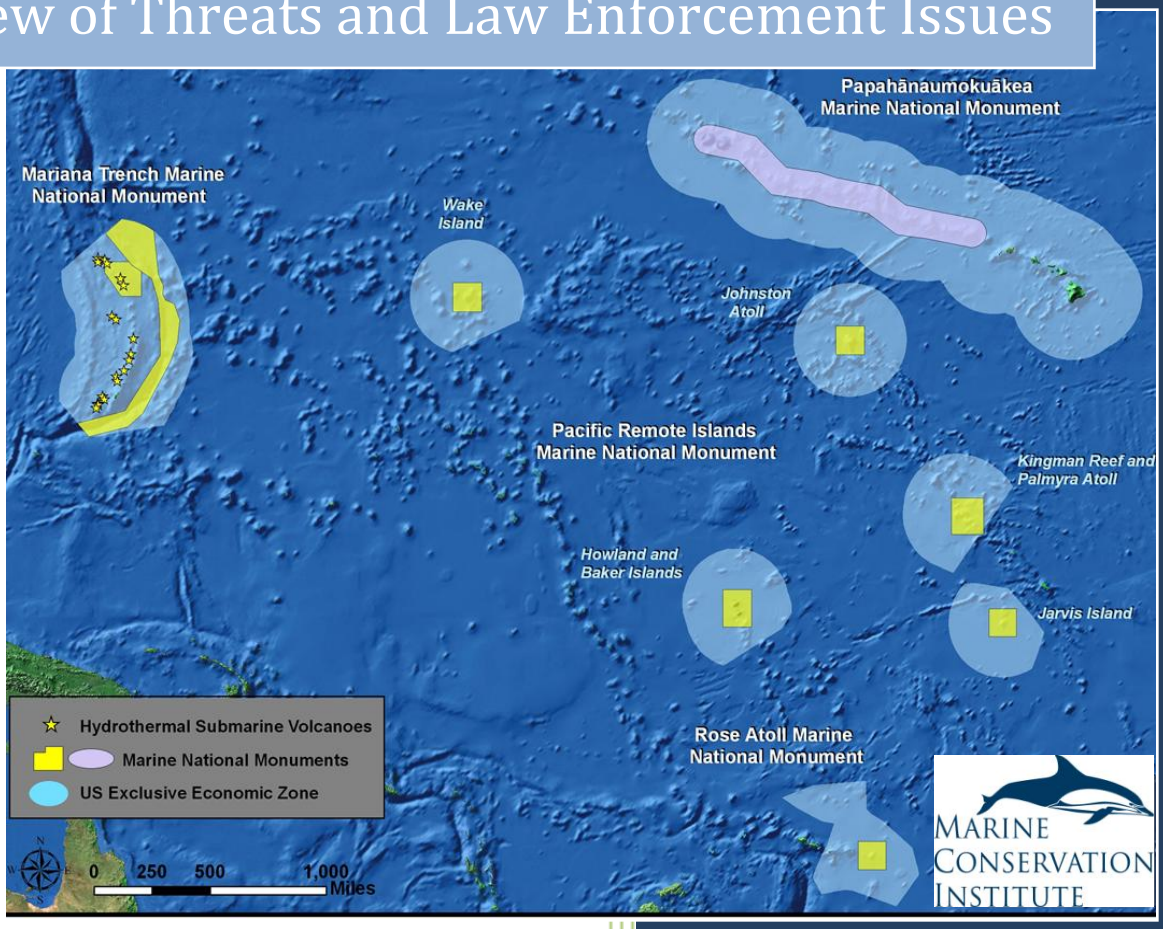
Protecting America's Pacific Marine Monuments:

A Review of Threats and Law Enforcement Issues



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Executive Summary

In January 2009, President George W. Bush exercised his authority under the Antiquities Act of 1906 to establish the Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments. Collectively, the three monuments encompass nearly 200,000 square miles of low coral islands and their surrounding pelagic zones, which extend roughly 50 nautical miles (nm) seaward of island shorelines. These areas harbor some of the last relatively pristine marine ecosystems in the Western and Central Pacific Ocean, and are home to countless species of marine wildlife, including dolphins, whales, turtles, seabirds, fish, invertebrates, and corals. The presidential proclamations creating these areas prohibit all commercial resource extraction activities, explicitly ban commercial fishing, and allow limited subsistence or recreational fishing.

The creation of the monuments reflects a growing trend in ocean protection as nations shift their focus away from smaller, coastal Marine Protected Areas (MPAs) in favor of larger areas that capture an array of marine ecosystems and biodiversity (e.g., the South Georgia & South Sandwich Islands Marine Protected Area created in 2012 spans 386,372 square miles). Unfortunately, large ocean areas remote from human populations are difficult and costly to manage and enforce. Without the provision of sufficient resources, even government agencies of wealthy nations cannot monitor these places on a consistent basis, let alone manage and protect them at a level commensurate with their status as internationally recognized conservation areas.

To ensure that the US Pacific marine national monuments (MNMs) in the Western and Central Pacific do not simply linger as "paper parks," Marine Conservation Institute assessed the major human threats to these areas and reviewed the current performance of US law enforcement agencies in deterring and prosecuting activities that could prove catastrophic to monument ecosystems. Based on an analysis of vessel traffic in the region, damage to the Pacific MNMs is likely to occur in one of the following ways: 1) illegal fishing activity by US or foreign fishing vessels; 2) accidental groundings and oil spills by large commercial vessels (e.g. container ships or tankers) or fishing vessels; or 3) introduction of invasive marine or terrestrial species by small recreational vessels (e.g. sailboats) that trespass in nearshore island waters or on the islands themselves. A synthesis of government documents, personal interviews with federal enforcement staff, and information from international fishery management organizations shows that vessel-based threats continue to manifest themselves inside Pacific marine national monuments. For example:

- Since the monuments were created in January 2009, there have been low but consistent levels of illegal fishing by US-registered vessels inside the boundaries of Rose Atoll and Pacific Remote Islands MNMs.

- Foreign fishing vessel incursions are a regular occurrence in the vast and discontinuous US Exclusive Economic Zone (EEZ) in the Western and Central Pacific

Ocean; there have been at least two documented cases of foreign vessels fishing illegally inside Marianas Trench MNM, and many more suspected violations.

- There have been several documented cases of attempted or actual illegal trespass by recreational sailing vessels at various islands within the Pacific Remote Islands MNM; in one case the presence of an invasive terrestrial species (a rat) was linked to a trespassing vessel at Johnston Atoll, which previously had been cleared of rats.

- Historically, commercial fishing vessels have posed the greatest threat of accidental groundings and spills; in the last 25 years there have been groundings on Rose Atoll, Palmyra Atoll, and Kingman Reef, all of which caused significant and lingering damage.

- Large container and tanker vessels pose a potential threat of catastrophic contamination and physical damage to the monuments through accidental groundings and spills, but the frequency and location of commercial vessel traffic are not routinely tracked or made public by federal agencies or international agencies.

In addition to documenting these threats, we analyzed routine law enforcement operations in the Pacific Islands region to assess government agency capabilities to track, respond to, and deter illegal activity. To effectively deal with threats, federal law enforcement agencies need to have a minimum set of things in place, including: 1) clear and enforceable regulations; 2) adequate financial, human, and technological resources; 3) a surveillance and monitoring system that detects vessels in real-time; 4) an effective public outreach and education program that contributes to voluntary compliance; and 5) a mechanism for interagency cooperation that allows agencies to leverage scarce resources and find collaborative solutions to problems.

Using these conditions as a framework for analysis, we identified various issues, gaps, and constraints that hinder effective law enforcement in the region. Major ones are summarized here:

1. There are currently no enforceable regulations that prohibit commercial fishing by US vessels in the Marianas Trench, Rose Atoll, and Pacific Remote Islands National Monuments, even though the proclamations immediately prohibited such fishing in January 2009. Furthermore, the USFWS penalty schedule for wildlife infractions may not be sufficient to deter illegal activity in marine waters under USFWS management. Finally, current provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) limit the effectiveness of US Coast Guard law enforcement activities in the Pacific Islands region.

2. USFWS, NOAA, and US Coast Guard are underfunded and underequipped to carry out their expanding portfolio of environmental protection mandates in the Pacific Islands region. The vast size and discontinuous nature of the US EEZ pose a huge

logistical and operational challenge for enforcement agencies that has yet to be sufficiently recognized and accepted by national level agency leadership.

3. USCG and NOAA rely heavily on vessel monitoring systems (VMS), in combination with air and sea patrols, to provide the bulk of our information about fishing vessel activity. However, these two surveillance methods currently provide only a partial picture of realities on the water. The Coast Guard has far too few physical assets to patrol the vast US EEZ, and current international VMS data sharing policies limit the ability to track foreign vessel incursions in US waters. USFWS has documented illegal trespass by recreational vessels on several occasions within the monuments, but lack of a staff presence on many islands hampers its ability to deal with trespass. Creative approaches to surveillance and planning could bridge these gaps and improve overall maritime domain awareness.

4. USCG and NOAA outreach to the fishing community are somewhat effective, but limited in scope. USFWS outreach to ocean user groups with respect to the Pacific monuments is largely non-existent, due to staffing and funding shortages. Expanded outreach efforts with US fishermen and recreational boaters potentially could increase voluntary compliance rates and leverage 'crowdsourcing' assistance from mariners to improve surveillance in remote marine areas. Furthermore, the three Pacific monuments are not currently depicted on official NOAA nautical charts, a deficiency that could be easily remedied by NOAA.

5. The creation of Rose Atoll, Marianas Trench, and Pacific Remote Islands US Marine National Monuments presents a unique management challenge to federal agencies in a time of constrained and diminishing budgets. Effective management of these large remote ecosystems requires a mindset that involves collaboration and creative thinking to ensure they are cared for in a manner consistent with their status as national treasures. However, there is currently no formal coordinating mechanism to foster cooperation and collaboration between the three management and enforcement agencies.

To address these problems, Marine Conservation Institute makes several recommendations for policy and operational changes that would improve the overall performance of enforcement agencies. The recommendations were discussed with federal agency stakeholders at a Pacific Monuments Enforcement workshop that took place April 25-26, 2012 in Honolulu HI. The workshop emphasized inter-agency collaboration in a resource-constrained environment. The recommendations can be grouped into four broad categories:

1. *Policy/Regulatory changes*: Above all else, NOAA needs to move quickly to establish fishery regulations that implement the presidential prohibition on commercial fishing in the monuments. These regulations are almost four years overdue. Without them, NOAA and USCG are legally powerless to prosecute cases of illegal fishing by US vessels in the monuments. In addition, small changes to certain provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) would

eliminate unnecessary costs for certain federal enforcement actions. Also, federal agencies should continue to work with other nations who are members of the Western and Central Pacific Fisheries Commission and the Foreign Fishing Agency to gain full access to VMS data collected by these entities to better track illegal foreign fishing activity inside the US EEZ.

2. *Greater emphasis on innovation*: Agencies should look for ways to augment traditional 20th century patrol and electronic monitoring techniques through innovative partnerships, and through the integration of science analyses with standard enforcement analyses. For example, enforcement agencies typically store large amounts of data on fishing activity but lack the analytical capacity to explore the data to depict patterns that explain the complex relationship between fisherman behavior and dynamic changes in the ecosystem. Partnering with science agencies and academia could help enforcement agencies better identify likely hotspots of illegal human activity.

3. *Improved ocean user outreach*: To eliminate confusion and unintentional violations, agencies should ensure monument boundaries are accurately portrayed on all relevant government and commercial nautical charting products. NOAA and USCG should also work together to improve use of their emergency hotlines to report illegal fishing activity, and work with USFWS to establish outreach programs to educate the recreational sailing community about the dangers and consequences of illegal trespass in National Wildlife Refuges within the monuments.

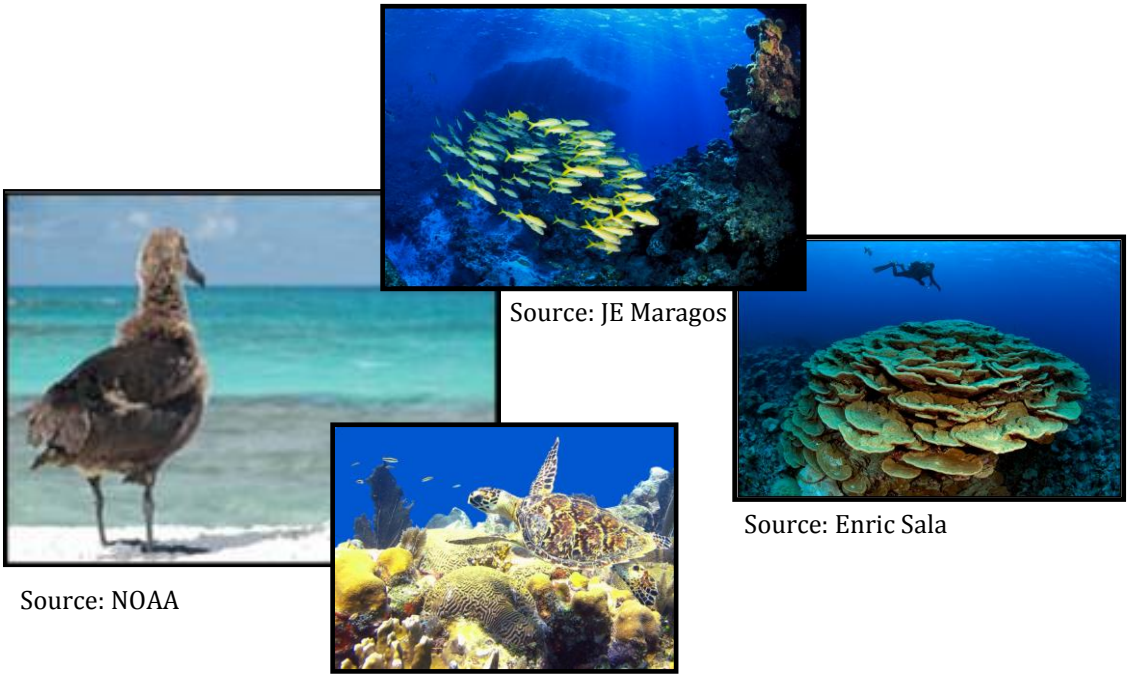
4. *Better coordination and transparency*: At a minimum, agencies should establish a formal working group or task force that is dedicated to dealing with shared challenges in protecting and managing the vast and remote US Pacific monuments. Progress toward meeting shared goals should be reviewed quarterly or biannually by the working group, with an annual strategy review led by the USCG 14th District Commander, NOAA Regional Administrator, and USFWS Regional Director. Agencies should coordinate their annual budget requests and work to promote the region's priorities at the national level. Furthermore, data on threats to the monuments and enforcement actions should be made publicly available on an annual basis.

The Pacific marine monuments are unprecedented in their geographic scope, ecological value, and national symbolism for ocean conservation. Their creation changes the landscape of ocean protection in the Pacific Islands region. Agencies must adapt traditional enforcement approaches to meet this new mandate. If implemented over the next 1-3 years, our recommended changes could help improve overall law enforcement performance in measurable ways. Collaboration and innovative thinking is essential to protecting the monuments and preserving their status as icons of ocean conservation in a time of flat or declining budgets.

Section I: Introduction

The Pacific US Marine National Monuments

The Marianas Trench, Pacific Remote Islands, and Rose Atoll Marine National Monuments were established in January 2009 by Presidential Proclamations 8335, 8336, and 8337 respectively, under authority of the Antiquities Act of 1906. The monuments comprise almost 200,000 square miles of emergent land, coral reef, and ocean habitat, and encompass several small US territories in the Western and Central Pacific and their surrounding pelagic waters. These areas contain some of the last relatively pristine marine ecosystems on the planet and harbor countless protected marine species, including dolphins, whales, turtles, seabirds, fish, invertebrates, and coral. The proclamations generally prohibit all resource extraction (with limited exceptions) and ban commercial fishing.



Source: JE Maragos

Source: Enric Sala

Source: NOAA

Source: Enric Sala

The President's proclamations gave the Secretary of the Interior (in consultation with the Secretary of Commerce) primary management authority over the three monuments. The secretary thereafter delegated management authority to the US Fish and Wildlife Service (USFWS). The Secretary of Commerce, in consultation with the Secretary of the Interior, has authority over fishing in pelagic waters of the monuments; this authority has been delegated to the National Oceanic and Atmospheric Administration (NOAA). In the Pacific Remote Islands Marine National Monument (PRIMNM), the USFWS manages all terrestrial and ocean areas 12 nautical miles (nm) seaward of the mean low water mark for Johnston, Howland, Baker, Kingman, Palmyra, and Jarvis; NOAA is responsible for managing pelagic fisheries seaward from 12 nm to the outer 50 nm boundary of the monument. Wake Island

is managed by the Department of Defense (DoD), as it maintains an active military base there; however, USFWS manages the waters out to 12 nm as a National Wildlife Refuge and NOAA manages fishing from 12 to 50 nm. The US Coast Guard (USCG) is not considered a resource management agency, in the traditional sense, but plays a vital role in enforcing US laws throughout waters controlled by the US.

Strong enforcement has been demonstrated to be one of the most important factors in the success of marine protected areas (MPAs), yet is particularly challenging in the case of large, offshore MPAs that cannot be routinely covered by traditional patrol craft.[1] Together with Papahānaumokuākea Marine National Monument, created in 2006 by President George W. Bush, the four Pacific marine national monuments collectively span more than 300,000 square miles of ocean, all of which must be patrolled by District 14 USCG. Many monument areas are interspersed among high seas waters and foreign exclusive economic zones (EEZs), where intensive fishing and other maritime activities take place. This situation presents a unique management challenge whereby law enforcement agencies must protect non-contiguous areas nestled within a complex patchwork of national and international laws and regulations.

Of all the Pacific monuments, PRIMNM is the most logistically challenging to manage and protect, as it encompasses seven disparate islands and atolls spread across the Western and Central Pacific Ocean (WCPO) (Figure 1).

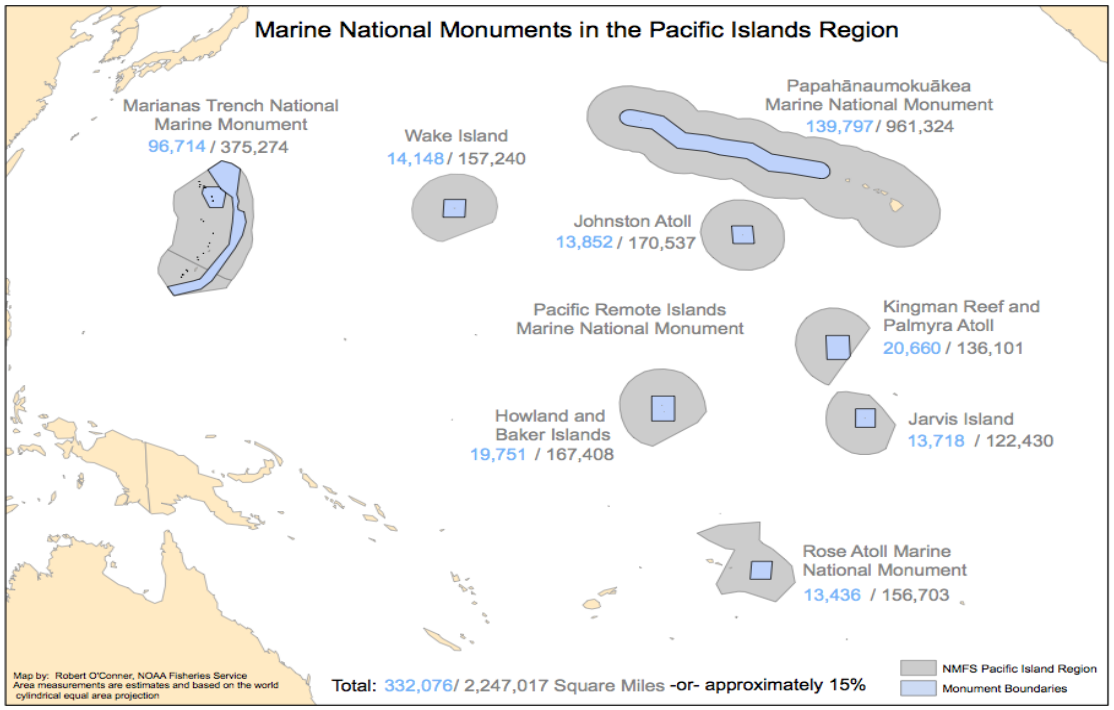


Figure 1. Marine National Monuments in the Pacific Islands Region. Source: NOAA

[1] Kaplan DM, Chassot E, Gruss A, Fonteneau A; "Pelagic MPAs: the devil is in the details." Trends Ecol Evol. 2010 Feb; 25(2):62-3

Objectives and Methodology

The goals of this report are to document the major human threats to US marine national monuments (MNMs) in the Western and Central Pacific and to improve the performance of US law enforcement agencies in deterring and prosecuting activities that could prove catastrophic to monument ecosystems. To determine the extent and gravity of threats, we looked at *vessel-based sources of harm* that are likely to affect the protection and conservation of the Pacific marine national monuments. We identified three major threats: illegal fishing activity, damage from accidental groundings, and introduction of invasive or nuisance species by trespassing vessels. We did not cover more generalized threats, such as ambient marine pollution and debris, climate change, or ocean acidification, as these threats are global in nature and extend beyond the control of the Pacific monument managers.

To determine the extent of federal agency capabilities to detect and respond to vessel-based threats, we drew upon conservation law enforcement literature and previous Marine Conservation Institute workshops with federal agencies that discussed the core components of effective law enforcement. In general, effective law enforcement for the Pacific marine national monuments (and wider region) depends on the following:

1. Clear and enforceable regulations;
2. Adequate financial, human, and technological resources;
3. A surveillance and monitoring system that detects vessels in real-time;
4. Effective public outreach and education that contribute to increased voluntary compliance; and
5. A mechanism for cooperation that allows federal agencies to leverage scarce resources and seek collaborative solutions to challenges.

We examined law enforcement agency operations and capabilities for each of those components to assess their soundness.

Because data from the enforcement sector is often classified, deemed too sensitive for public release, or simply not made public, the conclusions drawn in this paper rely on *publicly available* government documents, unclassified data obtained via Freedom of Information Act (FOIA) requests, insights gleaned from personal communications, and academic literature. To validate our analysis and recommendations, Marine Conservation Institute held a workshop with federal enforcement agencies in April 2012 in Honolulu, Hawaii. The workshop was a collaborative process meant to further identify and refine key threats and management challenges in the Pacific monuments. Participants also identified pragmatic solutions to problems which could be reasonably implemented over the next one to three years. However, the conclusions and recommendations of this report are solely those of Marine Conservation Institute.

US law enforcement agencies in the Pacific Islands region function in a much different context than regional offices in other parts of the country. Pacific-based offices are tasked with enforcing marine conservation laws over a discontinuous US EEZ that covers 1.5 million square miles—one third of the entire US EEZ. In addition to regulating US fishermen, NOAA and USCG must help enforce international treaties, to which the US is a party, that govern the lucrative tuna fishery that takes place both within the EEZs of a number of small island states and in the high seas. Tuna are heavily fished by distant-water fishing fleets, made up of vessels that fish outside of their national waters. A large portion of enforcement work in the region involves working internationally with partner nations and regional fishery authorities to prosecute foreign entities that violate US laws or international treaties. In short, the overall effectiveness of US law enforcement is dependent on agencies' ability to play the role of both policeman and diplomat.

NOAA, USFWS, and USCG each play a different role in enforcing protection of marine national monuments and living marine resources in the Pacific Islands region. Here is a brief summary of their respective missions and organizational details.

National Oceanic and Atmospheric Administration

NOAA Office of Law Enforcement (OLE) is responsible for enforcing over 35 different US maritime statutes, covering everything from marine mammal protection to fisheries management. OLE has jurisdiction over 3 million square miles of US ocean waters and 85,000 miles of coastline, as well as the National Marine Sanctuary System and fisheries in marine national monuments. The office also enforces US treaties and other international agreements governing the high seas and international trade. NOAA OLE, Pacific Islands Division enforces not only the traditional civil and criminal statutes involving fisheries and protected resources, but must also work cases that involve multiple agencies and jurisdictions and transnational nexuses.[2] At both the national and regional level, OLE's staff is made up of special agents that investigate criminal and civil cases, and enforcement officers that perform routine inspections to ensure compliance. NOAA also employs a small number of technical staff to maintain vessel tracking systems (VMS) that help ensure compliance by the US fishing fleet.

NOAA Office of General Counsel, Enforcement Section (GCES), formerly known as the General Counsel for Enforcement and Litigation, prosecutes civil penalty cases, permit sanctions, and administrative forfeitures for violations of fishery and other maritime laws. Criminal cases are usually turned over to the US Department of Justice for prosecution. The GCES attorney in Hawaii has special authority to assist in these cases. The GCES attorney in Hawaii also advises on NOAA enforcement policies and is involved in international negotiations through the Western and Central Pacific Fisheries Commission.

[2] NOAA. 2012. *NOAA's Office of Law Enforcement Workforce Analysis and Staffing Allocation Plan*. Retrieved June 20, 2012 from http://www.nmfs.noaa.gov/ole/docs/2012/ole_workforce_analysis_plan.pdf

US Coast Guard

The US Coast Guard (USCG) is responsible for meeting 11 different statutorily-mandated homeland security and maritime missions. USCG's maritime law enforcement program encompasses two mission areas that are particularly important for the monuments. The *Living Marine Resources* mission area deals with enforcing US domestic fisheries law and laws governing protected species or marine protected areas, such as the monuments and National Marine Sanctuaries. USCG's *Other Law Enforcement* mission area involves protecting the US EEZ against foreign fishing vessel incursions and enforcing high seas and international fisheries agreements.

The US Coast Guard's Fourteenth District includes USCG Sectors Honolulu and Guam. USCG has jurisdiction for enforcing and protecting US marine protected areas and fisheries throughout the 1.5 million square miles of US EEZ in the Western and Central Pacific Ocean. USCG is the only enforcement agency with the air and sea assets capable of patrolling this vast area, and thus acts as the primary on-scene presence to detect, intercept, and interdict illegal activity on the ocean.

US Fish and Wildlife Service

Although NOAA and USCG have primary authority for enforcing marine conservation and fisheries laws, the US Fish and Wildlife Service (USFWS) has become a more prominent player in the Pacific region by virtue of the Department of the Interior's authority to protect national monuments under the Antiquities Act, and its authority over the national wildlife refuges that lie at the heart of the monuments. USFWS carries out natural resource law enforcement in two ways: The USFWS Office of Law Enforcement has Special Agents who investigate cases of illegal trade and exploitation of protected wildlife, and uniformed Wildlife Inspectors stationed at points of entry along the border who serve as a "front line of defense" in detecting illegal trade in wildlife and wildlife products. The USFWS also has uniformed National Wildlife Refuge Officers stationed at refuges. These officers protect wildlife and wildlife habitat, guard USFWS facilities, and ensure visitor and employee safety. Refuge officers often work with other federal, tribal, state, and local law enforcement agencies that have overlapping jurisdiction within or adjacent to the refuges.[3]

Other Agencies

Partnerships with other federal, state, and international authorities are critical to the success of law enforcement in the Pacific. The USCG and NOAA work closely with the US Department of State on transnational cases, and work through partnerships with international fishery management authorities (see below) to help implement international conservation and enforcement measures. NOAA also has Joint Enforcement Agreements (JEAs) with many state law enforcement agencies that can leverage additional state officers

[3] FWS. 2008. *DOI Law Enforcement Jobs*. Retrieved on December 29, 2011 from http://olesem.doi.gov/jobs/fields/fwsrefugeofficer.html

and patrol assets to enforce federal fishery laws; NOAA provides states and territories with funding assistance under these agreements. In at least one recent case where NOAA and USCG seized a foreign vessel that was illegally fishing in US waters, the JEA with the government of Guam enabled Guamanian officers to help safeguard the crew and vessel after it was escorted to port.

International Enforcement Authorities

Western and Central Pacific Fisheries Commission

The Western and Central Pacific Fisheries Commission (WCPFC) was created when the *Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean* came into effect in 2004. The WCPFC exists as a regional governing body to promote multilateral coordination on the conservation and management of highly migratory species of tuna and billfish, and to address regional problems of illegal, unreported, and unregulated (IUU) fishing, insufficient documentation and data collection, excessive fleet capacity, and improper use of fishing gear. The WCPFC comprises 26 members, including the United States, the European Union, Canada, Japan, China, South Korea, and Australia. The commission also has a number of "cooperating" non-members and participating territories. There are currently over 6,000 active vessels listed on the WCPFC register, the majority of which are tuna longline, purse seine, or fishery support vessels.

To ensure compliance with its conservation and management measures, the WCPFC has established a monitoring, control, and surveillance program (MCS) that consists of several elements:

1. A centralized registry of vessels authorized to fish in the region;
2. A regional observer program;
3. A high seas boarding and inspection protocol that allows member countries to conduct high seas patrols;
4. A vessel monitoring system; and
5. An IUU list that contains vessels known to have committed fishing violations.

The IUU vessel list maintained by the commission acts as a powerful incentive for member countries to monitor and regulate the activities of their flagged vessels because any vessel on the active IUU list is prohibited from engaging in fishing activities in the WCPFC region. Also, countries wishing to become members of the commission are under incentive to ensure their vessels operate in compliance with WCPFC rules. The WCPFC also works closely with other international management bodies to ensure compliance and implement MCS measures, including the Forum Fisheries Agency (FFA) and the Secretariat of the Pacific Community, which provides data collection services for the WCPFC.[4]

[4] Western and Central Pacific Fisheries Commission (WCPFC). 2011. *Frequently Asked Questions (FAQs)*. http://www.wcpfc.int/frequently-asked-questions-and-brochures

Forum Fisheries Agency

The Forum Fisheries Agency (FFA) was established by the *South Pacific Forum Fisheries Agency Convention* signed in 1979. The FFA exists to strengthen regional solidarity and enhance the national capacity of its 17 member countries to effectively manage and conserve the tuna stocks within their respective EEZs.[5] Many Pacific Island nations depend on foreign revenue from sales of fishing rights and foreign development aid from distant-water fishing nations as major sources of national income, yet lack the resources and training to effectively regulate foreign fishing within their waters. Through FFA membership, small island nations rely heavily on international cooperation and assistance from member countries, such as Australia and New Zealand, to provide enforcement assistance and monitoring, as well as on partnerships with Western nations such as the US and France, which have strategic territorial interests in the region. For example, under the South Pacific Tuna Treaty of 1987, the US provides development aid to FFA nations in exchange for access by US fishing vessels to foreign waters. The US also provides C-130 aerial patrols and other coordinated enforcement efforts to bolster Pacific Island nations' ability to enforce fishery management within their EEZs.

[5] Food and Agriculture Organization of the United Nations (FAO). 2012. *Regional Fishery Bodies Summary Descriptions: Forum Fisheries Agency (FFA)*. http://www.fao.org/fishery/rfb/ffa/en

Section II: Threats to the Pacific Monuments

Illegal Fishing

The Pacific monuments are embedded in a region that is home to the largest and most important tuna fishery in the world. Catching and processing tuna is a multi-billion dollar industry that yielded over 2.41 million metric tons (mt) of legally caught fish in 2010.[6] There are currently approximately 6,000 vessels registered with WCPFC to fish on the high seas, and approximately 1,500 vessels registered by the FFA to fish in Pacific Island nations' EEZs. Longline and purse seine vessels conduct the majority of distant water fishing fleet activity in the region; however, the majority of the catch (~75%) is taken by purse seine vessels.[7] Fishing activity has historically been dominated by the "big four" distant water fishing nations (Japan, Korea, Taiwan, and the United States). There has been a push in recent years for Pacific Island nations to develop and manage their own large-scale fisheries. Distant water fishing nations are licensed to fish in island nation EEZs in exchange for access rights payments or development aid; in many cases, foreign income from these sources represents up to 50% of national revenue for the recipient nation.

IUU trawler. Source: NOAA, Mike Markovina

With thousands of vessels in the region pursuing lucrative tuna stocks, there is strong incentive for some vessels to cheat the system. IUU fishing is a major concern in the Western and Central Pacific Ocean (WCPO), and accounts for an estimated 34% of the total fish catch in the region.[8] The IUU fishing problem is exacerbated by the fact that many Pacific Island nations simply do not have the resources needed to enforce their maritime laws. To address this threat, both the WCPFC and FFA play a major role in fisheries enforcement in the WCPO region by helping sustainably manage and monitor fish stocks on the high seas and within their member nations' EEZs. Both organizations operate separate vessel monitoring system (VMS) for member vessels, and have implemented conservation measures to ensure sustainability of tuna fisheries.

Fishing activity in the region is driven largely by the biology of the targeted species, which is often strongly correlated with sea surface temperatures and location of oceanographic fronts and currents and bathymetric features such as seamounts. The two highest threats

[6] Williams P. & Terawasi P. 2010. *Overview of Tuna Fisheries in the Western and Central Pacific Ocean, Including Economic Conditions – 2009*. In: 6th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, WCPFC-SC6, Honolulu, HI, USA, 10-19 August 2010, GN WP-1 pp. 1-46.
[7] Ibid.
[8] Agnew D.J., Pearce J., Pramod G., Peatman T., Watson R., Beddington J.R., and Pitcher, T.J. 2009. *Estimating the Worldwide Extent of Illegal Fishing*. PLoS ONE 4(2): e4570. doi:10.1371/journal.pone.000457

to US marine national monuments come from US and foreign distant-water purse seine fleets that target skipjack tuna (*Katsuwonus pelamis*) for the canned tuna market; and distant-water tropical longline fleets that primarily target bigeye (*Thunnus obesus*) and yellowfin (*Thunnus albacares*) tuna for the fresh and frozen sashimi markets. Longline effort is widespread across the Pacific, while purse seine activity is distributed primarily along the equatorial warm water pool (average surface temperatures > 28.5 degrees Celsius) associated with skipjack presence.

There is a strong seasonal component to the location of the warm water pool which has implications for fishing pressure near some US marine monuments. During El Niño-Southern Oscillation Index (ENSO) years, the pool extends eastward, attracting increased purse seine activity in the national waters of Kiribati and in areas surrounding the remote US EEZs of Howland/Baker, Kingman and Palmyra, Jarvis, and American Samoa. In contrast, during La Niña years, environmental conditions generally restrict purse seine fishing efforts to the western regions of the WCPO, particularly to the waters of Papua New Guinea, Federated States of Micronesia, and Solomon Islands (Figures 2 & 3).

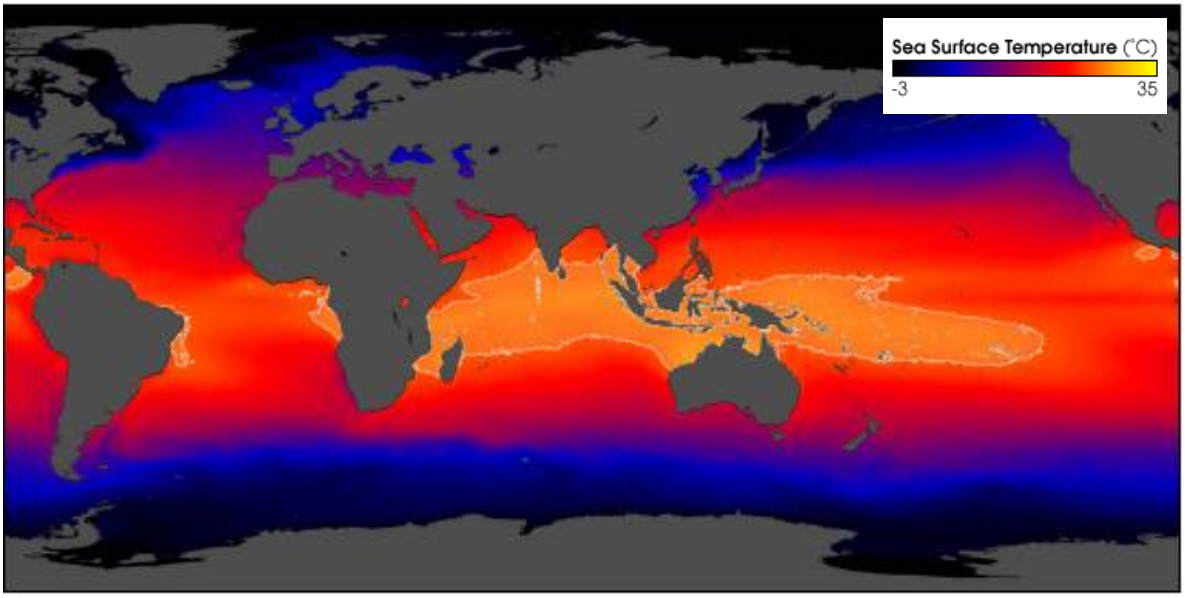


Figure 2: The Indian Ocean/West Pacific warm water pool (depicted by the orange area) extends almost halfway across the globe along the equator. The slow fluctuation of the size and intensity of the warm water pool are linked to intensity of El Nino events. Source: NASA[9]

[9] NASA. 2001. *Reverbrations of the Pacific Warm Water Pool.* http://earthobservatory.nasa.gov/Features/WarmPool/

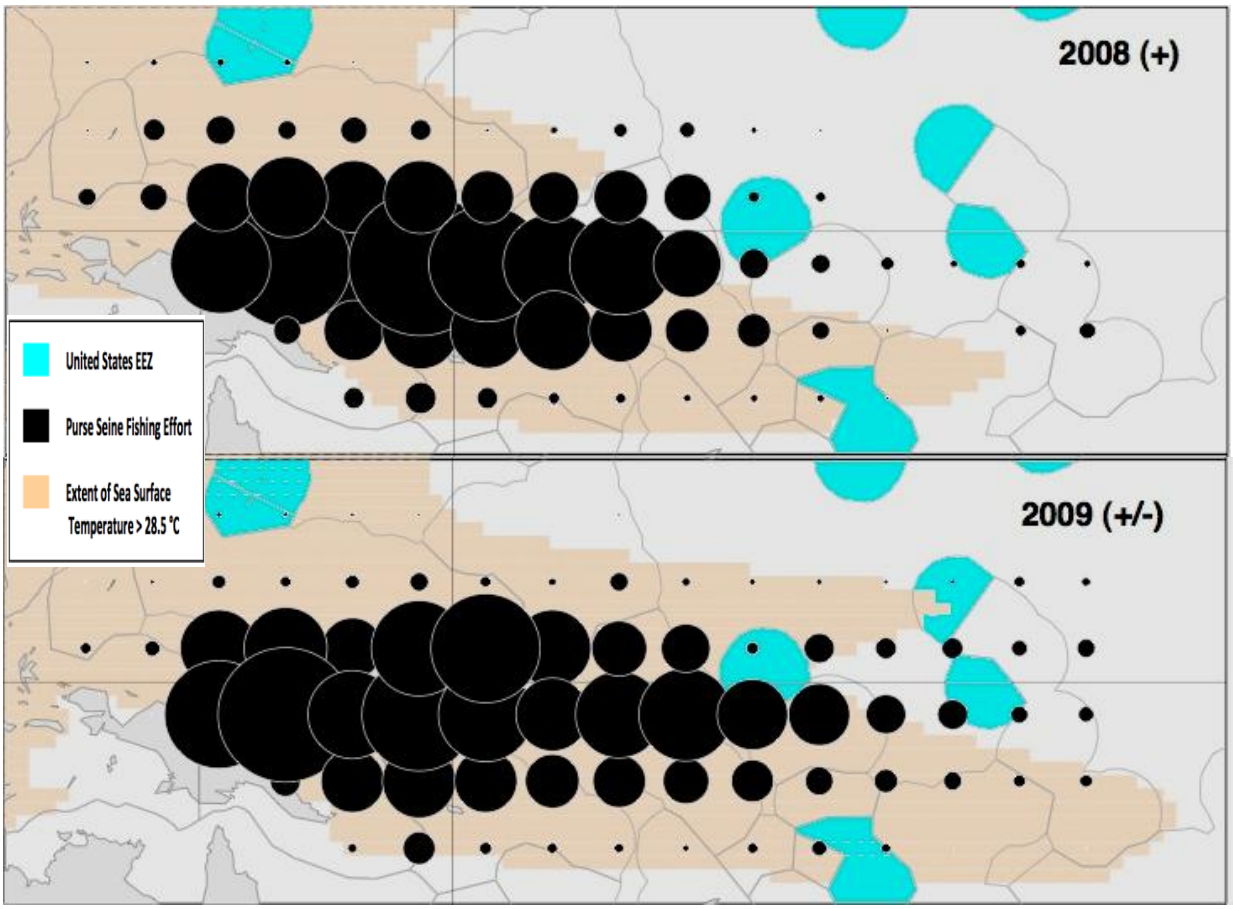


Figure 3: Example of a shift in both geographic extent of the Pacific warm water pool, and associated purse seine fishing effort, from 2008 (La Niña conditions) to 2009 (transition to ENSO conditions). Source: modified from Williams & Terawasi (2010).[10]

Foreign Fishing Vessel Threats in US Waters

Foreign fishing vessel incursions are a regular occurrence within US EEZ areas and represent a clear threat to US resources. To determine the extent of illegal foreign fishing activity in US waters, Marine Conservation Institute sent a Freedom of Information Act (FOIA) request to the USCG, asking for 14th District and headquarters data pertaining to *all detected foreign fishing vessel incursions* for the period 2001-2012 in the Western and Central Pacific Ocean (WCPO) high threat area (HTA), as defined in the USCG Annual Fisheries Enforcement Report submitted to the US Congress. For each detected incursion, we asked for the date of incursion, vessel name, vessel flag, specific EEZ where the incursion occurred, geographic coordinates (if available), and the farthest approximate distance inside the EEZ where the incursion was detected.

USCG measures its annual performance for its *Other Law Enforcement mission* (fisheries enforcement) by the total number of detected foreign vessel incursions nationwide. In this

[10] Williams & Terawasi, *op. cit.* page 7.

case, "detected incursion" means an instance where the USCG is aware of a foreign vessel *engaged in some type of suspected illegal fishing activity* within US waters: the vessel was spotted via routine air or sea patrols, reported by other national or international enforcement bodies, or discovered via satellite-based vessel monitoring systems. Each time a vessel is reported counts as one detected incursion. Thus, the same vessel may register multiple incursions. Detected incursions do not include foreign vessels that are simply navigating through our waters, which is allowed under the international doctrine of "innocent passage."

Only a very small percentage of vessel incursions are actually *intercepted* by the USCG. The size of the US EEZ simply makes it too difficult for USCG air and sea vessels to arrive in time to verify illegal activity, except in rare instances when they happen to be patrolling nearby. Even fewer vessels are *interdicted*, a term the USCG uses to mean a successful interception and subsequent law enforcement action, such as seizure of vessel and/or catch. For example, of the 26 detected incursions in the Western and Central Pacific portion of the US EEZ in FY 2009, USCG was only able to intercept 4 vessels and made only one successful interdiction.[11] This is largely due to the fact that USCG District 14 lacks sufficient planes, ships, and financial resources to execute its fisheries enforcement duties to the degree it would like throughout its vast area of responsibility in the WCPO. In comparison, in the Gulf of Mexico, another high threat area, the USCG had an interception rate of 59.4% and an interdiction rate of 13.0% in 2009.

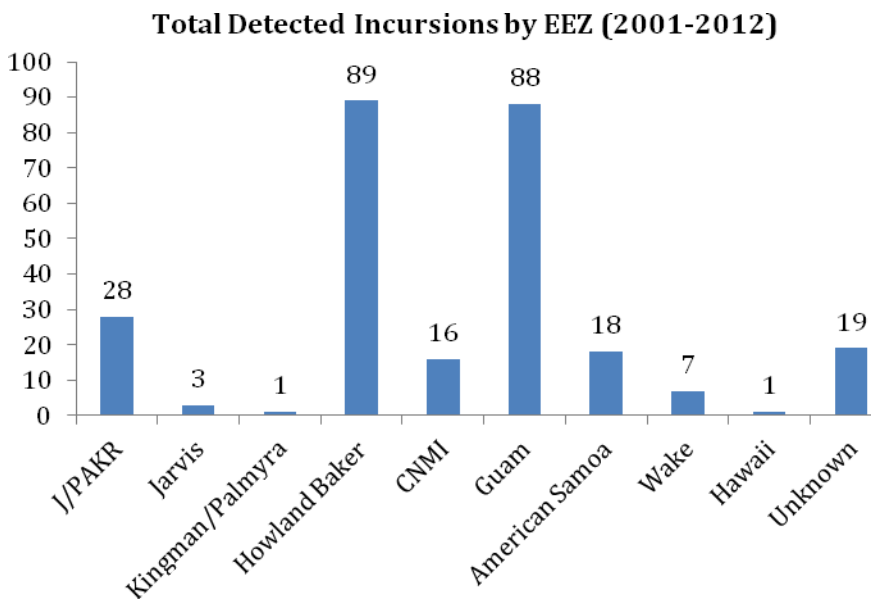


Figure 4: Number of detected illegal foreign fishing vessel incursions in the WCPO high threat area of the US EEZ during 2001-2012. (Note: "J/PAKR" represents combined data for Jarvis and Palmyra/KingmanEEZ areas, which were not recorded separately in USCG records until mid-2007. The separate "Jarvis" and "Kingman/ Palmyra" categories represent data recorded after mid-2007). Source: USCG MISLE database.

Using data provided by the USCG, Marine Conservation Institute was able to piece together a limited picture of the locations of foreign fishing vessel incursions in US EEZ areas of the Pacific. There were 270 detected incursions in the WCPO areas of the US EEZ from 2001 to 2012. Of these, the highest threat areas were the Howland/Baker and Guam EEZ areas (Figure 4). Of those records where a flag

[11] USCG. 2011. *Fisheries Enforcement Annual Summary 2010: Fiscal Year 2011 Annual Report to Congress*

state was identified, the highest number of violations was associated with vessels carrying the Taiwanese flag; there were also notable violations by Japan and Ecuador (Figure 5).

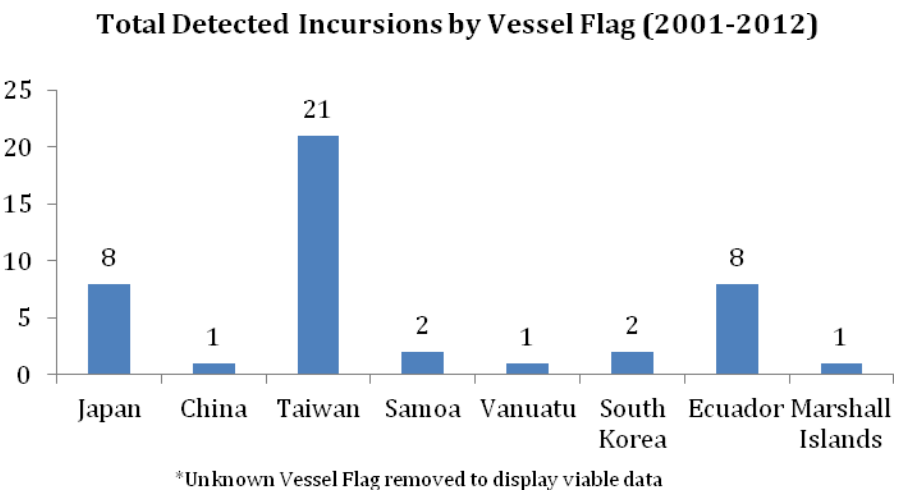


Figure 5: Number of detected illegal foreign fishing vessel incursions by flag state during 2001-2012 in the WCPO high threat area of the US EEZ. Source: USCG MISLE database.

In the majority of detected incursions, the type of vessel was not recorded in the USCG database at the time of the incident. However, in 50 cases where the USCG was able to determine the fishing vessel type, 39 incursions were committed by longline vessels and 11 by purse seine vessels. In general, incursions in the Guam/CNMI portion of the EEZ were by longline vessels. Howland/Baker saw a high number of incursions by both purse seine and longline vessels, and eastern areas like Kingman/Palmyra and Jarvis had more incursions by longline vessels.

Of the 270 incursions, USCG data contain only 30 records with geographic coordinates. This is mostly due to inconsistency in USCG record-keeping over the years, presumably because different personnel periodically transfer in and out of duty assignments in the14th District. Using these 30 records, we created a map using GIS software for the Howland/Baker and Guam EEZs (Figures 6 & 7). For the four incursion points closest to the Pacific Remote Islands MNM in the Howland/Baker EEZ, all incursions were by a single vessel, the FF/V DRENNIC (Ecuador). Two incursions were documented inside the Marianas Trench MNM, one by a Japanese purse seine vessel (September 2009) and one by a Japanese longline vessel (December 2010). It should be noted the USCG did not start recording geographic coordinates for incursions in their database until 2006, and even then, did not enter this information consistently until the beginning of 2009. This means that for the remaining 240 records without coordinates, it is possible that some of these incursions took place in areas that now lie within US monument boundaries.

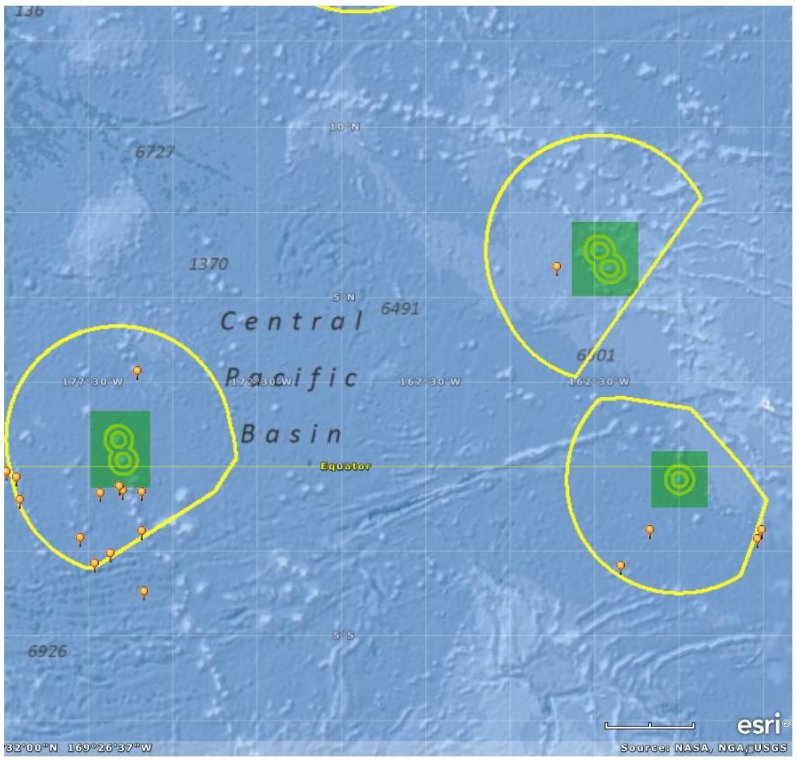


Figure 6: Location of detected illegal foreign fishing vessel incursions within the Pacific Remote Islands US EEZ Areas. Kingman/Palmyra upper right, Jarvis lower right, Howland/Baker far left. US Monuments show in green. Source: USCG MISLE Database

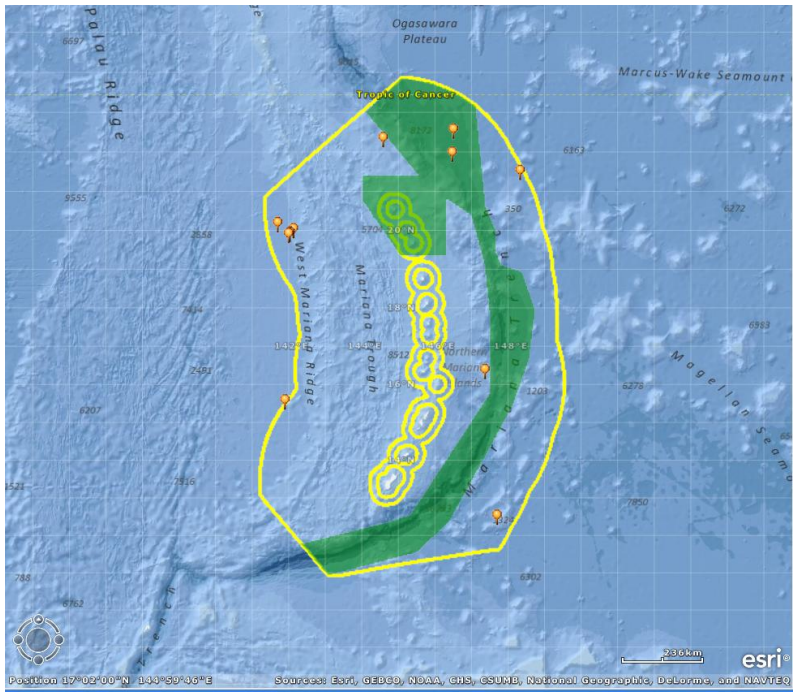


Figure 7: Location of detected illegal foreign fishing vessel incursions within the Guam US EEZ Area. US Monument area shown in green. Source: USCG MISLE Database

The general perception among enforcement officials we interviewed is that few foreign vessels would be ignorant or reckless enough to travel more than 150 miles inside the US EEZ boundary to fish inside a monument. However, because of the proximity of US islands to foreign territories, the 200 nm US EEZ boundary is partially truncated for all EEZ areas except the Hawaiian Islands and Johnston Atoll. Thus, the monument boundary in some locations is much closer to the boundary separating the US EEZ from a foreign EEZ. In these cases, a monument is more vulnerable to vessel incursions from foreign EEZs. For example, in the case of Kingman/ Palmyra, the edge of the Pacific Remote Islands monument rests directly on the US EEZ boundary with Kiribati. In certain parts of the Kiribati EEZ, a foreign vessel would only need to drift a few miles across the US EEZ border to fish inside a monument. The Marianas Trench monument faces a similar threat in that it rests on the shared border between Guam and the Japan EEZ.

The other piece of conventional wisdom is that most illegal incursions occur close to the US EEZ border, where foreign boats may briefly cross in and out of US waters to set or retrieve gear. However, the data we received via a FOIA

request shows that while many incursions do occur along the edge of the US EEZ, there were several instances in which fishing vessels intruded far inside the boundary, up to, and sometimes inside, a monument (Figures 4-6 & 7).

Fish Aggregation Devices and the ALBACORA UNO

Fish Aggregation Devices (FADs) are artificial floating structures deployed to attract schools of fish around them, making the fish easier to catch. FAD deployment practice varies with the species targeted, but for deep-water pelagic species like tuna, the common practice is to deploy FADs five to 10 nautical miles apart to maximize their capability to aggregate large schools of fish.[12]

FAD use in the WCPO is a growing law enforcement concern. FAD usage varies inter-annually, as certain ocean conditions are more favorable for FADs, while others favor setting fishing gear around schools of fish that are unassociated with FADs or other floating objects. In general, FAD usage has increased dramatically in the WCPO. A typical purse seine vessel may deploy around 100 FADs at a time, each outfitted with a GPS location device and echo-sounder to detect fish aggregations underneath the device. With 280 purse seine vessels currently active in WCPFC high seas fishing areas, there could be thousands of FADs deployed in the region at any given time.

There is much current debate over the ecological effects of intensive FAD use. For example, FADs could result in bycatch of non-target and juvenile target species or become "ecological traps," where aggregations of tuna and other species may disrupt their natural migratory and reproductive patterns.[13] Because drifting FADs are often deployed for an extended time to allow enough fish to aggregate around them, these devices could drift across parts of the US EEZ or monuments unbeknownst to US enforcement agencies.

One of the largest fines ever levied against a foreign fishing vessel was in the case of the purse seine vessel ALBACORA UNO (Spain), which allegedly deposited 67 FADs across the Howland/Baker EEZ over a two year period. Given that 67 FADs were used over a two-year period, it is likely that these devices were deployed across the breadth of the Howland/Baker EEZ, including within portions of the monument.

The ALBACORA UNO incursion was not included in the USCG FOIA data because the incident was originally detected through a routine NOAA law enforcement inspection of the vessel's records. According to NOAA officials we interviewed, the detection was mostly due to luck: The vessel just happened to pull into port in American Samoa, and a NOAA inspector who happened to be on hand at the time had the presence of mind to catch key discrepancies in the vessel's logbooks that revealed illegal activity. According to NOAA officials, there was no hint from the vessel's speed or course (registered on VMS) that the vessel was doing anything illegal. Because innocent passage is allowed under international

[12] http://www.fao.org/fishery/equipment/fad/en

[13] Marsac, F., Fonteneau, A., and Ménard, F. 2000. *Drifting FADs used in tuna fisheries: An ecological trap? Pêche thonière et dispositifs de concentration de poiss*ons. Edition Ifremer. Actes Colloque 28:36-54.

law, on VMS tracking monitors the boat appeared to be engaged in simple straight-line transits across the US EEZ, when in fact it was illegally depositing dozens of FADs along the way.

This case highlights several important concerns (also see later sections in this report). First, it demonstrates the limitation of relying too heavily on VMS as the sole detection tool. Second, it highlights the importance of having adequate numbers of NOAA inspectors at the docks; reviews of logbook and catch data via port inspections often uncover illegal activity that somehow evade real-time detection. Finally, as one NOAA official noted, the magnitude of this violation, and the chance manner in which it was detected, indicate that enforcement agencies may only be seeing the "tip of the iceberg" for IUU fishing in the Pacific.

Domestic Fishing Vessel Threats

The US longline and purse seine fleets are generally well-monitored by NOAA and USCG. On the surface, it would appear that compliance with US fishery laws by domestic vessels based in Hawaii and elsewhere in the Pacific region is very high. For example, in 2010, 99.1% of all domestic fishing vessels inspected by the USCG in the Western Pacific (USCG 14th District) were in compliance with fishing regulations; this compares to the USCG's national average compliance rate of 97%.[14]

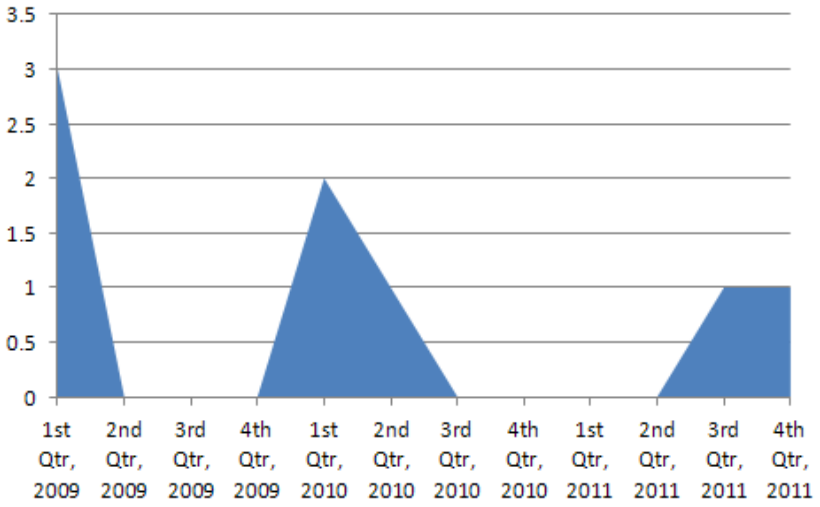


Figure 8: Instances of US fishing vessel activity in Rose Atoll MNM. Source: NOAA

However, since the monuments were created in 2009, NOAA has noted several instances of illegal fishing in the monument by domestic vessels, notably at Rose Atoll MNM and in the Johnston and Kingman/ Palmyra areas of PRIMNM. According to NOAA officers, monument violations were initially high during the months immediately following the issuance of the proclamations, but decreased after NOAA agents issued warnings to vessel captains suspected of illegally activity. More recently, illegal fishing activity has slowly increased, with an average of 1-2 instances of suspected illegal activity in the Pacific monuments per quarter. Presumably, this increase is because vessel owners have realized that there are no official penalties being handed out in the absence of monument fishing regulations (Figure 8).

[14] USCG, *Fisheries Enforcement Annual Summary 2010: Fiscal Year 2011 Annual Report to Congress*, 2011.

NOAA's Office of General Counsel, Enforcement Section, prosecuted 45 cases of fishing violations by US domestic vessels in the Pacific region over the period 2007-2010. The majority of these cases involved longline vessels fishing without a valid permit, fishing in closed areas, or illegal take of endangered species. More recently, several US purse seine vessels were caught deploying FADs during a WCPFC fishing closure period. This type of violation could become more prevalent in the future as the USCG increases its efforts to ensure US vessel compliance with international tuna fishery regulations.

The most relevant statistic for this report is the pattern of compliance within areas closed to fishing, whether they are special fishery management areas or ecological reserves like the Pacific monuments. Of the 45 cases made in 2007-2010, there were four violations within longline-prohibited fishing areas and seven violations inside Papahānaumokuākea Marine National Monument (where commercial fishing is prohibited). Thus, almost one quarter of the cases involved violations of special protected areas closed to fishing. It is unknown whether these violations occurred because of ignorance, confusion over complicated area boundaries, or complete disregard for the regulations. Nonetheless, this pattern of non-compliance is of ongoing concern.

Illegal Trespass and Invasive Species

The presidential proclamations establishing the three new Pacific marine national monuments recognize the right of innocent passage of any vessel through US waters in accordance with international law. However, the Pacific Islands National Wildlife Refuges located within monument areas are closed to all public access unless otherwise approved by USFWS. Only Palmyra Atoll NWR currently allows public access under a special use permit for limited scientific research purposes or for recreational fishing. Although most of the isolated island refuges are closed to public use, various user groups (amateur radio operators, bird watchers, tourists, etc.) have expressed interest in visiting them. There has also been increasing interest from the recreational yachting community to visit these monument islands in recent years.[15]

USFWS has documented several instances of attempted illegal entry and trespass in the national wildlife refuge portions of the monuments by recreational sailing vessels or small, motorized merchant vessels. With the exception of Palmyra, where USFWS manages a year-round field station, financial, logistical, and safety limitations have prevented the Service from establishing a permanent or periodic presence on the other islands within the Pacific Remote Islands monument. Therefore, it is difficult to characterize the severity and frequency of illegal trespass at most PRIMNM islands.

Illegal trespass by small recreational and commercial vessels poses significant risk to the fragile marine and terrestrial ecosystems of the monuments through physical damage, poaching, and, most of all, the unintended introduction of invasive species. USFWS is

[15] USFWS, *Howland Island National Wildlife Refuge: Comprehensive Conservation Plan*, 2008.

currently waging several expensive eradication efforts against invasive species, including a yellow crazy ant (*Anoplolepis gracilipes*) infestation on Johnston and a rat infestation on Palmyra, which threatens to kill thousands of ground-nesting seabirds. Once invasive species have a foothold on a remote island, it is difficult and expensive to remove them. USFWS has spent almost $3 million on ant and rat eradication efforts in its Pacific Islands refuges in the last few years. USFWS also notes that rats possibly have been reintroduced to Johnston Atoll following the illegal visit by the M/V MERCY in 2011, but this has not yet been confirmed.

In 2011, USFWS field staff began developing a protocol to systematically record all detected illegal and legal vessel visits to Palmyra and Johnston Atoll (where staff have been temporarily stationed since August 2010 to conduct yellow crazy ant eradication efforts). In the time they have been at Johnston, USFWS staff has observed a total of seven visits by small craft. At Palmyra, anecdotal observations indicate that the island receives an average of 1-2 vessels per year. However, after USFWS began officially recording visits in 2011, there were four unannounced visits by vessels during the month of September alone. Eight of the 12 documented visits to Palmyra and Johnston involved various claims of mechanical difficulty by vessel captains who requested entry to conduct repairs.

According to USFWS staff, some mechanical claims appeared legitimate, while others appeared to be contrived or exaggerated—as an excuse for recreational sailors to get a closer look at the islands. The recent spate of visits involving "mechanical issues" suggests that some within the sailing community have discovered that feigning mechanical trouble is the easiest way to have a look around. It is worth noting that recreational vessels also have been seen at Rose Atoll by USFWS staff during past research cruises, but again, the lack of regular monitoring of Rose means it is difficult to know how frequent such visits are. Rose is closed to public access but appears to be a popular anchoring spot for sailing vessels based on anecdotal information.

Vessel Traffic and Groundings

Ship traffic in the monuments includes vessels related to the transport of goods (e.g., cargo ships or tankers) and people (e.g., cruise ships), in addition to military ships and fishing vessels. There are myriad ways in which vessel traffic can affect marine life and ecosystems, including, but not limited to, introduction of invasive or nuisance species through ballast water discharge, noise pollution that "washes out" marine mammals' ability to communicate and forage, and CO_2 emissions that contribute to global warming. One of the most severe and direct threats is accidental groundings and shipwrecks (known as marine casualties) and the associated loss of cargo or fuel and chemicals.

Historically, marine casualties have occurred in monument areas due to weather, mechanical failures, and navigational errors. The best available summary of historic casualties is a research paper published in 1997 by the South Pacific Regional Environment Programme (SPREP), which includes a list of all casualties in the South Pacific between

1976 and 1996, compiled from Lloyd's Maritime Information Service Casualty Register.[16] During the 20-year period, there were 31 documented wrecks or groundings in the South Pacific:

- 14 off America Samoa (10 from heavy weather/typhoon; 13 were fishing vessels)
- 1 on Rose Atoll (1993, a fishing vessel struck a reef and was scuttled)
- 5 off Guam (1 from a typhoon; the 5 included a tanker, bulk carrier, container ship, cargo ship, and fishing vessel)
- 7 off the Northern Marianas (4 from heavy weather/typhoon; 3 cargo, and 1 each of fishing, supply ship, tanker, and landing craft)
- 1 on Kingman Reef (1979, a fishing vessel struck a reef after an electrical fault)
- 1 on Wake Island (1984, a bulk carrier stranded after engine trouble when its moorings broke in heavy weather)
- 1 on Palmyra Atoll (1991, an abandoned longline vessel struck the atoll and sank)

Source: JE Maragos

Source: USCG

Source: JE Maragos

Source: USCG

Based on this limited set of data, we see that casualties have occurred around islands within US monuments at a rate of around 2 per decade (1976-1996). Cleanup has been expensive and time-consuming. In some cases, the ecological fallout from the accident has lingered for years, even decades. For example, after the grounding and sinking of the fishing vessel JIN SHIANG FA at Rose Atoll in 1993, composition of fish populations was still significantly different than at nearby reefs more than ten years later.[17] At Kingman Reef

[16] South Pacific Regional Environment Programme (SPREP), *Ship Groundings in the Pacific Islands Region*, 1997.

[17] Schroeder, Robert E., et al., "Long-Term Effects of a Ship-Grounding on Coral Reef Fish Assemblages at Rose Atoll, American Samoa," Bulletin of Marine Science, 82(3): 345-364 (2008).

and Palmyra Atoll, a nuisance corallimorph (*Rhodactis howesii*) has spread across coral reef habitat; its explosive growth is being fueled by dissolved iron leaching into the water from vessel hulls and parts. The anemone-like corallimorph smothers native corals and has become the dominant benthic species on 750 acres of Palmyra's bottom, thus destroying part of our nation's most pristine reefs (Figure 9). According to USFWS, the only clear solution to stopping the corallimorph's spread is to remove the wrecks, the cost of which is estimated to be in the millions of dollars.

Figure 9: Left image: an invasive corallimorph has taken over the benthic ecosystem near a shipwreck at Palmyra, Right image: an unaffected reef at Palmyra, shown for comparison purposes. Source: Work et al. (2008)[18]

Responding to a serious oil or contaminant spill in the remote Pacific monuments would be a similarly expensive affair. USCG Sector Honolulu currently has two area response plans that cover Honolulu and American Samoa (the areas likely to see the most vessel traffic), but none for PRIMNM. Area response plans are general in nature and outline the steps needed to establish and quickly mobilize a national incident response chain of command and operating structure. Therefore, the same steps would likely be used to establish a response to a contaminant spill at a remote US atoll or island. The plans do not contain any specifics about the response itself (how, when, and where assets would be deployed), as each incident is unique and specific actions would be decided at the time of response. However, getting clean-up vessels to the scene of a remote spill could take days, if not weeks, potentially magnifying and prolonging damage to the ecosystem.

Because islands within the monuments can ill-afford a catastrophic accident, and because maritime accidents are a common occurrence, the best strategy is a preventative one that keeps vessels away from the islands. A suite of risk reduction measures can be employed now, such as charting the monuments and refuges on NOAA nautical charts, issuing periodic notices to mariners, conducting other outreach/education measures to the sailing community, and so forth. The bottom line is that Pacific mariners should know about the monuments, their locations, and their global importance when they pass through them.

[18] Work TM, Aeby GS, Maragos JE, "Phase Shift from a Coral to a Corallimorph-Dominated Reef Associated with a Shipwreck on Palmyra Atoll." PLoS ONE 3(8): e2989. (2008).

Unfortunately, federal management and enforcement agencies have yet to conduct this level of awareness building.

In addition to outreach and education measures, Marine Conservation Institute has requested USFWS and NOAA study the feasibility of initiating a nomination to the International Maritime Organization (IMO) to protect PRIMNM areas from vessel accidents by promulgating ship routing measures. The IMO has several regulatory tools at its disposal including a ship reporting system that requires mariners to advise enforcement agencies when they enter and leave monument waters; and the establishment of buffer zones (known as areas to be avoided--ATBAs) around monument islands to keep ships away from nearshore waters that are managed as wildlife refuges by USFWS. These two measures in combination could enhance mariner awareness and reduce the probability of accidents. USFWS and NOAA have initiated a review of the desirability and feasibility of IMO measures.

Collecting Evidence of Vessel Grounding and Spill Threats and Incidents

While anecdotal evidence from USCG and USFWS suggests that large vessel traffic in the monuments is relatively light, no one has mapped large vessel traffic routes or fishing vessel patterns to help verify these assumptions. In particular, we know too little about the activities of fishing vessels, which, in terms of sheer numbers, pose perhaps the greatest threat. This is because there is no international tracking requirement for fishing vessels. Vessel monitoring of fishing vessels may be conducted by the flag state or regional fishery management organizations using VMS, but the data obtained are not shared (for a variety of reasons) or easily accessible.

Clearly, the first step in determining the threat posed by commercial shipping is to procure and analyze available data to document the existence, location, and intensity of commercial traffic. Two major sources of real-time, electronic tracking data mandated by IMO for large vessels are 1) the short range Automatic Identification System (AIS) used for navigational safety and collision avoidance (see Figure 10); and 2) the long-range identification and tracking (LRIT) system, which requires ships to report their positions four times daily. Unfortunately, data from these systems are not accessible to the public. There is a great need for information of this type to be uniformly collected by government agencies, analyzed, and made available to the public and to managers of the monuments.

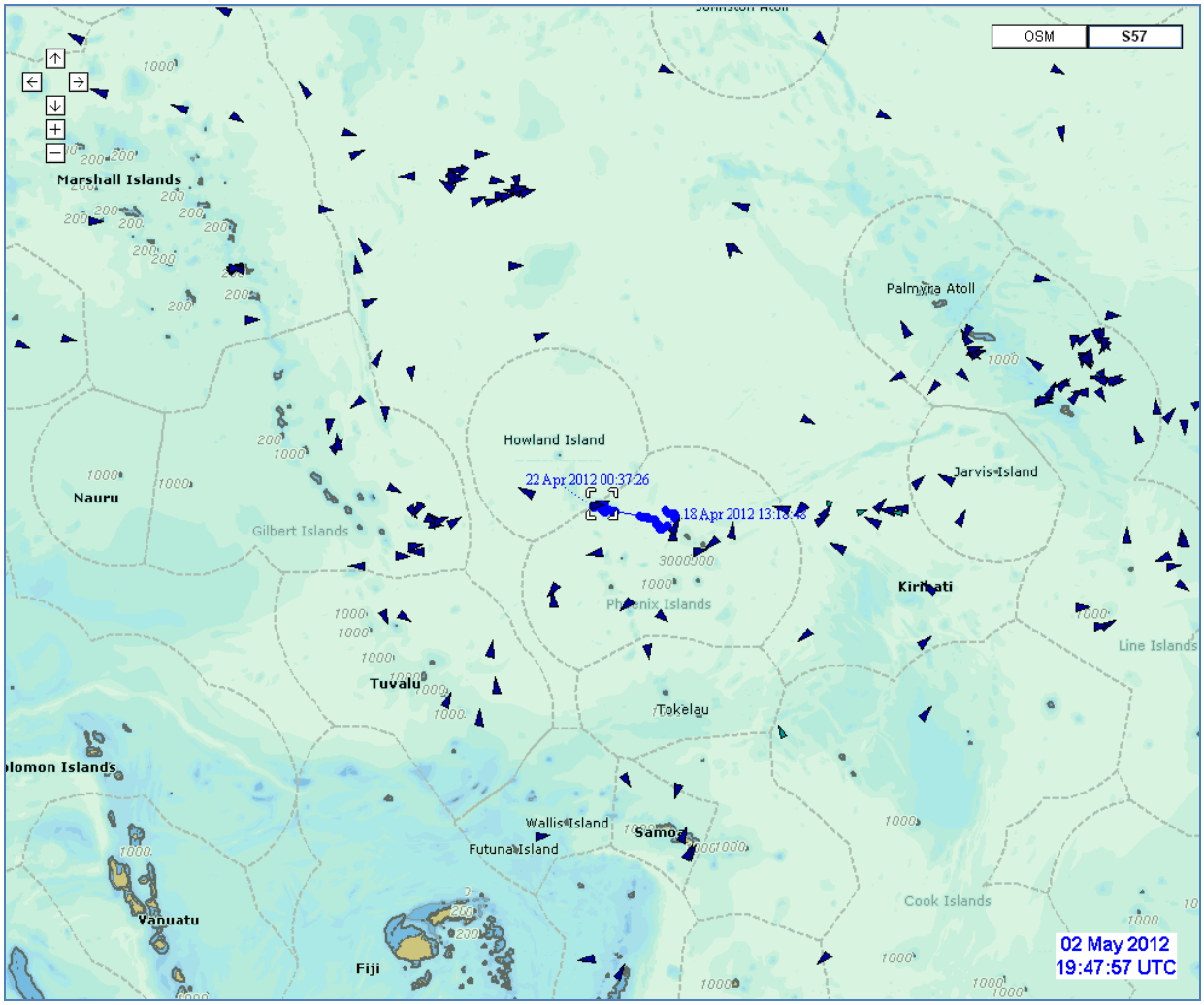


Figure 10: Example of a commercial visualization tool that displays AIS ship position reports in the Pacific made on May 2, 2012. The ship track highlighted in blue shows a longline fishing vessel operating legally within the Kiribati EEZ. Source: ComDev USA, LLC. *Includes copyrighted material of exactEarth Ltd. All Rights Reserved

Additionally, there is no comprehensive international database on marine casualties that could inform risk assessments of vessel traffic in the monuments. "Lloyd's List," a private service offered by Lloyd's of London, collects data on marine casualties, but while exceedingly valuable, it is not comprehensive. Fishing vessels are exempt from requirements to use AIS or IMO numbers and are therefore under-represented in Lloyd's List. Indeed, fishing vessels show up only when the vessel's owners or insurer require AIS or if noted by a Lloyd's agent. Nevertheless, about 10% of Lloyd's List vessels are fishing vessels, a significant number of which do not have IMO numbers. Private vessels (e.g., private yachts) are under-represented on the list for similar reasons.

Section III: Improving Law Enforcement Effectiveness: Recommendations

Based on a limited set of publicly available data, it is apparent that there are clear and present threats to the US Marine National Monuments in the Western and Central Pacific from a variety of vessel-based activities. Federal law enforcement agencies need to have a minimum set of tools at their disposal to effectively track, understand, and deal with these threats. Using the five components of effective enforcement mentioned earlier in the report (e.g., enforceable laws and regulations, adequate funding, real-time surveillance, effective outreach, and mechanisms for cooperation) as a framework for analysis, we identified key issues, gaps, and constraints that could hinder effective law enforcement in the Western and Central Pacific region. Key challenges under each component are outlined below. For each section, we also identify a baseline set of recommendations, which, if applied over the near-term of 1-3 years, we believe could greatly improve overall performance and law enforcement outcomes for the Pacific monuments and for the greater region as a whole.

Laws and Regulations

Regulations Implementing the Presidential Proclamations

Since the marine national monuments were created in January 2009, there have been multiple violations by US vessels of the ban on commercial fishing in the monuments. The lack of approved NOAA regulations means there is currently no legally enforceable standard with which to prosecute illegal commercial fishing by US vessels. More than three years after the presidential proclamations were issued; NOAA and the Western Pacific Fishery Management Council (WESPAC) are still in the process of preparing the required fishery management plan amendments, associated environmental assessments, and final regulations. On February 21, 2012, Marine Conservation Institute petitioned the Secretaries of Commerce and the Interior to issue interim emergency regulations to enforce the commercial fishing prohibition until such time as final regulations are issued. As of the date of this report, Marine Conservation Institute has not received an official response to its petition. However, in the meantime, we have learned that NOAA is proceeding with development of the draft regulations and that they may be made available for public comment and final promulgation sometime in the latter half of 2012.

Illegal commercial fishing. Source: NOAA

Violations within Refuge Boundaries

No clear protocol exists for how NOAA and USFWS would use their respective laws to prosecute fishing and other activities inside the monuments in areas of overlapping jurisdiction. To secure optimum enforcement, it would make sense for the two agencies to have a plan as to how fishery violations will be enforced both within the 0-12 nm portions of the monuments under USFWS management, and the 12-50 nm section under NOAA fisheries management. For example, it is unclear whether fishing violations inside of the 12 nm wildlife refuge areas would be prosecuted under NOAA or USFWS statutes, or both.

Furthermore, the penalty schedules of the agencies may need revision to adequately deter violations in a manner commensurate with the damage they could cause. In 2010, NOAA revised its civil administrative penalty schedule to provide a more consistent approach to penalty assessment across all NOAA regions. Civil penalties are now assessed according to a sliding scale that takes into account a defendant's prior violations, intent, and the level of harm inflicted upon marine resources. In the case of foreign vessel incursions or violations of international agreements by US vessels, the types of vessels involved are often large-scale commercial purse seine vessels, capable of obtaining catches worth millions of dollars. NOAA's penalty structure is designed to counter this profit motive by using expensive fines as a meaningful economic disincentive for violations.

In 2011, USFWS issued an updated penalty schedule for all refuge violations under the Antiquities Act and National Wildlife Refuge Administration Act, the result of a process that took nearly a decade. However, penalties under these acts are far less than their equivalents under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and other ocean-related laws. Most USFWS penalties deal with misdemeanor violations. For example, the penalty for illegal fishing (commercial or recreational) or hunting in a wildlife refuge is $500. Unlike the expensive civil penalties imposed by NOAA for fisheries violations, this is an extremely low fine for a US or foreign commercial fishing boat convicted of illegally fishing in a closed refuge and posing a potentially catastrophic grounding threat to a marine monument. Conceivably, illegal fishing in the refuges could be prosecuted under the much tougher penalty schedule of the MSA, but this should be determined and confirmed by the agencies. In essence, there needs to be a clear penalty process in place to strongly deter illegal fishing in the monuments.

Provisions of the Magnuson-Stevens Act Limit Enforcement Capabilities

One provision of the MSA, if changed, would both increase the effectiveness of federal law enforcement agencies and reduce unnecessary costs. Section 311 of the Act gives exclusive jurisdiction over illegal fishing cases in the Pacific Remote Islands monument EEZs to the US District Court of Guam. For example, if the USCG successfully interdicts and seizes a foreign vessel illegally fishing inside the US EEZ of Johnston Atoll, it is required to escort

the vessel all the way to Guam for legal proceedings instead of escorting the vessel to Honolulu, which is much closer.

The detrimental nature of this regulation was highlighted by an incident that took place in 2006. A routine air patrol by USCG observed a 210-foot Taiwanese purse seiner, MARSHALLS 201, illegally fishing about two miles inside the US EEZ around Howland and Baker islands. The USCG diverted a buoy tender to intercept the vessel, and ultimately seized it and an estimated 500 metric tons of skipjack tuna worth about $350,000. According to the USCG, the vessel was interdicted approximately 1750 nm from Honolulu and 2550 nm from Guam. Despite the facts that the interdiction occurred some 800 nm closer to Honolulu and that the USCG vessel which conducted the interdiction was based out of Honolulu, the USCG was forced to escort the MARSHALLS 201 all the way to Guam.

The journey took eleven days and required two USCG vessels. The buoy tender WALNUT, which had been closest to the violation, conducted the first half of the journey. The Guam-based USCG buoy-tender SEQUOIA traveled to meet the WALNUT mid-way to conduct the second half of the escort. Including the WALNUT's travel time back to Honolulu from the rendezvous site, the seizure of this one violator tied up two USCG vessels for about a week and a half, diverting them from their normal patrol duties. The USCG calculated that it cost $1.4 million more to escort the MARSHALLS 201 to Guam than it would have cost to escort it to Hawaii.[19]

The court jurisdiction provision may also constrain USCG operational decision-making: In certain cases, it may simply not be worth the time and effort to seize an illegal fishing vessel in US waters, given the opportunity cost incurred. The USCG may decide to simply document the illegal activity and let the violator go, relying on NOAA to administer a civil penalty and recoup damages from the violator after the fact—if it can.

Recommended Action

It is imperative that NOAA implement enforceable commercial fishing regulations for the Pacific monuments by the end of 2012. Every day that US boats are allowed to fish in the monuments brings another day of potential harm to areas that were set aside as national treasures for their ecological value. Meanwhile, NOAA and USFWS should determine whether current penalty schedules are sufficient to act as a deterrent against all prohibited activities, and further determine which laws will be used to prosecute illegal activity in various parts of the monument.

Second, the MSA should be updated to change the clause giving jurisdiction over all fishing violations in Pacific Remote Islands MNM to the US District Court of Guam. We have yet to find anyone who can explain to us why the "Guam requirement" was put in the Act originally, though one source we spoke with speculated that it may have been a drafting mistake. Instead, the MSA should divide court jurisdiction over these remote island

[19] US Coast Guard, *Report on Foreign Fishing Vessel Incursions into the United States' Exclusive Economic Zone*, July 2007.

possessions in a way that optimizes agency operations and saves money. The simplest and most cost effective solution would be to prosecute all Pacific Remote Islands MNM violations in Hawaii (except those at Wake, which should go to the closer district court in the Marianas). Both NOAA and USCG should advance this change as part of their FY 2012-2013 legislative agenda, and forward draft language to Congress for consideration.

Funding

Effective law enforcement requires adequate financial, human, and technical resources. The law enforcement community in the Pacific Islands region is faced with huge logistical and operational challenges as they seek to protect 1.5 million square miles--one third the US EEZ--with a staff and annual budget that is about the same as that of the average-size regional office within their agencies. Although they each have different management responsibilities, USCG, NOAA, and USFWS share a common problem: all are underfunded and understaffed. However, securing a budget increase is made difficult as a contentious political climate and slow economic growth continue to shape and constrain federal agency spending.

Below is a discussion of each agency's significant human, technical, or financial resource gaps, and a brief analysis of current political and economic realities that will have to be addressed in order to successfully acquire additional resources.

US Fish & Wildlife Service

Current Assets and Needs

USFWS has an extremely small staff with which to conduct law enforcement activities in the Pacific Islands region. USFWS employs one "zone officer" who is stationed in Hawaii, but reports to UWFWS Region I headquarters in Portland, OR. The region is responsible for covering 22 areas in the Pacific Islands National Wildlife Refuge Complex, plus refuges in Hawaii, Washington, Idaho, Nevada and Oregon. USFWS also has a full-time refuge enforcement officer stationed at Midway Island in Papahānaumokuākea Marine National Monument, which receives a small stream of visitors and field researchers each year. The USFWS Office of Law Enforcement has a small team of special agents and investigators based in Hawaii, but the scope of their duties does not typically involve the refuges and marine monuments unless warranted by a special investigation or when assistance is requested by wildlife refuge officers.

As most of the monument islands are uninhabited and unstaffed by USFWS, there is no one available to see and report infractions. USFWS does not even have an ocean-going vessel that would enable the agency to access its remote refuges on a regular basis. USFWS contracts with private vessels or aircraft to deliver people and supplies to the two Pacific Remote Islands refuges nearest to Hawaii: Johnston and Palmyra Atolls—and to its refuges in Papahānaumokuākea MNM. The agency also currently relies on NOAA to give them a few

berths on research ships that travel to the remote island areas of PRIMNM every two or three years. With limited berth space on these ships, it is rare for a law enforcement officer to participate in these primarily scientific cruises. Also, NOAA cruises have been reduced in frequency due to decreases in NOAA funding.

Barriers to Increased Funding

The National Wildlife Refuge System encompasses a total of 150 million acres, with the four marine monuments constituting one-third of the system's total area. However, the refuge system is known primarily for managing and protecting public lands and coastal wetlands areas, not for managing large areas of ocean. Given that most of the islands, atolls, and reefs within the monuments were already national wildlife refuges when the monuments were created, it is not surprising that the Secretary of the Interior was given overall authority for the monuments. However, from Marine Conservation Institute's experience, the ocean component of the refuge system, particularly the Pacific refuge islands and marine monuments, is not sufficiently understood or appreciated by those who control the agency's budget. Fortunately, there are signs this may be changing.

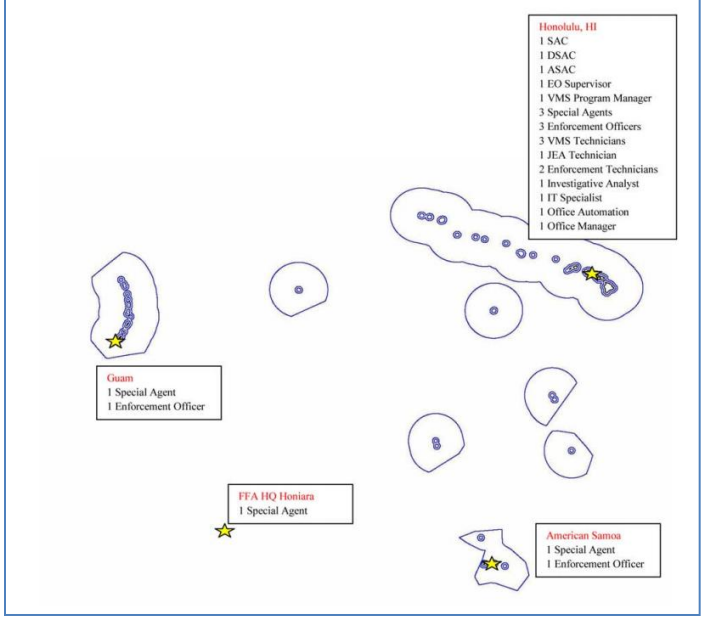


Figure 10: NOAA OLE future staffing needs for the Pacific Islands Division. Source: *NOAA's Office of Law Enforcement – Workforce Analysis and Staffing*, May 2012

NOAA Office of Law Enforcement

Current Assets and Needs

NOAA OLE has a staff of 146 Special Agents distributed throughout 52 field offices and its headquarters in Silver Spring, MD. The OLE Pacific Islands Division has 20 full-time employees (nine Special Agents, two enforcement officers, and nine staff), and a budget of $3.47 million. This team is responsible for enforcing more than 35 ocean-related statutes in Hawaii, American Samoa, CNMI and Guam, and on the high seas under US laws and treaties.

NOAA OLE operates primarily in the nearshore environment with a handful of small vessels that are limited to short-range coastal patrols. The Pacific Islands division recently acquired a 33' "Defender Class" SAFE boat capable of nearshore patrols in Hawaiian waters, but not for long-range patrols to Pacific monuments.

Successful marine enforcement of international fisheries in the Pacific Islands region depends upon close international cooperation with international bodies. According to NOAA staff, in the past, OLE agents have been assigned to posts at WCPFC and FFA headquarters where they performed an extremely valuable liaison role with these international organizations. OLE agents were able to directly access enforcement data that helped them detect violations by US vessels, resulting in hundreds of thousands of dollars in penalties. However, due to civil unrest in the islands, the agents were removed for safety reasons; they were not re-assigned to those positions even after the political situation stabilized. Despite the fact that the FFA is strongly supportive of having NOAA liaison officers, and there has been at least one formal letter from the FFA director to the NOAA OLE director on this matter, NOAA headquarters has thus far not reinstated the position. To meet additional responsibilities in the region, NOAA OLE Pacific Islands Division also has proposed stationing additional enforcement officers at Guam and Honolulu (Figure 10).

As of 2011, NOAA General Counsel, Enforcement Section (GSES) had only 16 attorneys, two paralegals, and one support person to cover enforcement needs for the entire nation. The Pacific Islands region has a single attorney in Hawaii with no dedicated support staff. Prior to creating the attorney position in 2007, all Pacific Islands cases were handled by an attorney based in California who had responsibility for all civil cases in both California and Pacific Islands region. According to NOAA sources, in general, international fisheries enforcement cases tend to be much more complex and time-consuming than standard domestic enforcement cases. As the US continues to fulfill its enforcement obligations as a member of the WCPFC and other international bodies, and with the advent of potential new obligations under a pending port state measures regime[20], the time spent on cases in the Pacific Islands region will continue to grow. Eventually, it will reach a point where enforcement staff must make tough decisions about which cases to prosecute and which to let go.

Barriers to Increased Funding

NOAA OLE is currently operating under extremely high scrutiny by Congress following an internal investigation by the US Department of Commerce Office of the Inspector General in response to complaints that NOAA was overzealously penalizing New England fishermen and had misused penalty revenues after they were placed in the asset forfeiture fund. The Inspector General report also criticized OLE's current staffing allocation, pointing out that although much of OLE's work involves civil penalty cases, 90 percent of its workforce consists of criminal investigators. [21]

In response to these findings and the political backlash following the complaints, NOAA has instituted broad reforms within OLE, including new restrictions on the use of the asset forfeiture fund. The fund is an important source of revenue for OLE Pacific Islands Division

[20] US Department of State, *President Obama Submits Port State Measures Agreement to Senate*, 2011. Retrieved from http://www.state.gov/r/pa/prs/ps/2011/11/177154.htm

[21] US Department of Commerce Office of Inspector General, *National Oceanic and Atmospheric Administration: Review of NOAA Fisheries Enforcement Programs and Operations (OIG-19887)*, Washington, DC 2010, 1-27.

investigations, training, and travel. Enforcement staff we interviewed do not believe the new NOAA policies will significantly constrain their work. However, because protection of the monuments and the US EEZ relies so heavily on international cooperation with WCPFC, FFA, and other nations, it is important that no further restrictions be placed on international travel.

In response to the Inspector General investigation, NOAA OLE also instituted a hiring freeze on new agents until it was able to complete a workforce analysis (which was completed June 2012). The workforce analysis proposed a different mix of investigative agents, uniformed officers, and support staff; and proposed new investigative analyst positions to track catch data and vessel ownership, and forecast trends in violations.[22] Until the study was completed, NOAA OLE had been unable to replace special agents and supervisory agents it lost during the past couple of years from attrition; this, in turn, led to increased workloads for existing agents in certain regions. Even with the hiring freeze lifted, the negative perceptions about NOAA OLE enjoying lavish perks derived from the asset forfeiture fund may linger. Filling a post in Honiara or Pohnpei, however important for international law enforcement, might be seen by outsiders as support for an exotic lifestyle funded by public money. In our view, this is assuredly not the case.

US Coast Guard

Current Assets and Needs

The USCG is the only agency with tactical assets to patrol the open ocean and respond to at-sea violations of federal maritime laws. Despite having responsibility for one third of the US EEZ, USCG District 14 has limited assets at its disposal. They include the following:

- Four C-130 "H-model" planes based at Air Station Barbers' Point in Hawaii; one plane is always held in reserve for search and rescue flights;
- Three ocean-going buoy tenders that fill the role of the medium-range cutters typically used in other USCG districts; two tenders are based in Hawaii, and one in Guam;
- Two High Endurance Cutters (HECs) allocated to the 14th District for a certain number of mission hours each year, neither of which is home ported in Honolulu; and
- Two 110-foot patrol boats (one in Hawaii, one in Guam), which are capable of patrolling the monument areas nearest to the home port (e.g. Marianas Trench MNM or Papahānaumokuākea MNM), but which have insufficient range to reach the most remote monument areas without an accompanying or nearby support vessel for refueling purposes.

To maximize effectiveness, and because response time is a critical factor in intercepting and documenting illegal activity in the Pacific region, the USCG tries to send its air and sea patrols where they are most likely to encounter fishing activity. A few years ago, the USCG

[22] NOAA, *Workforce Analysis and Staffing Allocation Plan*, 35.

began using SeaStar, commercial mapping software that combines remote sensing oceanographic data, fish species biology, and computer algorithms to identify potential fishing hotspots for US and foreign commercial fishing fleets (also see Real-time Detection and Monitoring section in this report). By using SeaStar, the USCG can anticipate where targeted fish are likely to be found, and, therefore, where they are most likely to encounter fishing activity, both legal and illegal.

US Coast Guard apprehending IUU fishing boats. Source: USCG

Barriers to Increased Funding

The USCG does not face the same public relations challenges as NOAA, but has suffered chronic budget shortages since its anti-terrorism workload dramatically expanded after 9/11. The USCG is responsible for 11 statutorily-mandated missions, including everything from polar ice-breaking, to drug interdiction, to search and rescue. As mentioned earlier in the report, the two missions that are particularly important for protecting the Pacific marine national monuments are the *Living Marine Resource (LMR)* mission (which deals with domestic fishery and protected species and resources laws), and the *Other Law Enforcement* mission, which focuses on enforcement of high seas fishery laws and protecting the US EEZ against foreign fishing incursions.

Estimating the cost of enforcement for the Coast Guard is not a simple task. Annual funding for USCG is not allocated directly to specific program line items, as is most often the case with civilian agencies like NOAA and USFWS. Instead, appropriations are allocated by national headquarters so as to ensure that a certain number of "mission hours" are funded for USCG aircraft and cutters (assets). These asset hours are further allocated among the 11 different mission areas to the Atlantic and Pacific Area Commands, then distributed to the district level. USCG headquarters maintains a cap on asset hours for each mission area, and district commanders must appeal to area commanders to increase the cap. The USCG may also divert asset hours from certain mission areas in order to respond to emergencies. FY 2010 was a particularly tough year, as the USCG was forced to respond to both the earthquake in Haiti and the *Deepwater Horizon* oil spill. During those events, many USCG aircraft and cutters originally tasked to law enforcement missions were re-tasked to provide disaster assistance.

Every USCG district faces a different set of challenges, and certain missions take priority over others. One way to judge the relative importance of missions in a region is by the percentage allocation of asset hours. We compared overall mission performance data at the national level collected by the US Department of Homeland Security, Office of Inspector General, with mission hour data for USCG District 14 acquired via our FOIA request (Figure 11). The notable differences are somewhat expected. District 14 does not have to focus on polar ice-breaking or interdicting migrants as do USCG districts covering Alaska or the Gulf of Mexico. One of the biggest differences in priorities between the national and District 14

level is the focus on *Other Law Enforcement*, one of the most challenging missions for the USCG because of the size and location of our EEZ boundaries. A much higher proportion of asset hours is spent on *Other Law Enforcement* in District 14 than at the national level.

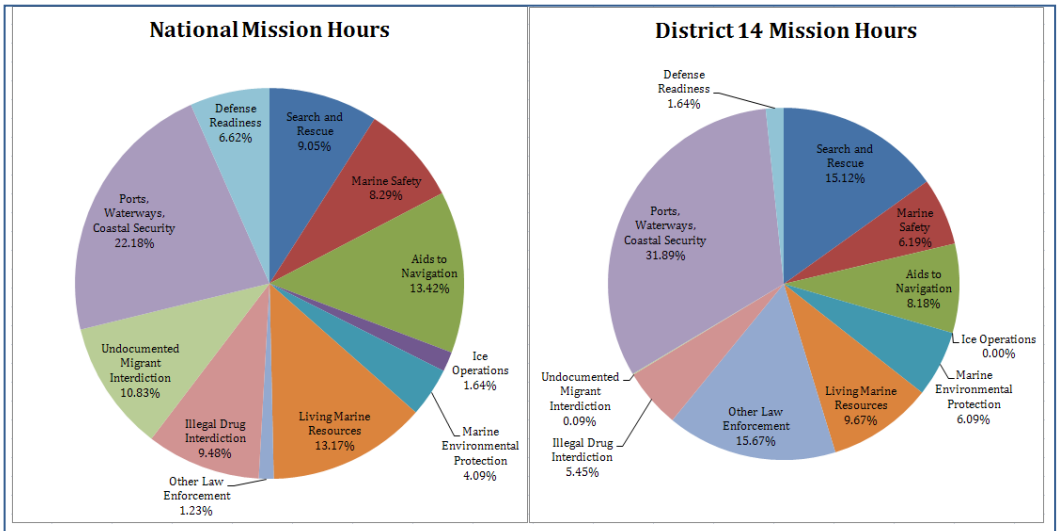


Figure 11: US Coast Guard mission hours for FY 2010 by mission type.
Sources: OIG,[23] USCG.[24]

Executing the *Other Law Enforcement* mission is an expensive job, both in terms of hours and cost. Because this mission involves patrolling vast stretches of the open ocean, only certain assets in District 14 can handle the job – the HECs, buoy tenders, and HC-130 planes (See Appendix II for inter-EEZ distances). The USCG has developed an official list of hourly standard rates (the amount of money per mission hour that it actually costs the USCG to use an asset, factoring in all costs like equipment depreciation, crew, support personnel, etc.). The standard rate for an HC-130 aircraft is $17,510 per hour, for the 225-foot sea-going buoy tender, $10,755 per hour, and for the 378-foot HEC cutter, $17,359 per hour.

We took the mission hours for District 14, broken down by asset type for each mission, and multiplied these hours by the USCG's standard hourly rates. This gave us a rough estimate of what it actually cost District 14 to conduct each of its missions. We then compared District 14 costs to the amount of money that was allocated to the USCG for each of its missions in FY 2010 as shown in Figure 12.[25]

[23] US Department of Homeland Security, Office of Inspector General (OIG), (2011) *Annual Review of the United States Coast Guard's Mission Performance (FY 2010)* OIG-11-111
[24] USCG (2011), District 14 mission hours provided electronically by USCG to Marine Conservation Institute in response to FOIA request, data source: USCG MISLE database.
[25] GAO, 2011. *Coast Guard: Observations on the Requested Fiscal Year 2011 Budget, Past Performance, and Current Challenges* (GAO-10-411T)

Mission	All Districts				District 14			
	Hours	% of total Hours	Cost (FY10 Enacted)	% of Total Cost	Hours	% of total	Cost (Actual)	% of Total Cost
Search and Rescue	64,273	9.05%	$ 985,991,000.00	11.54%	3013	15.12%	$ 34,062,354.94	19.27%
Marine Safety	58,828	8.29%	$ 649,711,000.00	7.61%	1233	6.19%	$ 3,649,554.94	2.06%
Aids to Navigation	95,268	13.42%	$ 1,215,310,000.00	14.23%	1629	8.18%	$ 14,838,201.52	8.39%
Ice Operations	11,639	1.64%	$ 167,397,000.00	1.96%	0	0.00%	$ -	0.00%
Marine Environmental Protection	29,039	4.09%	$ 202,241,000.00	2.37%	1214	6.09%	$ 12,926,918.32	7.31%
Living Marine Resources	93,470	13.17%	$ 893,391,000.00	10.46%	1926	9.67%	$ 13,298,007.72	7.52%
Other Law Enforcement	8,708	1.23%	$ 148,840,000.00	1.74%	3122.1	15.67%	$ 53,522,732.47	30.27%
Illegal Drug Interdiction	67,307	9.48%	$ 1,193,726,000.00	13.98%	1086.3	5.45%	$ 13,839,509.66	7.83%
Undocumented Migrant Interdiction	76,848	10.83%	$ 742,322,000.00	8.69%	17	0.09%	$ 62,339.00	0.04%
Ports, Waterways, Coastal Security	157,427	22.18%	$ 1,802,134,000.00	21.10%	6353.7	31.89%	$ 25,209,696.17	14.26%
Defense Readiness	47,030	6.62%	$ 540,686,000.00	6.33%	327	1.64%	$ 5,384,486.16	3.05%
Total	**709,837**	**100.00%**	**$ 8,541,749,000.00**	**100.00%**	**19921**	**100.00%**	**$ 176,793,800.90**	**100.00%**

Figure 12: Total mission cost for all USCG districts vs. District 14. Source: USCG

At the national level, *Other Law Enforcement* makes up only 1.74% of overall mission costs, but within USCG District 14, it represents more than 30% of overall mission costs (Figure 13). USCG District 14 spends a much higher portion of its resources enforcing fishery laws and agreements under *Other Law Enforcement* than USCG as a whole.[26] In short, Other Law Enforcement is a region-specific priority that may be out of synch with current national mission asset allocations. Because asset hour allocation decisions are made at the national level, any increase in resources for *Other Law Enforcement* will require raising its profile relative to other competing mission priorities.

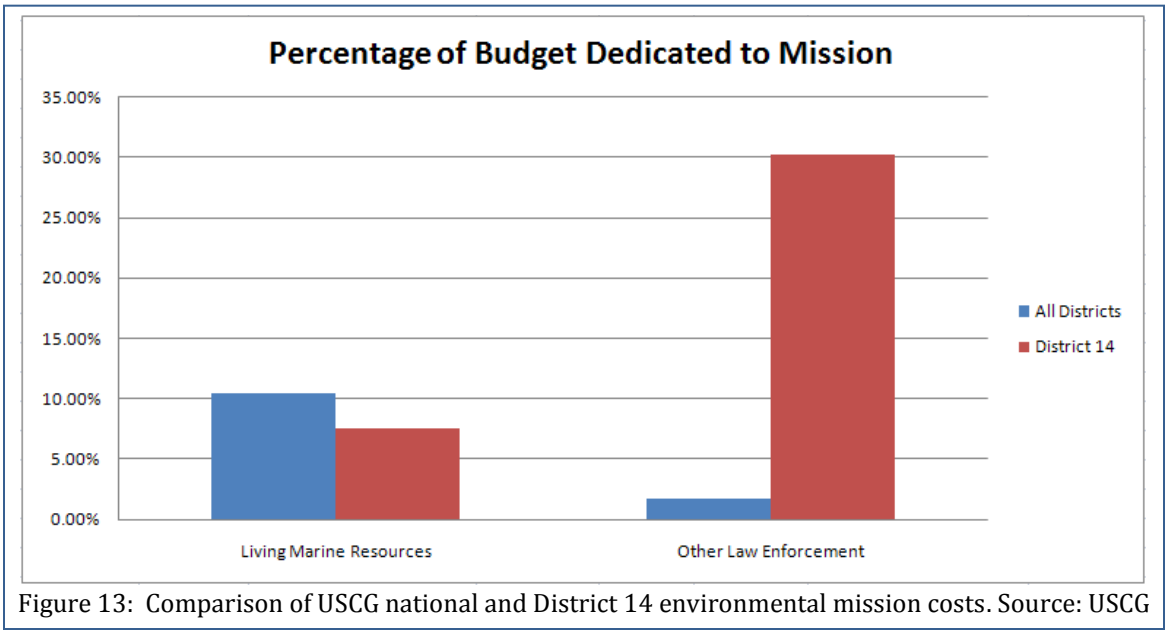


Figure 13: Comparison of USCG national and District 14 environmental mission costs. Source: USCG

[26] Mission hours and total budget do not include hours or monies spent on the use of assets for support activities such as training. In general, the number of support hours has grown over the past 4 years, decreasing the number of resource hours available for missions. (GAO 2011).

Another potential barrier to increasing enforcement resources is the Coast Guard's Integrated "Deepwater" System Program, an expensive 25-year re-capitalization project to replace its aging fleet of air and sea assets. Of primary importance to the Pacific Islands region is the replacement of older cutters (HECs) with new National Security Cutters (NSCs). The NSCs will have upgraded electronic command and control systems, will be able to take longer trips at sea, and will require far less maintenance than the older HECs. The current plan is to replace 12 HECs with eight NSCs. Although the NSCs represent a much-needed upgrade in capability, as the total number of USCG cutters decreases from 12 to 8, District 14 might experience a net loss of cutter hours in the annual budget allocation process.

For an agency that must balance 11 statutory missions on a shoestring budget, USCG has little margin for error and little money available to fund innovative projects. District 14 began paying for the use of SeaStar with money from the USCG's Innovation Fund, which is designed to provide limited start-up funding to innovative projects that improve USCG operations. With no dedicated innovation funding beyond the first year, USCG has continued to pay for its SeaStar user license with leftover operational funds from District 14, and, more recently, with funds from USCG Pacific Area Command (PACAREA). The Command's funding of SeaStar is an encouraging sign that USCG leadership recognizes the value of integrating scientific data with law enforcement planning. However, because there is no dedicated annual funding for SeaStar, its future availability is always in doubt.

Recommended Actions

USFWS has neither the physical assets nor the staff to perform a comprehensive law enforcement function for the US Pacific Marine National Monuments. USFWS leadership needs to provide additional resources to the regional office and the Pacific Islands National Wildlife Refuge Complex. In the absence of field staff, the USFWS should look into establishing a pilot remote surveillance system that could serve the dual purposes of biological and law enforcement monitoring. A simple ruggedized video camera system with zoom/pan and satellite communications capability could be deployed on one or more islands that currently do not have USFWS presence, such as Howland/Baker. In addition to monitoring its resources, the USFWS could broadcast live streaming images via the internet to members of the public, helping to build stakeholder interest both in the agency's mission and in these remote marine monuments and wildlife refuges.

Enforcement in the Pacific depends on strong partnerships that allow enforcement agencies to collaborate and share data with their foreign counterparts. NOAA needs to have people stationed at FFA and WCPFC headquarters offices. To do this, OLE Pacific Division needs to make a clear case for the return on investment. In the past when NOAA agents have visited FFA and WCPFC headquarters, they were able to collaborate with commission and agency staff to detect additional violations by US vessels of international conservation measures. This resulted in hundreds of thousands of dollars in fines and penalties. The gains in penalties and in detecting and deterring additional foreign incursions into the US EEZ by stationing two agents at these locations could easily offset agent costs. NOAA should develop a simple cost-benefit analysis that spells out the value-added contribution for

agents stationed at FFA and WCPFC headquarters to justify an increase in its law enforcement budget.

The USCG considers all of its missions important, but reality dictates that tradeoffs must be made based on *priorities of the moment*. Although the *Living Marine Resources* and *Other Law Enforcement* missions are among the highest priorities for District 14, these missions compete with homeland security priorities at the national level, which often take precedence over environmental missions. In order for USCG District 14 to successfully gain more resources for its critical environmental protection roles, the district will have to make an effective argument that natural resources protection and environmental crime is worthy of HQ support. The district will need to raise the profile of fisheries enforcement at a national level and make explicit the links between fisheries enforcement and strategic national interests in the region. District 14 has begun to describe their maritime enforcement missions in the Pacific as the "fight for fish." The economic development and food security of many Pacific Island nations are tightly linked to the sustainability of their marine resources. With IUU fishing rampant in certain areas, there is a clear danger to the political stability of the region. USCG and US Navy commanders in the Pacific region already understand this. However, it is imperative that the message be spread to higher levels of command and to Congress, as they shape the USCG budget. The environmental NGO community can help carry this message to decision makers, but the USCG must take the lead by demonstrating and justifying its needs and making this justification public.

USCG apprehending an IUU Fishing Vessel. Source: USCG

Finally, in a time of restricted federal budgets, it is difficult for any agency to make ends meet, much less go beyond traditional practices to seek innovative solutions to problems. In the case of District 14's use of SeaStar, innovative thinking paid off. SeaStar is expensive, with an annual license cost of around $150,000, but it is far too valuable a tool to be dropped. The SeaStar project is in its fourth year of funding. USCG headquarters is currently working with members of the intelligence community to investigate whether it could use a government-developed software system comparable to SeaStar in both its Pacific and Atlantic Command areas. It will likely take some time to develop a government-made product that can match the accuracy and utility of SeaStar. In the meantime, it is important that District 14 receive dedicated funding for SeaStar, or another comparable product from the commercial sector, in order to optimally leverage their limited pool of patrol assets throughout the US Pacific Islands EEZ.

USCG Air Patrol. Source: USCG

The USCG and NOAA rely heavily on electronic vessel monitoring systems (VMS), in combination with air and sea patrols, to provide situational awareness about fishing vessel activity in the Pacific. However, these traditional methods of detection have certain limitations and provide only a partial picture of what is actually going on. The USCG has a limited number of patrol assets, which have finite endurance and detection range. Furthermore, current rules of WCPFC and FFA prohibit countries from having access to certain VMS data that could track vessels close to or in nations' EEZs. As US agencies work to leverage scarce patrol resources and improve access to VMS data, they also need to look for additional information sources to fill in the gaps in detection capability. The following sections discuss current limitations, recent innovations, and further suggestions for creative approaches to surveillance and planning that could bridge detection gaps and improve overall maritime domain awareness.

Tracking Fishing Activity with Vessel Monitoring Systems

Vessel Monitoring Systems (VMS) have been used extensively since the 1990s as a cost-effective solution for the monitoring, control, and surveillance of fishing vessel activity. VMS consist of permanently-installed shipboard electronic equipment that broadcasts information about the vessel's activity and global position coordinates to a monitoring center via secure satellite communication channels. VMS use is fishery-dependent, meaning that only vessels fishing for particular species or in certain areas are required to carry VMS. Reporting requirements are set by the flag state or regional fishery authority that mandates VMS use. Fishing vessels are often only allowed to select VMS units from a limited list of approved providers. The approval process allows fishery managers to ensure that all vessels are using equipment that complies with a standardized reporting framework and allows officials to address problems (and detect whether vessels are attempting to flout the system) quickly. In the Pacific Islands region, US law enforcement agencies depend on three separate VMS systems to provide a common operating picture of fishing activity: a US system that tracks US-based domestic fishing vessels, a WCPFC system that tracks international vessels on the high seas, and a FFA system that tracks international vessels within member-country EEZs.

In general, VMS coverage of the US fishing fleet by NOAA is very good, and technical issues are resolved quickly. The US VMS program is administered independently by each National Marine Fisheries Service (NMFS) region. Each system reports vessel position information directly to a NOAA-managed central VMS database and the USCG. The Pacific Islands regional VMS center in Honolulu covers around 200 US vessels, with near 100% coverage of the Hawaii- and American Samoa-based longline fleets and the US purse seine fleet. Additionally, any vessel wishing to fish west of 150 degrees W longitude is now required to carry VMS per new requirements issued by the WCPFC.

Violations by US vessels sometimes occur in the monuments (see threats section above), but when they do, authorities usually know about it. The real challenge to enforcement agencies is the tracking of distant-water fishing vessels operating in the high seas and foreign EEZs adjacent to US waters. Current restrictions set by the WCPFC and FFA on sharing their VMS data severely limit the ability of the USCG and NOAA to track hundreds of international fishing vessels and respond to foreign fishing vessel incursions into our EEZ.

Both the WCFPC and FFA operate a VMS that uses satellite GPS to track fishing activity for all registered vessels throughout the region. The FFA VMS tracks approximately 1,500 vessels within its member nations' EEZs, and the WCPFC VMS tracks roughly the same number of vessels on the high seas. The WCPFC and FFA VMS essentially operate on the same system, using the same technology. However, due to data sharing rules, the VMS data is filtered so that each organization is only allowed to see vessel positions for their own jurisdictional areas. In other words, the WCPFC monitoring center in Pohnpei, Federated States of Micronesia, can only view vessel positions on the high seas, whereas the FFA center in Honiara, Solomon Islands, can only view vessel positions when they are within FFA-member country EEZs.

Near real-time FFA VMS data, when provided to US enforcement authorities, is limited to areas inside the US EEZ. One Coast Guard official has likened this to "looking through soda straws" – in other words, vessel activity is only visible within a collection of US EEZ circular areas spread across the Pacific. In contrast, the WPCFC VMS data shows vessel positions on the high seas, but these vessels "disappear" when they enter a nation's EEZ. The WPCFC currently provides USCG and NOAA with vessel positions that fall within a 100-mile buffer zone surrounding the US EEZ, but does not show any vessel positions within the US EEZ. Additionally, the WCPFC is not provided in real-time, but is sent to USCG and NOAA via electronic spreadsheet around once every 24 hours. Figure 14 illustrates this point for two hypothetical fishing boats operating near the US EEZ. The red-colored tracks indicate positions that are visible to US agencies, while the black lines indicate invisible movements. At any given time, the USCG and NOAA only have a partial picture of what's happening and must use intuition and other sources of data to fill in the gaps.

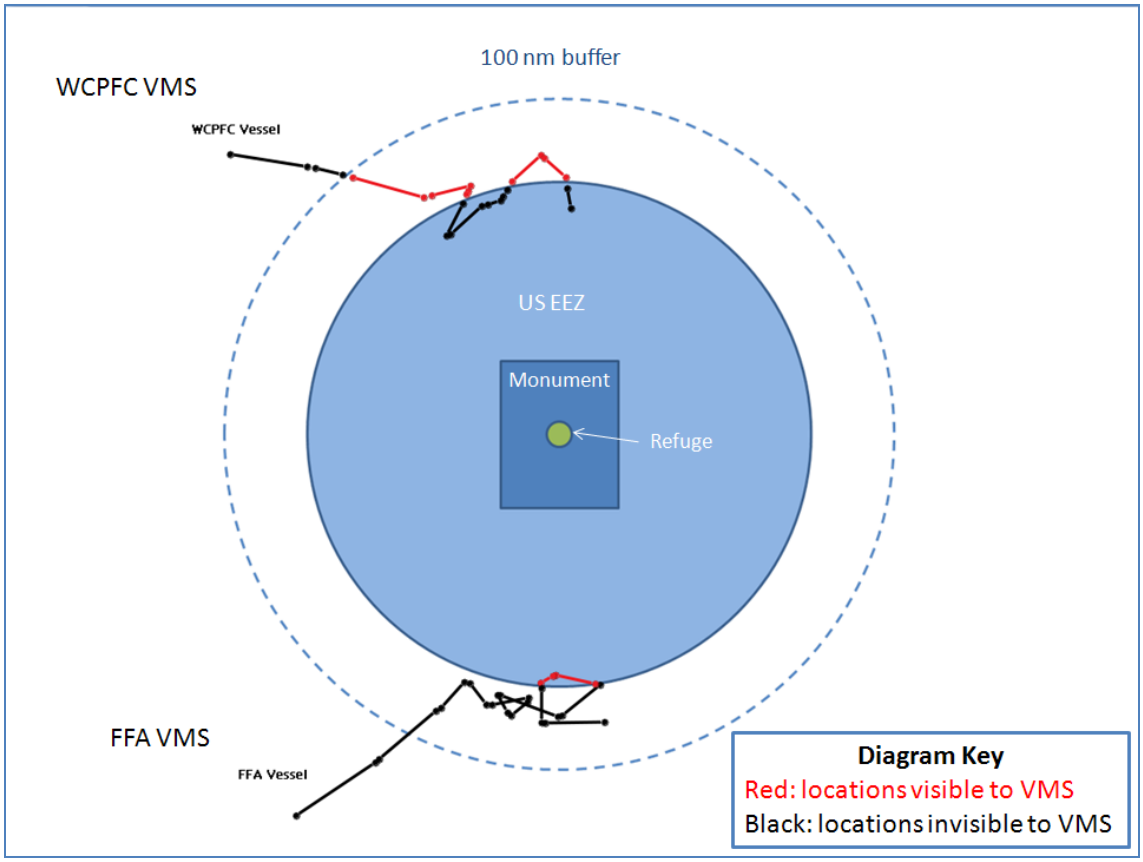


Figure 14: A hypothetical situation where two vessels (one FFA-registered vessel, one WCPFC-registered vessel) are fishing outside and inside of a section of the Pacific US EEZ that contains portions of the PRIMNM and a National Wildlife Refuge. Red colors indicate portions of the vessel tracks that US officials would normally see using international VMS data, and black colors indicate portions of the vessels' actual tracks that would be invisible to US enforcement officials. With only a partial picture of VMS tracks, it is difficult for US agencies to determine whether a few VMS data points seen inside the US EEZ represent illegal fishing activity, or whether they show a vessel that is simply transiting through US waters. In general, vessel tracks with more complicated routes and shorter turning angles indicate some type of fishing activity, while more straight-line routes indicate non-fishing activity, i.e. innocent passage.

The separation of FFA and WCPFC VMS into two separate streams of data with separate data access restrictions places enormous burdens on the USCG's ability to use the data as "actionable intelligence." Because of the vast distances involved and the financial and opportunity costs of deploying an air or sea asset to investigate a possible foreign fishing incursion, the USCG will only dispatch a patrol vessel or plane if there is reasonable indication of illegal fishing activity. Because FFA VMS only tracks boats once they are inside the US EEZ, if a foreign fishing boat is moving back and forth across the US EEZ border, only a few data points at a time will be visible to US officials. These few data points are not enough to warrant the cost of deploying an asset to investigate; enforcement officials often need a series of position data points over time in order to determine whether a vessel's heading and speed variations indicate that it is engaged in fishing activity.

The WCPFC is currently considering a proposal that would allow any member nation to access WCPFC VMS data broadcast from within the nation's EEZ. Since the WCPFC and FFA report through what is essentially the same system, all that is required is a "flip of a switch" to make this data available. The combined WCPFC and FFA VMS data would provide a much clearer picture of fishing vessel presence inside our EEZ. However, the proposal failed to move forward at the most recent WCPFC meeting (March 2012). The earliest it could see action again is at the next full meeting in December 2012.

Shiprider Agreements

USCG Vessel in harbor. Source: USCG

The USCG does not have enough air and sea assets to fully cover the US EEZ border with patrols. Even when patrol craft are present, detection range is subject to visual and technical radar limitations. In the last several years, the USCG has formed innovative partnerships with the US Navy and foreign nation fishery enforcement authorities to improve its maritime domain awareness. USCG currently has "shiprider" agreements with the US Navy, whereby USCG Liaison Officers (CGLOs) are placed on board Navy vessels transiting the Pacific. The USCG uses the Navy vessel as an observation platform (with the ship's enhanced surveillance technology) to complement VMS and other data received by District 14's enforcement office.

USCG and the Navy are currently working on an arrangement that would allow USCG law enforcement boarding teams to travel on Navy ships. This would allow USCG to actually interdict vessels engaged in illegal activity. A memorandum of understanding (MOU) between NOAA, USCG, and DoD has been signed. According to USCG officials, the USCG is currently finalizing a Concept of Operations document to implement the agreement. The agencies hope to begin execution in FY 2013.[27]

The USCG also has individual shiprider agreements with eight Pacific island nations that border the US EEZ (Cook Islands, Kiribati, Marshall Islands, Micronesia, Palau, Tonga, Tuvalu, and Nauru). These agreements allow the partners to conduct bilateral enforcement exercises. During a typical patrol, a USCG cutter will carry a foreign law enforcement official onboard, allowing the USCG to act as an extension of foreign nation authority to board ships and enforce laws within its EEZ. During these patrols, the USCG also has access to FFA VMS data showing vessels inside the foreign nation's EEZ. In the case of Kiribati and other nations that share an EEZ boundary with the US, the data provide USCG and NOAA with real-time knowledge of fishing vessel activity on both sides of the US border, allowing them to determine when a vessel is simply transiting in and out of the US EEZ and when it is engaged in more complex movements that indicate illegal fishing activity. Although

[27] Eric Roberts, USCG, personal email to William Chandler, Marine Conservation Institute, July 11, 2012.

bilateral patrols provide better maritime domain awareness, their frequency is limited by availability of USCG patrol craft

Tracking Small Recreational Vessels


Recreational yacht. Source: NOAA

Illegal entry and trespass by recreational vessels appears to be a chronic problem at some Pacific monument refuges. There are hundreds, if not thousands, of recreational boats (sail and motor) transiting the Pacific each year; some of them stop at various islands along the way. The international sailing community is believed to be fairly ignorant about the rules governing US island refuges within the monuments and unaware that these islands are closed to entry (including anchoring). Even one introduced species from an unauthorized visitor can quickly wreak havoc in an isolated island ecosystem, especially when USFWS biologists are unable to check up on their refuge islands more than once every two to three years. (see Section II: Threats to the Pacific Monuments).

The USCG has trouble tracking small boat activity because of the lack of regulatory requirements for these vessels to file navigation plans or carry GPS-enabled transponders--traditional tools for maintaining surveillance of commercial fishing fleets. Vessel detection by USFWS field staff is limited, as most islands are uninhabited. Even at Palmyra Atoll, where staff is deployed year-round, visual detection is usually limited to 2-5 miles. In addition, most biological field operations are conducted on the southern side of the atoll, where staff at the field camp can only view the southwestern part of the ocean. There is no ground-based radar at Palmyra to help with detection, and no way to tell if vessels are lurking just out of visual range of the atoll during the day or night.

This problem was graphically illustrated during a recent trip to resupply the Palmyra field station. The motor vessel M/V KAHANA was on route to Palmyra carrying USFWS field staff and supplies when the KAHANA's radar picked up an unidentified stationary vessel approximately 4 miles northwest of the atoll. An unknown language (suspected by USFWS staff to be Japanese, but this was unconfirmed) was heard over vhf band radio. Shortly afterward, the vessel headed west, its intentions unknown.[28] It is very concerning that the vessel was well within the refuge's boundaries (closed to the public unless you have an entry permit) with unknown intentions, appeared to be stationary, and would have gone unnoticed by Palmyra staff were it not for its serendipitous discovery by the M/V KAHANA.

[28] James Breeden, USFWS, personal communication with the author, February 6, 2012.

Even though it is generally the opinion of USFWS that illegal trespass violations in the refuges are infrequent, it is troubling that on the rare occasions when field staff are present at a remote island such as Johnston Atoll, they observe recreational vessels approaching. Beginning in 2011, USFWS started a process to formally record future encounters with unannounced vessels at Palmyra and Johnston. With the help of USFWS Office of Law Enforcement and National Wildlife Refuge Enforcement staff, USFWS is also developing an "Unannounced Vessel Data Sheet" for use at Palmyra and Johnston. The data sheet will provide a standardized form to collect information on all observed vessel contacts, including vessel identification, origin, destination, and stated cause for visit. USFWS is close to finalizing the data collection form and a protocol for reporting vessel contacts to USCG enforcement staff.

Recommended Actions

Improving Access to International VMS

It is vitally important that NOAA and USCG be alerted when foreign vessels are fishing illegally inside US waters; this means they need to have the ability to track all vessels that have VMS requirements in the international tuna fishery. Without full access to international VMS data, enforcement agencies can only see a fraction of a vessel's activity at any given time. NOAA, USCG, and the US State Department should continue their initiative at the WCPFC to secure an international agreement that would allow member nations to have full access to real-time WCPFC VMS data for foreign vessels inside their respective EEZs. Until that happens, enforcement agencies should explore other data sources that can help fill in the missing pieces of vessel activity in US waters.

Integrating Science with Law Enforcement

Due to the vast size of the Pacific Islands region, USCG does not simply patrol for "cold hits" but attempts to strategically place its patrols to areas where fishing is suspected to be occurring. A few years ago, USCG 14th District began using SeaStar, to produce predictive maps of commercial fishing hotspots. This same software is used by hundreds of tuna fishing vessels throughout the Pacific. By using the same product as the commercial fleet, the USCG can patrol where they are most likely to encounter fishing vessels. The project has been so successful that it has been picked up by USCG Pacific Area Command (PACAREA), and is employed throughout the entire Pacific.

USCG headquarters is now investigating the use of SeaStar (or a similar product) for the Atlantic area. One caveat to using this tool in other regions is that SeaStar works best to track fishing fleets in pursuit of highly migratory species like tuna and billfish.. It may not be as effective for fisheries in the Northern Pacific, such as the driftnet salmon fishery, or for traditional fisheries in the Atlantic. However, the key point here is that the USCG recognizes the value of combining commercially provided biological data with its traditional law enforcement intelligence to guide enforcement.

Given the success of SeaStar, USCG and NOAA should explore ways of integrating fisheries biology and oceanographic data with law enforcement planning and intelligence analysis. Bathymetric features, such as seamounts, influence placement of ocean currents; and mixing areas are often associated with higher than normal catches of tuna and other species. USCG already incorporates seamounts to some extent into their enforcement planning through their use of SeaStar and other oceanographic modeling tools. However, USCG and NOAA could take this a step further by combing a rigorous statistical analysis of these catch data with known historical fishing activity from VMS to yield further insight into spatial patterns of fishing. For example, one study looked at tuna fishing around Western and Central Pacific seamounts using fishing boat logbook data from the Secretariat of the Pacific Community, a regional intergovernmental organization which includes both nations and territories in the Pacific Ocean. The study found statistically significant levels of higher catch of yellowfin, bigeye, and albacore tuna around particular seamounts.[29] Many of these seamounts are located near the border between a US EEZ and that of another nation or near high seas fishery areas. The study did not look at catches at seamounts inside the US EEZ area due to lack of time and resources. This presents an opportunity for NOAA scientists to work with USCG and NOAA OLE Pacific Division to develop a greater understanding of fishing hotspots around US seamounts.

There are other ways that scientific or fisheries management data could be used to better inform law enforcement planning and operations. For example, NOAA OLE Pacific Division has expressed interest in partnering with NMFS scientists to use historical fishing data records to validate and enhance OLE methods for detecting illegal activity with VMS data. Many members of the non-profit and academic communities have the scientific expertise and willingness to apply science information towards solutions for illegal fishing and other conservation challenges. NOAA/NMFS, USCG and USFWS should identify research priorities and work them into their budgets.

Better Information Management and Data Integration

In general, all three agencies need to do a better job of enforcement data management and integration. The results of our FOIA request showed that USCG database records on foreign fishing vessel incursions during 2001-2011 were incomplete. This is likely due to the fact that USCG officers routinely rotate in and out of regional assignments every few years. Regardless, the USCG needs to be more consistent in its record keeping. The USCG database was missing crucial information about the locations of foreign vessel incursions into the US EEZ, information that could have been used to better inform enforcement planning.

Both NOAA and the USCG need to share and integrate historical fishing data. One personnel gap at both agencies is the absence of experts in data mining and statistical analysis. These experts could explore historical fishery data and past violations to determine patterns of illegal activity and predict potential enforcement hotspots. If NOAA proceeds with plans to

[29]Morato T, Hoyle SD, Allain V, Nicol SJ (2010) Tuna Longline Fishing around West and Central Pacific Seamounts. PLoS ONE 5(12): e14453. doi:10.1371/journal.pone.0014453.

add this expertise to its workforce (see 'Funding' section above), there will need to be greater coordination between Pacific OLE and USCG data managers.

Despite being the primary manager of the newest US marine monuments, USFWS is often not as involved as it should be in regional enforcement discussions with NOAA and the USCG, a pattern that must change in order to effectively protect monument areas. To rectify this situation, USFWS staff should acquire the necessary security clearances that would allow them to view classified data, or, at the very least, unclassified but sensitive law enforcement data (including proprietary data such as fishing vessel VMS data). The effort between the USCG and USFWS staff to develop an information collection protocol for trespassing vessels is a step in the right direction, but more needs to be done. The data collection protocol needs to be integrated into law enforcement intelligence planning in order to better understand the extent of illegal trespass within remote islands refuges and how it can be deterred.

Shiprider Agreements and Oceania Maritime Security Initiative

Both District 14 and US Navy Pacific Fleet headquarters support shiprider agreements because they contribute to improving US maritime domain awareness. The next step is to place USCG boarding teams on Navy ships. Now that a memorandum of understanding has been completed between the Navy and USCG, a Concept of Operations plan is being drawn up. USCG boarding teams could start operating as early as November 2012.

The Navy first began assisting the USCG to improve maritime domain awareness through the Oceania Maritime Security Initiative (OMSI) launched in 2009. OMSI allows the US Navy to use its ships and aircraft that routinely transit the Pacific region to help monitor and detect IUU fishing activity. Almost a dozen US Navy ships have participated in the mission since it began. Most recently, in June 2012, a Navy carrier "strike group" led by the USS CARL VINSON conducted an exercise in Oceania. In just nine days, the strike group provided almost 35 percent of all contacts and vessel data collected by the OMSI program since its beginning.[30]

Positive developments like this will have a tremendous impact on the USCG's ability to enforce the US EEZ and uphold international laws protecting marine life on the high seas. In addition to the OMSI agreement, the USCG should pursue other agreements with the US Air Force and other Defense Department agencies to enhance the tracking of foreign fishing vessels in US waters.

[30] Gidget Fuentes, "New Carrier Role in the Pacific: fight illegal fishing," *Navy Times*, June 21, 2012

Current Outreach Efforts

Education and outreach are necessary components of effective law enforcement because they increase voluntary compliance and prevent future illegal activity. NOAA and USCG outreach and education efforts in the Pacific Islands mostly consist of manning information booths at events and handing out brochures to interested persons. Agency staff also conduct presentations on regulations at special events organized by the Western Pacific Regional Fishery Management Council (WESPAC), such as the council's regular "Fishers Forums." NOAA OLE conducts some outreach activities in an effort to educate the fishing and boating communities about regional enforcement priorities. For example, NOAA conducts boater safety meetings for whale watch tour operators in Hawaii, during which they outline vessel regulations and whale viewing guidelines for the Hawaiian Islands Humpback Whale Marine Sanctuary, a heavily visited area.

The USCG will join NOAA in education efforts at regular WESPAC meetings and special events, but on the whole, does not conduct a large amount of outreach and education for fisheries or protected resources, relying on NOAA to carry the load. Most USCG outreach to mariners is conducted for the purposes of recreational boating safety (often administered through USCG Auxiliary Volunteers) and navigational safety, through means such as the District's Broadcast Notice to Mariners (BNM) and Local Notice to Mariners (LNM).

According to WESPAC officials we interviewed, NOAA and USCG do a fair job overall of conducting outreach and education, especially considering that the agencies have minimal resources. But they also believe these agencies could do "a whole lot more." In particular, WESPAC staff noted that there is no outreach activity specifically focused on marine monuments. NOAA agents typically give warnings to US vessels known from VMS data to have fished illegally in the monuments, but this type of outreach is reactive instead of proactive and only reaches a small subset of the fishing community.

USFWS does not have an outreach program for the recreational boating community.. When sailboats are detected approaching the refuges at Johnston or Palmyra and request permission to enter, they are informed by USFWS staff that these are sensitive ecological areas that are closed to the public. USFWS realizes it needs to be proactive in reaching the Pacific sailing community to inform them about monument rules and prohibitions. We recommend USFWS, in consultation with USCG and NOAA, develop a partnership outreach project and begin implementing it in FY 2013.

Law Enforcement Hotlines

NOAA OLE has a national hotline number for reporting illegal fishing activities and other maritime law violations that occur anywhere in the US. USCG operates a similar hotline that is used by the public to report all types of events, from illegal activities to emergency search and rescue situations. The NOAA OLE hotline is operated by a contractor who

basically provides a phone routing and messaging service to NOAA field offices. NOAA OLE headquarters does not assemble statistics on the number of calls or the types of violations reported. The USCG has a hotline in Hawaii that is manned around the clock by the watch officer on duty. Within the last couple of years, WESPAC distributed a magnetized card to US fishermen which lists the numbers of both the NOAA and USCG hotlines.

It is unclear how effective the two hotlines are for their intended purposes; in particular, they seem to be little used in protecting the monuments and remote US EEZs. For example, we were unable to acquire statistics as to how many times a call came in for a fishery-related issue, domestic or international. USCG enforcement reports submitted to WESPAC over the past six years mention only two instances, both in 2004, in which a US fishing vessel reported suspected illegal foreign fishing activity in the US EEZ. In both cases, the USCG patrol deployed to the scene found no evidence of illegal activity. According to USCG officials, US fishermen often do not report violations at the time they occur, limiting the USCG's ability to quickly respond, and therefore limiting the usefulness of the hotline.

Use of Maps to Increase Voluntary Compliance

In 2011, NOAA OLE began offering US fishing vessel owners in Hawaii and American Samoa real-time information about their vessels' locations through free Google Earth mapping software that is modified to incorporate VMS data supplied by NOAA. Vessel owners are provided access to the VMS data on their boats through a secure internet connection. Vessel owners can see real-time positional data for their ships as well as their location in relation to the boundaries of all US MNMs, national marine sanctuaries, and fishery closure areas. Owners can also click on the depicted areas to get more information about specific regulations pertaining to a MPA or fishery closure.

The VMS map service has received a great deal of positive feedback from vessel owners, as it lets them directly observe their vessels' activities and whereabouts. In one case, it allowed a vessel owner to observe one of his captains make an unscheduled visit to one of the main Hawaiian Islands when he was supposed to be underway to a fishing ground. The effect of this service on closed area compliance rates has yet to be determined, but in theory the tool would allow vessel owners to warn their captains when they are in danger of violating protected areas. At the very least, having access to these maps means vessel owners cannot claim ignorance when NOAA fines or penalizes their boats for violations in closed areas.

People may break the law due to ignorance or lack of clarity about laws and regulations. At the time of this report, Rose Atoll, Marianas Trench, and Pacific Remote Islands MNMs are not accurately listed on any official NOAA nautical charts, nor are they mentioned at all in the latest edition of US Coast Pilot 7, a navigational guide that provides supplementary information to the nautical charts for the US West Coast and US Pacific islands. Coast Pilot does mention the Pacific Islands National Wildlife Refuge areas and the fact that they are closed to the public. However, the publication does not correctly describe the geographic boundaries of the refuges. NOAA nautical charts currently list Johnston Atoll and Kingman

Reef as “Naval Defense Sea Areas” and “Air Space Reservations” – designations that refer to past military use. The outdated and incomplete information on NOAA nautical charts and in Coast Pilot fail to convey the true boundaries of the Pacific monuments and refuges, and therefore undercuts voluntary compliance—the cheapest form of deterrent.

Recommended Actions

Publish Updated Maps to Increase Voluntary Compliance and Prevent Harm

NOAA, USCG, and USFWS should collaboratively explore options for conducting preventative outreach to improve compliance with Pacific monument and National Wildlife Refuge policies. NOAA and USFWS should ensure that Pacific monument and refuge boundaries are clearly outlined on NOAA nautical charts, and that US Coast Pilot 7 clearly describes the protected nature of these areas and defines prohibited activities. Marine Conservation Institute is working with both agencies to expedite this process.

The three agencies should explore similar opportunities with the commercial sector. The company that produces SeaStar has a broad client base and a well-known presence within the US and international fishing communities. Marine Conservation Institute has initiated contact with the company’s Marine Services Division to request that they place monument boundaries, along with information on prohibited activities, on SeaStar as an additional information service to its clients. The company has indicated some interest in doing this, but may need additional encouragement from the USCG and its other potential clients within the law enforcement community. USCG should also explore options to reach out to the wider maritime community through the use of Broadcast Notices to Mariners and Local Notices to Mariners, which could provide information about the monuments.

NOAA’s use of Google Earth to display VMS data and protected area boundaries has been a great success in terms of gaining wide acceptance among US commercial fishing vessel owners. The next step is to determine what impact the service will have on compliance rates. NOAA should continue to work collaboratively with US fishing vessel owners to gauge how useful the maps are in terms of preventing illegal fishing in protected areas. NOAA should determine whether the tool helped owners avoid violations, or if the tool’s current format for describing prohibited areas and other regulations is useful and clear to owners. If the mapping service has not been distributed to international fleets, NOAA should work with FFA and WCPFC authorities to see if there is a way to provide similar VMS data to foreign vessel owners so they too can see the positions of their vessels in relation the boundaries of US monuments.

Crowdsourcing Surveillance through Public Outreach

USCG, NOAA, and USFWS do not currently have the capacity to maintain a persistent presence in the marine monuments to better understand the scope and severity of illegal fishing. To cover the gap between available patrol assets and the mandate to protect a vast, remote, and discontinuous US EEZ, we recommend that the three agencies harness the

power of crowdsourcing. In its simplest form, "crowdsourcing" involves distributing a complex problem or set of tasks to a larger network of cooperating people. In this case, its purpose would be to increase maritime domain awareness and improve understanding of threats in the Pacific Islands region. Crowdsourcing of maritime law enforcement is an emerging trend that has taken hold in diverse areas, including the California Coast where volunteer citizen groups have banded together to protect MPAs from illegal fishing; and in coastal regions of West Africa, where local fishermen use their smartphones to report incursions of large foreign trawlers in local waters.[31]

Hotlines are one of the simplest means of crowdsourcing. NOAA and USCG should initiate a study of emergency hotline usage and assess its impact on law enforcement operations. NOAA and USCG should explore how their hotlines are viewed within the US fishing community, especially how the community views their utility as a way to increase maritime domain awareness of illegal foreign fishing activity in the US EEZ and Pacific monuments. NOAA, Coast Guard, and USFWS could also explore opportunities to provide better knowledge of the hotlines to the recreational boating industry. The yachting community has already been engaged in "citizen science" initiatives that use crowdsourcing for scientific studies of ocean wildlife like seabirds and turtles. Federal agencies could harness the close and personal connection that this user group feels with the ocean to impart a sense of ownership and stewardship for protected areas.

Mechanisms for Cooperation

Each federal agency fills a unique niche when it comes to enforcing the Pacific monuments, but none can do it alone. NOAA handles investigations and prosecution, but relies on the USCG to provide an on-water enforcement presence. USFWS is the primary manager and enforcement authority of the isolated islands within the newest three monuments, yet lacks both the staff and an ocean-going vessel to monitor and protect these areas. The USCG is the only agency with air and sea assets capable of patrolling vast stretches of ocean, hence it provides the primary on-scene presence to detect, intercept, and interdict illegal activity in the monuments. However, the USCG has limited assets and must balance their use across 11 diverse missions. It is generally agreed that more USCG patrols are needed, but to conduct them USCG would need either an influx of additional ships and planes, or a greater percentage of ship and plane time in the agency's budget.

The business of law enforcement in the Pacific is only going to get more complicated. In addition to integrating the new monuments into their operations, federal enforcement agencies face the prospect of new environmental regulations on the horizon, including regulations that protect marine mammals and corals in Hawaii, and international treaties, such as the international Port States Measures Agreement currently under review by Congress.[32] Budget and staff constraints dictate a mindset that involves collaboration and

[31] Community Sciences. 2012. http://www.communitysciences.org/IntPages/TrawlerSpotter.php
[32] US State Department. 2011. *President Obama Submits Port State Measures Agreement to Senate* http://www.state.gov/r/pa/prs/ps/2011/11/177154.htm

creative thinking to ensure the monuments are cared for and protected in a manner consistent with their status as national treasures.

US federal agencies already collaborate. The USCG has developed shiprider agreements that extend the zone of deterrence into foreign waters. Through OMSI, the USCG is working with the US Navy to leverage additional surveillance from Navy ships and aircraft transiting the Pacific; and the USCG will soon be able to place boarding teams on Navy ships. NOAA and USFWS coordinate on research cruises to the monuments, and USFWS is partnering with the USCG to document recreational boats that visit the refuges. These collaborations are vital to improving surveillance and detection capabilities.

Agencies clearly understand the challenges at hand, and likewise express a general spirit of collaboration in their everyday work. Nevertheless, each agency still views its obligation to the monuments from its institutional vantage point. There is no formal workgroup or task force whose role it is to see the "big picture," set priorities, and coordinate problem solving across agencies in an efficient manner. In today's resource constrained environment, collaboration must be a central feature of protected area enforcement.

Recommended Actions

NOAA, USCG, and USFWS need more resources to handle an increasing workload of environmental protection mandates. To obtain new resources, federal agencies must be able to successfully communicate the importance of their mission in a way that will resonate with their agency leadership, Congress, nongovernmental conservation organizations, and the public. They must also clearly document the progress they are making and the results achieved.

Except for Papahānaumokuākea, the marine monuments occupy somewhat of an institutional purgatory. There is a clear policy directive for USCG to assist with protection of sanctuaries (see for example, the 2003 USCG Commandant instruction 16004.3A clarifying USCG's role), but no such directive exists for the three new Pacific marine monuments. When NOAA released an initial draft of its revamped national enforcement priority-setting process on November 8, 2011, the three new Pacific Marine National Monuments were not on the list of top enforcement priorities in the Pacific Islands region, a telling oversight. Ultimately, NOAA rated the monuments as a medium-level priority in its final version of the document in response to public comments. (Marine Conservation Institute had urged NOAA to do so.) Enforcement effort by USCG and NOAA is directed toward "their" statutory mandates (MSA, NMSA, MMPA, etc.), not toward the Antiquities Act. The USFWS has broad jurisdiction to enforce the Antiquities Act in the monuments, but this act carries weak penalties (compared to the Magnuson and National Marine Sanctuaries Acts). Furthermore, USFWS is woefully underfunded to carry out its oceanic enforcement mission.

Marine Conservation Institute believes the Pacific monuments are precedent-setting in their geographic scope, ecological value, and symbolism for conserving special places in the ocean. They also come with unprecedented challenges that require a new managerial mind-

set, one that emphasizes the prevention of harm to these special areas. Federal agencies must rise to the task.

The issue with the monuments is not a lack of inter-agency communication or project-specific collaborations – this already happens as agency managers meet regularly to discuss regional conservation priorities like Papahānaumokuākea Marine National Monument and the Humpback Whale National Marine Sanctuary. What is missing is the architecture required for proactive management and priority setting.

An approach that could be effective is for USCG, NOAA, and USFWS regional leaders to establish a monument task force or working group that meets periodically to deal with management issues, seeks collaborative solutions to problems, and develops a communication strategy that tells the story of the monuments and agency efforts to protect them. The working group would present their senior leadership with annual action plans that could be integrated with each agency's budget process to the extent possible. Senior regional leadership (e.g., the USCG 14th District Commander, NOAA Regional Administrator, and USFWS Regional Director) would meet once or twice per year to be briefed on plan implementation and to approve decisions on strategy. An elaborate planning exercise is not needed; agencies can build on what they do now. The challenge is connecting everything together and coordinating budget requests in a smart way.

If this is done, there is a greater chance of receiving budget support from the Administration and the Congress. Non-governmental advocacy organizations like Marine Conservation Institute can assist agencies by advocating for improved enforcement, but need a coherent interagency plan to support. More and more, budget examiners and appropriators in Washington are looking for ways to increase efficiency and get more return on investment in government programs. We believe collaborations that demonstrate innovation, competence, and results are much more likely to get a sympathetic ear from budget decision-makers than "business-as-usual" requests that are narrowly focused on individual agency programs and projects.

Appendix I: Commonly Used Acronyms

AIS:	Automatic Identification System
BNM:	Broadcast Notice to Mariners
CGLO:	Coast Guard Liaison Officer
CNMI:	Commonwealth of the Northern Marianas Islands
DoD:	Department of Defense
EEZ:	Exclusive Economic Zone
FFA:	Forum Fisheries Agency
GCES:	General Counsel Enforcement Section
HEC:	High Endurance Cutter
IMO:	International Maritime Organization
JEA:	Joint Enforcement Agreement
LNM:	Local Notice to Mariners
LRIT:	Long Range Identification and Tracking
MMPA:	Marine Mammal Protection Act
MNM:	Marine National Monument
MPA:	Marine Protected Area
MSA:	Magnuson-Stevens (Fishery Conservation and Management) Act
NMSA:	National Marine Sanctuaries Act
NOAA:	National Oceanic and Atmospheric Administration
NSC:	National Security Cutter
OLE:	Office of Law Enforcement
PACAREA:	US Coast Guard Pacific Area Command
PRIMNM:	Pacific Remote Islands Marine National Monument
RFMO:	Regional Fishery Management Organization
SAC:	Special Agent In Charge
USCG:	US Coast Guard
USFWS:	US Fish & Wildlife Service
VMS:	Vessel Monitoring System
WCPFC:	Western and Central Pacific Fisheries Commission
WESPAC:	Western Pacific Regional Fishery Management Council

Appendix II: Pacific Islands Regional Map