Expansion of the U.S. Pacific Remote Islands Marine National Monument

The largest ocean legacy on Earth

May 20, 2014

Report to the United States government prepared by:

Dr. Enric Sala - National Geographic Society, Washington, DC
Dr. Lance Morgan - Marine Conservation Institute, Sonoma, CA
Dr. Elliott Norse - Marine Conservation Institute, Redmond, WA
Dr. Alan Friedlander, University of Hawaii, Honolulu, HI
Expansion of the U.S. Pacific Remote Islands Marine National Monument

EXECUTIVE SUMMARY

Presidential Leadership and Legacy

President Obama has the authority and opportunity to leave the largest ocean conservation legacy in history by extending the existing U.S. Pacific Remote Islands Marine National Monument from the current 50 nautical miles around the seven U.S. Pacific Remote Islands out to the full extent of its 200-nautical mile Exclusive Economic Zone (EEZ) – an increase of 1.8 million square km of new protected area (increase 10 times the current 225,000 square km Monument).

That action would create the largest protected area on Earth (an expanded Monument over 2 million square km) – and include some of the world’s most pristine deep sea and open ocean ecosystems, with unique and global biodiversity value¹. These pristine national treasures would receive full protection, meaning no extractive activities such as mining, drilling, and fishing would be allowed.

The new National Monument alone would protect 18 percent of the United States EEZ, and it would double the area of the ocean that is currently fully protected globally². This would make the United States the undisputable world leader in ocean conservation, and set a record in conservation that is unlikely to be matched again in the U.S. or anywhere else in the world.

By doing this, the President sends very clear and strong messages:

a) Even as climate change threatens human life and property at home and abroad, The U.S. will show global leadership and do what is needed to protect our Earth.

b) The United States will protect its ocean natural resource treasures for the benefit of our own citizens and for the benefit of all other nations because these waters are part of the oceans that connect all of us and give life to the planet.

c) Of all the nations in the world, the U.S. is unmatched in its laws, public support, and technological capacity to conserve our oceans effectively.

¹ The largest monument on land in the United States is approximately 43,000 square kilometers. The largest marine no-take reserve is currently the United Kingdom’s Chagos Islands that were protected in 2010, which measures 545,000 square kilometers.
² http://www.mpatlas.org
Global ecological importance

The waters surrounding the Pacific Remote Islands Marine National Monument are of global ecological importance. If fully protected as Marine National Monuments with no extractive uses, the seven islands’ EEZs would be havens for all kinds of marine wildlife, and a precautionary bulwark against the degradation and decline of marine ecosystems in the Pacific, which continues to unfold at an alarming rate. In addition, the areas would provide badly needed baselines for other Pacific nations that are increasingly working to restore their own degraded coral island and pelagic ecosystems – and to preserve the last wild places left. This guards against the “shifting baseline” syndrome, whereby our expectations of what is natural diminish over time because we cannot remember what healthy ecosystems are supposed to look like. Finally, the islands would be ideal places to monitor the ocean impacts of global climate change, such as coral bleaching and ocean acidification.

The waters and seafloor surrounding the Pacific Remote Islands Marine National Monument harbor some of the best-preserved ocean habitats in the Pacific, and are home to many species of key ecological and commercial importance:

- **Large predatory fishes**, such as tuna, swordfish, marlin, and oceanic sharks are still found in these waters, even though their populations have been significantly depleted in the past 50 years; an estimated 90% of all large predatory fish worldwide have been wiped out, although the exact status of commercially exploited populations in the Pacific varies. Protection would increase the area where these commercially important species can grow and produce more eggs per capita without being exposed to the “wall of hooks” – and hence help replenish their populations.

- **Five species of protected sea turtles** also use these waters as migratory and feeding grounds, including the critically endangered leatherback turtle – which is near extinction because of human activities.

- The proposed area is habitat for **22 species of protected marine mammals**, including a new species recently described by scientists, the Palmyra beaked whale. Seven of these marine mammals are considered endangered.

- **Several million seabirds** of 19 species congregate around or nest at the US Pacific Remote Islands. These seabirds forage in the waters surrounding the current Monument, out to 200 nautical miles and farther, feeding themselves and their chicks.
• The deep sea on the area proposed as an expansion, virtually unexplored, is dotted with an estimated 241 undersea mountains and other unexplored geological features that are hotspots of ocean biodiversity. These undersea mountains (seamounts) each typically harbors thousands of species new to science, and large numbers of endemic species found nowhere else on the planet, just as archipelagos like the Galapagos and Hawaiian Islands do.

• Protecting ocean ecosystems from multiple human impacts will help them to be more resilient from climate change providing refuges for endangered species to adapt to changes already underway.

Legal feasibility

President Obama would earn high praise domestically and abroad by using his authority under the Antiquities Act of 1906 to extend protection for relatively pristine waters surrounding 7 US Central Pacific islands that President Bush started to protect in 2009. This action by President Obama, who has so far declared eleven Monuments on land but none in the sea, would be a natural and culminating step in his conservation legacy and demonstrate the United States’ leadership on protecting these critical ocean resources necessary for the health and well-being of humankind.

• This is a unique opportunity for very large ocean conservation impact in United States’ waters because of the sheer size and remote location of the waters that would be protected. The larger the area being protected the more beneficial it is for science and for conservation. These waters are the least fished in the United States’ EEZ, hence this is the least contentious of any potential large Marine National Monument. Any proposal to create even much smaller marine reserves around our mainland or other islands would be received with strong opposition from the fishing lobby (both commercial and recreational). This new, expanded Monument provides would firmly establish President Obama as the leading figure in ocean conservation in U.S. history.

• The President has clear authority under the Antiquities Act to establish National Monuments to protect lands, submerged lands and marine waters that are controlled by the U.S. Since first used by Theodore Roosevelt, all but two succeeding presidents have used the Act to establish one or more National Monuments. The President who
established the largest ocean area as Marine National Monuments to date is George W. Bush, who created four Monuments in the Pacific covering a total of 860,000 square km.

- **Protection is not controversial** because the islands are highly remote, under full U.S. control, uninhabited\(^3\), and principally used for conservation; yet without formal protections extending to the exclusive economic zone, ecosystem degradation in the near future from fishing or other development is likely. The 50 nautical mile buffers around 5 island or atoll/reef complexes are already managed for conservation and the extension of these boundaries will greatly expand these safe zones for marine life.

- **There is no conflict with commercial fishing.** Tuna fishing occurs episodically in the proposed area. The status of yellowfin and bigeye tuna is a cause for concern; both species are likely being overfished and are now fully exploited. The Honolulu-based longline fleet sets only 4% of their hooks in this area, and the annual catch by the purse seine fleet is only 5% of their tuna catch in the Pacific – and this effort occurs only at the edge of the U.S. EEZ. Both of these fleets obtain 95% of their catch from regions outside of the waters being considered for protection. Moreover, tuna move throughout the Pacific in yearly migrations, therefore the U.S. quota can still be caught outside the boundaries of the proposed Monument. However, tuna are crucial ecologically because they push small fish to the surface, which are then caught by seabirds, which in turn will feed their chicks on the islands of the current Monument.

- **The new Monument will further emphasize the President’s legacy in pivoting the U.S. policy focus towards the greater Pacific region.** It will greatly enhance the conservation value of the recent announcement by Kiribati that it will close the entire Phoenix Island Protected Area (408,250 square km that adjoin the U.S. territories of Howland and Baker islands) to commercial fishing. There is a growing movement among Pacific states, large and small, to protect and recover their ocean ecosystems and manage their fisheries more sustainably. In addition to the protections by Kiribati, other nations like Australia, New Caledonia, Palau, the Cook Islands and New Zealand have been developing national systems of marine reserves for a number of years. Protecting our own unique islands and their surrounding waters would make the U.S. the world leader in ocean conservation.

\(^3\) The only inhabitants are civilian and military employees of the U.S. government at Wake and Palmyra, who provide the capacity to manage the expanded monument.
Conclusion

There is widespread recognition that the oceans need more protection, especially no-take reserves, to protect and restore marine life. Currently less than 1% of the ocean is fully protected from fishing. The natural resource values of the oceanic region surrounding the Pacific Remote Islands MNM are superb, the need for their conservation is clear, and the timing is right for bold leadership by President Obama. The President is the only decision maker with the ability and authority to act swiftly and decisively to protect these national treasures, using the Antiquities Act. Should the President protect these places, he would make conservation history by establishing the world’s largest protected area. President Theodore Roosevelt laid the seeds for the National Park system through his proclamation of 18 National Monuments; President Bush helped increased the legacy of our ocean heritage; and now President Obama can leave an incomparable ocean legacy by protecting our unique and vibrant Pacific ocean ecosystems and establishing the largest ocean conservation legacy in history.

President Obama can use the Antiquities Act to extend the boundaries of Pacific Remote Islands Marine National Monument around U.S. territories in the Central Pacific. That would send a strong message to Americans, our friends and others around the world, saying this is how Americans treat our lands and waters in an age of climate change and emerging ocean acidification.
1. Introduction

The seven islands and atolls that are the core of the Pacific Remote Islands Marine National Monument (Kingman, Palmyra, Jarvis, Howland, Baker, Wake, and Johnston – hereafter ‘the islands’ or ‘assessment areas’) and their surrounding waters are of global conservation interest. The islands and atolls harbor some of the most pristine coral reefs and deep reefs in the world. The surrounding waters contain dynamic and diverse open ocean (pelagic) habitats that are permanent or temporary home to many vulnerable and threatened species of ecological importance.

However, the Pacific Remote Islands Marine National Monument protects only 50 nautical miles (nm) around the islands. Most of the Exclusive Economic Zone (EEZ) of the U.S. around these islands (from 50 to 200 nm) is currently open to exploitation.

President Obama has a unique and rare opportunity to create the largest protected area on Earth by expanding the current Pacific Remote Islands Marine National Monument from 50 to 200 nm. Here we describe why President Obama must establish the largest ocean conservation legacy in human history.

If fully protected as Marine National Monuments with no extractive uses, the eight islands’ EEZs would be havens for all kinds of marine wildlife, and a precautionary bulwark against the degradation and decline of marine ecosystems in the Pacific, which continues to unfold at an alarming rate. In addition, the areas would provide badly needed baselines for other Pacific nations that are increasingly working to restore their own degraded coral island and pelagic ecosystems – and to preserve the last wild places left. This guards against the “shifting baseline” syndrome, whereby our expectations of what is natural diminish over time because we cannot remember what healthy ecosystems are supposed to look like. Finally, the islands would be ideal places to monitor the ocean impacts of global climate change, such as coral bleaching and ocean acidification.
This report makes the case for expansion of the Pacific Remote Islands Marine National Monument, including the scientific justification and the benefits of protection for the United States and for other Pacific nations. The report focuses on the value of the waters and deep-sea habitats in the proposed area for Monument expansion (between 50 and 200 nm), which is currently unprotected.

2. Conservation Value

The waters and seafloor surrounding the Pacific Remote Islands Marine National Monument harbor some of the best-preserved ocean habitats in the Pacific, and are home to many species of key ecological and commercial importance. An estimated 14 million seabirds representing 19 species use the islands as critical stopover points, as well as breeding areas and feeding grounds. Large tunas are still providing an important ecological function to foraging seabirds at these remote islets and atolls. Tunas drive prey, such as squid, towards surface waters where they are easily caught by seabirds. In short, seabirds rely on the tunas to help them feed their chicks, which in turn are eaten in near shore waters by reef sharks. Therefore, protecting the waters around the current Monument from fishing is critically important to maintaining the health of the coral reefs within the Monument. Twenty-two species of marine mammals inhabit and feed in these waters, including a recently discovered species of beaked whale. In addition, there are an estimated 241 undersea mountains that probably are deep-sea biodiversity hotspots.

This section of the report analyzes the scientific information available for these waters and seafloor, and their conservation value.

2.1. Open Ocean Waters

2.1.1. Large Predatory Fishes

Large predatory fishes, such as sharks, tunas and billfishes, are a key component of open ocean (pelagic) ecosystems. They are highly migratory, ranging widely throughout the tropical central and western Pacific. The tuna populations of this region are distinct from the eastern tropical Pacific tuna populations and other areas in the Pacific. Four species of tuna are common to this region: skipjack (Katsuwonus pelamis), yellowfin (Thunnus albacares), bigeye (Thunnus obesus), and albacore (Thunnus alalunga). There is growing concern over the regional status of bigeye and yellowfin, which are likely overfished or close to be overfished. Within the EEZ of the seven islands, bigeye and yellowfin are targets of the longline fishery in and around Johnston, Palmyra
and Kingman Reef, while the other species are more commonly targeted by the purse seine fleet near the equator in the waters of Howland, Baker and Jarvis (see “Fishing” section below). Other pelagic fishes that are kept by the longline fleet are blue marlin, black marlin, striped marlin, swordfish, sailfish, short-billed spearfish, mahi mahi, wahoo and bluefin tuna.

In 2003, a widely reported scientific study estimated the decline of large predatory fishes such as tunas at nearly 90% (1). Among the populations of pelagic fishes that are greatly reduced are many species of oceanic sharks (2) – the top predators in marine ecosystems (Figure 1). In 2006, another analysis further reported a 74% global decline in pelagic fishes from the pre-exploitation, pristine state (3). Globally it is clear that large, pelagic fishes are being unsustainably fished, and that without drastic improvements in management they will not recover.

Figure 1. Oceanic whitetip sharks are among many kinds of large predators that are disappearing from ecosystems worldwide. Extending no-take protection to the edge of Pacific Remote Islands Marine National Monument Exclusive Economic Zones (to the 200 nautical mile limit) would make history by creating the world’s biggest safe refuge for pelagic sharks.
The loss of these top predators has significant impacts on the structure of ecosystems (4). As explained in greater detail in this document, tunas are important to the success of foraging seabirds in the tropics as they drive small fish and squid to the surface where they are accessible to diving seabirds (Figure 2). The observed declines of tuna stocks because of overfishing must be having deleterious effects on island seabird populations.

Figure 2. Tuna are ecological keystone species in US Central Pacific waters because they chase small fishes and squids to the surface, where seabirds can catch them to feed to their chicks (5, 6). 97% of the US’ Pacific yellowfin and bigeye tuna catch happens in other areas (7).

The import of pelagic fishes from the offshore waters around the islands (see “Seabirds” section below) by adult seabirds not only helps raise seabird chicks, but also to feed reef sharks. For example, in the lagoon of Palmyra Atoll, 30% of the blacktip reef sharks (*Carcharhinus melanopterus*) were found to eat seabirds (8).

Tuna in the region are managed under international agreement by the Western Central Pacific Fisheries Commission. The four species of tuna and a number of other pelagic species provide a relatively small proportion of commercial fishing catch in the waters surrounding these islands (9). No international vessels are permitted to fish in the EEZ of the islands, and the US purse seine and longline tuna fleets take less than 5% of their annual tuna catch here (7). The areas surrounding the more southerly US territories- Jarvis, Howland, and Baker – are of almost no significance to the US tuna longline fleet (7).
Given the significant role of schooling fish to the health of seabirds in this region, and the small overall catch, protecting tuna and other fishes in these waters is the best way of ensuring the health of the surrounding pelagic ecosystems. Furthermore, restrictions on fishing in these areas are likely to help sustain these populations of fishes for the long term.

2.1.2. Sea Turtles

Sea turtles have inhabited the Earth for a very long time, as evidenced by 150 million year old fossils. In the last few centuries, humans have caused massive reductions in sea turtle numbers through direct capture of adults and collection of eggs, and indirectly through bycatch in commercial fisheries (10, 11). Although irresponsible fishing methods and practices are the main cause of turtle declines today, they are also harmed by entanglement in marine debris, destruction of feeding and nesting areas, and ingestion of garbage and plastic objects carelessly thrown into the sea. All of these stressors are significantly impacting dwindling sea turtle populations.

Sea turtles are listed as threatened or endangered with extinction by several international bodies (12) and are protected domestically under the Endangered Species Act (ESA)4. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) controls the international trade in endangered and threatened species and currently lists all species of sea turtles found in US waters in CITES Appendix 1, as the most endangered animals and plants5. Similarly, the International Union for the Conservation of Nature (IUCN) categorizes all sea turtle species as endangered and lists the leatherback sea turtle, which has been documented in all the US Pacific territorial waters, as critically endangered (12).

Five species of sea turtle have been documented as present in the seven islands and surrounding waters: green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*) (13). Green and hawksbill turtles forage and nest in the US Pacific islands, and loggerheads, leatherbacks and olive ridleys forage and/or migrate through US Pacific waters (14). There are reports of green sea turtles nesting on Baker, Howland, Jarvis and Palmyra (15, 16). Green sea turtles also swim and forage in the waters surrounding each of these islands, as well as those of Kingman, Wake and Johnston. Hawksbill sea turtles are found in the waters surrounding Baker, Howland, Jarvis, Palmyra, and Kingman (17-19).

---

4 http://www.nmfs.noaa.gov/pr/species/esa/turtles.htm
5 http://www.cites.org/eng/app/index.shtml
The waters in this region are important migration paths for all sea turtle species. These waters are important to the migration of the critically endangered leatherback sea turtle. Benson and colleagues mapped satellite tag tracking data for 126 individual leatherbacks across the Pacific (Figure 3). These maps show leatherbacks are actively transiting and/or foraging in the EEZs of the monuments twelve months a year (Figure 4) (20). Considering the extremely low population of leatherback sea turtles globally (90% or greater in decline in the Pacific) (21), and the minuscule percentage that are successfully tagged, the fact these turtles have been tracked navigating US waters demonstrates that these EEZs are an important migration route between Indonesia and California\(^6\) and deserve strict protection.

\[\text{Figure 3. All 126 leatherback deployments presented as probability of transit. Large, darker circles indicate Area Restricted Search (ARS) behavior; small, lighter dots indicate transiting behavior. Color of track indicates deployment season: red \(\approx\) summer nesters, blue \(\approx\) winter nesters, green \(\approx\) deployments at central California foraging grounds. Inset shows deployment locations; PBI \(\approx\) Papua Barat, Indonesia, PNG \(\approx\) Papua New Guinea, SI \(\approx\) Solomon Islands, CCA \(\approx\) central California. Black boxes represent ecoregions for which habitat associations were quantitatively examined (see text): SCS \(\approx\) South China, Sulu and Sulawesi Seas, IND \(\approx\) Indonesian Seas, EAC \(\approx\) East Australia Current Extension, TAS \(\approx\) Tasman Front, KE \(\approx\) Kuroshio Extension, EEP \(\approx\) equatorial eastern Pacific, and CCE \(\approx\) California Current Ecosystem.}\]

Figure 4. Seeking high concentrations of the jellyfish they eat, critically endangered Pacific leatherback sea turtles—the largest turtles in the world—migrate through the EEZ surround the USA’s Pacific Remote Islands, where President Obama could protect them from the “wall of hooks” and nets of the tuna fleet.

All five species of sea turtles found in U.S. island waters have been documented as bycatch fatalities in U.S. fisheries. Longliners fishing for tuna and other large pelagic fish accidentally catch and kill large numbers of sea turtles throughout Pacific waters. A report by Lewison and colleagues (22) estimated the effects of longline fisheries on turtle species in the entire Pacific:

“... despite infrequent rates of encounter, the analyses show that more than 200,000 loggerheads and 50,000 leatherbacks were likely taken as pelagic longline bycatch in 2000. The analyses suggest that thousands of these turtles die each year from longline gear in the Pacific Ocean alone. Given 80–95% declines for Pacific loggerhead and leatherback populations over the last 20 years, this bycatch level is not sustainable.”

Turtle bycatch numbers are compiled separately by National Marine Fisheries Service (NMFS) observers for the tuna and swordfish fisheries. According to NMFS, tuna purse seine vessels have 100% observer coverage, and the tuna longline fleet has approximately 20% observer coverage. We requested turtle bycatch data for the seven areas from the Pacific Islands Regional Office of NMFS, but did not receive it. One thing in favor of the turtles is that tuna longline sets are “deep sets” that are less prone to hook turtles than shallow sets for swordfish.

As discussed earlier, the economic importance of commercial tuna fishing in the EEZs of the seven assessment areas is relatively small. Altogether, only 5% of the annual tuna catch by US
boats comes from these areas (7). A fully protected Monument across the entire EEZ of the islands would provide much needed sanctuary for migrating, foraging and nesting turtles and their hatchlings.

2.1.3. Seabirds

Seabirds are an important component of ocean and coastal ecosystems and play an especially important role in the central Pacific. Unfortunately, the population of just about every seabird in the greater region is declining (23). The major threats to seabirds and factors contributing to their decline are bycatch in fisheries, human settlements, nonnative predators such as rats and cats, habitat destruction, indirect fishery interactions, pollution, and global climate change and sea level rise (23, 24). Protecting and effectively managing the few remaining refuges for seabirds in the tropical Pacific, particularly uninhabited islands and their surrounding foraging grounds that they rely on for food, are essential for the continued health and survival of these species.

Over 3 million seabirds of 19 species use the lands and marine waters of the seven islands for breeding, foraging, or resting; and up to 14 million seabirds may use the waters around the islands for foraging (B. Flint, personal communication). These birds are primarily pelagic feeders that obtain the fish and squid they consume and feed to their young by associating with schools of large predatory fish such as tuna and billfish (5, 24). Large schools of predatory fish force schools of small pelagic fish to the surface where they become easy picking for seabirds; otherwise the fish would be too deep or scattered for the seabirds to reach (6) (Figure 5).

Figure 5. Schematic of subsurface-predator facilitated foraging (6).
It is especially important to have abundant schools of small prey and large predatory fish near breeding colonies because it is much harder for newly hatched and inexperienced birds to find food and successfully feed far from shore and return home safely (5, 24). Because tropical oceans have very low productivity, predators such as tuna and seabirds are adapted to unpredictable and patchy prey distributions. What food can be found exists mostly in ocean fronts and currents that concentrate nutrients. These zones of high nutrients encourage the growth of plankton and attract small pelagic fish, which in turn attracts tunas and seabirds. Commonly, there are eddies that form patches of high nutrients and food availability downstream of remote islands, aided in part by the nutrients brought back to the island and surrounding waters by the seabirds themselves. These areas of high nutrients attract small pelagic fish and in turn attract tunas and seabirds. The presence of natural densities of these tunas within the foraging radius of seabird colonies enhances the ability of birds to provide adequate food for themselves and their chicks (6, 24).

Although some food is available close to shore, breeding seabirds typically have to travel great distances to find enough food to feed themselves and their young (6). The red-tailed tropicbird has the longest recorded foraging distance around the islands, with a radius of 468 km (252 nm) (Figure 6) (6). Other longer-ranged species also feed beyond the 200 nm boundary of the islands’ EEZ (Figure 7).

Figure 6. Red-tail tropicbirds nest on U.S. Central Pacific Islands but forage out to 252 nautical miles (468 kilometers) out at sea to feed their chicks. Protecting the EEZ out to 200 nautical miles (370 km) from these islands will protect the crucial feeding grounds of these and many other seabirds.
Unfortunately, the patchy nature of food resources in the tropical Pacific and the association between tuna and seabirds exposes the birds to higher likelihood of contact with fishing vessels. Of the fisheries occurring in the US EEZ in the tropical Pacific, the most harmful to the seabirds is longlining for tuna. Longlining is a fishing method in which many baited hooks are attached to a fishing line that is typically miles long. As a reference, the Hawaii-based longline fleet deployed an astonishing 45.4 million hooks in 2012 (7). Seabirds get caught on the baited
hooks and drown. Globally endangered black-footed albatross (Table 1) in particular interact with longline fisheries. Data from the National Marine Fisheries Service (NMFS) observer program shows that a minimum of 450 black-footed albatrosses and Laysan albatrosses were killed in 2005-2007 in the longline fishery (25). This is an ongoing management concern.

Table 1. Seabirds found in the EEZ of the U.S. Pacific Remote Islands7 (26).

<table>
<thead>
<tr>
<th>Seabirds</th>
<th>Breeding</th>
<th>ESA Status</th>
<th>IUCN Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audubon’s Shearwater (<em>Puffinus iherminieri</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Band-rumped Storm-petrel (<em>Oceanodroma castro</em>)</td>
<td></td>
<td>Critical</td>
<td>Least Concern</td>
</tr>
<tr>
<td>Black Noody (<em>Anous minutus</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Black-footed Albatross (<em>Diomedea nigripes</em>)</td>
<td>Breeding</td>
<td></td>
<td>Endangered</td>
</tr>
<tr>
<td>Black-naped Tern (<em>Sterna lunata</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Black-winged Petrel (<em>Pterodroma nigripennis</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Blue Noddy (<em>Procellsterna cerulea</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Bonin Petrel (<em>Pterodroma hypoleuca</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Bridled Tern (<em>Sterna anaethetus</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Brown Booby (<em>Sula leucogaster</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Brown Noddy (<em>Anous stolidus</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Bulwer’s Petrel (<em>Bulweria bulwerii</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Christmas Shearwater (<em>Puffinus nativitatis</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Fairy Tern (<em>Sterna nereis</em>)</td>
<td>Breeding</td>
<td></td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Flesh-footed Shearwater (<em>Puffinus carneipes</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Gould’s Petrel (<em>Pterodroma leucoptera</em>)</td>
<td></td>
<td></td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Great Crested Tern (<em>Sterna bergii</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Great Frigatebird (<em>Fregata minor</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Grey-backed Tern (<em>Sterna sumatrana</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Hawaiian Petrel (<em>Pterodroma sandwichensis</em>)</td>
<td></td>
<td>Endangered</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Herald Petrel (<em>Pterodroma heraldica</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Kermadec Petrel (<em>Pterodroma neglecta</em>)</td>
<td></td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Laysan Albatross (<em>Diomedea immutabilis</em>)</td>
<td>Breeding</td>
<td></td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Lesser Frigatebird (<em>Fregata ariel</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Little Shearwater (<em>Puffinus assimilis</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Masked Booby (<em>Sula dactylatra</em>)</td>
<td>Breeding</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Murphy’s Petrel (<em>Pterodroma ultima</em>)</td>
<td></td>
<td></td>
<td>Near Threatened</td>
</tr>
<tr>
<td>Newell’s Shearwater (<em>Puffinus newelli</em>)</td>
<td></td>
<td>Threatened</td>
<td>Endangered</td>
</tr>
<tr>
<td>Phoenix Petrel (<em>Pterodroma alba</em>)</td>
<td></td>
<td>Former Breeder</td>
<td>Endangered</td>
</tr>
<tr>
<td>Polynesian Storm-petrel (<em>Nesofregetta fuliginosa</em>)</td>
<td></td>
<td></td>
<td>Vulnerable</td>
</tr>
</tbody>
</table>

---

7 Personal communication with Beth Flint at the US Fish and Wildlife Service; http://www.fws.gov/endangered; http://www.iucnredlist.org/
2.1.4. Marine Mammals

The waters surrounding the islands are home to at least 22 species of marine mammals, many of which are rare or endangered (Table 2).

Table 2: The status of species under the Endangered Species Act (ESA) and the International Union for the Conservation of Nature (IUCN) for marine mammals in the Central Pacific.\(^8\)

<table>
<thead>
<tr>
<th>Marine Mammals</th>
<th>ESA Status</th>
<th>IUCN Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blainville's beaked whale (<em>Mesoplodon blainvillei</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Blue whale (<em>Balaenoptera musculus</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
<tr>
<td>Bottlenose dolphin (<em>Tursiops truncatus</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Bryde's whale (<em>Balaenoptera edeni</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Cuvier's beaked whale (<em>Ziphius cavirostris</em>)</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>Dwarf sperm whale (<em>Kogia simus</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>False killer whale (<em>Pseudorca crassidens</em>)</td>
<td></td>
<td>Lower Risk</td>
</tr>
<tr>
<td>Fin whale (<em>Balaenoptera physalus</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
<tr>
<td>Hawaiian monk seal (<em>Monachus schauinslandi</em>)</td>
<td>Endangered</td>
<td>Critically Endangered</td>
</tr>
<tr>
<td>Humpback whale (<em>Megaptera novaeangliae</em>)</td>
<td>Endangered</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Killer whale (<em>Orcinus Orca</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Melon-headed whale (<em>Peponocephala electra</em>)</td>
<td></td>
<td>Least Concern</td>
</tr>
<tr>
<td>North Pacific right whale (<em>Eubalaena japonica</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
<tr>
<td>Palmyra beaked whale (<em>Mesoplodon hotaula</em>)</td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td>Pan-tropical spotted dolphin (<em>Stenella attenuata</em>)</td>
<td>Least Concern</td>
<td></td>
</tr>
<tr>
<td>Risso's dolphin (<em>Grampus griseus</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Rough toothed dolphin (<em>Steno bredanensis</em>)</td>
<td>Least Concern</td>
<td></td>
</tr>
<tr>
<td>Sei Whale (<em>Balaenoptera borealis</em>)</td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
<tr>
<td>Shortfinned pilot whale (<em>Globicephala macrorhynchus</em>)</td>
<td>Lower Risk</td>
<td></td>
</tr>
<tr>
<td>Sperm whale (<em>Physeter macrocephalus</em>)</td>
<td>Endangered</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Spinner dolphin (<em>Stenella longirostris</em>)</td>
<td>Data Deficient</td>
<td></td>
</tr>
<tr>
<td>Striped dolphin (<em>Stenella coeruleoalba</em>)</td>
<td>Least Concern</td>
<td></td>
</tr>
</tbody>
</table>

---

The life histories and conservation status of many of these species are not well known due to the difficulty and cost of research. However, it is safe to assume that many of these species rely on the waters surrounding the US islands to some degree for food, mating, calving, migration or play; many of the details await discovery.

The waters around Johnston Island are teeming with spinner dolphins and frequented by endangered whales such as blue whales, sperm whales, sei whales, Northern Pacific right whales, Cuvier’s beaked whale, and even humpback whales, some of which are believed to give birth in the warm waters near shore (27). Johnston Island, Wake Island, and Palmyra Atoll are occasionally visited by the rare and endangered Hawaiian monk seal (28), and may hold potential as monk seal re-colonization areas. There are only about 1200 Hawaiian monk seals remaining (27), and starting experimental populations in other locations is a potential recovery strategy being considered. Kingman and Palmyra are known to have large numbers of dolphins swimming in their waters, as well as large resident pods of rare melon-headed whales. Recently a new species of marine mammal, a type of beaked whale, was described from Palmyra (29). Even Wake Island, once a fierce battleground, has its own resident population of spinner dolphins9.

All marine mammals in US waters are protected from “take” by the Marine Mammal Protection Act, and all of the whales are similarly protected by the International Whaling Commission, with limited exceptions for research. In addition, blue, fin, humpback, right, sei, and sperm whales, as well the Hawaiian monk seal are endangered species protected by the Endangered Species Act (ESA). Despite all this protection, these animals still are not safe. Every year, whales, dolphins and seals get caught and killed by fishing gear. Most of the deaths occur when marine mammals get snagged on a longline, trapped in a purse seine net, or entangled in derelict fishing gear (25).

Current data are not available, but in the period from 2005-2007, about half of the marine mammal species living in these areas have been caught on longline gear used for swordfish and tuna; the most frequent deaths involve false killer whales that are part of a small and distinct Hawaiian population. The sustainable take level for this whale is one death a year, suggesting major concern for this species10. Table 3 shows estimated deaths of marine mammals in the Hawaii-based longline fishery (both for swordfish and tuna) for 2005 and 2006, and actual deaths in 2007 (because the estimates were not complete).

---

10 Tosatto, Mike. Pacific Islands Regional Office, NMFS, NOAA. Personal Communication with Lance Morgan.
**Table 3:** Estimated numbers of fishery interactions with long-line fishing gear for the Hawaiian longline fishery (swordfish and tuna fleets) from 2005-2007 (25)

<table>
<thead>
<tr>
<th>Species</th>
<th>2005</th>
<th>2006</th>
<th>2007*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Striped dolphin (<em>Stenella coeruleoalba</em>)</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Bottlenose dolphin (<em>Tursiops truncatus</em>)</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Risso's dolphin (<em>Grampus griseus</em>)</td>
<td>4</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Unidentified dolphin (Delphinidae)</td>
<td>0</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Blainvilles beaked whale (<em>Mesoplodon blainvillei</em>)</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>False killer whale (<em>Pseudorca crassidens</em>)</td>
<td>6</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Shortfinned pilot whale (<em>Globicephala macrorhynchus</em>)</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Bryde's whale (<em>Balaenoptera edeni</em>)</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Humpback whale (<em>Megaptera novaeangliae</em>)</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Unidentified whale (Cetacea)</td>
<td>1</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td>62</td>
<td>14</td>
</tr>
</tbody>
</table>

*2007 is observed interactions, not estimated ones, which would be higher.

Entanglement is another problem. Lost fishing gear can get entwined around a marine mammal making it hard to impossible for the whale, dolphin, or seal to feed or come to the surface to breathe. Marine debris from other sources, such as trash dumped overboard at sea, can also damage or even kill marine mammals and their prey if they consume or get entangled in it (see marine debris discussion below under threats).

Other factors affecting marine mammals living in the central and western Pacific are whaling, noise pollution, and vessel strikes. Whaling is not allowed in US waters, but occurred in the region for over a century, decimating populations in the process. All vessels traveling through water make some noise, some more than others. Many marine mammals, particularly whales and dolphins, are acoustically oriented animals that rely on audible feedback to locate prey and navigate. It is unknown how much damage noise pollution causes to marine mammals, but it has been known to confuse, disorient, and in extreme cases cause the death of marine mammals. No known vessel strikes of whales have been documented in the region; thus strikes are thought to be uncommon, but certainly possible.

---


2.2. Deep Seamounts

A seamount is a mountain rising from the seabed, but which does not reach the sea surface of the ocean. Seamounts are widespread throughout the world’s oceans, and can arise along the mid-ocean ridges or as isolated features on the seafloor. Most often they occur in chains or clusters. Nearly all seamounts are volcanoes. Some are still erupting actively, such as Loihi seamount, southeast of Hawaii which will become a new Hawaiian island many thousands of years from now. Others, such as the Emperor Seamounts northwest of the Hawaiian Islands, stopped erupting tens of millions of years ago.

In addition to the shallow water coral ecosystems, there are likely hundreds of undescribed undersea mountains found in the EEZs of the islands. The Pacific Remote Islands Marine National Monument includes 40 seamounts; the proposed expansion would include 241 more seamounts (Figure 8, Table 4). Only a very small number (~300) of the estimated 14,000-100,000 seamounts worldwide have been visited and sampled by scientists. Consequently, most of the deep-water species and ecosystems of these seamounts remain undiscovered.

![Figure 8. Seamounts (observed and estimated) at the EEZs of the U.S. Pacific Remote Islands](image)

---

Table 4. Number of seamounts in the U.S. Pacific Remote Islands Marine National Monument and in the unprotected areas of their EEZ.

<table>
<thead>
<tr>
<th>Assessment Island Area</th>
<th>Seamounts in current Monument</th>
<th>Seamounts in proposed expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wake</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>Johnston</td>
<td>7</td>
<td>89</td>
</tr>
<tr>
<td>Howland and Baker</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>Kingman and Palmyra</td>
<td>18</td>
<td>67</td>
</tr>
<tr>
<td>Jarvis</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40</td>
<td>241</td>
</tr>
</tbody>
</table>

Less than 0.2% of seamounts globally having been explored, and 15-44% of the species on a seamount or seamount group are found nowhere else on earth, which makes seamounts extraordinary biodiversity hotspots (30). Roughly 5-10% of invertebrates found on each survey of a seamount are new to science (31). Some seamounts are “lost worlds” having enormous pools of undiscovered species. Therefore all estimates of biodiversity loss and extinction are conservative because our scientific study of the deep sea is still meager (Table 5).

Table 5. Level of study of deep sea ecosystems

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Amount studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelagic deepwater</td>
<td>&lt;0.0001%</td>
</tr>
<tr>
<td>Abyssal plains</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Continental slope (bathyal)</td>
<td>minimal</td>
</tr>
<tr>
<td>Ridges</td>
<td>10%</td>
</tr>
<tr>
<td>Seamounts</td>
<td>0.5%</td>
</tr>
<tr>
<td>Hydrothermal vents</td>
<td>10%</td>
</tr>
<tr>
<td>Canyons</td>
<td>Minimal</td>
</tr>
<tr>
<td>Cold seeps</td>
<td>2%</td>
</tr>
</tbody>
</table>

Given the numbers of seamounts and high levels of endemism, seamounts may well harbor the largest number of undiscovered large marine species left on Earth. Unique and undiscovered seamount species hold tremendous potential as medicines and for biomedical research. Many deep-sea species contain compounds that are currently in clinical trials to treat diseases such as cancer and AIDS. There is strong scientific evidence that deep sea biodiversity holds major promise for the treatment of ills that plague mankind.
Most of the world’s ocean basins are flat, muddy abyssal plains, but seamounts are solid rocky mountains that tower above the plains. Seamounts protrude into the water column and have dramatic effects on the water currents around them. These currents both remove fine sediments from seamounts and bring them an unending supply of nutrients. Therefore, seamounts often attract a remarkable diversity of fishes and other open ocean animals. Because food availability above and on seamounts is often higher than in surrounding waters and seafloors, seamounts are biological hotspots that attract a diverse fauna. Pelagic predators such as sharks, tunas, billfishes, sea turtles, seabirds and marine mammals often congregate above seamounts. However, the seamounts in the EEZ of the islands do not harbor tuna fisheries (Figure 9) (32).

Figure 9. Location of seamounts with significant higher catch rates of tuna [adapted from (32)]. Relative catches of yellowfin tuna (yellow), bigeye (red), and albacore (blue) are depicted on each circle, corresponding to a specific seamount. The EEZs of the Pacific Remote Islands are highlighted in dark blue.
Deep-sea fish species such as orange roughy and eels gather on seamounts to spawn. Animals that live on the rocky crests and slopes of seamounts can also be very diverse and abundant. These include many suspension-feeding animals, such as deep-sea corals and sponges. Corals are especially important in seamount ecosystems because they can form extensive, complex but fragile three-dimensional structures that provide habitat for many other kinds of animals. On some seamounts, scientists have found many new species. Figure 10 shows species found in deep-water (up to 1360 m depth) EEZ areas of Jarvis, Kingman and Palmyra.

![Figure 10](image-url)

**Figure 10.** Deep-sea fauna of the Pacific Remote Islands’ EEZ. (A) Soft coral and sea lillies at the Kingman/Palmyra EEZ, (B) soft coral at the Jarvis EEZ, (C) deep sea fish and corals at the Kingman and Palmyra EEZ, (D) deep-sea crab at the Jarvis EEZ. Photo credit: Hawaii Undersea Research Laboratory (HURL).
3. Threats to the Region

The central Pacific region is at risk from a variety of human activities. Human use of the Pacific Ocean has intensified significantly in the last 40 years. Threats in the pelagic realm include the overfishing of target populations of large predatory fish, disturbance of seabird foraging grounds, the killing of non-target species (marine mammals, sea turtles, and seabirds) in fisheries, and marine debris. The lack of good research on these pelagic threats does not detract from their reality; our ignorance about them is one good reason to take the precautionary approach of fully protecting these relatively intact ecosystems while we can.

3.1. Fishing

Commercial fishing is a threat to the ecosystems of the seven islands because by definition it removes large numbers of fish, which in turn has ecosystem impacts. Industrial fishing, especially for tuna, has been occurring in the islands’ waters for many years. Regrettably, its cumulative effects have not been assessed, although we know that population growth and economic globalization is placing an enormous strain on fisheries everywhere. The U.S. Hawaii-based longline fleet alone set a record 45.4 million hooks in Pacific waters in 2012 (7).

Overexploitation is a constant danger, whether by legal or illegal fishing. The macro impacts of fishing on large fish species has been addressed by Myers and Worm, who found that the world’s oceans have lost more than 90% of their large predatory fish (1). Jackson indicates that more important than the percentage of decline is the shift in species abundance and composition (33). Industrial scale commercial fishing is a phenomenon of the last 60 years; it is now the principal extractive use of the islands’ EEZ waters, and a use that could potentially grow as more boats chase fewer tuna.

Early commercial catch levels are not known. The enactment of a federal fisheries law in 1976 inaugurated a new era of catch reporting by US vessels; reporting has gradually improved, but is not yet comprehensive for all species. Although reef fish, bottom fish and shellfish have been taken sporadically in the past near some islands, there is little near shore fishing going on now. After establishment of the Pacific Remote Islands Marine National Monument in 2009, commercial fishing was closed within its boundaries.

Commercial fishing for tuna by longline and purse seine boats continues in the outer waters of the EEZs, and other species also are taken and kept, such as swordfish and mahi mahi (7, 9). Of the four species targeted by the tuna fleet, the bigeye population is the one most likely to be overexploited at this point in time. Yellowfin tuna is considered to be fully exploited, while
skipjack and albacore are nearing full exploitation levels. There is also anecdotal information and satellite observation of illegal fishing (e.g., shark-finning) in the region by non-US flagged vessels.

Tuna fishing effort varies from across the region. The longline fleet concentrates around Hawaii and Kingman, Palmyra and Johnston (Figure 11). Most of the purse seine catch is taken around Howland, Baker and Jarvis. The portion of the total US tuna catch obtained from the islands’ collective EEZs prior to the monument designation in 2009 amounted to about 3% of the purse seine fleet catch, and 7% of the longline fleet’s take. In 2012, the log book data for the long-line fleet showed about 5% of catch from the region under consideration (Figure 12), and almost no purse seine or other tuna catch in the area (7). The complete closure of these waters to commercial fishing should not result in significant impacts.

Figure 11. Location of the 1.8 million longline sets (blue dots) recorded in the South Pacific Commission’s catch and effort database (1960–2007) [adapted from (32)]. Location of seamounts where tuna fishing occurs (black stars) is shown. The EEZs of the Pacific Remote Islands are highlighted in red. Note that the Pacific Remote Islands EEZs are among the least fished in the central Pacific.
Recreational fishing occurs only at Palmyra Atoll, where the Fish and Wildlife Service allows limited catch and release fishing, whose main objective is help with fish tagging research, and to raise funds to help run the operation of the Palmyra Research Station.

A recreational fishery can have an impact as strong as a commercial fishery. Among populations of concern, recreational landings in the United States in 2002 accounted for 23% of the total nationwide, rising to 38% in the South Atlantic and 64% in the Gulf of Mexico (34). Moreover, recreational fishing affects many of the most-valued overfished species, all of which are taken primarily in the recreational fishery. Moreover, catch and release, even when conducted with apparently harmless gear, has a significant impact on target fish populations. A study conducted off Baja California showed that an average 26 percent of the caught-and-released striped marlin, and 100 percent of the fish released bleeding from the gill chamber, died within five days after release (35).
3.2. Illegal Fishing

All refuge waters in the assessment islands are closed to US and foreign commercial fishing. Because most of the islands are unoccupied and poorly monitored, it is not possible to easily catch US or foreign boats that may enter refuge waters. This issue is complicated by the fact that NOAA and FWS disagree over who has jurisdiction over which waters under what controlling authorities.

There is also some illegal foreign fishing in US island waters. We know this from foreign fishing vessel groundings at Kingman and Palmyra (36); the occasional arrest of a high seas vessel in our EEZ by the Coast Guard (more information in "threats" section); and anecdotal biological evidence of poaching, such as a decline in species numbers over time (e.g., sharks, bumphead parrot fish, and sharks at Palmyra); skewed age structures (grey reef sharks at Howland and Baker), and suspiciously low absences of expected numbers of fish (grey reef sharks at Wake) (33).

It is prohibited for foreign vessels to fish in the entire EEZs of the islands. Infrequent Coast Guard patrols and the lag time between spotting and apprehending a violator before the boat exits US waters means few illegal entrants are caught and prosecuted. The Coast Guard patrols Kingman, Palmyra and Johnston Island EEZs using direct flights from Honolulu. Regular aerial patrols of the other EEZs do not happen unless there is an extended deployment of a Coast Guard aircraft. As a result, even if an aircraft from Hawaii is deployed to Samoa or Guam, only one to two hours of active patrol time per dispatch could be dedicated to patrol the most remote EEZs, such as those of Howland, Baker, Jarvis or Wake Island. These factors, combined with an aging air fleet in need of modernization, challenge the Coast Guard’s ability to protect US living marine resources in the assessment areas. Despite these limitations, the Coast Guard has observed the presence in the islands’ EEZs of an average of 15 illegal fishing vessels per year for the last 4 years. In 2007, there were 11 illegal fishing vessels detected in the islands’ EEZs compared to nine illegal vessels in 2006.

One such case is documented in the US Department of Homeland Security United States Coast Guard Report on Illegal Incursions into the United States Exclusive Economic Zone by Foreign Fishing Vessels. On February 23, 2007, a Coast Guard aircraft observed the Ecuadorian fishing vessel San Andres actively fishing approximately 80 nautical miles inside the US EEZ around Jarvis Island. The Coast Guard was unable to intercept this vessel with a cutter, but did obtain evidence of active fishing activity by the Ecuadorian vessel inside the US EEZ. The US will

---

request the government of Ecuador to take enforcement action against the vessel and prevent further occurrences\textsuperscript{15}.

The vision of a fully protected reserve, which protects natural ecological functions, energetics and ecosystem processes, is incompatible with the extraction of fish or shellfish by commercial and recreational fishers. This was recognized by President Bush when he proclaimed the Papahanaumokuakea Marine National Monument, which prohibits all fishing (except subsistence fishing) within 50 nm of the island chain. At the time of the proclamation there was little recreational fishing taking place in the Monument, and only a few commercial fishermen were actively fishing for bottom fish and pelagic species. President Bush’s proclamation capped commercial fishing at the existing catch level, and directed a phase out of the fishery within five years; recreational fishing was terminated immediately.

Given the massive amount of fishing capacity and power of the entire Pacific fishing fleet, closing the EEZ of the US central Pacific islands will offer a much needed respite for these large pelagic creatures. Critically endangered sea turtles, albatrosses and sharks will once again have significant areas where they are protected during their oceanic wanderings. The closure of these fishing grounds will have relatively small impacts to the combined fishing fleets (less than 5% of their average landings), which can be made up in other areas. Indeed the scientific value from studying these near pristine and intact ecosystems far outweighs the commercial opportunities that are lost. Extending the current Pacific Remote Islands Marine National Monument into the adjacent pelagic waters will provide a unique opportunity to study the linkages between ocean and coastal tropical atolls.

### 3.3. Minerals Extraction

Given the geological history of the Pacific Basin, there are no likely oil and gas deposits in the region. For a number of years there has been discussion of mining cobalt crusts and manganese nodules from the basin and some limited exploration. No mineral extraction is currently taking place on the seafloor of the islands EEZs. We believe seabed mining in the eight islands EEZs would be incompatible with preserving these areas as intact, fully protected ecosystems. Therefore, we recommend all minerals extraction be prohibited.

\textsuperscript{15} United States Coast Guard. 2007. Report on illegal incursions into the United States exclusive zone by foreign fishing vessels.
4. Protection Will Promote Scientific Research

The U.S. Pacific Remote Islands are home to some of the healthiest marine ecosystems remaining in the world; compared to other areas, they are relatively intact and rich in biodiversity. The islands have nearly four times as many shallow-water, reef-building coral species as the Florida Keys, and are home to hundreds of fish species, dozens of seabird species, and an untold number of invertebrate species, including many endemic species found nowhere else. The islands serve as stepping stones on dispersal highways for many coral reef species and marine colonizers that are now established throughout the Pacific. Seldom visited, and mostly uninhabited, the islands’ surrounding marine waters are relatively free from the problems of most other marine ecosystems: over-exploitation, disturbance and pollution.

It is within this context that the great scientific value of the island areas must be understood – they offer a unique window into the past. Nowhere else do we have such remarkably intact tropical ecosystems from which to develop historical baselines of what “natural” islands and oceans are supposed to be. The assessment islands and their surrounding waters offer tremendous opportunities for scientific research on a number of topics if they are protected in their natural state. The islands offer:

- Pristine examples from which to assess the status of coral reef ecosystems throughout the Pacific, and an understanding of coral reef community dynamics without the impacts of fishing, pollution or runoff
- A historical baseline for setting coral reef restoration goals throughout the Pacific
- Sites to monitor the effects of climate change on healthy ecosystems
- Areas study the ecology of near shore ecosystems and their relationship to open ocean waters
- Sites to enhance knowledge of seabirds, sea turtles and marine mammals in open ocean settings and their congregation and migratory patterns—much remains to be done here
- Zones for exploration of the open ocean ecosystem, including its pelagic waters and the deep sea, all of which are not well understood
- Areas to implement and learn from terrestrial and coral restoration projects

Comprehensive coral reef research between NOAA, FWS and several other institutions began in 2000. NOAA has done integrated ecosystem assessments to develop benthic habitat maps; conducts biennial Pacific Reef Assessment and Monitoring Program cruises to each region/island; and conducts Oceanographic and water quality monitoring around each island. A modest budget allocation goes to this effort—about $3M annually\(^\text{16}\). Scientists have mapped

and monitored all US-affiliated islands in the Pacific, allowing for status and health comparisons between the islands and with other non-US islands. These comparisons have only begun. Researchers must continue to more completely understand the differences between nearly pristine and less than pristine coral areas. In addition, The Palmyra Atoll Research Consortium (PARC) should be allowed to continue operation and supported. Very little work has investigated the deep sea and open ocean areas of this region and resources to support this are needed.

Scientific research has shown that these Central Pacific US remote atolls have the largest reef fish biomasses ever reported (37). Their biomass is between 5 and 30 times greater than that in unprotected US coral reefs (38, 39). These results indicate that fishing has removed between 20 and 97 percent of the reef fishes – including sharks – of US unprotected coral reefs. In addition, the biomass of large predators at Jarvis, Kingman, Howland and Palmyra is larger than the biomass of their fish prey (37). These findings support the idea that our previous understanding about the structure of coral reef fish assemblages is biased as a consequence of having studied mostly degraded reefs (40). Based on this consistent set of data, we conclude that large biomass and inverted biomass pyramids were the norm on coral reefs before exploitation by humans. These Central Pacific reefs are essential baselines to understand how natural reefs function, to understand what we have lost, and to identify rigorous, unbiased management and conservation goals. These systems need to be protected lest we forget what a healthy ocean looks like, and how an intact ecosystem functions. This latter point is even more significant given future uncertainty due to rising levels of atmospheric CO₂ and its impacts.

Fully protected from fishing, large tuna will inhabit the pelagic waters of the region and provide an important ecological function to foraging seabirds at these remote islets and atolls driving prey, such as squid, towards surface waters where they are easily caught by seabirds. The community dynamics that reveal themselves to scientists in these untrammeled waters are important insights that cannot be gained in areas under heavy exploitation.

Open ocean research also must be advanced to understand the importance of the ocean areas beyond the coral reef shelves. The assessment areas collectively encompass an estimated 281 seamounts, most of which have not been identified or explored. Given the high rates of species discovery at other seamounts and bottom habitats in the deep Pacific Ocean, we can easily surmise that hundreds to thousands of new species will be discovered in these waters. We recommend that research be continued and increased levels of funding. All research should continue under current agency research permits, consistent with the monuments’ objective of protecting and restoring these unique areas. Funding must be increased for future research for coral reef, deep sea, and open ocean surveys and studies.
REFERENCES CITED


APPENDIX 1
Recommendations for Protection
and Management of the expanded Pacific Remote Islands Marine National Monument

General recommendations and use

In general, we recommend that the U.S. Pacific Remote islands be fully protected to the outer boundary of their EEZ as a Marine National Monument in order to safeguard these rare, relatively pristine and intact ecosystems. Resource extraction should be prohibited on all of the islands, in the waters of the EEZ and on the seafloor, with certain limited exceptions. The purposes of the Monument should be to protect and restore the scientific and historic resources therein, and to maintain natural biodiversity and ecological processes. Uses of the Monument would be limited to scientific research, education, and wildlife viewing by permit.

Management

Because of the existing Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) co-management of the Pacific Remote Islands MNM and its extensive management plan development, we recommend that FWS retain its full and exclusive authority over the islands and nearshore waters, and that seaward of this region, that NOAA should retain management out to the 200 nm zone (or extent of the EEZ) around the islands as an ocean reserve under its authorities. The President should direct NOAA and FWS to coordinate their research and law enforcement activities in their respective zones of management.

The following principles should apply to the areas under consideration:

• Commercial extractive activities are prohibited, including mining and drilling.
• Ships waste discharges and other discharges are prohibited unless relevant national and international treatment standards are met.
• Commercial and recreational fishing is prohibited in the entire zone, except as provided in the earlier proclamation for the Pacific Remote Islands MNM.

The special circumstances of the two military-managed islands call for special measures:
• Johnston Island and surrounding waters to 12 nm is transferred to the Department of the Interior immediately and managed by FWS as a refuge, with funding provided for staff to be based on the island.
• Wake Island remains under DOD management until such time as the DOD declares the island surplus to its needs, at which time it would revert to the Department of the Interior.
• Interior and DOD are directed to negotiate a cooperative wildlife management agreement for Wake Island’s emergent lands. FWS and DOD are directed to co-manage the land areas and wildlife as mutually agreed upon. Funding is provided to place FWS staff on the island for wildlife law enforcement and management purposes.
• The marine waters of Wake to a distance of 12 nm are designated as an overlay national wildlife refuge with primary management authority granted to FWS. Appropriate regulations should be issued by FWS, in consultation with DOD, for recreational fishing in the 0-12nm zone around Wake Island. FWS is authorized to manage recreational fishing under the Refuge Administration Act, Consistent with the management goals of the monument.
• The waters from 12 to 200 nm at Wake are managed by NOAA as a fully protected area.

Military activities

As per the President’s memo of August 26, 2008, DOD should be permitted to continue any activities it deems necessary for national defense in the waters surrounding Wake and the other islands.