



Civil-Military Cooperation to Combat Illegal, Unreported, and Unregulated (IUU) Fishing

A Summary of the
September 2017
National Maritime
Interagency Advisory
Group Meeting

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Foreword

In September 2017, the Stimson Center, the U.S. National Maritime Intelligence-Integration Office (NMIO), National Geographic, and the Waitt Foundation hosted a meeting of 100 experts on illegal, unreported, and unregulated (IUU) fishing. Attendees represented entities across the U.S. government, several foreign governments and non-governmental organizations, as well as the private sector. The purpose of the meeting was to discuss current enforcement efforts against IUU fishing, with a focus on marine protected areas (MPAs). The participants identified next steps to increase international, national, regional and sub-regional enforcement frameworks.

In light of the United Nations' (UN) Sustainable Development Goals (SDGs) and the Aichi Targets to protect 10 percent of the ocean by 2020, governments have upped their efforts to create MPAs. This is good news. Recent research has shown that no-take marine reserves are highly effective in protecting and restoring marine biodiversity, increasing fish stocks and making the ocean more resilient to the effects of climate change. But equally important are efforts to move beyond the designation of MPAs toward management and enforcement. To ensure that protected areas are not merely lines on a map where IUU and unsustainable fishing can continue without consequence, MPA managers are seeking innovative ways to implement stronger monitoring, management, and enforcement mechanisms.

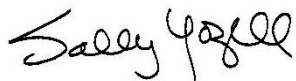
Worth \$15.4 to 36.5 billion annually, IUU fishing creates not just ecological and economic pressures, but also converges with a range of other security threats. For example, transnational criminal networks have been known to exploit the fishing industry to traffic weapons, drugs and even humans. Additionally, as fisheries become depleted, competition over increasingly scarce stocks are likely to escalate geopolitical tensions. In fact, we have already begun to see the effects of such competition in areas such as the South China Sea.

Mounting recognition of these threats has spurred a conversation about the security dimensions of what was considered, until recently, primarily a conservation issue. At the same time, there has been a proliferation of technologies to monitor fisheries and illegal activities. Now the key to reducing IUU fishing is to leverage that technology for targeted enforcement efforts.

The NMIO meeting was a benchmark in government-NGO efforts to rally behind this issue and to advance a security-based approach to combatting IUU fishing. The meeting stands out because of its focus on actionable solutions and innovative partnerships, several of which were forged during the two-day meeting. For example, the meeting effectively broadened the community of interest and action around this issue by convening experts and entities from both the security and conservation, governmental and non-governmental communities. These groups have not typically worked side-by-side in partnership to combat IUU fishing. A core goal of the meeting was to crowdsource solutions from the different types of organizations, with different focuses, and to forge relationships that can build comprehensive and innovative solutions to this multidimensional threat.

During the meeting we developed an action-oriented and network-based approach to the problem of IUU fishing in MPAs and enforcement at the ports in two specific countries—Chile and Costa Rica. Through gaming exercises using real situations in these two nations, it reinforced the understanding that perpetrators of IUU fishing and other fisheries crimes are often networked and adaptable to the environment around them. They are able to evolve their practices to outpace enforcement efforts. Collectively, we agreed on the need for a network of enforcers who can take action and respond effectively to the agility of the perpetrators.

The two-day meeting broadened the community of interest around IUU fishing enforcement. It brought together a new kind of network, dubbed “the network of action.” The answer from participants was resounding—networks, like communities of interest, need to be broadened in order to put an end to IUU fishing and the associated threats.

A handwritten signature in black ink that reads "Sally Yozell". The signature is written in a cursive, flowing style.

Sally Yozell
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Executive Summary

In September 2017, the Stimson Center, the U.S. National Maritime Intelligence-Integration Office (NMIO), National Geographic, and the Waitt Foundation hosted a meeting of 100 experts on illegal, unreported, and unregulated (IUU) fishing, focusing on enforcement within marine protected areas and at ports. In addition to reviewing global solutions, the meeting also focused on two specific case studies on Chile and Costa Rica. This report serves as a record of the meeting—the discussion and resulting recommendations. The report provides a roadmap to guide government-NGO partnerships in addressing IUU fishing with a particular focus on enforcement, and it highlights areas for further research.

The meeting was conducted under Chatham House rules. Views are not attributed to participants but rather represented anonymously, except for the public remarks.

Around the world, depleted fisheries jeopardize economic, ecological and food security, and foment unrest. In doing so, they pose direct and indirect threats to U.S. national security. Increasingly, experts within government and civil society have recognized this convergence. In September 2016, the U.S. National Intelligence Council released a report calling IUU fishing an ‘existential threat.’ In March 2017, in testimony to the U.S. Congress, Director of National Intelligence (DNI) Daniel R. Coats drew similar connections between IUU fishing and insecurity. Still, there remains much to be done to build IUU fishing into the mandate of the U.S. military and other security agencies; operationalize a civil-military response to IUU fishing; and increase cooperation between the security and conservation communities, all with the goal of protecting valuable marine resources and minimizing the negative security impacts associated with IUU fishing around the globe.

Recognizing these gaps, the National Maritime Intelligence-Integration Office (NMIO) held the September National Maritime Interagency Advisory Group (NIAG) meeting to focus on expanding cooperation between the security and conservation communities. Over the course of the two-day meeting, participants outlined a series of recommendations, drawing from their professional and organizational expertise with a specific focus on enforcement against IUU fishing in MPAs and at ports. The recommendations coming out of the meeting cover an array of challenges to enforcement against IUU fishing. They can be broadly defined by the following categories:

- Match technology to capacity
- Increase information sharing
- Leverage existing bilateral and multilateral efforts
- Tackle surveillance, enforcement, and prosecution jointly
- Prioritize a whole-of-government approach

Match Technology to Capacity

The proliferation of technologies to enhance maritime domain awareness (MDA), from drones to satellites, has improved our capacity to monitor fisheries. But technology by itself is not a solution. Rather, the effective use of technology depends on sustainable implementation, which requires financial and human resources. As such, technological solutions for monitoring and enforcement must be matched to governments' capacity to deploy the technologies in concert with other tools and as part of a wider strategy. To ensure enduring success, financial resources must be identified on a long-term planning horizon to guarantee that the technology can be maintained and sustained. In addition, the incorporation of technological solutions into strategies should be complemented by legal reform to make information collected by technology permissible in judicial proceedings.

Increase Information Sharing

The U.S. National Security Council recently issued guidance to U.S. intelligence and law enforcement agencies to adopt a new approach to their fight against illicit trafficking around the world. In response, the agencies are seeking innovative strategies to increase information sharing across governments and NGOs, as well as with industry and academic partners. This matches steps being taken across the international community, which has increasingly recognized the importance of information sharing, to respond to the global and networked nature of IUU fishing and related crimes. One central element of successful information sharing involves organizing and leveraging information held across the global community—not just within governments but also by non-traditional partners in enforcement, such as NGOs—to create a more comprehensive and timely understanding of IUU fishing networks. The UN Food and Agriculture Organization (FAO) Committee on Fisheries, for example, has created the Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels, called the Global Record, which gathers information about fishing vessels according to an assigned Unique Vessel Identifier (UVI). Enhanced information sharing at the global level, using tools like the Global Record, is an important objective, but it must be appended by efforts at the regional and sub-regional levels. Information sharing frameworks organized at these levels allow governments to adapt information gathering, storing, sharing, and analyzing to meet national and regional contexts and needs, which in turn provides law enforcement with more targeted and actionable information.

Leverage Existing Bilateral and Multilateral Efforts

There are many existing bi- and multilateral agreements related to maritime security, as well as strategies to reduce maritime threats and enhance MDA. For example, the United States has shiprider agreements with most countries that border its exclusive economic zone (EEZ). A shiprider agreement is a bilateral agreement between the United States and a foreign country that authorizes a U.S. Coast Guard detachment to be on U.S. Navy vessels or foreign enforcement vessels, and vice versa. This arrangement allows U.S. Coast Guard personnel to exercise their

enforcement authority aboard U.S. Navy or foreign enforcement vessels, and foreign enforcement officials to extend their authority to a U.S. Coast Guard or Navy vessel that they are aboard. Existing shiprider agreements focus primarily on counter-narcotics operations. In some cases, however, shiprider agreements have been expanded to include a counter-IUU fishing mandate, offering a model for how existing agreements can be leveraged creatively to address IUU fishing. Similarly, existing bi- and multilateral alliances can be adapted to include IUU fishing. New alliances focused specifically on IUU fishing can be modeled after successful existing ones. Five Eyes (FVEY), for example, is an intelligence alliance between the United States, Canada, the United Kingdom, Australia, and New Zealand. FVEY creates a framework for fast decision-making to respond to security threats, and can serve as a model for a multinational on-call system to facilitate time-sensitive decision-making about port entry requests, such as those required by the Port State Measures Agreement (PSMA).

Tackle Surveillance, Enforcement, and Prosecution Jointly

Following the 2016 Our Ocean Conference in Washington, D.C., the Safe Oceans Network (SON) announced its framework for combatting IUU fishing—the surveillance, enforcement, and prosecution chain. Historically, counter-IUU fishing efforts have focused on these capacities separately. Today, there is growing recognition that any effort to enhance enforcement must be considered in the context of surveillance and prosecution. Strategies that focus on the capacities separately tend to result in a patchwork of solutions that is less effective and more inefficient.

Prioritize a Whole-of-Government Approach

In the United States, more than a dozen federal agencies have some responsibility related to combatting IUU fishing. In the past, the Departments of State and Commerce, under the aegis of NOAA, have led the federal strategy to combat IUU fishing and seafood fraud. Looking to the future, in order to maximize the strategy's impact, the leadership should be broadened to include the Departments of Defense and Homeland Security, as well as the Intelligence Community (IC) agencies. Broadening the community of action to include a whole-of-government approach begins to address a lack of interagency coordination, which has been as a major impediment to effective and sustainable enforcement solutions and strategies.

Overview of the Meeting

The two-day National Maritime Interagency Advisory Group (NIAG) meeting had several sessions. The first day included welcoming remarks by Sally Yozell, the Director of Environmental Security at the Stimson Center, and Dan Myers from National Geographic Pristine Seas. There were also keynote remarks by Rear Admiral (RADM) Robert D. Sharp, U.S. Navy, Director of NMIO, and three panels with audience discussion. The panel sessions delved into the security dimensions of IUU fishing; the status of current enforcement efforts; and opportunities for expanded or innovative enforcement approaches. The afternoon of the first day featured remarks by the Ambassador of Chile to the United States Juan Gabriel Valdés, as well as the first tabletop exercises, which focused on enforcement against IUU fishing in two MPAs and two ports.

During the tabletop exercises, participants broke into four groups, each of which was assigned one of four case studies: the Cocos Island MPA in Costa Rica; the port of Puntarenas in Costa Rica; the Juan Fernandez MPA in Chile; and the port of Talcahuano in Chile. Based on pre-set IUU fishing scenarios designed by Stimson Center Military Fellow LCDR Ben Cipperley, U.S. Navy, the participants discussed potential enforcement solutions to the scenario, as well as general solutions for the assigned geography.

The second day included opening remarks by the Ambassador of Costa Rica to the United States Roman Macaya Hayes, as well as the second round of tabletop exercises, during which participants were assigned to new groups. Vice Admiral (VADM) Charles W. Ray, the Deputy Commandant of Operations for the U.S. Coast Guard, closed the two-day meeting. RADM Sharp provided reflections on steps forward.

This report serves as a record of the meeting—the discussion and resulting recommendations. The report provides a roadmap to guide government and NGO partnerships to address IUU fishing, and highlights areas for further research. In the form of two appendices, the report includes enforcement recommendations for Chile and Costa Rica based on the tabletop exercises discussions.

The meeting was conducted under Chatham House rules. Views are not attributed to participants but rather represented anonymously, except for the public remarks.

Keynote Remarks by Admiral Robert D. Sharp

In his opening remarks, RADM Sharp discussed the IC's commitment to expanding the community of action around combatting IUU fishing. Acknowledging the many societal dimensions of IUU fishing and its impact on economic, ecological, and food security, RADM Sharp called IUU fishing “evil fishing.” He spoke about its connections with transnational, illicit networks and with other threats to national and global security. Drawing on his experience attending the 2016 Our Ocean Conference, RADM Sharp highlighted the importance of building new and unconventional

partnerships across sectors to contribute to a more comprehensive understanding of the challenges to combatting IUU fishing and, most importantly, to enhance collaboration on solutions. He closed by defining two goals for the meeting: to meet someone new and to actively participate.

Panel 1: Why Does IUU Fishing Matter from a U.S. National Security Perspective?

The first panel focused on the convergence of IUU fishing and related crimes with U.S. national security priorities, including illicit trafficking in drugs, arms, and humans, as well as other financial crimes. In highlighting the criminal elements connected to IUU fishing, the panelists underscored the importance of enforcement. Specifically, the panelists discussed the importance of establishing standard, shared definitions of national security to allow for more productive conversations about how IUU fishing converges with current military and IC priorities. Next, the panelists outlined the range of national security linkages, including: adverse effects on critical ecosystems; threats to food security; and threats to economic security. They further highlighted the connections with other criminal activities, particularly trafficking and the consequent erosion of rule of law. The erosion of law enables corruption and other criminality. Finally, the panelists touched on the geopolitical tensions that arise from fisheries disputes. These convergences are outlined in greater detail throughout the report.

Panel 2: What Does Current IUU Fishing Enforcement Look Like?

The second panel highlighted current governmental and non-governmental projects to enforce against IUU fishing and related crimes, as well as current collaborations between governments, civil society, and the private sector to enhance enforcement. The panelists discussed the importance of vessel tracking and how enforcement efforts must also target the narcotics networks that often become interconnected with illegal fishing activities. There were three major lessons learned:

- Due to the interconnections between IUU fishing and other dangerous crimes, such as drug trafficking, there is an increased physical risk to non-law enforcement entities and NGO personnel participating in and supporting enforcement efforts;
- Vessel tracking systems are one of the major keys to effective enforcement;
- Political will is necessary for any enforcement solution to be effective. To build political will, NGOs and governments should engage in public education on the security implications of IUU fishing.

Panel 3: What Does Enforcement Look Like Moving Forward?

The third and final panel built on the previous discussions to identify opportunities to enhance enforcement, with a focus on expanding government and NGO collaboration on enforcement. The panel identified what surveillance and prosecution support is required to enhance current enforcement. Some themes discussed included the use of new technologies or the use of existing

technologies in new ways to enhance MDA. In addition to the importance of sea-based enforcement, the panel also discussed the importance of targeting enforcement at the onshore support networks, including tracking the beneficial ownership of vessels and monitoring the financial flows and electronic transactions associated with the IUU fishing networks, thus limiting the ability of owners to profit from such illegal activities.

Keynote Remarks by the Chilean Ambassador to the United States Juan Gabriel Valdés

In his remarks, Ambassador Valdés highlighted that the protection, conservation, and sustainable use of the ocean and its resources has been a priority for the Chilean government. Chile has made a series of recent national and international commitments. He noted how the Our Ocean Conference 2015, held in Valparaiso, Chile, served as a catalyzing event for improving ocean and fisheries governance and marine protection. He underscored the government's important legacy of creating new MPAs to safeguard the productivity of their sovereign waters and the economic benefits to their fishing communities, including the waters surrounding Juan Fernandez, Desventuradas Islands, and Easter Island. He noted that Chile was one of the first nations to sign the Port State Measures Agreement and the importance of interagency coordination such as the work by the Chilean Navy and local fishing authorities to address illegal fishing

Keynote Remarks by the Costa Rican Ambassador to the United States Roman Macaya Hayes

Reflecting on a 2009 incident in Costa Rica where nearly half a ton of cocaine was found hidden in 90 shark carcasses in a 40-foot shipping container, Ambassador Hayes highlighted the strong links between IUU fishing and the narco-trade. In particular, he discussed the exploitation of the fishing industry. Small-scale fishermen facing the pressures of collapsing fisheries have been known to participate in arms and drug smuggling, both directly and indirectly. For example, fishermen often provide fuel (often government subsidized) to boats that are smuggling narcotics from South America to the U.S. The fishers are paid in return with drugs, which they then sell in Costa Rica to monetize their profit. This trend has contributed to drug consumption and violence in Costa Rica. Ambassador Hayes also discussed how poorer, less-developed coastal fishing communities are particularly vulnerable to exploitation by transnational organized criminal operators because of the limited access to jobs and government services in those areas.

Closing Remarks by Vice Admiral Charles W. Ray

VADM Ray closed the meeting with a reflection on how IUU fishing has grown as a priority within the U.S. security community over the course of his career. He highlighted that nearly 85 percent of fisheries are fully or overfished, while demand for fish continues to grow at an unsustainable rate. Building on themes from discussions throughout the meeting, VADM Ray described the

interconnections between IUU fishing and drug trafficking. He emphasized the importance of building a whole-of-government approach to combatting IUU fishing and convergent crimes, and to equip enforcement officials to act against all illicit activity they encounter. VADM Ray recalled a poignant example from his early career, when he was aboard a U.S. Coast Guard cutter in the Gulf of Mexico. His cutter intercepted a vessel, which claimed to be catching shrimp. However, based on the proximity of the vessel to shrimp grounds, it was clear that the vessel could not be catching shrimp. The personnel aboard the cutter had the ecological knowledge of the fisheries in the region to recognize the misleading information. This triggered an inspection of the ship's storage where illegal turtles and other prohibited species were found. The issue can be further illustrated to include arms, drugs and human trafficking, highlighting the need for enforcement personnel to be trained to address any situation they find when boarding a vessel. In closing, VADM Ray noted that the NIAG meeting, and other cross-community gatherings, contribute to building an IUU fishing "community of action" to combat and enforce against the threat.

Reflections on Steps Forward by RADM Sharp

In his reflection on steps forward, RADM Sharp highlighted a data competition that NMIO recently concluded. The competition focused on software solutions to analyze vessels' geographic and behavioral information gathered through open-source platforms. The competition attracted 119 contestants from 33 countries, and is part of NMIO's continued engagement with the Safe Oceans Network. RADM Sharp closed by emphasizing the importance of network-based solutions to combat the networked threat of IUU fishing, and asked NIAG attendees to continue working together and forging partnerships to combat IUU fishing.

The Security Dimensions of IUU Fishing

Increasingly, the conservation and security communities have recognized and acknowledged the security connections to IUU fishing. This section focuses on those connections, highlighting points made by participants throughout the course of the NIAG.

From the military and IC perspectives, a national security threat includes the following: first and foremost, it is a threat to the homeland; second it includes threats to U.S. allies and other strategic partners, and third it encompasses activity that degrades elements of U.S. national power. According to all three criteria, IUU fishing is both a direct and indirect security threat. This report focuses on the connections between IUU fishing and ecological security; food security; and economic security. It delves into the connections to transnational organized crime, such as trafficking and piracy and it focuses on the degradation of the rule of law, the impacts on good governance, and the issues of sovereignty and geopolitical tensions between states.

Threats to Economic and Food Security

Some threats posed by IUU fishing are acute, while others are diffuse. The adverse effects of IUU fishing on ecosystems threatens sustenance, especially in communities that depend heavily on the ocean as a source of food. Moreover, depleted fisheries drain communities of their economic livelihoods and displace fishers and others in fisheries-related jobs, such as the processing industry or marketplaces. One result of the displacement of fishermen is their increased vulnerability to exploitation, especially in developing nations where choices for employment are limited. Displaced fishermen are at risk of turning to other criminal activities, such as drug trafficking and piracy.

Geopolitical Tensions and Consequences

Another threat posed by IUU fishing is geopolitical tensions, often arising out of food or economic insecurity. Heightened tensions tend to fester within countries or between countries as a result of collapsing ecosystems, disputes over access to resources, and competition, especially among countries that are heavily dependent on fisheries for sustenance and economic livelihoods. In areas where resources are scarce, there is a greater risk for escalation of conflict, both intended or inadvertent. Geopolitical tensions have the potential to further empower transnational criminal elements. Unresolved disputes and a lack of clear governance structures, for example, can open the door for transnational criminal operators and activities.

IUU fishing itself is increasingly recognized as a transnational organized criminal activity. The association between illegal fishing and other illicit activities, especially the trafficking of weapons, drugs, humans, and commodities, is increasingly apparent and pronounced in geographies such as the Caribbean, where counter-narcotics enforcement drives smugglers to masquerade their activities in the fishing industry. At the more diffuse level, IUU fishing and the associated crimes undermine the rule of law, facilitate corruption, and contribute to discontent with government. These outcomes foster a culture of lawlessness where IUU fishing and other crimes can occur without repercussion.

Lacking or Undermined Governance Structures

Weak maritime regulation and enforcement regimes foster an environment that enables IUU fishing to take place and also contributes to other illegal or undesirable activities at sea, such as piracy. In Somalia, for example, piracy has been fueled by frustrations around foreign fleets overfishing in Somali waters and destroying fisheries infrastructures, as well as the inability of the government to enforce against the metastasizing threat. In addition to the links between a lack of effective governance, IUU fishing and piracy in East Africa, these activities have also been known to perpetuate other crimes, such as illegal trafficking in weapons.

Understanding the Unreported and Unregulated Dimensions

As the government and the non-governmental communities work to build a comprehensive global enforcement regime against IUU fishing, it is important to separately consider the elements of illegal, unreported, and unregulated threats and develop solutions to each component. For example, illegal fishing is often connected to other crimes which can destabilize coastal communities, while unreported and unregulated fishing activities are generally not directly linked to acute threats, such as transnational organized crime. Rather, unreported and unregulated fishing can adversely affect ecosystems, contributing to food and economic insecurity, and, in the end, also destabilize communities. The lack of political will to enforce against IUU fishing is further exacerbated by the fact that some major fishing nations do not even acknowledge the threats associated with unreported and unregulated fishing.

It is also important to recognize that fishing vessels can shift between engaging in legitimate and illegal behavior with relative ease. A licensed fishing vessel can be operating legally one minute, but once it meets its quota, if it continues to fish, it shifts into illegal behavior. Other vessels are known to legally fish in authorized managed areas, only to cross into no-take MPAs and continue fishing. Similarly, vessels also are known to go from legal fishing grounds to unmanaged areas, switching in a matter of hours between legal, illegal, and unregulated fishing activities. This agility means that fishermen engaged in illegal activities can quickly and easily mask their activities. Furthermore, political will, or the lack thereof, often limits governments' responses to unreported or unregulated fishing. Some governments hesitate to hold their own domestic fleets accountable for unreported or unregulated fishing. While other governments are known to hold their domestic fleets accountable for unreported and unregulated fishing in their own waters, but ignore their activities when they move into distant international or foreign waters.

The Threat from Artisanal v. Industrial Fleets

Finally, in outlining the security threat posed by IUU fishing, it is necessary to distinguish between the threats posed separately by artisanal and industrial fleets. The UNFAO estimates that industrial commercial fishing vessels make up 10 percent of all fishing activities, while small-scale artisanal fishing accounts for the remaining 90 percent. However, the capture rates of both sectors are roughly the same—50 percent industrial and 50 percent small-scale artisanal. IUU fishing within artisanal fleets tends to fall into the unreported and unregulated categories. The mismanagement of small-scale fisheries can lead to economic displacement or food insecurity and result in civil discontent.

Because of their larger capacity, industrial fleets tend to have a greater and more acute ecological footprint. They can undermine healthy ecosystems by targeting high-value migratory or straddling species while discarding less commercially valuable bycatch. Additionally, as domestic fisheries collapse, many industrial fleets are moving farther from home as is the case with Chinese fleets. Too

often distant water fleets operate out of reach of their own governing structures and are able to engage in unsustainable practices with little ramification. They are frequently found fishing in or close to other nations' sovereign waters. As a result of their capacity to catch large volumes of fish and to target certain species, their fishing efforts are known to have negative impacts on the ocean ecosystem, fishery health and overall resiliency. Unsurprisingly, industrial fleets are often at the center of geopolitical disputes.

Conservation and security communities have focused much of their work on addressing the threats associated with industrial fleets around the world, albeit ecological or criminal threats. Yet, artisanal fleets also play a role in inflaming regional and sub-regional tensions. For example, a recent rise in incidents of Peruvian artisanal fishing vessels operating illegally in northern Chile has increased tensions between the Peruvian and Chilean artisanal fishing communities and the Peruvian and Chilean governments, as well as the Chilean government and Chilean artisanal fishermen, who feel their interests are not be adequately represented by their government.

General Recommendations

The following recommendations were aggregated from the panel discussions and tabletop exercises. While this is not an exhaustive list of solutions, it does pull together a range of tools that can be deployed independently or in concert to enhance and expand enforcement efforts. One of the points reiterated over the course of the meeting was that one size does not fit all, meaning one solution will not work in every context. In most cases, a combination of several tools is required to build a complete enforcement strategy. The appendices, which breakdown recommendations for Costa Rica and Chile do just that: they offer a suite of solutions driven by local contexts.

Vessel Tracking Systems (VTS)

Recommendations:

- Create new and contextually-appropriate incentives for the use of vessel tracking systems (VTS).
- Pass laws that prohibit turning off or meddling with vessel tracking systems and prosecute the captains of vessels who break such laws.
- Make vessel monitoring systems (VMS) data publicly available so that governments and NGOs can jointly hold fishing vessels accountable.
- As more technologies become available, integrate VTS data with other structured and unstructured information to build a comprehensive picture of fisheries and fleets to produce actionable information that can be used for enforcement.

In recent years, there has been tremendous growth in the range of technologies and methods to monitor the maritime domain. This proliferation has captured the attention of governments and NGOs alike, leveraging technology to increase the visibility of the global fishing fleet. As the expansion of technological solutions has opened opportunities, it has also created challenges, namely:

- Vessel operators can turn off vessel-based monitoring technologies when they want to avoid detection.
- With the proliferation of technologies and data streams, governments, the private sector and NGOs need to design methods to integrate data, make it publicly available and turn it into actionable information.
- To ensure that information can be utilized for both enforcement and prosecutions, technologists need to work with both law enforcement authorities and the judicial systems to ensure that information is admissible in court. Laws and policies need to be nimble enough to keep up with technology.

There are three main categories of technology being used to monitor fishing fleets. These include: Automatic Identification Systems (AIS), Vessel Monitoring Systems (VMS), and other vessel tracking systems (VTS).

AIS was originally developed for maritime search and rescue. It is required by the International Maritime Organization on ships over 300 gross tons and cargo vessels over 500 gross tons. The technology produces an open-source signal that allows nearby vessels to track each other. Several governments and organizations such as Global Fishing Watch have created platforms to aggregate AIS signals in order to build a more comprehensive picture of the global fishing fleet. However, the initial design framework for AIS leaves it open to exploitation: Fishers can scramble their AIS signals or simply turn the transceivers off to hide their activities; often, vessels are only required by law to have AIS broadcasting when entering port; and because of the ship size requirements for AIS, it tends to illuminate only larger fishing vessels. Broadly, a new vessel tracking regime needs to be established, either employing technologies that cannot be turned off, or creating the right incentives for the use of existing technologies.

Vessel Monitoring Systems (VMS) are a satellite based system that is installed on commercial fishing vessels, allowing governmental regulatory agencies to monitor position, time, course, and speed of vessels. They come equipped with a transmitter and GPS unit and are usually mandated for vessels of a certain size, type or fishing class. VMS is important for governments to track fishing vessels within territorial waters and Exclusive Economic Zones (EEZs). Some of the shortcomings of VMS is that the information tends to be proprietary and not made publicly available. Governments do not require it on all fishing vessels or even above a certain size due to the associated costs. VMS systems often require an on-board power source, meaning that they cannot be used to monitor artisanal fleets.

In the past decade, companies have begun producing alternative vessel tracking systems (VTS) to address some of the shortcomings of AIS and VMS. For example, technologists have developed small, hand-held vessel tracking devices that are low-cost and can be used by artisanal fishing vessels. Through the use of cell phone technology, they operate off of satellite and cell tower signals. One company, Pelagic Data Systems (Pelagic) has developed a hand-held VTS that cannot be turned off. Pelagic has worked primarily with small-scale fishing industry associations and fishery cooperatives to use VTS for certifying local catches and thus increase their value.

Governments, the private sector and NGOs are increasingly innovative in the use of satellites, radar and electronic monitoring technologies for fisheries management. Traditionally, satellite data was prohibitively expensive and limited to militaries and defense contractors. However, through partnerships and the declassification of some data, this information is slowly becoming more affordable and accessible. Yet one major constraint in using satellite data for marine enforcement is the processing delay which can take up to three days from image capture to data delivery making it difficult to act on real-time detection.

In response, governments, private companies and NGOs such as Vulcan, OceanMind, and Global Fishing Watch are working to use data analysis software and newly developed algorithms to first automate the analysis of satellite imagery and radar and then integrate it with other data streams, such as AIS and VMS signals. Such efforts to automate the analysis of large amounts of data in real time have been at the forefront of recent technology innovations related to MDA.

As governments look to implement technological monitoring solutions, it is critical to consider the long-term viability of using that technology and the financial and human resources to operate and maintain it. It is also important to ensure that the technology meets the enforcement needs. For example, if the IUU fishing threat is primarily from artisanal vessels, a system that requires an onboard power source will be ill-suited. Alternatively, if the primary threat is from so-called dark vessels, satellite and other imagery solutions might be the right fit.

Standard Operating Procedures and Training for Vessel Boarding and Inspection

Recommendations:

- Establish country-specific standard procedures for boarding vessels.
- Collaborate at the regional level to exchange vessel boarding best practices.

When an officer boards a fishing vessel, they may encounter a range of things, from a hold full of an unreported catch to drugs or weapons. A major challenge for fisheries authorities when boarding a suspicious vessel is being prepared for the range of activities that they may encounter. This challenge is particularly pronounced for fisheries authorities and NGOs who are not typically equipped to address a higher-level threat, such as the presence of drugs or weapons. To address this threat, governments should build a protocol of procedures for boarding, and equip the relevant officers for

boarding that could result in the identifying of infractions beyond IUU fishing, as well as providing those officers with available information about the vessel, such as past suspicious behavior or infractions, prior to boarding. For example, the NGO Secure Fisheries is working with the United Nations Office of Drugs and Crimes (UNODC) and the U.S. Department of State to develop country-specific standard operating procedures for boarding vessels, identifying fisheries crimes, determining what types of evidence needs to be gathered, and how to gather evidence, in order to ensure the evidence gathered is useful in the prosecution chain. Furthermore, they are engaged in training officials at the ports. This project is focused primarily in the Western Indian Ocean, but similar projects would be effective in Southeast Asia, West Africa, and South America. Building capacity across regions rather than within specific countries also has multiple benefits enabling the creation of regional communities of action that can then also facilitate information sharing.

Building Inspection Capacity

Recommendations:

- Train fisheries inspectors on the mechanics of a successful inspection, particularly on how to collect evidence that can be used in court.
- Train law enforcement officers who may conduct inspections related to other illicit activities, such as drug trafficking, on the procedures of fisheries inspections.
- Train inspectors at regional workshops so that they are equipped to address the transnational elements of IUU fishing.
- Pay inspectors a living wage, elevate their status, and provide more professional opportunities to discourage corruption.

A successful vessel inspection requires human and financial capital, as well as knowledge and capacity building to conduct lawful and complete inspections that gather information which can be used as evidence during prosecutorial process. In many countries, there are a limited number of fisheries inspectors, raising the question of how to leverage the human resources dedicated to other national security issues, such as drug trafficking, to also address IUU fishing, while not taking away from the drug trafficking mission. A key here is to train enforcement officials focused on other illicit crimes how to inspect a vessel for fisheries crimes, including how to identify species, for example.

Inspector training at the national and regional level is critical. If you aren't trained enough to recognize some of the nuance of IUU fishing, you're going to miss it. Likewise, inspectors must be able to correctly identify species, their status in terms of protection, and know what sizes of certain species are protected. Some machine learning technologies are being developed to automate this knowledge in order to increase the capacity of inspectors who are not trained specifically on fisheries to effectively conduct enforcement. This effort should be matched with some level of human resource and capacity building in the form of training inspectors. If governments can gather enough information during vessel or port inspections, in part by training inspectors to gather the right

information, that can have a ripple effect of benefits, enabling governments to prosecute illicit activities, but also trace value chains and beneficial ownership networks.

IUU fishing is often inherently international. Fishermen can move between national jurisdictions with relative ease and little oversight. Traffickers who use the fishing industry to disguise their activities are often also moving products across several national jurisdictions. Consequently, it is important for trainers to have a regional understanding of IUU fishing, as well as knowledge of the enforcement procedures of neighboring countries. Joint inspector trainings at the regional level offer one way to increase this understanding. These trainings also help inspectors identify their counterparts in neighboring countries to facilitate information sharing. Higher-capacity countries can also provide technical assistance to lower-capacity neighboring countries to build their inspection capacity. In East Africa, the FISH-i program has been successful in cultivating this kind of regional cooperative approach.

Enhancing Interagency Protocols

Recommendations:

- **Implement interagency, whole-of-government protocols to assist in operationalizing cooperation at the interagency level.**

Around the world, governments have stepped up their response to IUU fishing by building interagency teams and frameworks to address the threat. The Indonesian government established the Presidential Task Force to Combat Illegal Fishing; the Chilean government created a set of fusion centers, which include representatives from across the government; and the United States implemented the Presidential Task Force on Combating IUU Fishing. A critical next step is to enhance interagency protocols to operationalize an interagency response. For example, the U.S. Maritime Operational Threat Response Protocols guide the USG response to maritime threats. When there is an international incident involving a U.S. individual or entity, the protocols trigger actions by certain USG agencies. Within the USG, there are other procedures, such as the U.S. Coast Guard's Global Maritime Coordination Center, which could serve as models for the development of interagency protocols focused on IUU fishing.

Information Sharing

Like technology, information sharing to combat IUU fishing has become one of the main focuses of the conservation and security communities. IUU fishing is inherently transnational, which necessitates sub-regional, regional, and even global cooperation on solutions. As such, information sharing across jurisdictions is critical. Likewise, information sharing creates many opportunities to enhance current enforcement efforts and to maximize their impact; however, it also presents operational challenges. Information sharing is also a broad concept, which includes many nuances.

The following sections discuss information sharing among governments and between governments and nongovernmental stakeholders. It also includes a discussion of the electronic storage and sharing of data, as well as international and regional standards for information sharing.

Information Sharing Between Governments

Recommendations:

- Increase regional and sub-regional formal and informal government-to-government information sharing mechanisms to complement global information sharing frameworks.
- Develop procedures for timely information sharing related to decisions such as port entry.

It is necessary to establish more regional and sub-regional formal and informal government-to-government networks for information sharing. This could include establishing networks such as intelligence fusion centers or informal sharing procedures whereby officials in countries can identify and contact their counterparts in the region to share information on suspicious vessels and/or activities. Broadly, this type of information sharing is an assumption underlying the success of the Port State Measures Agreement, and the UNFAO aims to develop a repository for information at the global level. However, this database is in its initial stages of formation and needs to be developed in a more expedited manner. As a result, in the short and medium-terms, other formal or informal networks must be established to share information to combat IUU fishing.

As PSMA is implemented, information sharing between governments becomes increasingly important to inform decisions about whether to allow vessels to enter ports. For example, PSMA requires a port country to exchange certain information about a vessel requesting port entry with the vessel's flag state. When a port state has just a matter of hours to make a decision about entry, fast information sharing procedures are critical. Such procedures can be modeled after existing intelligence alliances and on-call systems. For example, Five Eyes, a multilateral intelligence sharing arrangement between five nations, would be a suitable framework, as would the U.S.-Canada bilateral working group, whereby agency representatives are on-call to approve or deny decisions related to information collection and sharing. Presently, the working group is being used to address primarily higher-level threats than fisheries, such as the malware threat that affected U.S. ports in the summer of 2017. However, this type of institutional framework could be made helpful to addressing IUU fishing by deputizing officials at a lower level for quick IUU fishing decision to be made.

Information Sharing Between Governments and Non-Governmental Entities

Recommendations:

- Increase networks and mechanisms to encourage the sharing of information between governmental and non-governmental entities.
- Formalize an approach to collecting and storing non-traditional intelligence gathered by non-governmental entities.
- Host national workshops to discuss barriers to information sharing between governments and NGOs, and assess what, if any, governmental information can be declassified.

Beyond increasing information sharing between governments at the sub-regional, regional, and international levels, it is necessary to expand information sharing mechanisms between governments and non-governmental entities, ranging from the non-profit to private sector. Governments need to formalize approaches to collect and store non-traditional intelligence gathered by NGOs and private sector organizations. While this could be done in the form of a fusion center, it could also be achieved through informal information sharing networks based around the NIAG community of action, for example. In concert with efforts to formalize information sharing between governmental and non-governmental entities, regulations need to be passed that make information gathered by non-governmental sources permissible in judicial proceedings. A challenge to expanding governmental/non-governmental information sharing is that the classified nature of government intelligence, especially within the U.S. government, limits the bi-directional flow of information, which can frustrate non-governmental entities and can contribute to the segregation of efforts.

Electronic Submission, Storage, and Sharing of Information

Recommendations:

- Develop electronic platforms to gather and share information.
- Develop data enterprise systems that integrate data from multiple sources and enable analysts to quickly assess the availability and quality of information.

To facilitate the exchange of information, it is necessary to begin developing electronic platforms to gather, store, and share information. If inspectors could input information from a vessel inspection directly into an automated, digitized database, it would be easier to give neighboring authorities access to that information in real-time. Likewise, it empowers the investigator to reference background information on a vessel to see if it has been flagged in the past for suspicious activities.

Storing information digitally also facilitates the automated analysis of information. Relying on human resources to analyze individual data sets and points is not only a huge drain on resources, but is also unfeasible given the enormity of the information collected by a single technology, let alone

several working in concert. Furthermore, storing and sharing information digitally allows multiple agencies to access information in a timely manner, facilitating quick decisions that involve multiple entities. Expediting the sharing of information within and across governments is particularly important in the contexts of targeting enforcement assets and making port entry request decisions. A basis of shared knowledge also enables analysts to identify patterns of illicit activities and networks, and it improves the ability of authorities to anticipate and interdict illicit vessels.

Building International and Regional Information Sharing Standards

Recommendations:

- Develop formal protocols to standardize information sharing, such as the use of common data fields.
- Identify opportunities to create regional fisheries management and enforcement standards.

Related to building formal protocols for information sharing is the development of regional and international standards, such as common data fields, so that information can be automatically integrated. Creating consistent standards across regions facilitates the sharing of information, the implementation of effective enforcement, and the exchange of best practices related to monitoring and enforcement.

Leveraging Data Collected and Stored by RFMOs

Recommendations:

- Leverage information collected and stored by RFMOs to enhance enforcement.
- Increase the capacity of RFMOs to collect, store, and share information in a timely manner to inform port entry request decisions.
- Develop mechanisms to facilitate the timely exchange of information between governments and RFMOs.

Regional Fisheries Management Organizations (RFMOs) often collect and store a significant amount of information about fishing vessels. At the regional level, governments can leverage that information to improve enforcement against IUU fishing. However, governments are often unaware of the data that RFMOs hold. Governments need help to better understand what information is collected by RFMOs and how best to access it. NGOs can work with RFMOs to audit what information is currently available through these regional entities. RFMOs should also develop more streamlined information sharing processes, including improving feedback mechanisms with governments. For example, a vessel offloading tuna caught in the Inter-American Tropical Tuna Commission's (IATTC) jurisdiction at a port should be on the IATTC-authorized vessel list, making it easy for port inspectors to verify its legitimacy. Inspectors should be trained on what information

RFMOs have and how to access that information. This information sharing gap highlights the deficiencies existent in RFMOs.

To complement efforts by governments to leverage the data collected by RFMOs, governments, NGOs, and multilateral organizations should work with RFMOs to build their capacity to collect, store, and share information. In the context of PSMA implementation, mechanisms should be developed to facilitate the timely exchange of information between governments and RFMOs that could inform decisions on port access requests. This could also include the creation of digitized platforms for information sharing. The digitization of information is critical for the success of PSMA. While the Agreement requires vessels to give advance notice of entry, if information cannot be accessed quickly enough, it becomes an ineffective tool for decision-making in terms of whether to allow entry and inspect or deny entry. (See ‘Enhancing and Expanding the Implementation of the Port State Measures Agreement’ on page 26.)

Uncovering and Enforcing Against Onshore Networks

Recommendations:

- Expand efforts to identify and enhance enforcement against direct and beneficial ownership structures.
- Expand efforts to identify other onshore support networks that enable IUU fishing, such as insurance companies.
- Advocate flag state governments, particularly governments known to issue flags of convenience, to increase requirements that vessels report and verify information about ownership structures.
- Target beneficial owners and other high-level operators rather than low-level actors.
- Amend threat finance regulations to allow governments to track and freeze assets that are connected to IUU fishing.
- Prosecute entities and individuals who land illegal catches for related crimes that may be easier to prove, such as financial crimes.
- Engage Departments of Treasury and other financial institutions to support enforcement against IUU fishing.

Like technology and information sharing, onshore enforcement efforts are one of the main focuses of the IUU fishing enforcement community. Onshore enforcement efforts tend to target the direct and beneficial owners of vessels. Beneficial owners are entities and individuals who profit from an activity or enterprise, even if they are not the legal owners. If authorities only enforce at the vessel level, they will only encounter low-level actors, such as fishermen. By enforcing at the ownership level, authorities can address the root of persistent illegal activities by an entire fleet, compared to just one vessel.

Additionally, the international community should require flag states to collect more information about a vessel and its direct and beneficial ownership before issuing a flag. Flag states should also make this information available to other governments and multilateral organizations, such as RFMOs, so that the information can be validated.

Beyond targeting beneficial ownership structures, governments should target IUU fishing perpetrators for the range of crimes that facilitate the entry of illegal catch into the legal supply chain. When a perpetrator lands an illegal catch, he or she is likely committing a series of violations, such as money laundering and tax evasion. In most cases, money laundering is easier to prove than IUU fishing. At the same time, however, fisheries laws need to be made more robust so that authorities can more easily prosecute perpetrators for IUU fishing. While this process is underway, the legal work-around of charging a perpetrator with related crimes provides authorities with a creative solution to an institutional legal challenge.

In addition to targeting assets and beneficial owners, it is also critical that governments close the enforcement loop. Often, profits from illegal fishing are filtered back into other illegal activities. If authorities interdict an illegal activity funded by IUU fishing or vice versa, they should alert the relevant entities so that both crimes can be addressed.

Governments are increasingly adopting whole-of-government strategies to respond to IUU fishing. For the first time, these strategies have included non-conventional agencies, such as Departments of Defense. However, Departments of Treasury and other financial institutions also need to be engaged to support efforts to combat IUU fishing because of the potential to track criminality in the value chain. Existing security mechanisms to trace financing to threats and block it can be expanded to include individuals profiting from IUU fishing activities.

Target Support Vessels in Addition to Fishing Vessels

Recommendations:

- Target monitoring at support vessels to track fishing fleets that may not be returning to ports for extended periods.
- Increase the due diligence requirements for support vessels, as well as the enforcement of existing requirements.
- Expand the collection and sharing of information about support vessels.

There are approximately 600 reefers in the world. Reefers are refrigerated ships that transport perishable commodities. To make large fishing fleets more cost effective, reefers are often used to collect catch from several vessels. The reefers take the catch to port, while the fishing vessels stay at sea for longer periods. Rather than attempt to monitor every fishing vessel, authorities should target

the smaller number of support vessels, including reefers, at-sea processing vessels, and refueling ships. Support vessels are not inherently illegal. However, monitoring support vessels can help governments identify fleets that are engaged in illegal activities. By monitoring support vessels, governments can identify where fishing vessels are converging and if they are engaging in suspicious behavior.

Governments should also increase the due diligence requirements for support vessels. In most cases, there are regulations that require a support vessel to obtain information about a fishing vessel's activities and catch. For example, Chile requires reefers to present transshipment manifestos when they request port entry. Those manifestos should be inspected and corroborated. If support vessels are held accountable for the activities of the fishing vessels they connect with, then the support vessels will take additional due diligence steps. In some cases, those additional steps could compel fishing vessels to avoid illegal activities.

Increase Transparency and Traceability

Recommendations:

- Increase transparency across governments, NGOs, and the private sector on what enforcement processes and tools exist.
- Conduct knowledge and capacity building sessions to increase the usage of enforcement tools that already exist.
- Conduct outreach on the potential use of PSMA documentation to enhance traceability in both the public and private sectors.
- Make traceability a requirement for market access particularly in large-scale markets like the U.S., the EU and Japan.
- Make traceability information publicly available.

To achieve effective enforcement and prosecution, authorities need to understand the entire monitoring, enforcement, and prosecution chain, and they need to be aware of the enforcement tools available to them. As a means to increase traceability, NGOs and the private sector – in addition to government authorities – should be able to access information on what enforcement tools are being utilized by governments along the supply chain. Further, when not jeopardizing enforcement activities, they should be able to access the data being collected for enforcement. For example, transshipment information in a transshipment declaration can be used by interested entities further down the supply chain to prove chain of custody. However, entities can only utilize the information if they know it exists and is publicly available. A survey of existing enforcement tools and mechanisms should be conducted at the national and international levels. This information will better equip governments, NGOs and the private sector to know what is available for their use, and expand their reach in combatting IUU fishing, particularly at ports. Simultaneously, knowledge and capacity building sessions should be implemented to increase the usage of existing tools.

While PSMA was not designed specifically to increase traceability, documentation required by PSMA can be leveraged to bring greater transparency to supply and value chains. For example, the documentation required by PSMA will create a range of new records that could be used by fishermen and importers/exporters to prove chain of custody.

Leveraging PSMA to increase traceability would have the secondary impact of helping governments, NGOs, and the private sector understand the value of PSMA, and create more buy-in for the agreement. PSMA presents a first-of-its-kind, global opportunity to trace a product back to harvest and first landing. As such, the agreement presents a breakthrough opportunity to illuminate parts of the supply chain that were previously harder to trace.

Enhancing and Expanding the Implementation of the Port State Measures Agreement

Recommendations:

- Governments should build their capacity to allow port entry and inspect vessels that are suspected to have engaged in IUU fishing, rather than deny port entry.
- Provide technical assistance to low-capacity governments to enhance their capacity to inspect vessels and encourage them to join PSMA if they are not already party.
- Publish an overview of the mechanics of PSMA to assist governments implementing the agreement, as well as NGOs that aim to support governments' implementation.
- Leverage the Global Record to build a comprehensive online database of fishing vessels, as well as past port entry requests, denials, and infractions.

Since PSMA entered into force in June 2016, global cooperation against IUU fishing has improved. With 50 countries plus the EU members, the initial implementation of PSMA has been effective in enhancing port inspections and making it more difficult for vessels suspected of IUU fishing to enter port. PSMA is also considered a deterrent when implemented. The first meeting of the parties of PSMA happened in Oslo, Norway, in spring of 2017, and included a specific session to discuss assistance to developing states to implement the agreement. In addition to these steps forward in implementation, more work is required to ensure the effective implementation of the agreement.

First, governments should always inspect vessels that request port entry, rather than deny entry to vessels suspected of IUU fishing. If governments deny rather than admit vessels suspected of IUU fishing, those vessels can easily request port entry at another, less-enforced port. PSMA will only be effective if vessels are not able to take advantage of low-capacity ports to evade proper inspection. Similarly, parties to PSMA should encourage states that are not party to join. Just as vessels can take advantage of low-capacity ports, they can dock at non-PSMA ports to avoid more rigorous inspection.

Second, an organization should publish an overview of the mechanics of PSMA. NIAG attendees observed that apart from the agreement itself, few resources exist to support governments that are implementing PSMA.

Third, PSMA should be leveraged by NGOs, governments, and UNFAO to build a comprehensive database of port requests, inspections, and rejections. The Global Record was intended to be the repository for such records, but it has not been implemented to that extent for several reasons. In some countries, domestic legal restrictions bar governments from reporting that information. In other countries, low capacity limits the ability of governments to make that information available. Nonetheless, a repository of port requests, inspections, and rejections would strengthen PSMA, allow governments to make timely and informed port entry decisions, and equip NGOs to hold IUU fishing vessels accountable by other means.

Enhancing Prosecution to Support Enforcement

Recommendations:

- Conduct audits of legal systems to pinpoint gaps in the surveillance, enforcement, and prosecution chain.
- Coordinate surveillance, enforcement, and prosecution strategies.
- Craft laws requiring vessels to provide evidence of the legality of their activities to shift the burden of proof off the government.
- Expand the IUU fishing community of action to include Departments of Justice and legal NGOs.

IUU fishing enforcement and prosecution are often treated separately, but are actually closely connected. As a result of their separate treatment, vessels are often arrested but not prosecuted because prosecutors lack sufficient or admissible evidence. In other cases, enforcement officers do not pursue legal options because of a lack of clarity or trust in the legal system. Governments and NGOs should audit legal frameworks to identify gaps in the enforcement-prosecution chain. Such an audit would allow governments and NGOs to address barriers to successfully prosecuting perpetrators of IUU fishing.

To tighten the enforcement-prosecution chain, enforcement solutions should be paired with legal reforms that support those solutions. For example, when a government implements a new monitoring system, an assessment should be conducted to ensure that the information gathered through the system is legally permissible. Likewise, laws should be assessed to ensure that they provide sufficient deterrence. If the cost of engaging in an illegal activity is lower than the potential reward, the incentive is to continue engaging in that activity, no matter how robust enforcement is. In cases like this, where there is a mismatch between the laws that exist and ongoing enforcement, reforms should be implemented to make sure the activities complement each other.

Finally, laws should be reformed or written to require vessel operators to prove the legality of their actions, rather than requiring authorities to prove their illegality. For example, a law that prohibits vessels from turning off or scrambling their AIS signal would ease the burden on authorities. Rather than having to puzzle together what activities occurred during a period when AIS was turned off, authorities could just fine or arrest a vessel operator for tampering with the technology.

Equally important to legal reform is expanding the enforcement community of action to include representatives from judiciaries and legal NGOs. Intelligence fusion centers have become a common government solution to create whole-of-government responses to IUU fishing. Departments of Justice should be included in the fusion centers to enhance the efficacy of the monitoring, enforcement, and prosecution chain.

Communications

Recommendations:

- Launch a communications campaign to advocate for IUU fishing as a national priority, particularly by framing it as a security threat.
- Conduct studies to provide further information on the specific ways in which IUU fishing threatens national security to help build political will for enforcement and prosecution.
- Develop a repository of up-to-date stories of IUU fishing and its security impacts, which NGOs and other entities can use to build a case for the security threat of IUU fishing.

NIAG attendees repeatedly reiterated that one of the main hurdles to curbing IUU fishing is a lack of political will. In order for governments to combat IUU fishing, it must be made a priority. Once IUU fishing is considered a priority, governments can mobilize a wider range of resources to combat it. Using lessons from political communications, NGOs should advocate for making IUU fishing a whole-of-government priority, particularly by framing it as a security threat. For example, studies on the effects of IUU fishing, ranging from its impact on ecological, economic, and food security to the degradation of the rule of law, can recast IUU fishing as an urgent issue.

Appendix I: Chile

The IUU Fishing Threat in Chile

While Chile faces some limited IUU fishing threats from its artisanal fleet, as well as neighboring artisanal and commercial fleets, the main threat comes from foreign commercial fleets operating within or near its EEZ. The presence of several high-value straddling and migratory species in the EEZ attracts foreign fleets, who tend to engage in unsustainable fishing that violates South Pacific Regional Fisheries Management Organization (SPRFMO) regulations. Near Chile's EEZ, foreign fishing vessels show extended gaps in their AIS, which may indicate illegal activities within the EEZ.

Unlike other South and Central American countries such as Costa Rica, where illegal fishing is linked to drug trafficking, the fishing industry and illegal fishing activities in Chile are not significantly connected with other transnational crimes. Sernapesca, the agency responsible for managing fisheries in Chile, is mainly aware of and focused on customs and tax fraud as a convergent crime.

Current Enforcement in Chile

In 2007, the Chilean government conducted a search and rescue operation in response to a fire aboard the foreign fishing vessel, Hercules. This event drew the Chilean government's attention to the extent of foreign vessel presence on the edge of its EEZ. As a result, DIRECTEMAR, the branch of the Chilean Navy that handles IUU fishing, developed and implemented a strategy to combat IUU fishing by synchronizing information coming from satellite and other digital technologies, and to efficiently and effectively plan oceanic surveillance operations and fisheries control operations aimed at preventing illegal activity in the national EEZ and in the area regulated by the South Pacific Regional Management Organization (SPRFMO).

The government uses a series of Monitoring, Control, and Surveillance (MCS) systems in tandem with patrols. Chilean-flagged vessels larger than 12 meters are required to carry Vessel Monitoring Systems (VMS), which Sernapesca uses to monitor the national fleet and target patrol assets. Sernapesca has also begun to use unmanned aerial vehicle (UAVs) to monitor its artisanal fleet, most of which is too small to meet the VMS requirement. Images captured by UAVs have been used as evidence in prosecutions. The government primarily uses AIS to track foreign vessels.

In 2017, DIRECTEMAR piloted a program which provided satellite data to supplement vessel tracking systems. The pilot program has already identified the presence of these dark vessels on the edge of Chile's EEZ. While the availability of several information streams to distinguish between potential illegal fishing and other activities, like bunkering, have helped prioritize patrol assets, interviewees identified the need to more fully integrate information streams.

The information gathered from the satellite data highlights the need to have assets based in the country's island territories, like Juan Fernandez. The distance of Chile's archipelagos from the continent means that authorities are often unable to respond to suspected illegal activity in a timely manner, and as a result, the costly satellite information is wasted. Another challenge highlighted by the satellite data was the presence of support and transport vessels operating without AIS.

Juan Fernandez Marine Protected Area

The Juan Fernandez marine protected area (MPA) is a multiple-use site located in an archipelago 600 kilometers west of Valparaiso, Chile. The archipelago consists of three islands: Robinson Crusoe, Santa Clara, and Alejandro Selkirk. The MPA encompass 4,247 square miles and it is home to many rare and endemic plant and animal species, including the Juan Fernandez fur seal. To protect the area's rich marine wealth from artisanal and commercial fishing fleets, Chilean NGOs, the Ministry of the Environment, the Ministry of Foreign Affairs and other civil and state actors pushed for the increased protection of this vulnerable eco-region. The MPA is governed by the national fisheries and aquaculture service of Chile. This year, the government announced expand the size of the multiple-use MPA and to create a new marine park named "Mar de Juan Fernandez" encompass 274.611 square kilometers where fishing and other extractive activities will be banned, making this new marine park the largest of its kind in South America.

Summary of Tabletop Exercise Discussions

Red Team (Illegal Actors)

The red team modeled the behavior of illegal actors, aiming to subvert efforts by the green (the Chilean government, in this instance) and blue teams (external actors, including foreign governments and NGOs).

The red team largely aimed to maintain the status quo, which currently allows for foreign fishing vessels to engage in illicit activities. They discussed potential opportunities for evading monitoring, either by keeping AIS on to avoid suspicion while scrambling the signal, or turning the signal off all together. Because the penalties for getting caught fishing illegally are not very high, illegal operators, especially those who belong to larger fleets, have an incentive continue illegal fishing and do not see a major risk to their operations. Since their strategy has been effective, there's no impetus for change.

Green Team (Government Solutions)

The green team focused on developing internal solutions by the Chilean government to address the threat.

The green team advised the government to take the following steps: take advantage of existing patrol capabilities; take advantage of artisanal fishing groups to create a neighborhood ‘fishing’ watch; create an intelligence fusion center to enhance information collecting, storing, analyzing, and sharing practices and processes; encourage more government awareness on the threats associated with illegal fishing and therefore as a means to mobilize more resources; and “name and shame,” which was identified as one of the most effective techniques in the absence of the ability to patrol and have real-time enforcement.

Blue Team (External Solutions)

The blue team modeled behavior by foreign governments, NGOs, and other external actors.

The blue team identified two main gaps: first, the ease with which illegal fishermen avoid tracking, which is problematic because monitoring forms the basis of the Chilean government’s current enforcement strategy; and second, the lack of information sharing both across the government and with external actors. Solutions included: developing enhanced ability to detect vessels engaged in devious behavior through the use of innovative tracking technologies that integrate information such as satellites, Synthetic Aperture Radar and then use algorithms to detect dark vessels, like the project with OceanMind; change regulations for interdiction to allow enforcement officials to interdict based solely upon suspicious behavior; develop strict laws and rules about transponder tampering and make it a punishable offence; and increase external coordination, like publishing a compliance record. A publicly available compliance record provides an opportunity for NGOs to be involved in gathering and making public information about vessels and/or fleets employed in suspicious activities. The blue team also noted that by publishing compliance records, it would encourage other actors, like insurance groups, and financial institutions to get more involved to halt IUU fishing.

Recommendations

Station Assets Closer to Remote MPAs: At the operational level, one of the major challenges to combatting IUU fishing is the lack of assets near Chile’s remote MPAs for real-time enforcement. The government should consider options to station assets closer to the remote MPAs.

Further integration of Intelligence Fusion Centers: Chile’s existing intelligence fusion centers are a model in that they have played a major role in facilitating interagency information sharing. However, the centers could be expanded to include the Department of Justice and NGOs, in addition to the already present Navy, Coast Guard, and Sernapesca. Such a step would help to expand the community of action around IUU fishing enforcement in Chile.

Coordination between Different Agencies: As a result of the fusion centers, there is already a high level of coordination between the agencies charged with enforcement against IUU fishing. For example, port inspections are conducted by a team that represents the interagency.

International Cooperation at the Interagency Level: Chile already has a well-established interagency process for IUU fishing and relatively high capacity to address IUU fishing. The government should leverage this capacity and expertise to encourage regional cooperation at the interagency level. Similarly, the government could assume an active leadership role in establishing regional information sharing mechanisms.

Involve and Catalyze Artisanal Fishing Communities: Artisanal fishermen can serve as a valuable information network. The government should implement a public awareness campaign to work with artisanal fishing communities to create a community of action and to gather information on sightings of foreign fishing vessels in and near the EEZ. This step could also help to mitigate tensions between the government and artisanal fishing communities over the encroachment of foreign fishing vessels.

Build Capacity to Accept and Inspect Rather than Deny Fishing Vessels Request Port Entry: In the first year of PSMA implementation, Chile has denied access to two foreign fishing vessels based on information gathered from SPRFMO. While the ability of the government to gather the necessary information and to make a time-sensitive decision on port entry is a major benchmark, the next step forward for Chile in countering IUU fishing and building regional-level deterrence is to build capacity to accept rather than deny vessels that are suspected of having engaged in illegal activities.

Leveraging Satellite Imagery to Increase MDA Near High-value Fisheries: In Chile, foreign fishing vessels are targeting certain high-value species. The government, along with NGOs, can use ecological data on those fisheries to target satellite monitoring and flag vessels engaged in suspicious activities. That information can then be used to effectively and efficiently target assets.

Appendix II: Costa Rica

The IUU Fishing Threat in Costa Rica

In Costa Rica, the primary IUU fishing threat comes from the foreign industrial fleet, including longliners and purse seiners. An additional threat is associated with their domestic artisanal and commercial fleets. The small boats are often not captured by AIS, and while there is a VMS system, which is enforced on commercial ships, it has been very limited in its implementation and use on artisanal vessels. A systematic analysis and profiling of the foreign industrial fleet threat is currently being conducted in order best define enforcement strategies. According to IATTC records, the Costa Rican EEZ registers an annual capture rate between 24,000 to 30,000 metric tons. However, INCOPESCA, the official Costa Rican fisheries authority, sets a historical quota between 8,000 to 11,000 metric tons per year.

Moreover, foreign, largely industrial fleets are licensed by the government to fish in Costa Rica. These fleets typically fish for tuna or other high-value pelagic species. In March 2017, the National University of Costa Rica and MarViva published a study indicating that Costa Rican laws allow international fleets to capture 95 percent of tuna caught within the country's EEZ. The revenue generated from the licenses is nowhere near commensurate with the value of the fish caught. In fact the commercial value of the country's tuna catch is \$62 million annually, but Costa Rica receives only \$904,000 in license fees because the most of the fish is not landed or brought to market in Costa Rican ports. Furthermore, of the 25,000-30,000 metric tons of tuna caught in Costa Rican waters, which is twice the authorized quota set by INCOPESCA, just 5,000 ended up being processed domestically. Most of the catch is taken to processing facilities in neighboring countries, so the economic value does not return to the Costa Rican economy. Some suggest that this asymmetry exacerbates the economic struggles of local fishermen. The current administration is working to balance the interests of industry, the artisanal sector, and ecosystem health.

It is projected by some in the government and the NGO community that the presence of foreign fishing vessels is expected to significantly increase in the coming years. The July 2017 interdiction of the Chinese-flagged *Fu Yuan Yu Leng 999* in the Galapagos with a load of thousands of sharks, as well as previous incidents involving distant water fishing fleets along the Pacific coast of South America, have put the threat of illegal fishing by foreign vessels on the radar of the Costa Rican government. The *Fu Yuan Yu Leng 999* incident caught the attention of enforcement agencies of the Eastern Pacific, which estimated that about 600 Chinese fishing vessels were operating in the Pacific waters between Costa Rica and Chile. In the process of this research, top officials remarked that, as stocks globally face increasing stress and depletion, they foresee a threat from distant water fishing fleets operating farther from home in Costa Rica's waters, which also have abundant sharks, in the coming years.

In addition to the IUU fishing threats outlined, South American narco-trafficking and its networks and routes are strongly linked to the Costa Rican fishing industry. There are two primary drug trafficking threats: traffickers from Ecuador and Colombia who bring products to Costa Rica by boat and land them on remote shorelines to be further shipped north; and traffickers who cross the Costa Rican EEZ to land products in neighboring Guatemala. For artisanal fishermen, whose livelihoods are threatened by collapsing stocks and who tend to live in areas with limited economic options, the drug trafficking industry offers an alternative source of income. One issue of concern is that the government has a program that provides fuel subsidies to the national artisanal fleet. The program historically has had little government oversight. As a result, artisanal fishermen are known to support the drug trafficking industry by selling and shuttling government-subsidized fuel to traffickers at sea.

Cocos Island Marine Protected Area

Located 550 kilometers from Costa Rica, Cocos Island is a national park surrounded by a 12-mile no-take MPA zone. Cocos Island was designated as a national park in 1978, and the surrounding MPA was established in 1982. In 2002, the MPA boundaries were extended. At the 2016 Our Ocean Conference, Costa Rica announced that it plans to expand the protected waters around the island by almost 10,000 square kilometers. In 2011, the government announced the creation of a separate but adjacent conservation area, the Seamounts Marine Management Area (MMA). The MMA, which protects a group of deep seamounts located 35 miles south of Cocos Island, is intended to serve as a buffer for Cocos Island MPA. The addition of the Seamounts MMA to the Cocos Island MPA makes it that largest protected area in Costa Rica and the second largest in the Eastern Tropical Pacific.

There are three main challenges to enforcement at the MPA. The MPA is remote, the Coast Guard is not present, and current enforcement assets are inadequate or nonexistent. Enforcement is conducted entirely by SINAC rangers using small boats. The rangers are focused on stopping illegal fishing within the MPA and often lack the capacity to make arrests. As a consequence, they mostly serve a deterrence role.

Current Enforcement in Costa Rica's Cocos Island MPA

The National System of Conservation Areas (SINAC) has a ranger station on Cocos Island, but the rangers have limited patrol capacity due to a lack of patrol assets. The lack of vessels also limits transportation to and from the island. The government does not have a transportation system to the island, but rather relies on two tourism companies that leads tours to Cocos Island to ferry rangers to and from the mainland.

In 2011, a coalition of NGOs installed a system of radars on the island, but due to the remote location of the island, maintenance of the radar is a problem. There is also limited radar coverage of the southeastern side of the island, which presents a gap in monitoring. However, the primary IUU

fishing threat from artisanal fleets often takes place in the area covered by the radar. The radar is used by the park rangers, as well the Coast Guard for enforcement against other maritime crimes, particularly narco-trade. The MPA is a no-take fishing area, yet certain types of non-fishing vessels are permitted within the park boundaries. The radar's image can be used as proof of presence in the park but not as proof of illegal fishing.

When a park ranger catches persons fishing in the MPA, they can seize the vessel and catch, detain the fisher, and file a criminal complaint with the courts. Beyond patrolling the large area with limited resources, transferring fishers caught fishing illegally to Puntarenas, where they are then arrested, poses an additional challenge. As a result, in most cases, perpetrators are released with a warning. The captains of vessels who have received multiple warnings can be fined. In the rare case of an interdiction of a boat illegally fishing, park rangers inform a prosecutor in Puntarenas and the captain of the vessel is expected to present him/herself at the port. There are currently also plans to secure a boat with limited oceanic capabilities, which would extend the coverage of the park rangers and provide a transportation solution to the mainland.

An increased Coast Guard presence at Cocos Island would provide much-needed support for the park rangers. In conjunction with the installation of the radar on Cocos Island, the Ministry of Public Security and the Coast Guard agreed to assign at least 12 Coast Guard personnel to the area. Historically, labor laws prohibited Coast Guard personnel from being stationed at Cocos Island for extended periods of time, which is almost inevitable given limited transportation to and from the island. In May 2018, however, the Coast Guard is scheduled to receive two new patrol vessels from the USG that will give them the autonomy to operate around Cocos Island. Additionally, Conservation International and Friends of Cocos Island have begun conducting enforcement workshops with the Coast Guard that included the familiarization of satellite monitoring and surveillance platforms. Conservation International, Friend of Cocos Island are developing a process to expand operational and analytical capacities with both the Coast Guard and SINAC officers, and is expected to be implemented during 2018.

The main challenges to enforcement in and around the Cocos Island MPA are: (1) limited resources; (2) limited human capacity; and (3) limited patrolling capacity due to lack of vessels and other equipment.

INCOPESCA is a quasi-governmental entity responsible for managing the nation's fishery. Many suggested that INCOPESCA appears to be more supportive of the financial interests of the commercial fishing fleet than taking enforcement actions and developing sustainable fisheries. INCOPESCA did not return any emails or calls from the Stimson Center during the initial research phase nor did they send any representatives to the meeting despite many invitations and even urging by the Costa Rican government for them to attend.

Summary of Tabletop Exercise Discussions

Red Team (Illegal Actors)

The red team modeled the behavior of illegal actors, aiming to subvert efforts by the green team (the government) and the blue team (external actors).

The red team identified a variety of methods used by fishermen to engage in IUU fishing in and around the Cocos Island MPA. The two methods identified were using ocean currents to float fishing lines or Fish Aggregating Deceives (FADs) into the MPA and taking advantage of gaps in the island's radar to avoid monitoring. Similar to the red team that gamed the behavior of illegal actors at the Juan Fernandez MPA, the Cocos Island team underscored how the status quo benefits illegal actors.

Green Team (Government Solutions)

The green team focused on developing internal solutions by the Costa Rican government to address the threat.

The green team recommended expanding bilateral agreements with other countries in the region to include provisions for enforcement against IUU fishing. At present, bilateral enforcement agreements in the region are primarily focused on narco-trafficking. The green team also recommended amending Costa Rican labor laws to allow the Coast Guard to patrol for longer periods, which would permit the Coast Guard to play a larger role in enforcement around the Cocos Island MPA. Additionally, the team recommended amending the current law that requires fishermen accused of engaging in IUU fishing in the Cocos Island MPA to present themselves to the court in Puntarenas within 24 hours of the incident. Given the distance of the MPA from Puntarenas, this requirement is nearly impossible to meet, which discourages rangers from taking full legal action against perpetrators, and should be amended.

Blue Team (External Solutions)

The blue team modeled behavior by foreign governments, NGOs, and other external actors.

The team's recommendations included: expanding joint patrolling with neighboring countries to equip authorities to confront the convergence of IUU fishing and drug trafficking; conducting regional training workshops to build regional standards for monitoring and enforcement; integrating VMS systems with regional countries; and expanding cooperation with RFMOs, particularly the Inter-American Tropical Tuna Commission (IATTC) since tuna is the primary high-value fishery in Costa Rica.

Recommendations

Increase the Coast Guard Presence at Cocos Island: Due to the remote location of the MPA, as well as the limited capacity of the SINAC rangers, the Costa Rican government should increase the presence of the Coast Guard around the island. Recognizing that the Costa Rican government has already taken steps in this direction, NIAG attendees affirmed the important role that the Coast Guard can play in supporting SINAC.

Conduct Regional Enforcement Training Workshops: The convergence of IUU fishing and drug trafficking in Costa Rica and the region poses distinct enforcement challenges. The Costa Rican government should conduct regional enforcement training workshops and joint patrol exercises with neighboring governments to enhance the regional capacity to address the networked and confluent IUU fishing and trafficking threats.

Expand Cooperation with Relevant RFMOs: In Costa Rica, foreign fishing vessels are primarily focused on the tuna fishery. Their presence in Costa Rica is projected to grow in coming decades. To address the current and future impacts of foreign fishing vessels, the Costa Rican government should enhance cooperation and collaboration with the IATTC, which is responsible for the management of tuna in the eastern Pacific Ocean.

Address the Lack of Political Will and Undue Political Influences: NIAG attendees repeatedly emphasized the undue political influences around fisheries management and enforcement, as well as its impact on political will to combat IUU fishing. In recent years, certain entities within the Costa Rican government have made progress on prioritizing IUU fishing, but this progress must be expanded to engage INCOPECSA. Simultaneously, INCOPECSA should be reformed to limit the influence of the fishing industry within the agency.

Review the Fuel Subsidy Program: The Costa Rican Government provides fuel subsidies to fishing vessel owners. The program has been exploited in the past and has little oversight. As such, the fuel subsidy program should be changed in order to encourage the compliance of fishing boats with fisheries management policies. Such compliance measures could include mandatory use a vessel tracking system such as AIS or VMS.

Integration of Regional Maritime Monitoring and Surveillance Systems: In the region, all countries have vessel monitoring systems (VMS). However, the information collected by each country through VMS are proprietary to each government. Sharing these data with neighboring countries will allow other countries to expand their monitoring and enforcement capacities.

About and Acknowledgments

About National Maritime Intelligence-Integration Office

The National Maritime Intelligence-Integration Office (NMIO) is the principal advisor to the Director of National Intelligence on maritime issues and the unified maritime voice of the U.S. Intelligence Community (IC). The office works to facilitate the integration of maritime information, intelligence collection, and analysis in support of national policymakers. Part of NMIO's charter is to foster a global maritime community of interest, advocating for the IC to collect and integrate data across the maritime domain.

About National Geographic Pristine Seas

Pristine Seas is a National Geographic project to explore, research, and advocate for the creation of MPAs. National Geographic Explorer-in-Residence Enric Sala launched Pristine Seas in 2008 to explore and help protect the last wild places in the ocean. Through partnerships with government and private sector leaders, as well as other NGOs, Pristine Seas helps identify areas for protection and work with local stakeholders to design management plans. Pristine Seas has been involved with the establishment of 15 MPAs. The two MPAs selected for case studies for the September NIAG meeting, Cocos Island and Juan Fernandez, are both Pristine Seas projects.

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The Environmental Security Program at the Stimson Center explores the intersections of natural resource theft and management with national and global security. The increasingly complex and transnational drivers of resource theft and degradation compromise ecological, economic, and food security, and ultimately foster destabilization and geopolitical tension. Through its engagement with unconventional stakeholders to broaden the community of interest and action around resource theft,

particularly IUU fishing, the Stimson Center works to identify the roots of these threats to peace and stability and advocate for innovative, network-oriented solutions.

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