609 of the Moratorium Protection Act addresses IUU fishing activity. The Act establishes minimum guidelines for a definition of IUU fishing. These guidelines are: (1) fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is party; (2) overfishing of stocks shared by the United States to which no international conservation or management measures apply, where the overfishing has adverse impacts on the stocks; or (3) fishing activity with adverse impact on seamounts, hydrothermal vents, or cold-water corals, to which no conservation and management measures apply.

As required under the Moratorium Protection Act, NMFS published a definition that reflected these guidelines within 90 days of enactment (NOAA, 2007a). This definition was later modified in a final rule establishing identification and certification procedures under the Moratorium Protection Act (50 C.F.R. §300.201 (2011)). NMFS has published a proposed rule that seeks to further revise this definition consistent with the purposes of the Moratorium Protection Act in order to more comprehensively address IUU fishing and more effectively address this problem that threatens the sustainable management of the world's fisheries (NOAA, 2012).

Significantly, Section 609(a) refers to IUU fishing activities of "vessels;" thus, a nation must have more than one vessel engaged in IUU fishing activities to be identified under Section 609. It also is worth noting that any entity

other than a "nation" (as recognized by the U.S. government) cannot be identified for having vessels engaged in IUU fishing activity for purposes of the Moratorium Protection Act. Notably, the conservation measures of some RFMO's include provisions for reducing bycatch. If a nation's vessels are fishing in violation of these provisions, then Section 609 can serve as another mechanism through which the reauthorized MSA can address international bycatch.

Another key point is that the activity must occur during the "preceding two years" from submission of the biennial report to Congress. Information concerning activities outside that time period cannot form the basis for an identification decision. Currently, Congress is considering legislation that would expand this time period to three years. During the 111th Congress, the U.S. House of Representatives passed H.R. 1080, the Illegal, Unreported, and Unregulated Fishing Enforcement Act of 2009, on 22 September 2009. The U.S. Senate Committee on Commerce, Science, and Transportation reported S. 2870, the International Fisheries Stewardship and Enforcement Act, on 24 March 2010. The House bill was reintroduced during the 112th Congress as H.R. 4100, and the Senate bill was reintroduced as S. 52.

Congress has taken several steps toward enactment of this legislation. The Subcommittee on Fisheries, Wildlife, Oceans, and Insular Affairs held a hearing on H.R. 4100 in June 2012 and discharged the bill to the House Committee on Natural Resources for consideration. The Senate Commerce Committee reported S. 52 out of Committee in January 2012, and the bill is awaiting consideration by the Senate.

Section 610 of the Moratorium Protection Act addresses international bycatch of PLMR's and requires that the Secretary identify a nation for bycatch activities if:

1) fishing vessels of that nation are engaged, or have been engaged during the preceding calendar year in fishing activities or practices;
   A) in waters beyond any national jurisdiction that result in bycatch of a protected living marine resource, or
   B) beyond the exclusive economic zone of the United States that result in bycatch of a protected living marine resource shared by the United States;
2) the relevant international organization for the conservation and protection of such resources or the relevant or regional fishery organization has failed to implement effective measures to end or reduce such bycatch, or the nation is not a party to, or does not maintain cooperating status with, such organization; and
3) the nation has not adopted a regulatory program governing such fishing practices designed to end or reduce such bycatch that is comparable to that of the United States, taking into account different conditions."

Thus, the identification of nations for bycatch activities can be based only on current activities of fishing vessels of that nation, or activities in which those vessels have been engaged during the preceding calendar year from development of the biennial report to Congress. Activities outside that time frame cannot form the basis for identification. As mentioned previously, two bills before the 112th Congress (H.R. 4100 and S. 52) would expand this time frame to three years. Further, the reauthorized MSA specifies that the bycatch must occur on the high seas or affect a PLMR that is shared with the United States. The identification criteria are critical because the bycatch of certain species is excluded from consideration under these provisions.

For example, the bycatch of species that solely exist within coastal waters of another nation, such as the endangered vaquita, *Phocoena sinus*, which occurs only in the territorial waters of Mexico, cannot form the basis of identification. Likewise, the statute only allows nations to be identified for bycatch activities that occur under certain circumstances. Specifically, nations can be identified for fishing activities and practices that result in the bycatch of PLMR's where the relevant international conservation organization has failed to implement effective measures to reduce such bycatch or the nation is not a party to or a cooperating partner with the organization. Another requirement for identification is that the nation has not adopted a regulatory program governing such fishing practices that is comparable to that of the United States, taking into account different conditions. Bycatch activities that fail to meet these criteria cannot form the basis for identification.

Promulgation of Regulations

In its implementation of the bycatch provisions of the reauthorized MSA, NMFS published an Advance Notice of Proposed Rulemaking (ANPR) on 11 June 2007 in the Federal Register (NOAA, 2007b) to announce that it was developing certification procedures to address IUU fishing and bycatch of PLMR's pursuant to the Moratorium Protection Act. In addition to soliciting written comments on the ANPR, NMFS held three public input sessions around the country. NMFS also hosted a meeting of representatives from foreign embassies. These meetings provided valuable opportunities for NMFS to explain the ANPR, respond to questions, and receive feedback from the public.

Taking into consideration the comments from the ANPR, NMFS drafted a proposed rule and published it on 14 January 2009 in the Federal Register (NOAA, 2009). In addition to soliciting written comments on the proposed rule, NMFS held six public hearings around the country. NMFS prepared a draft Environmental Assessment to accompany this proposed rule, which includes a Regulatory Impact Review and Initial Regulatory Flexibility Analysis (NMFS, 2009c). The regulations, which were finalized in January 2011, provide guidance for the identification and certification procedures under the Moratorium Protection Act (50 C.F.R. §300.201 (2011)).

Identifying Nations Engaged in PLMR Bycatch

When determining whether to identify a nation as having fishing vessels engaged in the bycatch of PLMR's in the previous calendar year, NMFS evaluates appropriate information and evidence. Once NMFS has determined that information on PLMR bycatch is credible and provides a reasonable basis to believe or suspect that a nation's fishing vessels are engaged in bycatch of PLMR's, NMFS—acting through or in consultation with the U.S. State Department—will initiate bilateral discussions with the nation. The discussions will: 1) seek credible information that corroborates or refutes the alleged PLMR bycatch; 2) communicate the requirements of the Moratorium Protection Act to the nation; and 3) encourage the nation to address the PLMR bycatch and take the necessary actions to receive a positive certification.

In determining whether to identify nations for bycatch of PLMR's, NMFS will consider information gathered during bilateral discussions and examine whether the nation has implemented measures that are deemed to be effective to reduce bycatch of the relevant PLMR's. NMFS will also examine whether there is an international organization with responsibility for the conservation of the PLMR, and whether the nation is party to or maintains cooperating status with the relevant international body.

Further, NMFS will consider whether the relevant international body has adopted effective measures for reducing bycatch of PLMR's and whether the nation has implemented and is enforcing such measures. If an identified nation is not party to the international body with responsibility for bycatch of the PLMR's in question, NMFS will consider whether the nation has implemented effective measures for reducing bycatch of such PLMR's. Such measures may include, but are not limited to: 1) programs for data collection and sharing, including observer programs; 2) bycatch reduction and mitigation strategies, techniques, and equipment, including gear restrictions and gear modifications; and 3) improved monitoring, control, and surveillance of fishing activities. When making identification determinations, NMFS will also examine whether adequate enforcement measures and capacity exist to promote compliance.

Notification and Consultation

Pursuant to the requirements under the Moratorium Protection Act, NMFS will publish a list of nations that have been identified as having fishing vessels engaged in bycatch of PLMR's in the biennial Report to Congress. Upon submission of the biennial Report to Congress, the Secretary of Commerce, acting through or in cooperation with the Secretary of State, will: 1) initiate consultations with identified nations for the purposes of entering into bilateral and multilateral treaties to protect the PLMR's from the bycatch activities described in the biennial report; and 2) seek agreements through international organizations calling for international restrictions on the fishing activities or practices described in the biennial report that result in bycatch of PLMR's.

Procedures to Certify Nations

Based on the identification, notification, and consultation processes outlined above, NMFS will certify nations that have been identified in the biennial report.

Identified nations will receive either a positive or negative certification. A positive certification indicates that a nation has: 1) 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 2) established a management plan containing requirements that will assist in gathering species-specific data to support international assessments and conservation enforcement efforts for PLMR's.

When determining whether a nation's regulatory program is comparable to measures required in the United States, NMFS will consider whether the program is comparable in effectiveness, taking into account different conditions that could bear on the feasibility and efficacy of comparable measures. If other measures could address bycatch of the PLMR's in question that are comparable in effectiveness, then the implementation of such measures by a nation may be deemed sufficient for purposes of the Moratorium Protection Act. As relevant, NMFS will consider whether measures have been implemented and effectively enforced, including, but not limited to: 1) programs for data collection and sharing, including observer programs; 2) bycatch reduction and mitigation strategies, techniques, and equipment (including training and assistance for bycatch reduction technology and equipment); and 3) improved monitoring, control, and surveillance of fishing activities.

When making certification determinations, the Secretary of Commerce will, in consultation with the Secretary of State, evaluate the information discussed above, comments received from such nation, the consultations with each identified nation, and other relevant actions, such as requests for assistance in the implementation of measures comparable to those of the United States. The Secretary of Commerce will also take into account whether the nation participates in existing certification programs, such as those authorized under Section 609 of the Endangered Species Act (P.L. 101–162), or the affirmative finding process under the International Dolphin Conservation Program Act. Nothing in the proposed regulations will modify these existing certification procedures.

If nations identified as having fishing vessels engaged in PLMR bycatch receive a positive certification from the Secretary of Commerce pursuant to the Moratorium Protection Act, no actions will be taken against such nations. If an identified nation fails to sufficiently address PLMR bycatch and receives a negative certification, the nation could face denial of port privileges, prohibitions on the import of certain fish and fish products into the United States, as well

as other appropriate measures, based on recommendations from the Secretary to the President. The process for determining appropriate action will consider the circumstances, extent, and gravity of the bycatch of PLMR's for which the initial identification was made, and other relevant factors. The Secretary will make such recommendations in accordance with U.S. obligations under applicable international trade law, including the World Trade Organization.

To facilitate enforcement, nations that do not receive a positive certification may be required to submit documentation of admissibility when exporting fish to the United States. To inform U.S. ports that cargo originating from a foreign port may not be permitted to enter into the United States, NMFS intends to collaborate with other Federal agencies and take advantage of existing prior notification procedures, such as those required under section 343(a) of the Trade Act of 2002, or those proposed for further development under the International Trade Data System (ITDS) established under the Security and Accountability for Every (SAFE) Port Act of 2006.

If the Secretary of Commerce cannot reach a certification determination for an identified nation by the time of the next biennial report, the Moratorium Protection Act requires the Secretary to establish alternative procedures for the certification of fish or fish products from such nation. Under these alternative procedures, the Secretary of Commerce may allow entry of fish on a shipment-by-shipment, shipper-by-shipper, or other basis as long as specified conditions are met. To qualify for the alternative certification procedures, NMFS must determine that imports were harvested by practices that do not result in bycatch of PLMR's or were harvested by practices comparable to those required in the United States, accounting for different conditions that affect the feasibility and efficacy of such practices, which, in the case of pelagic longline fishing, includes mandatory use of circle hooks, careful handling and release equipment, and training and observer programs.

Identification Decisions

Under the Moratorium Protection Act, NMFS is not required to establish regulations for the identification process. Although NMFS has opted to promulgate regulations for the identification process for transparency, its first identification process was based on the statutory text of the amendments because regulations implementing the new amendments were not finalized in time for the first biennial report. In preparation for the identification decisions in the in the first biennial Report to Congress, NMFS solicited information from the public, other nations, other U.S. government agencies, and international organizations regarding nations whose vessels were engaged in IUU fishing activity in 2007 or 2008 or PLMR bycatch during 2008. On 21 March 2008, NMFS published a notice in the Federal Register requesting such information (NOAA, 2008). NMFS circulated this notice widely to constituents and discussed it at relevant bilateral and multilateral meetings.

In response to the Federal Register notice, NMFS received reports, IUU vessel lists, peer-reviewed literature, and other information from individuals, nongovernmental organizations, and other nations. In addition to information gathered from the public, NMFS also solicited RFMO information, including RFMO IUU vessel lists, compliance reports, information on violations of conservation and management measures, and scientific reports. From its regional offices and science centers, NMFS also solicited information, including peer-reviewed literature, scientific reports, and information on cooperative scientific work, on bycatch activities.

The information received focused mostly on alleged IUU fishing activity; relatively little information was provided on PLMR bycatch. Of the bycatch information that was provided, much of it could not be used in the identification process because this information did not fall within the preceding calendar year as required in the Moratorium Protection Act. Unfortunately, due to the process of collecting and analyzing bycatch information, this information is rarely available for the previous year.

Even for U.S. PLMR stocks, the most recent data available usually is at least 2 or 3 years old (e.g., see NMFS marine mammal stock assessments). Generally, such data must be collected by placing independent observers on fishing vessels and implementing effective observer programs. This can be logistically challenging and expensive. To address this issue, NMFS is providing training and other assistance to developing nations to foster the development and implementation of effective observer programs.

Another issue that arose concerned the geographic scope and nature of bycatch activities. In some cases, information was provided on fishing activities that did not fall within the scope of PLMR bycatch, as described under the Moratorium Protection Act. For example, information was provided on the bycatch of species found solely within the EEZ of another nation that are not shared with the United States. Such activities do not qualify as PLMR bycatch for purposes of the Moratorium Protection Act.

All information received and collected was compiled, reviewed, and compared against the criteria and statutory requirements of the Moratorium Protection Act. Following this process, NMFS analyzed the information and concluded that no nations could be identified for PLMR bycatch under section 610 due to the restrictions in the Moratorium Protection Act. Further, no nations were identified under section 609 for violating RFMO bycatch measures. NMFS did, however, identify six nations (France, Italy, Libya, Panama, People's Republic of China, and Tunisia) for other IUU fishing activities under section 609.

Although NMFS fulfilled its obligations under the Act to examine information on bycatch for potential use in the identification procedures, NMFS was unable to identify nations for having vessels engaged in fishing activity or practices that result in PLMR bycatch for the reasons discussed above. In preparation for the second biennial report to Congress, which was published in January 2011, NMFS followed

the same process and faced the same challenges. NMFS was unable to identify nations having vessels engaged in PLMR bycatch.

Despite these difficulties in implementing these provisions, NMFS already has long-standing outreach and assistance programs with a number of nations to address their PLMR bycatch. The U.S. Government engages in cooperative research with several nations and is working to enhance other nations' capacity to reduce and mitigate bycatch. NMFS intends to continue those programs and to initiate additional programs with other nations based on the nature of their PLMR bycatch interactions, need for assistance, and willingness to work cooperatively with the United States.

Additionally, NMFS developed a process to determine which nations' fishing activities are likely to result in bycatch of PLMR species. As part of this process, NMFS began to compare the distribution of PLMR species with the distribution of fisheries effort using gear that is known to have significant PLMR bycatch rates. NMFS conducted an initial analysis comparing available information on pelagic longline fisheries with species distribution information. Additional analyses and information will be required to develop a comprehensive list of nations whose fishing activities are likely to result in PLMR bycatch. NMFS also will continue to collect information for possible identification of nations for PLMR bycatch under the provisions of the Moratorium Protection Act.

Identifying Nations in Relation to Shark Conservation

The High Seas Driftnet Fishing Moratorium Protection Act was amended by the international provisions of the Shark Conservation Act, which was enacted in January 2011. Under this law, NMFS is required to identify nations whose fishing vessels engaged in directed or incidental catch of sharks on the high seas and do not have a regulatory program for the conservation of sharks comparable to that of the United States. More information on how NMFS plans to implement these provisions can be found in a proposed rule that was published in July 2012 (NMFS, 2012). Although this law is in the early stages of implementation, it provides a new tool to promote the sustainable harvest and management of sharks and the adoption of international measures for the conservation of sharks.

Conclusion

This paper has summarized how NMFS has and is implementing the new bycatch provisions in the MSA. The new provisions have provided new and enhanced tools to address bycatch both domestically and internationally. Importantly, the provisions provide new mechanisms through which stakeholders can inform and influence effective bycatch practices.

Section 316 of the MSA, which created the BREP, has made significant progress to develop technological devices and other conservation engineering designed to minimize bycatch, seabird interactions, bycatch mortality, and post-release mortality in Federally managed fisheries. It is worth noting that although Section 316(a) focuses on Federally managed fisheries, Section 316(c) allows for an international element to the overall work of the BREP, at least in terms of seabird interactions. In addition, although the most recent reauthorization of the MSA did not revise the MSA's definition of bycatch to encompass seabirds, Section 316's explicit identification of seabirds as a major concern of the Bycatch Reduction Engineering Program does more closely associate seabirds with the concept of bycatch.

Improvements to bycatch reduction devices and TED's in Atlantic and Gulf of Mexico trawl fisheries, gillnets in Northeast fisheries, and trawls in Alaska and Pacific Northwest fisheries; improvements in our understanding of post-release mortality in Southwest shark fisheries; and documentation and monitoring of seabird bycatch around the country will help NMFS meet its obligations under the MSA, ESA, MMPA, and the U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries. The impacts of shifting the majority of BREP funding in 2012 from internal agency research to external non-Federal grants are hard to estimate, but applying internal BREP project selection criteria to the external grants program should result in the awarding of grants to high-quality projects.

The new international bycatch provisions in the MSA provide an innovative and comprehensive tool through which the United States can address bycatch by foreign nations. By combining incentives for positive action toward addressing and mitigating bycatch and sanctions for fishing activities and practices that result in bycatch of protected species, the provisions embody a "carrot and stick" approach to encourage effective bycatch reduction practices and reprove failure to employ these practices.

Given the lack of resources of some nations to address bycatch, NMFS and the U.S. Congress have embraced the approach of providing international cooperation and assistance to other nations to enhance their capacity for achieving sustainable fisheries. In the first year of the reauthorized MSA, a half million dollars was spent by NMFS on cooperative work with other nations to address IUU and international bycatch. In subsequent years, Congress has allocated more than one million dollars, allowing NMFS to provide financial and personnel resources to developing nations. Capacity building projects that NMFS has supported or assisted include observer and enforcement training, marine mammal stranding training, training in the use of bycatch reduction and mitigation gear such as circle hooks, and bycatch research.

If funding continues at or above the current level, NMFS can potentially implement a long-term bycatch strategy. Unlike the short-term international bycatch reduction projects in which most governments and NGO's engage, a long-term strategy would encourage enduring changes. A recent study by the National Research Council found that long-term investments in capacity building are critical for proper stewardship of the oceans, but are often not funded (NRC,

2008). The MSA funding can possibly help fill this need.

The new MSA provisions hold value for many of NMFS' stakeholders, from fishermen to foreign nations. There are three aspects of the new provisions that are especially notable: increased equity, new mechanism of communication, and new outlets to influence change. The provisions could potentially increase international equity of bycatch requirements. As the United States is at the vanguard of implementing bycatch measures domestically, increased equity would benefit domestic fishermen, allowing them to be more competitive on the global market.

In the past, the United States used international organizations, multilateral, and bilateral meetings as venues in which to discuss international bycatch. Unfortunately, some nations do not belong to relevant international organizations to which the United States is a member or do not have relevant multilateral or bilateral relationships with the United States. The consultation provisions provide new mechanisms through which the United States and foreign nations can engage in constructive discourse about bycatch reduction techniques and strategies.

Increasingly in recent years, nongovernmental organizations, RFMO's, and academics are undertaking research and data collection on international bycatch practices (Lewison et al., 2004; Lewison and Crowder, 2007; López-Mendilaharsu et al., 2007). The identification and certification processes of the reauthorized MSA provide an opportunity to use the information gleaned from these investigations to influence the bycatch practices of other nations, primarily in those circumstances in which bilateral and multilateral engagement have not been effective in reducing bycatch. The primary constraints on this information are that it must focus on bycatch by individual vessels and must be obtained within the calendar year preceding the biennial report to Congress. If Congress passes H.R. 4100 and/or S. 52, the time frame for information that could be used in identifying nations for bycatch would expand to three years, which could increase the information available for potential use in the identification process under the reauthorized MSA. Further, this legislation would authorize creation of an International Cooperation and Assistance Program to provide assistance for efforts to build sustainable fishery management capacity in other nations. This program, which would be authorized at $5 million annually over five years, could allow NMFS to expand its international cooperative assistance program and significantly increase NMFS' efforts to address international bycatch.

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