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Illegal, Unreported, and Unregulated (IUU) Fishing Enforcement Act of 2013

An Investigation of H.R. 69

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Faculty Advisor: Dr. Robert Cook

Manager: Stephanie Leombruno

Deputy Manager: Ingunn Gunnarsdottir

Team Members:

Marco Bassano

Alyssa Fico

Casey Furr

Ligia Henriquez

Malin Meyer

Olivia Owre-Bell

Holly Winters

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Executive Summary

There is consensus among scientists and policymakers alike that commercial fish stocks are suffering. While difficult to quantify, there is also consensus that illegal, unreported, and unregulated (IUU) fishing contributes to declining fish stocks. A decline in fish stocks results in a number of other effects, including a loss of biodiversity, ecosystem health, and erosion in food security. Every country in the world is dependent on fish as a protein source to some degree, and with study after study concluding that commercial fish stocks are in decline, the need to mitigate IUU fishing is critical.

The Illegal, Unreported, and Unregulated (IUU) Fishing Enforcement Act of 2013, or H.R. 69, intends to combat IUU fishing and its effects by amending fourteen current pieces of legislation with the goal of increasing enforcement, enforcement mechanisms and, ultimately, fisheries laws compliance. To fulfill the goals of H.R. 69, a number of programs would need to be created and implemented. However, many programs and initiatives currently in operation could serve as excellent models for programs under H.R. 69.

In order to reach an effective sustainable management of fisheries, a multidisciplinary approach is necessary. Standardized data about illegal, unreported, and unregulated fishing is necessary in order to establish applicable and effective models of the real situation to the extent possible. H.R. 69 would be an excellent first step in effective fisheries management, as the approach and methods are multidisciplinary, and the effects could be wide in scope, aiding fishery health and management not only in the U.S., but by serving as an example for other governments around the world.

Introduction to H.R. 69

Summary of H.R. 69

In January 2013, Congresswoman Madeleine Bordallo introduced The Illegal, Unreported, and Unregulated Fishing Enforcement Act of 2013 (H.R. 69). This bill heightens the implementation and enforcement processes of existing national and international agreements regarding illegal, unreported, and unregulated (IUU) fishing. H.R. 69 has the objective of protecting U.S. fishing communities from unfair competition while protecting global marine ecosystems, reducing food scarcity issues in the future, and providing consumer confidence that the fish purchased is from legal and sustainable sources.

Other proponents include advocacy groups, conservationists, as well as environmentally conscious individuals and organizations. Opponents of H.R. 69 include those who benefit from IUU fishing financially, as well as those segments of American civil society that view their fishing practices as part of their culture or tradition.

The Problem of Illegal, Unreported, and Unregulated Fishing (IUU)

The nature of IUU fishing limits the ability of governments, scientists, and responsible fishers to accurately monitor and manage fish stocks. Scientists estimate marine harvesting at the current rate will result in the total depletion of worldwide fish stocks in the next 34 years (National Geographic, 2014). Furthermore, according to the Food and Agriculture Organization of the United Nations (FAO, 2014), international agreements regulating fishing are not preventing IUU fishing. This failure is in large part due to other signatory nations' insufficient capacity, resources, and priority to enforce them (FAO, 2014). Despite strict controls on fisheries in the U.S., international IUU fishing poses significant economic, social and environmental threats to the U.S., mainly because more than 90 percent of the seafood in U.S. markets is imported, making it the world's third largest importer of seafood (NOAA, 2014).

The bill currently remains immobile with a 15 percent chance of enactment (govtrack.us, 2014).

Summary of Bill H.R. 69

Purpose of H.R. 69

The purpose of H.R. 69 is to “strengthen enforcement mechanisms to stop illegal, unreported and unregulated fishing” (H.R. 69, 2013). H.R. 69 intends to protect U.S. fishing communities from unfair competition; provide consumers with confidence that the fish they purchase from legal and sustainable sources; and maintain healthy global marine ecosystems, ensuring fish supply continuity in the future.

Overview of H.R. 69 Bill Text

H.R. 69 amends fourteen different Acts related to national and international fisheries law. Details of these amendments are given in Appendix A (on page 24). H.R. 69 is separated into two sections based on their function. Title I deals with strengthening fisheries enforcement mechanisms, while Title II focuses on the implementation of the Antigua Convention. Below is an overview of the main goals and directives of the bill:

Title I: Strengthening Fisheries Enforcement Mechanisms

Amends High Seas Driftnet Moratorium Protection Act by:

- Granting the Secretary the same means and jurisdictional powers as stated in the Magnuson-Stevens Fishery Conservation and Management Act
- Increasing civil penalties up to \$100,000 per violation
- Referring unpaid violations to U.S. Attorney General
- Increasing strictness of permit standards
- Directing Secretary of Commerce to maintain a list of identified vessels that engaged in IUU fishing within the past three years.

Amends Northern Pacific Halibut Act of 1982 and the Northwest Atlantic Fisheries Convention Act of 1995 by:

- Allowing officials to investigate fishing vessels from the U.S. and abroad
- Allowing officials to inspect facilities and records of facilities engaging in fish-related activities
- Allowing officials to delay fish shipments for up to five days.

Title II: Implementation of the Antigua Convention

Amends the Tuna Conventions Act of 1950 by:

- Mandating a total of four Commissioners, giving ultimate authority over Commissioners to the Secretary
- Authorizing Secretary to regulate administrative matters regarding Commissioners
- Amending committee personnel requirements
- Establishing the General Advisory and Scientific Advisory Committees
- Authorizing General Advisory and Scientific Advisory Committees to fulfill Act's provisions
- Authorizing Secretary to create regulations to fulfill obligations of this Act.

Repeals the Eastern Pacific Tuna Licensing Act of 1984.

Environmental Problem

As previously stated, the Illegal, Unreported, and Unregulated Fishing Enforcement Act of 2013 (H.R. 69) is designed to amend and reinforce existing Acts in order to hinder IUU fishing. The definition of IUU fishing is seen in the box below:

Illegal, unreported, and unregulated fishing (IUU) occurs when anyone fishes:

- Without a permit
- With a suspended permit
- After a permit has been revoked
- When a fisher fails to report their catch partially or completely
- With an unregulated vessel, equipment, or methods
- In marine reserves.

A fisher refers to any person or organization that fishes either legally or illegally.

Government agencies set fishing standards and regulations in order to preserve fish stock sustainability. When IUU fishers violate the regulations, they increase the total take of fish, which deplete the stocks for future generations. This also creates serious environmental concerns, such as major biodiversity loss in marine ecosystems (biodiversity is defined as the variety of life in an ecosystem). In addition, IUU fishers often use prohibited methods or equipment like bottom trawling or driftnets. Bottom trawling causes serious damage to coral reefs and other fragile marine systems (Slow Fish, 2014). These activities can therefore significantly contribute to stock decline. It is estimated that IUU accounts for 20 percent of the world's seafood catch (*Ibid*, 2014). As the name suggests, nearly all IUU fishing catch goes unreported to the appropriate government agencies, drastically affecting stock estimates used to set catch limits necessary for managing the fish populations, and further undermining the sustainability of the species.

H.R. 69 aims to decrease IUU fishing by increasing the jurisdiction and expanding the scope of the Coast Guard and Secretary of Commerce, as well as providing additional Federal and State resources as needed. By giving the Coast Guard and the Secretary of Commerce the authority to call on government agencies and solicit government resources, H.R. 69 grants more authority to those tasked with implementing regulations amended in H.R. 69.

Environmental Impact of Problem

IUU fishing has a number of consequences, and some of the most critical include its effects on loss of fish stocks, biodiversity, ecosystem health, and erosion in food security. Below is an overview of the main environmental impacts of the problem:

Consequences of IUU fishing:

- Loss of biodiversity
- Reduction in fish stocks
- Harm to ecosystem health
- Erosion in food security

Loss of Biodiversity

IUU fishing can significantly decrease fish stocks, causing negative effects on ecosystems and biodiversity. Biodiversity is defined as the variety of living things in an ecosystem (Seaweb, 2014). Studies on the loss of biodiversity within marine environments indicate numerous consequences. The elimination of locally adapted populations and species sabotages the stability and recovery potential of the marine ecosystem (Worm et al., 2006). The continual, massive legal and illegal fishing is altering and potentially harming the complex equilibrium necessary for ecosystems to function. This is important, as literature suggests local species richness is critical in enhancing ecosystems' productivity and stability (Loreau et al., 2001).

Due to fish stock abundance and the oceans' vastness, it is commonly believed that reductions in marine fish stocks do not result in species extinction. However, studies have shown that coastal and marine fish communities are losing populations, species, or entire functional groups (Jackson et al., 2001). Indeed, research conducted by Dr. Boris Worm from Dalhousie University reveals that if current fishing rates continue, the world's seafood population will collapse by 2048 (Fig. 1), impairing the ability of marine ecosystems to feed a growing human population (Worm et al., 2006).

Reduction in fish stocks

Fisheries are considered collapsed when catches drop under 10 percent of the recorded maximum. Measurements meeting this criteria have increased considerably in the past twenty years, especially for large marine ecosystems, with 29 percent of species currently fished considered collapsed in 2003 (Worm et al., 2006). A number of factors could be the cause of this loss of fishery, such as habitat loss and destruction, alterations in ecosystem composition, introduction of non-native species, pollution and contamination, and global climate change. H.R. 69 addresses the issue of fishery loss caused by overexploitation in the form of over-fishing.

Over-fishing is considered to be the practice of fishing at a non-sustainable rate. Many past fishing practices were not sustainable and resulted in the depletion of several different fish species. This problem arose in the late 1980s when global catches began declining significantly. Scientists estimate marine harvesting at the current rate will result in the total depletion of worldwide commercial fish stocks by 2050 (Fig. 1). The main consequence of over-fishing is a reduction in fish stock size. Studies over the past decades have shown that this overexploitation can result in a collapse of the particular species making it an unviable catch due to its diminished size. Healthy fish stocks often serve a fundamental role within their environment, helping to maintain a delicate equilibrium. Therefore, this loss has a ripple effect throughout the ecosystem, affecting all organisms in the food chain, as organisms in an ecosystem are dependent on each other for survival (Briley, 2014).

Bycatch

The National Oceanic and Atmospheric Administration (NOAA) defines bycatch as: “the discarded catch of any living marine resource, plus unobserved mortality due to a direct encounter with fishing gear” (National Geographic, 2014). This broad definition refers to any marine life caught that was not the species targeted, which includes juveniles of the targeted species that do not meet regulations, or any other non-target species. It is estimated that bycatch constitutes up to 40.4 percent of global marine catches (Davies et al., 2009); this can have major negative impacts on marine biodiversity, manifesting in numerous ways. A large juvenile bycatch of a specific species results in a significant population loss and an extended population recovery period, as these animals are unable to contribute to the future of the population by reproducing. Non-target species are affected by bycatch in similar ways, including extended recovery periods. A common bycatch is the target species’ predators as they are often in close proximity to the target species at the time of catch. These predators include sharks, sea

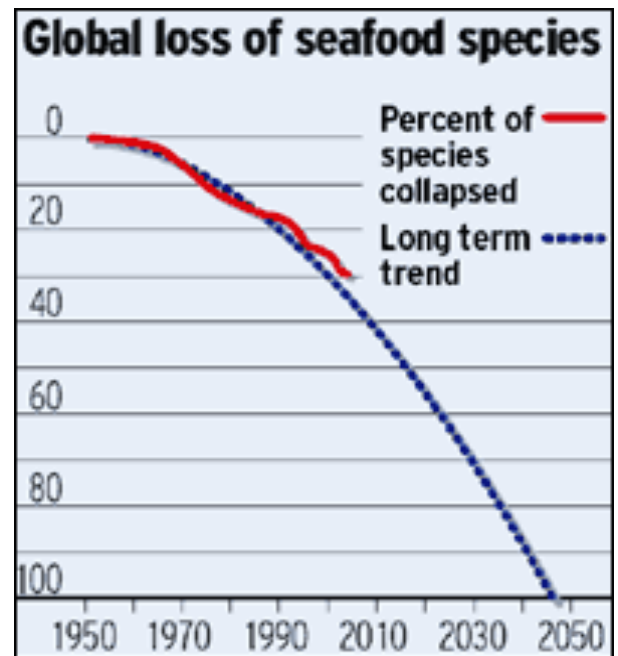


Figure 1. Current and predicted percentage of seafood species loss.

Trends reporting the current species loss (red line), already around 30 percent, and the projected long term trend (dotted blue line). The projection is made using the current exploitation rates if no action is taken (Worm et al., 2006).

turtles, dolphins, and seals. Many predators have long generation times, making them particularly vulnerable to extinction. Therefore even a relatively low number of predators caught as bycatch can significantly impact the predators' population.

Maximum Sustainable Yield

The science of managing and understanding fisheries has advanced significantly in the past decades. Scientists now know that a fish stock can recover most of its previous abundance if not exploited for an extended period (Hardy, 1956). In order to show this relationship, scientists use models to predict affects of fishing on any given population. Scientists work on calculating the number of fish caught to an optimum level where there are enough fish to eat as well as create the next generation of fish. This optimal level of exploitation is referred to as the Maximum Sustainable Yield (MSY) (Mace, 2001). The MSY is the maximum exploitation rate that the resource can sustain without impairing its renewability through natural growth and reproduction (*Ibid*, 2001). This yield occurs when fish stocks are fully exploited without hurting the population of the fish stock; that is, fishing at a sustainable rate.

Proposed Solution

Legislative Solutions of H.R. 69

As previously mentioned, H.R. 69 amends 14 other bills with the purpose of streamlining enforcement mechanisms of the relevant federal and state agents by making the prohibitions, penalties, and enforcement mechanisms of nine different international fisheries agreements consistent with one another and with U.S. fisheries legislation (See Appendix A). These amendments improve the U.S.'s ability to apprehend and sanction vessels and nations that practice IUU fishing. Furthermore, H.R. 69 establishes interagency collaboration, data exchange, and the creation of a list that records IUU fishing vessels, resulting in quicker and more effective monitoring and apprehension of vessels engaging in IUU fishing and identification of their nation of origin.

Specifically, H.R. 69 improves legislative infrastructure in the following three primary categories:

Permit requirements:

- Modified by voiding any permit issued under the High Seas Fishing Compliance Act of 1965 if invalid or ineligible

Port privileges:

- Granted to domestic and foreign vessels that meet permit requirement under U.S. law

Sanctions:

- Sanctions placed against vessels and foreign nations that practice IUU fishing by refusing them access to a US port.

Furthermore, H.R. 69 strengthens enforcement mechanisms in the following three ways:

Investigation of vessels and facilities:

- Authorized officials granted the ability to investigate vessels and facilities

Search and seizure:

- Authorized officials granted the ability to seize fish shipments for up to five days

Criminal Process:

- Improved through increased enforcement mechanisms coupled with better legislative infrastructure.

Possible Benefits and Consequences of H.R. 69

First and foremost, H.R. 69 will reduce IUU fishing. Hopefully this reduction in IUU fishing will prevent overfishing, thereby allowing fish stock to replenish, protecting food security, and promoting biodiversity. The prevention of IUU fishing will protect legal fishers and fisheries economically in numerous ways, helping to enable stable market prices.

There are potential flaws and possible negative consequences to H.R. 69. The primary concern is the uncertainty that the implementation of the bill will be successful in decreasing IUU fishing. However, it is certain that the increased enforcement mandated by the bill will require more financial resources, such as increased labor costs. In fact, high costs of enforcement of H.R. 69 may decrease profits for legal fishers. Additional permit requirements could place additional stress on legal fishers and fisheries. Finally, H.R. 69 could strain international relations with foreign nations that are sanctioned for tolerating IUU fishing.

Science Behind the Solution

H.R. 69 improves permit requirements, port privileges, and illegal fishing sanctions. There are numerous options currently used to improve permitting regulations within U.S. fisheries. Science based technological components could be used to fulfill the intent of the legislation, which will lead to larger fish stocks, increased biodiversity, and improved food security.

Management Options

Rights-based fishing

Rights-based fishing or rights-based management allocates fishing rights directly to individual fishers in the form of licenses, territory ranges, or quotas, defining the region before the fishing season begins (WWF, 2014). Fishers must buy into the market and fishing rates are closely monitored, allowing fish stocks to recover from over-exploitation (fishsec.org, 2014). This management option is flexible to the needs of specific regions, individuals, and industries, while still being a strong, viable tool to protect and manage fish stocks. Research has shown this management strategy contributes to healthier fish populations, and more support in conservation efforts from fishers, while the divided ownership among fishers can incentivize the use of more technical and specialized fishing (Edwards, 2000).

Promotion of sustainable fisheries

Promotion of sustainable fisheries to the consumer is another way to protect against illegal fishing. The Marine Stewardship Council certifies fisheries with an eco-label to set a standard and support sustainable fisheries. This certification involves a science-based, third party assessment that promotes and rewards sustainability in the market (MSC, 2014). H.R. 69 may require these sorts of eco-labels as a prerequisite for fishing licenses or permits. Sustainable fishing practices could also reduce bycatch (NOAA, 2013). For example, to have a permit, the fishery would need to show that it is using techniques to limit the destruction of the habitat and protect non-fishery targeted marine species.

Monitoring Options

One of the biggest challenges to H.R. 69 is to monitor vessels and nations that practice IUU and limit their access to U.S. ports. Currently, the Coast Guard maintains a list of every vessel with a permit from the U.S. and all information pertaining to each vessel, which is then regularly sent to the National Technical Information Service. The implementation of H.R. 69 would result in improvements in the tracking of ships through port privileges and illegal fishing sanctions.

Identifying, tracing, and monitoring fishing vessels across the oceans is easier now than ever before due to advancements in technology. Maritime security and fishery management use a variety of systems that differ by cost, feasibility, and effectiveness to watch over the seas (Chang, 2003). Under H.R. 69, the following technological and management tools could be used to fulfill the goals of the legislation:

Vessel Monitoring Systems

Vessel Monitoring Systems (VMSs) are in use by several countries to track the path of fishing vessels moving in and out of closed areas. In the U.S., the technology is used to identify vessels in the act of illegal fishing. Equipped with a built-in Global Positioning System (GPS), VMS works at regular intervals by sending a signal to a satellite from a small transmitter unit on the vessel. The satellite is able to interpret the signal's time and position, with this information the path and location of the vessel are calculated and the activity of the vessel can be analyzed (MPA News, 2000).

Automatic Identification System

The Automatic Identification System (AIS) provides position, identification, and tracking data of vessels to naval units and land control centers (Ou, 2008). It is a shipboard broadcast transporter system in which ships continually transmit their identification, position, course, speed and other data to nearby ships and shore-side authorities on a common radio channel. AIS is used for coastal security, maritime traffic management, and vessel tracking and monitoring (Chang, 2003).

Fishery-Monitoring Centers

Fishery-monitoring centers (FMC) collect all data transmitted through the various systems for tracking and analysis. Vessel positions are presented using geographical information system (GIS), and compared to geographical features of interest, such as exclusive economic zones (EEZs) or Marine Protected Areas. The FMC typically incorporates a system, when for example, a vessel enters a prohibited zone, and an alert can be sent electronically to the appropriate management authority.

Environmental Impacts of Solution

The purpose of these permit programs and technology based around fisheries science is to decrease IUU fishing resulting in more accurate Maximum Sustainable Yield (MSY) calculations. An accurate MSY will lead to more sustainable fishing practices and increase in fish stocks.

Controversies

While it is universally accepted that humans are overfishing wild species and that IUU fishing contributes greatly to this problem, there is some controversy about the extent to which these practices occur and their implications. There is also debate about the proposed solutions and potential backlash in response to increased enforcement of fishing regulations. These debates include the initial economic costs, unforeseen consequences of implementing new technologies, as well as foreign relations issues.

Controversies about Fishing Estimates

Overfishing Estimates:

There is virtually no debate as to whether humans are actively overfishing nearly every commercial fish stock. However, there is disagreement as to the relative impact on specific populations. One study suggests that by 2048, nearly every commercial fish stock will have collapsed, producing only about 10 percent of their peak catch (Worm et al, 2006). However, a study by the same author three years later observed that many commercial fish stocks were already recovering due to improved management (Worm et al., 2009). Another study suggests that approximately 58 percent of global fish stocks have already collapsed or are overexploited (Froese, 2012), while a more optimistic study puts the figure of globally collapsed fisheries between 7 and 13 percent with 33 percent overexploited (Branch et al., 2011).

Several factors contribute to such discrepancies among experts. An ideal population survey would count every fish in every ocean of the world. The second best scenario is to have comprehensive studies that can estimate fish stocks of all major commercial species in all parts of the world. However, these studies are costly, difficult to impossible to conduct, and therefore rarely performed. The typical methodologies in use consist of indirect methods to infer total fishery stock populations resulting in less reliable data.

Catch and extrapolation is the most common method for estimating stocks. Essentially, this method compares the total number of fish in a catch to the number in previous catches. Scientists conclude that if the number of fish caught is the same as in years past, the population is likely stable. However, this method does not factor in variables such as advancements in technology or changes in effort on the part of the fishers. For example, if fishers invest greater effort into their catch (i.e. increased hours of fishing, more lines in the water, different or larger

nets, and more engine power) and the catch remains the same, one can infer that the total population is declining.

Errors in global fishing estimates are further exacerbated by the disproportionate number and quality of fish stock surveys conducted in the developed world compared to the developing world. The ramifications for fisheries management in the developing world are doubly bad, particularly in Africa and Asia, due to poor enforcement mechanisms leading to high rates of overfishing (Pitcher and Cheung, 2013).

Illegal Fishing Estimates:

Another uncertainty that may arise as H.R. 69 is implemented is due to the difficulty in estimating the actual extent of IUU fishing. According to some sources, in 2011 illegal and unreported catches represented 20 to 32 percent by weight of wild caught seafood imported to the United States. This amount alone represents between 4 and 16 percent of the value of the global illegal fish catch. The extent of regional or country based IUU fishing from a global perspective was recently estimated between 13 and 31 percent of reported catches, with some regions reaching 50 percent (Pramod, 2014). A study reviewing the situation in 54 countries and on the high seas estimated that IUU fishing totaled between 11 and 26 million tons of catch (Agnew et al., 2009). These estimates are calculated based on information gathered through confidential interviews with knowledgeable individuals, surveillance data, trade data, stock assessments, and expert opinion. Some of these methods deliver a point estimate of the level of illegal fishing, whereas others provide upper and lower bounds. Because of the inherent difficulty in quantifying illegal activities and the combination of many different types of sources to account for this, the margin of error in the estimates can be significant.

The economic implications of IUU fishing are equally difficult to estimate. In 2009, total imports to the U.S. coming from illegal fishing practices were valued between \$1.3 billion and \$2.1 billion, out of a total of \$16.5 billion derived from the sale of 2.3 million tons of imported seafood (*Ibid*, 2009). In 2011, IUU trade represented between 4 and 16 percent of the value of the global illegal fish catches (Pramod et al., 2014). Attempting to create an estimate of the global economic costs of IUU fishing, another study puts the total value of current IUU fishing losses between \$10 billion and \$23.5 billion annually (Agnew et al., 2009). Since the economic estimates are dependent on the amount of illegal and unreported catches, there is an error associated with them. This error varies depending on the size of the estimate associated with the illegal catches, which results in the wide range of estimates noted.

Measuring Success

In order to properly implement H.R. 69 it is crucial to establish means to measuring the success of the legislation. To measure the success of H.R. 69, four specific indicators have been identified: compliance rates, performance rates, fish stock calculations, and market improvements for legal fishers. Together, these four indicators can be used to evaluate whether H.R. 69 is successful in deterring illegal, unreported, and unregulated fishing in U.S. waters.

Measurement Options:

Compliance Rates

Compliance rates are a readily used form of measurement in the U.S.. Achieving high compliance rates is a goal for most environmental regulations (INECE, 2014). For H.R. 69, compliance rates can be measured by recording and tracking issued IUU sanctions, vessel seizures, and catch seizures. The success of the implementation of H.R. 69 can be assessed through these compliance rates, which include higher civil penalties and stricter permit requirements.

Performance Rates

Equally important is the assessment of performance rates by U.S. agencies responsible for implementing and enforcing H.R. 69. Performance can be measured through the recording and analysis of vessel searches and inspections. To fully assess the effectiveness of H.R.69 the performance rates should be compared to inputs invested in the program, including, but not limited to, funding, personnel hours, and equipment in the form of government vessels and monitoring systems. If a particular vessel is boarded by multiple U.S. Coast Guard units throughout the year and found to be in compliance with U.S. fisheries law on every inspection, it will be a strong indicator that both compliance rates and performance rates are improving under H.R. 69 (U.S. Coast Guard *pers. comm.*, 2014).

Fish Stock Calculations

Another central indicator for measuring the success of H.R. 69 is the calculation of fish stocks and accuracy improvements in MSY calculation for fisheries. As the primary purpose of H.R. 69 is to reduce illegal, unreported, and unregulated fishing practices, thus protecting fish stocks from collapse and over-exploitation, measuring the response in fish stocks to H.R. 69 is pivotal for evaluating the program. Due to the inability to count every individual fish in the ocean, fish stock calculations are based on indirect means of measurement. The most common method, catch and extrapolation, compares the total number of fish in a catch to the number of fish in previous

catches. If the number of fish caught is the same as in previous years, scientists conclude that the fish population is likely stable. The stabilization of fish stocks sought by H.R. 69 reduces uncertainties associated with MSY and enables scientists and government officials to better manage fish stocks in a sustainable manner.

Market Improvements for Legal Fishers

The fourth measurement indicator concerns market improvements for legal fishers. Due to the illegal, unreported, and unregulated fishers' ability to avoid regulatory costs and sell their catch at a lower price, legal fishers are dealt an unfair hand in the consumer market. However, with increased consumer awareness, fishers engaged in sustainable fisheries operations have the ability to achieve a higher market price for their catch while simultaneously appealing to the market. This development is illustrated through rights-based fisheries, which, as previously mentioned, is an increasingly used management approach chosen by States to comply with federal fisheries permit requirements. Fishers engaged in rights-based fisheries have been shown to achieve a higher market price due to their ability to obtain sustainability labels from groups such as the Marine Stewardship Council (Grimm et al., 2012).

Measurement Challenges

It is important to note that these are not straightforward indicators for measuring the success of H.R. 69. As it stands, compliance and performance rate evaluations are subject to data skewedness originating from gaps in monitoring requirements. As previously stated, U.S. federal agencies rely on satellite-based Vessel Monitoring Systems (VMS) and Automatic Identification System (AIS) for detecting, tracking, and monitoring illegal, unreported, and unregulated fishing activities. The challenge of using VMS is that the system is used differently across countries. In the U.S., for instance, it is implemented on a fishery-by-fishery basis, while several European countries require it for vessels of a certain size. The lack of an international VMS standard makes it difficult to conduct cross-nation comparisons of fisheries regulation results (FAO, 2004).

AIS, on the other hand, is considered a reliable method for tracking illegal, unreported, and unregulated fishing, but current regulations only require AIS to be fitted on ships of 300 gross tonnage and above, and cargo vessels of 500 gross tonnage and above (IMO, 2014). As most fishing vessels are below 300 gross tonnage, this essentially means that a majority of vessels related to illegal, unreported, and unregulated fishing are able to go undetected by U.S. agencies. Lastly, one must remember that fish stocks are also affected by factors other than illegal, unreported, and unregulated fishing, including ocean acidification, pollution, changes in sea temperatures and more generally the whims of mother nature. This complicates efforts to tie U.S. regulatory and enforcement endeavors to observed changes in fisheries.

Conclusion

While the exact figure is unknown, there is widespread consensus in the scientific community that IUU fishing contributes to a decline in fish stocks. A decline in fish stocks results in a number of other effects, including a loss of biodiversity, ecosystem health, and erosion in food security. H.R. 69 intends to combat IUU fishing and its effects by amending fourteen other acts with the goal of increasing enforcement, enforcement mechanisms, and compliance. To fulfill the goals of H.R. 69, a number of programs would need to be created and implemented. Many programs and initiatives currently in operation could serve as models for programs under H.R. 69.

If H.R. 69 is implemented, there are several challenges to measuring if it has been successful at achieving its aims. The evasive nature of IUU activities makes it difficult to conduct proper monitoring and accurately quantify the impact of IUU fishing. Additionally, there is lack of standardized monitoring programs and several gaps in program requirements. Furthermore, there exists disagreement on how to measure fish stock size. Lastly, the very nature of ecosystems and their complexity could make it difficult to measure if any changes in stock size from a decrease in IUU fishing have occurred. One avenue for future research that would positively affect many aspects of combatting illegal fishing and better insure fish stocks from depletion is the creation of a better measurement strategy. When developing effective management practices, using the Maximum Sustainable Yield concept can be beneficial to some extent. This concept is currently the leading strategy in place for sustainable fisheries management. However, lack of strong supporting regulation, monitoring and strict enforcement have contributed to its ineffective application around the globe.

In order to reach an effective sustainable management of fisheries, a multidisciplinary approach is necessary. Standardized data about illegal, unreported, and unregulated fishing is necessary in order to establish applicable and effective models of the real situation as much as possible. H.R. 69 would be an excellent first step in effective fisheries management, as the approach and methods are multidisciplinary, and the effects could be wide in scope, aiding fishery health and management not only in the U.S., but by serving as an example for other governments around the world.

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Appendix A

Table 1: List of acts amended by H.R. 69.

Amended Acts	Purpose of Act	Species covered under Act	Amendments by H.R.69
<i>Sec.101 High Seas Driftnet Fishing Moratorium Protection Act</i>	"A bill to prohibit the United States from entering into any international agreement which would prevent full implementation of the United Nations moratorium on large-scale driftnet fishing on the high seas" (S 2569).	No specific species covered. The UN moratorium on driftnet fishing aims to protect all fish, as driftnet fishing affects both target and non-target species.	Adds to Section 606; Secretary and the Secretary of the department in which the Coast Guard is operating is responsible for enforcing the High Seas Driftnet Fishing Moratorium Protection Act and any Acts to which Section 606 applies to; the Secretary has the same means and jurisdictional powers to prevent violations of the Act as specified in Sections 308 through 311 of the Magnuson-Stevens Fishery Conservation and Management Act.

<p><i>Sec. 102 High Seas Driftnet Fisheries Enforcement Act</i></p>	<p>Implemented to guarantee that the U.S. comply with the UN moratorium on large-scale driftnet fishing and to reduce or eliminate unregulated fishing practices in the Central Bering Sea.</p>	<p>Addresses fishing in the Central Bering Sea; bans U.S. and national vessels from fishing in the Sea unless in compliance with international fishery agreements that the U.S. and Russia are involved with. The Enforcement Act amends the Marine Mammal Protection Act of 1972 by altering requirements on imports from "intermediary nations" - nations that 1) import yellowfin tuna from countries prohibited from direct imports to the U.S. and 2) nations that export yellowfin tuna to the U.S. (H.R. 2152).</p>	<p>H.R. 69 amends this Act through changes in the legislative language</p>
<p><i>Sec. 103 North Pacific Anadromous Stocks Act of 1992</i></p>	<p>"To implement the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed in Moscow February 11, 1992" (H.R. 5796).</p>	<p>Makes it illegal to fish for anadromous fish in waters designated under the Act and the Convention (H.R. 5796).</p>	<p>H.R. 69 altering Section 811 to refer to Section 606 the High Seas Driftnet Fishing Moratorium Protection Act, which serves as the guideline on additional prohibitions related to the enforcement of H.R.69. Section 606 authorizes The President to make use of appropriate federal resources to prevent violations of the UN moratorium on driftnet fishing. Amendments made to 606 by H.R. 69 also apply.</p>

<p><i>Sec. 104 Pacific Salmon Treaty Act of 1985.</i></p>	<p>Establish cooperation between the U.S. and Canada for management, research, and improvement of the transboundary Pacific Salmon stocks (16 U.S.C. 3631).</p>	<p>Pacific Salmon stocks; Chinook - <i>Oncorhynchus tshawytscha</i> Chum - <i>Oncorhynchus keta</i> Coho - <i>Oncorhynchus kisutch</i> Pink - <i>Oncorhynchus gorbuscha</i> Sockeye - <i>Oncorhynchus nerka</i> Masu - <i>Oncorhynchus masou</i></p>	<p>H.R. 69 replaces subsections (b) through (f) of the Pacific Salmon Treaty Act with a reference to Section 606 the High Seas Driftnet Fishing Moratorium Protection Act</p>
<p><i>Sec. 105 Western and Central Pacific Fisheries Convention Implementation Act</i></p>	<p>This Act implements the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. The purpose of the Convention is to guarantee, by effective management, long-term conservation and sustainable resource use of highly migratory fish stocks in the western and central Pacific Ocean in compliance with the 1982 United Nations Convention on the Law of the Sea and the 1995 UN Fish Stocks Agreement (16 U.S.C. 6901).</p>	<p>All fish stocks of species listed in Annex 1 of the 1982 Convention, except sauries (WCPFC).</p>	<p>Changes in legislative language; implements a reference to Section 606 of the High Seas Driftnet Fishing Moratorium Protection Act</p>

<p><i>Sec. 106 South Pacific Tuna Act of 1988</i></p>	<p>"Provides for the implementation of the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America, signed in 1987" (16 U.S.C. 16C).</p>	<p>Tuna</p>	<p>Amendments by H.R. 69 are in the form of changes in Legislative Language</p> <p>Adds section 606 of the High Seas Driftnet Fishing Moratorium Protection Act (see High Seas Driftnet Fishing Moratorium Protection Act above)</p>
<p><i>Sec 107. Antarctic Marine Living Resources Convention Act</i></p>	<p>"The 1982 Convention established CCAMLR for the purpose of protecting and conserving the marine living resources in the waters surrounding Antarctica. The Convention is based upon an ecosystem approach to the conservation of marine living resources and incorporates standards designed to ensure the conservation of populations and the Antarctic marine ecosystem as a whole" (16 U.S.C. 2431).</p>	<p>Antarctic marine living resources</p>	<p>Amendments by H.R. 69 are in the form of changes in Legislative Language</p> <p>Adds section 606 of the High Seas Driftnet Fishing Moratorium Protection Act (see High Seas Driftnet Fishing Moratorium Protection Act above)</p>
<p><i>108. Atlantic Tunas Convention Act</i></p>	<p>ICCAT was established to provide international cooperation and recommendations to sustainably manage tuna and similar species (H.R. 541).</p>	<p>Tuna and tuna-like species.</p>	<p>Amendments by H.R. 69 are in the form of changes in Legislative Language</p> <p>Gives authority to the Secretary of Commerce to enact regulations restricting trade based on Commission's recommendations</p>

<p><i>109. High Seas Fishing Compliance Act of 1965</i></p>	<p>“Prohibits high seas fishing vessels from harvesting operations on the high seas without authorization from the Secretary of Commerce. Provides for notification of the flag nation and investigation of a foreign vessel reasonably suspected of activities undermining the effectiveness of international conservation and management measures.” (H.R. 898).</p>	<p>No specific species covered</p>	<p>Establishes standards for voiding permits if: “(1) any other permit or authorization required for the vessel to fish is expired, revoked, or suspended; or (2) the vessel is no longer documented under the laws of the United States or eligible for such documentation.” (H.R. 69).</p>
<p><i>110. Dolphin Protection Consumer Information Act</i></p>	<p>“... establishes conditions for protection of dolphins by ocean vessels when harvesting tuna with purse seine nets. It provides labeling standards for tuna products that are exported from or offered for sale in the United States, and it sets the penalty for noncompliance...” (H.R. 69).</p>	<p>Dolphins</p>	<p>Adds section 606 of the High Seas Driftnet Fishing Moratorium Protection Act (see High Seas Driftnet Fishing Moratorium Protection Act above)</p>

<p><i>Sec. 111. Northern Pacific Halibut Act of 1982</i></p>	<p>“An act to give effect to the Protocol Amending the Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea.” “An act to give effect to the Protocol Amending the Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea” (16 U.S.C. 10).</p> <p>The purpose of the Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea is “to conserve, manage, and rebuild the halibut stocks in the Convention Area to those levels that would achieve and maintain the maximum sustainable yield from the fishery... ‘Convention waters’ are defined as the waters off the west coasts of Canada and the United States.”</p>	<p>Halibut (<i>Hippoglossus stenolepis</i>)</p>	<p>Authorized officials may investigate fishing vessels in addition to search and inspection. Adds to the enforcement powers the ability to search or inspect any facility that reasonably appears to be or have been employed in fish or fish product storing, processing, transporting, or trading. Authorized officials may inspect the records of any facility described above. Authorized officers may detain any shipment of fish or fish products within the United States for up to five days.</p>
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<p><i>Sec. 112. Northwest Atlantic Fisheries Convention Act of 1995</i></p>	<p>"An act to implement the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries." (H.R. 622).</p> <p>The purpose of the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries is "to promote the conservation and optimum utilization of the fishery resources of the Northwest Atlantic area within a framework appropriate to the regime of extended Coastal State jurisdiction over fisheries, and accordingly to encourage international cooperation and consultation with respect to these resources" (S. 267).</p>	<p>Atlantic cod (<i>Gadus morhua</i>) Haddock (<i>Melanogrammus aeglefinus</i>) Atlantic redfish (<i>Sebastes marinus</i>) Silver hake (<i>Merluccius bilinearis</i>) Red hake (<i>Urophycis chuss</i>) Pollock (<i>Pollachius virens</i>) American plaice (<i>Hippoglossoides platessoides</i>) Witch flounder (<i>Glyptocephalus cynoglossus</i>) Yellowtail flounder (<i>Limanda ferruginea</i>) Greenland halibut (<i>Reinhardtius hippoglossoides</i>) Roundnose grenadier (<i>Macrourus rupestris</i>) Atlantic herring (<i>Clupea harengus</i>) Atlantic mackerel (<i>Scomber scombrus</i>) Atlantic butterfish (<i>Peprilus triacanthus</i>) River herring (<i>Alosa pseudoharengus</i>) Atlantic argentine (<i>Argentina silus</i>) Capelin (<i>Mallotus villosus</i>) Long-finned squid (<i>Loligo pealei</i>) Short-finned squid (<i>Illex illecebrosus</i>) Shrimps (<i>Pandalus</i> sp.)</p>	<p>H.R. 69 amends this act by making it illegal to deny or assault an authorized officer that is boarding fishing vessels to investigate. It is already prohibited to deny officers from boarding to search or inspect.</p> <p>This H.R. 69 further amends this act by removing the Civil Penalty, Criminal Penalty, Civil Forfeiture, Disposal of Fish, Enforcement, and Jurisdiction of Courts sections. They are replaced with section 606 of the High Seas Driftnet Fishing Moratorium Protection Act.</p>
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<p><i>Sec. 113. Magnuson-Stevens Fishery Conservation and Management Act</i></p>	<p>"An act to provide for the conservation and management of the fisheries, and for other purposes." To conserve and manage fishery resources off of the coasts of the United States and to conserve the anadromous species and the fishery resources of the Continental Shelf fishery, and to promote protection of habitat (16 U.S.C. 1802).</p>	<p>All fish within the exclusive economic zone. All anadromous species throughout migratory range. All Continental Shelf fishery resources beyond the exclusive economic zone. Highly migratory species. Definitions and clarification are provided within the Act.</p>	<p>It is illegal to trade in interstate or foreign commerce any fish that was taken or processed in any way that violates foreign law. H.R. 69 adds that it is illegal to for any fish to be taken or possessed in a any way that violates and treaty of contravention of a binding conservation measure adopted by international agreement or organizations of which the US is a member.</p>
<p><i>Sec. 210. Eastern Pacific Tuna Licensing Act of 1984</i></p>	<p>"An act to implement the Eastern Pacific Ocean Tuna Fishing Agreement." (H.R. 5147).</p>	<p>Yellowfin tuna (<i>Thunnus albacares</i>) Bigeye tuna (<i>Thunnus obesus</i>) Albacore tuna (<i>Thunnus alalunga</i>) Northern bluefin tuna (<i>Thunnus thynnus</i>) Southern bluefin tuna (<i>Thunnus maccoyil</i>) Skipjack tuna (<i>Katsuwonus pelamis</i>) Blck skipjack (<i>Euthynnus Lineatus</i>) Kawakawa (<i>Euthynnus affinis</i>) Bullet tuna (<i>Auxis rochei</i>) Frigate tuna (<i>Ausix thazard</i>) Eastern Pacific bonito (<i>Sarda chiliensis</i>) Indo-Pacific bonito (<i>Sarda orientalis</i>)</p>	<p>Repealed.</p>