

Potential Marine Conservation Management Areas:
Comments of Marine Conservation Biology Institute and
Environmental Defense Fund

Submitted to
James L. Connaughton, Chairman
Council on Environmental Quality
Washington, DC
October 25, 2008

By
Marine Conservation Biology Institute
Environmental Defense Fund

Table of Contents

Executive Summary	4
Lands, Waters and Ecosystems of National Historical and Scientific Interest	10
Historical Themes	10
Scientific Values	11
Geology of Islands and Submerged Lands	13
Seamounts	14
Biology of Islands and Surrounding Waters	15
Coral Reefs	15
Reef Fish.....	18
Large Predatory Fishes.....	20
Sea Turtles.....	21
Seabirds	23
Marine Mammals.....	25
Terrestrial Biology.....	29
Current Uses	29
Resource Extraction and Commercial Fishing.....	29
Military Use.....	30
Human Occupancy	31
Conservation	31
Scientific Research.....	32
Threats to the Islands	33
Federal Agency Conflict.....	33
Fishing.....	34
Illegal Fishing.....	35
Landscape Alterations and Settlements.....	36
Invasive Species	36
Vessel Groundings	37
Marine Debris	38

National Recognition Means Stronger Protection	39
Use of Antiquities Act	40
Presidential Leadership	42
Strategic Issues	43
Military Use.....	43
Fishing.....	45
Minerals Extraction.....	47
Scientific Research.....	47
Recommendations for Protection.....	49
General Recommendations and Use	49
Management.....	49
Military Activities.....	51
Conclusion.....	51
Appendices	
Appendix 1: Scientist Letter of June 6, 2008 to President Bush	Tab 1
Appendix 2: Island Fact Sheets	Tab 2
Appendix 3: Commercial and Recreational Fishing in the Waters of the PRIA.....	Tab 3
Appendix 4: Leatherback Turtle Migration Map	Tab 4
Appendix 5: Conservation Status of Seabirds.....	Tab 5
Appendix 6: Seabird Spot Counts on Islands	Tab 6
Appendix 7: Seabird Foraging Map	Tab 7
Appendix 8: Commercial Shipping Lanes.....	Tab 8

**Potential Marine Conservation Management Areas:
Comments of Marine Conservation Biology Institute and
Environmental Defense Fund**

EXECUTIVE SUMMARY

Conservation Opportunity

President Bush has the authority and opportunity to leave a meaningful and lasting ocean legacy by protecting rare natural gems in the Pacific Ocean. He has asked federal officials to assess the potential for conservation action in three areas: 1) US possessions in the central Pacific (Wake, Baker, Howland, Jarvis and Johnston islands, Palmyra Atoll and Kingman Reef) and their surrounding waters, 2) Rose Atoll in the territory of American Samoa, and 3) the federal waters surrounding Asuncion, Maug and Uracas islands in the Commonwealth of the Northern Mariana Islands (CNMI). They include the some of the world's most pristine coral reefs and the ocean's deepest canyon, with important scientific, cultural, and historic value. The President's action to safeguard these areas would create the largest protected area on Earth —891,000 square miles of relatively healthy coral reef islands and linked pelagic and deep water marine ecosystems.

Marine Conservation Biology Institute (MCBI) and Environmental Defense Fund (EDF) recommend providing these unique national treasures full protection as marine national monuments, meaning no extractive activities such as mining, drilling, and fishing would be allowed. While we support protection for the area being assessed in CNMI, we focus our specific comments to the US possessions in the central Pacific and Rose Atoll in American Samoa.

Areas of Scientific Interest

The pelagic and abyssal marine realms are the least protected ecosystems on Earth. Much of the ocean is still treated as a frontier zone where anything goes; human management, such as it is, has not been effective in stopping the decline of fish and shark populations, sea turtles, seabirds, marine mammals or food webs vital to our planet. Moreover, the decline of ocean life has outpaced scientific exploration and research, leaving us unaware and uneducated about marine life and ecosystems that could benefit mankind. Although we have recognized the importance of coral reefs, both ecologically and economically, there are precious few coral reef islands left in the Pacific – or anywhere on the planet -- that remain in a relatively healthy state,

and more of them are being degraded with each passing year. The relatively pristine ecosystems currently being assessed for conservation action are valuable in their own right, and are among the last places on earth where we can conduct scientific research to better understand baseline ecosystem structure and function. For example, research in the central Pacific “Line Islands” is beginning to show the importance of alleviating human-induced stresses like fishing and pollution around coral reefs to enable them to recover from disease brought on by climate change.

The eight low reef islets and atolls and their surrounding waters (including both the possessions in the central Pacific and Rose Atoll in American Samoa, and referred to herein as ‘the islands’ or the ‘eight islands’ or ‘assessment areas’) are of scientific interest for several reasons. To begin with, the islands and their near shore waters and submerged lands provide habitat for hundreds of species of fish, corals and other invertebrates, endangered sea turtles, and marine mammals; moreover, new species are being documented with each new research expedition. The surrounding waters provide dynamic and heterogeneous pelagic habitats that are shaped by the interplay of various physical, chemical and biological processes. Large pelagic 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, though the exact status of commercially exploited populations in the Pacific varies. An estimated 14 million seabirds of 19 species congregate around or breed on the eight islands. These birds forage in the surrounding pelagic waters out to 200 nm and farther, feeding themselves and their chicks. The seafloor of the pelagic zone, virtually unexplored, is dotted with an estimated 200 seamounts and other unexplored geological features. These underwater mountains typically harbor large numbers of endemic species, just as archipelagos like the Galapagos and Hawaiian Islands do, and appear to function as feeding stations and engines of ocean productivity.

If fully protected as marine national monuments with no extractive uses, the eight islands 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 restoration benchmarks for other Pacific nations which are increasingly working to restore their own degraded coral island and pelagic ecosystems. This guards against the “shifting baseline” phenomena, whereby our expectations of ecosystem health diminish over time because we cannot remember what healthy systems are supposed to look like; consequently, we pass on a poorer natural legacy to future generations. Finally, the islands would be ideal places to monitor the ocean impacts of global climate change, such as coral bleaching and ocean acidification.

Presidential Leadership

Action by President Bush to conserve the areas is appropriate and timely for a number of reasons. First, President Bush already has demonstrated his personal interest in the oceans through implementation of his Ocean Action Plan, including a call to end overfishing. Furthermore, in 2006, the President employed his authority under the Antiquities Act to proclaim the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands (NWHI), a 140,000 square mile pelagic marine and islands ecosystem with scientific and ecological values comparable to those in the central and western Pacific. Protecting the rest of our Pacific island ecosystems would be a natural and culminating step on the President's part.

Second, the President has clear authority under the Antiquities Act to establish national monuments to protect lands, submerged lands and marine waters of scientific interest that are controlled by the US. Presidents have repeatedly used the Antiquities Act to permanently protect lands and waters of unique importance interest to America's natural and cultural heritage because of their scientific values. In fact, since first used by Theodore Roosevelt, all but two succeeding presidents have used the Act to establish one or more national monuments.

Third, protection is politically feasible because the islands are under US control, mostly uninhabited, and principally used for conservation; yet without formal protections extending to the exclusive economic zone, ecosystem degradation is likely. Six of the eight islands are federal national wildlife refuges in their entirety, managed by the US Fish and Wildlife Service (FWS). Part of Johnston also is a refuge. Although Wake and Johnston are under Department of Defense (DOD) management, their nearshore waters are closed to a distance of 3 nautical miles (nm) for defense purposes, thereby providing de facto conservation zones. All of the islands are uninhabited except for a handful of scientific researchers and government staff at Palmyra, and about 125 personnel who maintain the Air Force base at Wake. FWS allows limited recreational fishing at Palmyra, but has closed all the other refuges to recreational fishing and all island refuge waters to commercial fishing. Commercial fishing, mainly for four species of tuna, occurs episodically in the US exclusive economic zones (EEZ) of Howland, Baker, Johnston, Palmyra, Kingman, Jarvis and Johnston. The status of yellowfin and bigeye tuna is a cause for concern; both species are likely being overfished and are now fully exploited. The fish caught in these pelagic waters make up about 7% of the Honolulu-based longline fleet's annual catch, and about 3% of the purse seine fleet catch. Both of these fleets obtain the vast majority of their catch from regions outside of the waters being considered for protection. Because the health of the nearshore systems is linked to the health of the pelagic systems, for example

through the ecosystem-structuring roles played by large pelagic predatory fish, it is necessary to extend protections to cover the entire linked system.

Fourth, full protection of the eight islands will be well received by other Pacific nations and by the public at large. President Bush's permanent protection of the Northwestern Hawaiian Islands generated an outpouring of praise from scientists, conservationists and the public at large. Why? Because there is widespread recognition that the oceans need more protection, especially no-take reserves, to protect and restore marine life. One hundred ninety-four US scientists have signed a letter to President Bush calling for the islands protection (see Appendix 1). Furthermore, there is a growing movement among Pacific states, large and small, to protect and recover their pelagic and coral reef ecosystems and manage their fisheries more sustainably. Soon after President Bush proclaimed Papahānaumokuākea Marine National Monument, the island state of Kiribati established a marine protected area approximately 158,000 square miles in size. Other nations like Australia and New Zealand have been developing national systems of marine reserves for a number of years. Protecting our own unique islands and their surrounding pelagic areas would make the US a world leader in ocean conservation.

Recommendations for Protection

General recommendations and use

In general, we recommend that the eight islands be fully protected to the outer boundary of the US EEZ as marine national monuments in order to safeguard these rare, relatively pristine and intact ecosystems. Rose is the only exception due the Governor's recommendation that a monument extend to 12 nm. 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 FWS presence on the ground and its extensive management knowledge and experience in the islands, we recommend FWS retain its full and exclusive authority over the islands and nearshore waters to a distance of 12nm, where it has such jurisdiction now, and that its jurisdiction be expanded to 12 nm at the rest of the islands where it currently has a 3 nm boundary. With the exception of Rose Atoll, NOAA should manage the 12 to 200 nm zone

around the islands as a pelagic biological 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 area around Rose should be cooperatively managed with the Government of American Samoa. Furthermore, adequate funds must be provided to NOAA and FWS for effective outreach and education to increase understanding of these rare natural gems, as well as for monitoring and enforcement of the areas with the assistance of the Coast Guard, which also needs additional funds.

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 fishing is prohibited in the 12 nm zone.
- Commercial fishing in the 12 to 200 nm zone is capped at the average catch level for the last five years, and terminated within three years.
- Recreational fishing is prohibited in the 0- 12 nm zone and the 12- 200 nm zone. Exceptions are that fishing in the 0-12nm zone around Palmyra Island is capped at the average catch level for the last five years. FWS is authorized to manage recreational under the Refuge Administration Act and consistent with the management goals of the monument.

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. Recreational fishing in the 0-12nm zone around Wake Island is capped at the average catch level for the last five years; or if such statistics are not available, appropriate regulations should

be issued by FWS. 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.

Conclusion

In sum, the natural resource values of our eight Pacific islands are superb, the need for their conservation is clear, and the timing is right for bold leadership by President Bush who is the only one with the ability and authority to act swiftly and decisively to protect these national treasures. Should the President protect these places, he would make conservation history by establishing the world's largest protected area and laying the foundation for a national system of ocean reserves. Theodore Roosevelt laid the seeds for the national park system through his proclamation of 18 national monuments. President Bush can leave a comparable ocean legacy by protecting our unique Pacific island ecosystems.

LANDS, WATERS AND ECOSYSTEMS OF NATIONAL HISTORICAL AND SCIENTIFIC INTEREST

The eight assessment areas in the central Pacific include a number of small coral reef islands and atolls and surrounding waters that lie within the United States Exclusive Economic Zone (EEZ). The collective size of the eight areas being assessed is approximately **779,430 square miles**, an area three times the size of Texas. Although these ecosystems share many of the same flora and fauna, there are important distinctions between them due to geographic location, biological assemblages, stage of geologic evolution, and historic and current use.

The islands are of national significance, both historically and scientifically. This document focuses on the scientific and biological value of the areas, the writers' area of expertise. However, it is generally known that these islands have played a significant role in the pageant of human history.

Historical themes

Here we briefly highlight some of the well known historical themes. Detailed documentation may be obtained from the managing government agencies—the Department of Defense, Department of the Interior, Department of Commerce, and the Government of American Samoa; from the National Park Service, which maintains the National Register of Historic Places and other historical data bases; and from cultural and historical organizations and individual historians.

Exploration and Discovery. The islands were discovered, explored and claimed at different times by several European powers in the race to find riches and desirable lands to claim. Pre-European exploration by early Polynesians and Micronesians also is likely to have occurred on many of the islands although little evidence as of yet has been discovered. Rose Atoll was discovered in the 19th century. An attempt to establish a fishing station and coconut plantation by Germans failed, and the island has been unpopulated ever since.

Human settlement and development. Because of their remoteness, small size and lack of fresh water and other resources, none of the islands were settled at the time of discovery. Small US civilian settlements were made on Howland, Baker and Jarvis in the 1930s to solidify US claims, but these occupants were withdrawn after WWII. Palmyra Atoll was inhabited by the military during WWII, and by its private owner. The Nature Conservancy now oversees a small research facility on Palmyra capable of housing approximately 20 scientists and staff. Johnston Island was claimed by the US in the mid-19th century and occupied during WWII and the Korean War.

The base on Johnston was closed in 2004. Rose Atoll was visited by Samoans for harvest of several species including the giant clam used for cultural celebrations, but was too small for settlement. Wake Island has been occupied by the US military since the 1930s.

Military Use. The islands played a key role in the run up to World War II and during the conflict. The US occupied Wake, Johnston, Howland, Baker, Jarvis, Kingman and Palmyra with US troops and airbases during the war, and extensive changes were made to the landscapes. Wake was the site of two battles with the Japanese in 1941, and was the first US territory conquered by Japan. Several of the larger islands continued to be used for defense purposes after WWII until they were decommissioned. Wake is a National Historic Landmark and is the only island still in active military use.

Aviation. The islands also played an interesting role in US aviation history. Kingman and Wake were once used as commercial seaplane landing spots in the 1930s. An airstrip on Howland was the intended destination of Amelia Earhart before her airplane disappeared.

Resource Use and Conservation. The islands were exploited for their fish and wildlife by early Micronesian and Polynesian peoples, and Western explorers, whalers and other ship's crews. Five islands were claimed under the Guano Act, and three of them mined for guano until deposits ran out¹. After WWII most the islands were converted to conservation status as FWS-managed wildlife refuges. They are now sites for biodiversity conservation and ongoing scientific research. Commercial fishing for tuna is the main extractive use in the pelagic zone; fish taken from the islands' EEZs make up approximately 5% of the US tuna fleet's annual catch.

Scientific Values

The scientific values of the islands and their surrounding EEZs are superlative, as has been documented by successive research expeditions over the last 100 years, and the Palmyra field station. Given the increasing degradation of the Pacific region due to hundreds of years of human settlement and resource exploitation, the eight US islands' highest and best use is for conservation, restoration, and research and exploration of Pacific marine ecosystems. The overarching scientific values of the areas are summarized and discussed below. More detailed fact sheets on each island are found in Appendix 2.

The eight US Pacific 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 natural resources. The

¹ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

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 found nowhere else. Seldom visited, and mostly uninhabited, the islands' surrounding marine waters are relatively free from the problems of other marine ecosystems, such as over-exploitation, disturbance, introduction of exotic species, and pollution.

It is within this context that the great scientific value of these island areas must be understood – they offer a unique window into the past. Nowhere else do we have such a remarkably intact tropical ecosystem from which to develop baselines for scientific study. Large sharks still inhabit the coral reefs keeping the ecological balance intact. The abundance of other larger predatory fish is also quite high, including endemic and rare species. 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.

The islands are significant for their intact coral reef ecosystems, their diverse fish and invertebrate communities, the habitat they provide for millions of seabirds, and the sanctuary they offer many threatened and endangered species. Dozens of marine and terrestrial threatened, endangered, depleted and endemic species still thrive here, but are missing or rapidly vanishing elsewhere in the world. Oceanic sharks and tunas hunted throughout the Pacific have nowhere to hide from fishermen, but around the islands fishing impacts are thought to be relatively minor. The eight islands serve as critical components of flyways for seabirds and migratory shorebirds, and as stepping stones for many coral reef species and marine mammal colonizers that are now established throughout the Pacific. They may also play an important role in the life cycles of tunas and other large pelagic fish.

An estimated 14 million seabirds representing 19 species use the islands as critical stopover points, as well as breeding areas and feeding grounds. These species include tropicbirds, boobies, frigatebirds, terns, noddies, petrels, shearwaters and albatrosses. 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. Protecting the waters around the islands from fishing is critically important to maintaining seabird populations.

But not everything is without concern. Historical uses, primarily military ones, have left the islands with lingering problems, some of them serious, including alien species and rodent

infestations, altered landscapes, leaking waste dumps, and discarded equipment and materials. Some of these problems are being addressed, but much remains to be done. Commercial fishing may have removed as much as 90% of the ocean's top predators, and the islands' surrounding waters may also have been affected, though little has been documented on a site-specific basis. Illegal fishing also occurs in US waters, though its extent is not known. In an ocean where impacts from so many different activities weigh heavily on the ecosystems, these eight islands offer unparalleled opportunities for the study of natural and intact ecosystems, and new discoveries.

GEOLOGY OF ISLANDS AND SUBMERGED LANDS

FWS biologist James Maragos has succinctly summarized the central Pacific islands' geology and biological value:

The Ancient U.S. Reef Islets and Atolls in the Central Pacific are among the World's oldest living biogenic formations, in the World's oldest and largest ocean, forming first as volcanoes and then subsiding and evolving into reefs while moving slowly northwest...to their present central Pacific locale over the past 70 million years or more. They serve as the last of the reef frontiers in the central Pacific, never permanently inhabited throughout their entire history and within the remotest part of the tropical Pacific Ocean. They were the last to be visited and occupied over the past several centuries and the first of their kind to be afforded full protection. Consequently, they are among the most pristine coral reef ecosystems of Pacific, serving as critical components of flyways for seabirds and migratory shorebirds, and marine highways and stepping stones for many coral reef species and marine mammal colonizers that are now established in the southeastern Pacific. Dozens of marine and terrestrial threatened, endangered, depleted and endemic species thrive on the islets and reefs that are missing or rapidly vanishing elsewhere in the World. All major oceanic boundary currents in the tropical Pacific drift by these islands and reefs, subsidizing unique upwelling zones at some of the reefs....Their ancient reef rock formations of thousands of feet thickness and laid down over millions of years, cap the tops of drowned volcanoes and have preserved the ancient climatic and oceanic history of the Pacific Ocean and World to this day, including the evolution of the marine species that now construct these features."²

² Maragos, J., A. Friedlander, S. Godwin, C. Musburger, R. Tsuda, E. Flint, O. Pantos, P. Ayotte, E. Sala, S. Sandin, S. McTee, D. Siciliano, and D. Obura. 2008. U.S. coral reefs in the Line and Phoenix Islands, Central Pacific Ocean: status, threats and significance. In: Riegl, B. and Dodge R.E., editors. Coral reefs of the USA. Coral reefs of the world, Vol. 1, Springer-Verlag, p. 1-73.

These Darwinian atolls of the central Pacific are outstanding examples of how healthy coral reefs should look. Similarly, undersea geological features, including seamounts, are little disturbed and almost completely unexplored by scientists. They offer a rare glimpse into untrammled deep ocean ecosystems.

Seamounts

In addition to the shallow water coral ecosystems, there are likely dozens of undescribed seamounts found in the EEZs of these eight areas. Only a very small number (~300) of the estimated 14,000-100,000 seamounts worldwide have been visited and sampled by scientists. Consequently, the deep water species and ecosystems of these seamounts remain undiscovered.

Assessment Island Area	Documented Seamounts in EEZ³	Predicted Seamounts in EEZ⁴
Wake	2	39
Johnston	18	95
Howland and Baker	5	13
Kingman and Palmyra	6	58
Jarvis	1	22

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.

Most of the world's ocean basins are flat, muddy abyssal plains, but seamounts are solid rocky mountains that tower above the plains. Because the nature of the substrate is one of the most important factors affecting the kinds and abundance of seafloor life, seamount species and ecosystems are very different than those of the surrounding abyss. Furthermore, 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

³ <http://seamounts.sdsc.edu>

⁴ Kitchingman, A. and S. Lai. 2004. Global seamount location database, Sea Around Us Project, University of British Columbia.

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. 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.

One of the most exciting findings in biological oceanography in the last decade has been the discovery that some seamounts have high levels of endemic species, that is, species found on only one seamount or seamount chain. Some of this endemism may be due to the fact that so few seamounts have been explored by biologists that we lack adequate data to know which species are truly unique. Nonetheless, studies of some seamounts have found a high percentage of endemic species, as high as 35% or more⁵. On one seamount, half of the invertebrate species found were new to science. Some seamounts are “lost worlds” having enormous pools of undiscovered new species.

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.

BIOLOGY OF ISLANDS AND SURROUNDING WATERS

Coral Reefs

Coral reefs represent one of the most diverse ecosystems on Earth, but are among the most threatened. Reef ecosystems are highly sensitive to human induced stressors including:

⁵ Parin, N. V., A.N Mironov, and K.N. Nesis. 1997. The Nazca and Sala y Gomez submarine ridges: an outpost of the indo-west Pacific fauna in the eastern Pacific. p. 145-242 *In*; Gebbruk, A. V., Southward, E. C. and Tyler, P. A. (eds). Biogeography of the oceans. advances in marine biology 32. Richer de Forges, B. R., J.A. Koslow, and G.C.B. Poore. 2000. Diversity and endemism of the benthic seamount fauna in the southwest Pacific. Nature 405: 944-947.

overfishing, pollution, sediment runoff, and climate change (increasing sea surface temperatures and ocean acidification). The majority of coral reefs globally, many of which were in pristine condition only a few decades ago, are threatened from the combination of human impacts listed above⁶. It is believed that undisturbed coral areas that are located in isolated regions far from the direct impacts of human activity are more resilient and will have the best chances of survival over the long term.

The uninhabited islands and coral atolls under US jurisdiction in the central Pacific are a prime example of isolated coral areas that have an excellent chance for survival. This region is one of the only known areas that still possess healthy coral reefs with very high coral cover (> 50%) and intact trophic structure⁷. The coral ecosystems of the central Pacific are unspoiled; Kingman Reef in particular has been described as one of the most pristine coral reefs on the planet⁸. These areas have not been overfished and have largely escaped the devastating bleaching events that have affected coral reefs in other regions of the world. Healthy reef communities with relatively intact food webs like those found around Kingman, Jarvis, Howland, and Baker islands are the best representative baseline reefs in the Pacific. They have top predator biomasses greater than other well protected areas like the Great Barrier Reef in Australia or the Northwest Hawaiian Islands. Palmyra Atoll and Kingman Reef lie within the inter-tropical convergence zone and the eastward moving Equatorial Countercurrent. These currents bring larvae from the biologically diverse western Pacific Ocean and deposit them in the waters of these islands. Johnston Island is thought to be an important source of coral, fish, and gastropod larvae for the Papahānaumokuākea Marine National Monument and other neighboring reefs and islands within the Line Islands group⁹.

The central Pacific areas collectively contain nearly four times the number of shallow-water reef-building coral species as the Florida Keys,^{10,11} Palmyra atoll alone is estimated to harbor three times the number of coral species found in Hawaiian waters, and five times the number of species found in the waters off the Florida Keys¹². Approximately 200 species of stony corals and two dozen other prominent cnidarians such as anemones, black corals, corallimorphs, and

⁶ Jackson, J. 2008. Ecological extinction and evolution in the brave new ocean. PNAS:11458-11465.

⁷ *ibid.*

⁸ Sandin, S.A., J.E. Smith, E.E. DeMartini, E.A. Dinsdale, S.D. Donner, et al. 2008. Baselines and degradation of coral reefs in the northern line islands. PLoS ONE: 1-11.

⁹ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

¹⁰ http://floridakeys.noaa.gov/sanctuary_resources/specieslist.pdf

¹¹ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

¹² Federal Register. 2007. Palmyra Atoll National Wildlife Refuge and Kingman Reef National Wildlife Refuge. Federal Register. 287771-25773.

hydrozoans have been reported around the central Pacific islands. For instance, Kingman Reef and Palmyra Atoll have over 180 coral and other cnidarian species, the highest in the central Pacific¹³; some of the deepest reef building corals have been documented in Johnston Island waters¹⁴. Rose Atoll supports 113 species of stony corals and supports one of the largest remaining populations of the globally depleted Giant clam (*Tridacna maxima*) in Samoa¹⁵. Recent expeditions photographed many deep water species yet to be identified, including stalked crinoids and several deepwater fish in these waters around Rose Atoll¹⁶.

The reefs of the central Pacific Islands also provide safe harbor for a number of reef building corals with an “elevated risk of extinction”¹⁷ and have proven themselves to be remarkably resilient in the face of climate change. Currently there are a number of threatened hard coral species around the central Pacific islands.

Number of Threatened Hard Coral Species in Proposed Areas in the Central Pacific¹⁸

Proposed Area in Central Pacific	Number of Species
Kingman Reef & Palmyra Atoll	12
Baker & Howland Islands	27
Johnston Atoll	7
Rose Atoll	58

The assessment islands and atolls are more resilient to stress and have demonstrated a greater capacity to survive and/or recover from major disturbances including bleaching events and outbreaks of coral disease. Other reefs in the Pacific, some of which have the highest biodiversity in the world, have been unable to recover from similar events because they are not located in remote areas, and are compromised by pollution, sedimentation, overfishing and runoff¹⁹. The coral reefs of the assessment islands are relatively unthreatened by these factors and are therefore likely to be much more resilient to future changes resulting from climate change.

¹³ *ibid.*

¹⁴ Lobel, P.S. and L.K. Lobel. 2008. Chapter 17: aspects of the biology and geomorphology of Johnston and Wake Atolls, Pacific Ocean. In: Coral Reefs of the USA I (eds BM Riegl and RE Dodge) Springer p. 806

¹⁵ <http://ccma.nost.noaa.gov/stateofthereefs>

¹⁶ Green, A and P. Craig. 1999. Population size and structure of giant clams at Rose Atoll, an important refuge in the American Samoan Archipelago. *Coral Reefs* 18:205-211.

¹⁷ Elevated risk of extinction means they are either ‘vulnerable’, ‘endangered’, or ‘critically endangered’ according to the IUCN.

¹⁸ Carpenter, K. et al. (2008). One-Third of Reef-Building Corals Face Elevated Extinction Risk from Climate Change and Local Impacts. *Science*, 1-5.

¹⁹ Sandin, S.A., J.E. Smith, E.E. DeMartini, E.A. Dinsdale, S.D. Donner, et al. 2008. Baselines and degradation of coral reefs in the northern line islands. *PLoS ONE*: 1-11

To sum up, the reefs of the central Pacific islands are arguably the jewels in the crown among US coral reef ecosystems. Their geographic isolation, lack of human population, relatively healthy coral ecosystems, and ability to recover from disturbances, make them ideal areas for full protection.

Reef Fish

Recent studies show that coral reefs within the eight areas are among the most biomass-rich reefs and atolls in the central, if not the entire, tropical Pacific. Fish assemblages at Howland, Baker, and especially Jarvis Islands have some of the highest biomass and the greatest number of predatory fish of any reefs yet described²⁰. Kingman Reef in particular is recognized as a near-pristine relict of natural coral reef ecosystems, and now represents the new baseline standard against which to compare other central Pacific reefs degraded by human impact. Total reef fish biomass at Palmyra atoll in 2005 was over twice as great as that found along the inhabited coastline of Kiritimati, where the human population is relatively dense, and in turn total fish biomass at Kingman was nearly twice that at Palmyra²¹.

Unlike degraded reefs, these pristine reefs have exceptionally high numbers and biomass of top predators. Differences in shark abundance and diversity between Kingman (pristine) and Kiritimati (impacted) are extreme; in 2005 reef sharks comprised 62% of total fish biomass at Kingman, in stark contrast to their complete absence at Kiritimati during the same time period. Dr. J. Jackson examined all available evidence (mostly anecdotal) for the apparently marked historical declines in shark abundance at some central equatorial Pacific islands, noted the strong inverse relation between human population density and the abundance of sharks and other large predatory fishes, and concluded that overfishing has been the most likely cause of the observed declines. A similar conclusion was drawn regarding the low numbers of grey reef sharks along the southern margin of Wake Atoll; reasons for this are not clearly understood, but the island's civilian work force frequently fished for sharks and dried their fins, particularly in the south where access was easier and seas calmer than other parts of the island²².

The diversity of reef fish found in these eight areas is not as high as other islands in the tropical Pacific (typically ~300 species vs ~600 in the Hawaiian Islands and ~1350 in Palau) probably due to their small area, limited habitat diversity and large distance separating them

20 Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

21 Ibid.

22 Lobel P.S., and L. K. Lobel. 2008. Aspects of the biology and geomorphology of Johnston and Wake Atolls, Pacific Ocean. In: Riegl, B. and Dodge R.E., editors. Coral reefs of the USA. Coral reefs of the world, Vol. 1, Springer 806p

from other population sources²³. The islands may however, play an important role as larval sources, stepping stones or refuges for reef fish that are found elsewhere in the tropical Pacific. The fish community of Wake Atoll represents a mixture of species from the Marianas Islands and Hawaii²⁴, including the Hawaiian endemic *Sebastipistes ballieui*. Johnston Atoll's fish fauna is dominated by Hawaiian species; however some species are indigenous only to Johnston and the Line Islands, but not found farther north in Hawaii. Johnston Island therefore represents an overlap point between fish species from the two regions²⁵. Some of the fish species on Johnston may be sub-species of those found elsewhere; the pygmy angel has been identified as endemic to the island.

These relatively un-impacted islands provide refuge for reef fish that have been severely depleted elsewhere. The humphead wrasse (also known as the Maori or Napoleon wrasse) and the bumphead parrotfish, are listed by the International Union for the Conservation of Nature (IUCN) as endangered and vulnerable, respectively²⁶. The humphead wrasse is highly prized in the live reef food fish export trade. Males can reach six feet long and weigh several hundred pounds. Only rarely are fish of this size seen anymore, except in remote unfished locations. The humphead is particularly sensitive to fishing pressure since it is slow growing, late to mature and forms aggregations that can be fished easily. Fishing often occurs at night by spear fishing and cyanide, with protection typically weak or non-existent²⁷. The humphead has been severely depleted, to the point of extirpation, in some places. Both the humphead and bumphead parrot fish occur in higher numbers at sites located far from human populations, with the highest densities found at Wake Atoll. It is critical that these species be protected from human activity since both have already been driven to local extinction²⁸. Protection of the assessment islands would not only provide refuge for these large and valuable fish, but also for other reef species that are suffering from the same pressures.

²³ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

²⁴ Lobel P.S., and L. K. Lobel. 2008. Aspects of the biology and geomorphology of Johnston and Wake Atolls, Pacific Ocean. In: Riegl, B. and Dodge R.E., editors. Coral reefs of the USA. Coral reefs of the world, Vol. 1, Springer 806p

²⁵ Ibid.

²⁶ Zgliczynski B, R. Schroeder, M. Nadon, B. Richards. 2008. Pacific-wide status of the rare/endangered humphead wrasse (*Cheilinus undulatus*) and bumphead parrotfish (*Bolbometopon muricatum*). 11th International Coral Reef Symposium, Ft Lauderdale (Abstract)

²⁷ Sadovy, Y., M. Kulbicki, P. Labrosse, Y. Letourneur, P. Lokani, T.J. Donaldson. 2003. The humphead wrasse, *Cheilinus undulatus*: synopsis of a threatened and poorly known giant coral reef fish. *Reviews in Fish Biology and Fisheries* 13(3): 327-364

²⁸ Zgliczynski B, R. Schroeder, M. Nadon, B. Richards. 2008. Pacific-wide status of the rare/endangered humphead wrasse (*Cheilinus undulatus*) and bumphead parrotfish (*Bolbometopon muricatum*). 11th International Coral Reef Symposium, Ft Lauderdale (Abstract)

Large Predatory Fishes

Large predatory fishes, such as sharks, tunas and billfishes, are a key component of 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 the threshold. Within the US EEZ of the eight 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. 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 report estimated the decline of large predatory fishes such as tunas at nearly 90%²⁹. Among the populations of pelagic fishes that are greatly reduced are many species of oceanic sharks – the top predators in marine ecosystems. In 2006, another analysis further reported a 74% global decline in pelagic fishes from the pre-exploitation, pristine state³⁰. Globally it is clear that pelagic fishes are being unsustainably fished, and that without drastic improvements in management they will not recover.

The loss of these top predators has significant impacts on the structure of ecosystems³¹. As explained in greater detail in this document, tunas are important to the foraging success of seabirds in the tropics as they drive small fish and squid to the surface where they are accessible by diving seabirds. Ninety percent declines of tuna stocks must be having deleterious effects on island seabird populations.

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. No international vessels are permitted to fish in the US EEZ, and the US purse seine and longline tuna fleets take roughly 5% of their annual tuna catch here. The areas surrounding the more

²⁹ Myers, R.A. and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. *Nature* 423:280-283.

³⁰ Lotze, H.K., et al. 2006. Depletion, degradation, and recovery potential of estuaries and coastal seas. *Science* 312:1806–1809.

³¹ Heithaus, M.R., A. Frid, A.J. Wirsing, and B. Worm. 2008. Predicting ecological consequences of marine top predator declines. *TREE* 23(4):202-210.

southerly US territories- Jarvis, Howland, and Baker - are of almost no significance to the US tuna longline fleet.

Given the significant role of schooling fish to the health of seabirds on these remote islands, and the small amount of overall catch taken from this region protecting, tuna and other large fishes in the waters surrounding the islands 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 fisheries for the long term. (See Appendix 3 for a detailed analysis and discussion of the tuna fishery.)

Sea Turtles

Sea turtles have been around for a very long time, as evidenced by 150 million year old fossils. Over a century ago, sea turtle populations were at relatively healthy levels. But in the last 100 years, humans have been the cause of massive reductions in sea turtle numbers through direct capture of adults and collection of eggs, and indirectly as by-catch in commercial fisheries. Although destructive gear and irresponsible fishing practices are the main cause of turtle declines today, turtles also face other threats including: entanglement in marine debris, feeding and nesting area destruction, and ingestion of garbage and plastic objects carelessly thrown into the sea. All of these stressors are having a significant impact on the dwindling populations of sea turtles that remain.

Sea turtles are listed as threatened or endangered with extinction by several international bodies and are protected domestically under the Endangered Species Act (ESA)³². 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 plants³³. 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*³⁴.

Five species of sea turtle have been documented as present in the eight islands and surrounding waters: green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*)³⁵.

³² <http://www.nmfs.noaa.gov/pr/species/esa/turtles.htm>

³³ <http://www.cites.org/eng/app/index.shtml>

³⁴ http://iucn.org/about/work/programmes/species/red_list/2008_red_list_summary_statistics/index.cfm

³⁵ Snover, M., J. Baker, and M. Sullivan. 2007. U.S. Pacific Islands research plan for green turtles (excluding Hawaii). Honolulu: Marine Turtle Assessment Program, PSD, NOAA/NMFS/Pacific Islands Fisheries Science Center.

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 waters³⁶. There are reports of green sea turtles nesting on Baker, Howland, Jarvis³⁷, Palmyra and Rose³⁸. 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 nest on Rose and are found in the waters surrounding Baker³⁹, Howland⁴⁰, Jarvis⁴¹ and Palmyra islands,⁴² and Kingman Reef.

The EEZ waters surrounding the assessment islands also are important migration paths for all sea turtle species in the region. These waters are particularly important to the migration of the critically endangered leatherback sea turtle. MCBT obtained from NOAA and mapped satellite tag tracking data for 24 individual leatherbacks (see Appendix 4). The map shows leatherbacks moving through the EEZs of all the assessment areas except Rose Atoll. Considering the extremely low population of leatherback sea turtles globally (90% or greater in decline in the Pacific), and the miniscule percentage that are successfully tagged, the fact these turtles have been tracked navigating US waters demonstrates that these EEZs form part of an important migration route between Indonesia and California⁴³ and deserve strict protection.

All five species of sea turtles found in US island waters have been documented as bycatch fatalities in US high seas fisheries. Longliners fishing for tuna and other large pelagic fish accidentally catch and kill large numbers of sea turtles throughout Pacific waters.⁴⁴ A report by Lewison and colleagues, estimated the effects of longline fisheries on turtle species in the entire Pacific:

³⁶ Balazs, G. 1982. Status of sea turtles in the Central Pacific Ocean. Washington, D.C. p 583: In K.A Bjorndal, editor. Biology and conservation of sea turtles. Smithsonian Inst. Press. National Marine Fisheries Service and US Fish and Wildlife Service. 1998. Recovery plan for the U.S. pacific populations of the green turtle (*Chelonia mydas*). National Marine Fisheries Service. Silver Spring, MD, p. 84

³⁷ National Marine Fisheries Service and US Fish and Wildlife Service. 1998. Recovery plan for the U.S. Pacific populations of the green turtle (*Chelonia mydas*). National Marine Fisheries Service. Silver Spring, MD, p.84.

³⁸ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

³⁹ Pacific Remote Islands National Wildlife Refuge Complex. Baker Island National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment. (2007): 1 – 142

⁴⁰ Pacific Remote Islands National Wildlife Refuge Complex. Howland Island National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment. (2007): 1 - 139.

⁴¹ Pacific Remote Islands National Wildlife Refuge Complex. Jarvis Island National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment. (2007): 1 - 140.

⁴² "Pacific Islands – Rose Atoll NWR." U.S. Fish & Wildlife Service. 22 April 2008. 29 April 2008. <http://www.fws.gov/pacificislands/wnwr/prosenwr.html>.

⁴³ Donnelly, M. 2008, October 2. Director of International Policy. Interviewer: Jennifer Felt.

⁴⁴ Lewison, R.L., S.A. Freeman and L.B. Crowder. 2004. Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. *Ecol. Lets.* 7:221-231.

“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.”⁴⁵

Turtle bycatch numbers are compiled separately by 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. MCBI requested turtle bycatch data for the eight assessment areas from the Pacific Islands Regional Office of NMFS, but has not received this data. 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. We recommend CEQ ask for NOAA’s data for the considered waters.

As discussed earlier, the economic importance of commercial tuna fishing in the EEZs of the eight assessment areas is relatively small. Altogether, about 5% of the annual tuna catch by US boats comes from the eight islands’ EEZs. A fully protected monument would provide much needed sanctuary for migrating, foraging and nesting turtles and their hatchlings, especially if commercial fishing were prohibited within the entire EEZ of the eight islands. Given the precarious status of these sea turtles, full protection is the appropriate action (see Appendix 3 for additional details on fishing).

Seabirds

Seabirds are an important component of marine and coastal communities and play an especially important role in small island ecosystems. Unfortunately, the population of just about every seabird in the greater Pacific islands region is declining⁴⁶. The major threats to seabirds and factors contributing to their decline are the human settlements, nonnative predators such as rats and cats, habitat destruction, direct and indirect fishery interactions, pollution, and global climate change and sea level rise⁴⁷. Protecting and effectively managing the few remaining refuges for seabirds in the tropical Pacific, particularly uninhabited islands and their surrounding waters which the seabirds rely on for food, are essential for the continued health and survival of these species. For a list of seabirds that breed in the central and western Pacific island areas and their conservation status, see Appendix 5.

⁴⁵ *ibid.*

⁴⁶ Flint, E. 1996. Status of seabird populations and conservation in the tropical island Pacific. Chapter 9 in: Eldridge, L.G., J.E. Maragos, P.F., Holthus, and H.F., Takeuchi, editors. 1996. Marine and Coastal Biodiversity in the Tropical Island Pacific Region. East-West Center.

⁴⁷ *ibid.*

An estimated 14 million seabirds of 19 species use the lands and marine waters of the eight islands for breeding, foraging, or resting (see Appendix 6 for bird counts on the eight islands). 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 billfish⁴⁸. 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. 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 safely⁴⁹. Because tropical oceans have very low productivity, predators such as tuna and seabirds are adapted to unpredictable and patchy prey distributions⁵⁰. 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 chicks⁵¹.

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 young⁵². Shorter travel distances translate into energy conservation that will enhance survival of chicks. Several of the longer-ranged species will feed even beyond the 200 nm boundary of the islands. To see how various bird species forage relative to the extent of the US EEZ, see Appendix 7.

⁴⁸ Fefer, S.I., C.S. Harrison, M.B. Naughton, and R.J. Shallenberger. 1984. Synopsis of results of recent seabird research conducted in the Northwestern Hawaiian Islands. Proc. Res. Inv. NWHI UNIHI-SEAGRANT-MR-84-01.

⁴⁹ Fish and Wildlife Service. 2008. Personal Communication.

⁵⁰ Ashmole, N.P. 1971. Seabird ecology and the marine environment. In: Farner D.S., King J..R., editors. Avian Biology 1:223–286 and Weimerskirch, H., M. Le Corre, S. Jaquemet, M. Potier, and F. Marsac. 2004. Foraging strategy of a top predator in tropical waters: great frigatebirds in the Mozambique Channel. Mar Ecol Prog Ser. 275: 297–308.

⁵¹ Ashmole, N.P. & M.J. Ashmole. 1967. Comparative feeding ecology of sea birds of a tropical oceanic island. Peabody Museum of Natural History, Yale University Bulletin 24. Au, D.W.K. and R.L. Pitman. 1986. Seabird interactions with dolphins and tuna in the Eastern tropical Pacific. Condor 88:304-317. Diamond, A.W. 1978. Feeding strategies and population size in tropical seabirds. American Naturalist 112:215-223. Fefer, S.I., C.S. Harrison, M.B. Naughton, and R.J. Shallenberger. 1984. Synopsis of results of recent seabird research conducted in the Northwestern Hawaiian Islands. Proc. Res. Inv. NWHI UNIHI-SEAGRANT-MR-84-01.

⁵² Flint, E.N. 1991. Time and energy limits to the foraging radius of sooty terns *Sterna fuscata* Ibis 133: 43–46. Weimerskirch, H., M. Le Corre, S. Jaquemet, M. Potier, and F. Marsac. 2004. Foraging strategy of a top predator in tropical waters: great frigate birds in the Mozambique Channel. Mar. Ecol. Prog. Ser. 275: 297–308.

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. Seabirds will get caught on the hooks which are baited with their usual prey and drown. One avian species in particular that interacts with the longline fishery is the globally endangered black-footed albatross. Data from the National Marine Fisheries Service (NMFS) observer program shows that 25 black-footed albatrosses were killed in the three months between April 1 and June 30, 2008 in the longline fishery. In the entire years of 2005, 2006, or 2007, only 12, 17, and 14 black-footed albatross, respectively, were killed in the deep-set longline fishery.

Marine Mammals

The waters surrounding the eight islands are home to many species of marine mammals, many of which are rare or endangered. There are at least 21 species of marine mammals that live in the central and western Pacific and spend some of their time in the assessment areas. These species are shown in Table 1.

Table 1: The status of species under the Endangered Species Act (ESA) and the International Union for the Conservation of Nature (IUCN) for marine mammals that live in the Pacific Remote Island Area, American Samoa, and the Northern Marianas Islands region.⁵³

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

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.

⁵³ Data from Western and Central Pacific Fisheries Commission- Scientific Committee. 2008. Annual Report – Part 1 Information on Fisheries, Research, and Statistics. WCPFC-SC4-AR PART 1/WP-31. ; <http://www.nmfs.noaa.gov/pr/species/esa/> ; <http://www.iucnredlist.org/> ; http://www.wpcouncil.org/protected/species_mammals.html ; Fish and Wildlife Service Fact Sheets. 2008. Summary of interagency assessment process as of October 1st, 2008.

Still, some important information regarding marine mammals is known. 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. Johnston Island, Kingman Reef, and Palmyra Atoll are visited by the rare and endangered Hawaiian monk seal, and may hold potential as monk seal re-colonization areas. There are less than 1200 Hawaiian monk seals remaining, 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. What may very well be a new species of marine mammal, a type of beaked whale, was recently found stranded on Palmyra's shores. Pilot whales, humpback whales, and scores of spotted dolphins have been seen in the waters surrounding Rose Atoll in American Samoa. Even Wake Island, once a fierce battleground, has its own resident population of spinner dolphins.⁵⁴

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 (see Appendix 3 on fishing for additional details).

In the past three years, about half of the marine mammal species living in the assessment 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 species.⁵⁵ Table 2 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).

⁵⁴ Fish and Wildlife Service Fact Sheets. 2008. Summary of interagency assessment process as of October 1st, 2008.

⁵⁵ Tosatto, Mike. Pacific Islands Regional Office, NMFS, NOAA. Personal Communication with Lance Morgan.

Table 2: Estimated numbers of fishery interactions with long-line fishing gear for the Hawaiian longline fishery (swordfish and tuna fleets) from 2005-2007

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

*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 process⁵⁶. 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

⁵⁶ National Marine Fisheries Service. 2006. Biological opinion and incidental take statement under section 7 of the Endangered Species Act on the effects of the U.S. purse seine fishery in the western and central Pacific Ocean.

mammals. No known vessel strikes of whales have been documented in the region; thus strikes are thought to be uncommon, but certainly possible⁵⁷.

Terrestrial Biology

The seven central Pacific territories and Rose Atoll are not only known for their highly diverse species in their surrounding waters, but also for their terrestrial uniqueness. Every territory, except Kingman reef, includes emergent terrestrial environments that provide habitat to a variety of migratory and resident seabird species as mentioned earlier. Although these emergent islands and atolls are relatively small, and their native vegetation sparse, some are home to endemic terrestrial plant species. For instance, Palmyra and Rose atoll are some of last remaining locations for the *Pisonia grandis* trees in the Pacific region. Due to human development, *Pisonia grandis* forests have been lost or severely degraded over much of their range. Also, Wake Island supports a rare grass species, *Lepturus gasparricensis*. More detailed information on terrestrial species and ecosystems may be obtained from FWS and DOD.

CURRENT USES

Within the last 100 years, the eight islands and their near shore waters principally have been used for extraction of natural resources, military defense and most recently, conservation. These uses have ebbed and flowed with time and events. As our understanding of the complexity, importance and vulnerability of island ecosystems has increased, the preponderant trend has been to place the islands in conservation status as their highest and best use. Six of the eight islands are national wildlife refuges that include emergent lands, near shore waters, and submerged lands to a distance of 3 or 12 nm, depending on the islands' establishment authority. The next logical step is to standardize refuge boundaries to 12 nm around all the islands and permanently protect the adjoining pelagic ecosystems as biological reserves, free from fishing and other extractive uses.

Resource Extraction and Commercial Fishing

Early uses of the islands included stopovers by explorers, whalers and other mariners in the 18th and 19th centuries in search of lands to be claimed and food, water and exploitable resources. Several of the islands were claimed as US possessions under the Guano Act and three of them

⁵⁷ National Marine Fisheries Service. 2006. Biological opinion and incidental take statement under section 7 of the Endangered Species Act on the effects of the U.S. purse seine fishery in the western and central Pacific Ocean.

were subsequently mined for guano until extraction was no longer profitable⁵⁸. 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 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. As of January 2008, according to NMFS there were eight permits in the island EEZ fisheries, including pelagic trolling and handline (4), lobster (3), and bottomfish (1). Some of these have expired since then. According to NMFS, the permits are held by a total of three fishermen, all based in Hawaii; reportedly not all of these permits are being exercised.

Commercial fishing for tuna by longline and purse seine boats is the main fishery occurring in the outer waters of the EEZs; other species also are taken and kept, such as swordfish and mahi mahi. Tuna fishing effort varies from island to island. EEZ. The longline fleet concentrates around Hawaii and Kingman, Palmyra and Johnston. 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 is small, amounting to about 3% of the purse seine fleet catch, and 7% of the longline fleet's take. Were commercial fishing to be ended around the islands, the catch would likely be made up elsewhere as tuna are very mobile and wide ranging (see Appendix 3 for a detailed analysis of the tuna fishery).

There is also some illegal foreign fishing in US island waters. We know this from foreign fishing vessel groundings at Rose, Kingman, and Palmyra; 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 humphead wrasse at Rose, and sharks at Palmyra); shells of dead giant clams on the seafloor (Rose); skewed age structures (grey reef sharks at Howland and Baker), and suspiciously low abundances of expected numbers of fish (grey reef sharks at Wake).⁵⁹

Military Use

Military use of the islands accelerated in the 1930s, precipitated by defense concerns related to the rise of the Japanese Empire, and reached its apogee during World War II. At one time, the

⁵⁸ Maragos, J. et al. 2008. US Coral Reefs in the Line and Phoenix Islands: Chapter 15 and 16, in Riegl, B. M. and R. E. Dodge, editors. 2008. Coral Reefs of the USA.

⁵⁹ Ibid.

military occupied Palmyra, Howland, Johnston, Wake, Baker, Jarvis and Kingman, for varying periods. The US government also put civilian 'settlements' on Howland, Baker and Jarvis in the mid-1930s to demonstrate US claims to these lands; the settlements were withdrawn after WW II began. In addition, Kingman Reef, Palmyra, Johnston and Wake all had naval defensive seas declared around them.

Human Occupancy

Civilian and military occupancy has had substantial impacts on many of the islands, including dredge and fill construction, altered landscapes, introduction of non-native species, and the dumping of toxic and non-toxic wastes trash. The Wake rail went extinct during the period of Japanese occupation of the island. Defense needs changed after WWII. Military use wound down, and the islands were gradually converted to conservation use under FWS management. The military withdrew from Palmyra, Kingman, Jarvis, Howland and Baker, but remained at Johnston and Wake. In 2004, the Air Force vacated Johnston and now seeks to transfer the island to another party. Wake is the only island still in active use as an air base, and its waters as a Navy training area.

Conservation

Six of the eight islands and a portion of Johnston are part of the National Wildlife Refuge System. The refuges have been created by a number of executive branch decisions, commencing with the establishment of a bird refuge by President Coolidge on Johnston in 1926. Refuge lands and waters are managed by The Department of the Interior, Fish and Wildlife Service, under various authorities. Under the Refuge Administration Act, all refuges are closed to public entry unless specifically opened. FWS manages Palmyra Atoll and Kingman Reef to a distance of 12 nautical miles off shore; a Nature Conservancy in holding, the only private land on Palmyra, is managed for conservation purposes in cooperation with FWS under a cooperative agreement. A permanent scientific research station is maintained on Palmyra by a nine-member research consortium. Palmyra is open to public wildlife viewing and limited recreational fishing.

The refuges on Baker, Howland, Jarvis and Rose Atoll in American Samoa include all emergent lands and the seaward waters and submerged lands to 3 nautical miles. These remote refuges are closed to public entry and use. Rose Atoll is cooperatively managed with the Government of American Samoa. FWS continues to manage its lands on Johnston as a closed refuge, but has no authority over the near shore waters; a three-mile naval defensive sea is still in effect.

Wake Island is the only island that lacks formal conservation status. Wake is one of the oldest and most isolated atolls in the world. The island has been developed as an air base and is currently managed by the Air Force, though at reduced activity levels from previous years. The Navy uses the surrounding waters for training purposes. The island possesses outstanding terrestrial and marine resources, including large numbers of migratory seabirds and shorebirds, green sea turtles, and a healthy coral reef community. The food web of the reef ecosystem is virtually intact, with high numbers of predators and high diversity of invertebrates. There are abundant populations of bumphead parrotfish, Napoleon (humphead) wrasse and large grouper, all of which have been depleted elsewhere from overfishing. Because of its long occupancy by the military and long distance from Hawaii, there has been little US commercial fishing around Wake. The Navy's enforcement of a naval defensive sea of 3 nm around Wake has created a de facto marine protected area. The Air Force allows recreational fishing by base occupants under guidelines issued periodically by the base commander. Also, the Air Force manages an informal bird reserve of about 100 acres on part of the island. Feral cats have been eliminated, and this year a rat eradication program will be launched to end this rodent's predation on birds.

Scientific Research

The eight islands have seen various research expeditions over the last century with most activity occurring in the last 25 years. NOAA and FWS now conduct regular biennial research cruises to the islands of Johnston, Kingman, Palmyra, Baker, Howland and Jarvis Islands⁶⁰, but these provide only short stays. Researchers are in the early stages of researching and monitoring coral reefs, large predatory and reef fish density and diversity, and seabird and sea turtle diversity and abundance. The Nature Conservancy maintains a scientific research center on Palmyra and hosts visiting scientist on a regular basis to study degraded corals reefs, invasive species, ocean acidification and other global environmental threats⁶¹. Research at Wake Island is conducted under NOAA sponsorship with permission and assistance from the DOI and the U.S. Air Force⁶².

⁶⁰ Miller, J. et al. 2008 The state of coral reef ecosystems of the Pacific remote island areas. p. 353-386. In: J.E. Waddell and A.M. Clarke, editors, The State of the Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008. NOAA Technical Memorandum NOS NCCOS 73. Silver Spring, MD.

⁶¹ The Nature Conservancy. 2008. The nature conservancy joins world's top scientists to launch climate change research station on pacific atoll. Retrieved October 14, 2008, from The Nature Conservancy: <http://www.nature.org/wherewework/asiapacific/palmyra/press/press2152.html>.

⁶² Miller, J. et al. 2008 The state of coral reef ecosystems of the Pacific remote island areas. p. 353-386. In: J.E. Waddell and A.M. Clarke, editors, The State of the Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008. NOAA Technical Memorandum NOS NCCOS 73. Silver Spring, MD

Actions critical to the preservation of the islands' original ecosystems are ongoing. All island areas have been significantly affected by introduced species including mammals, plants, and insects. Over the years, FWS has eradicated rats and feral cats. FWS conducts problem-specific species monitoring on a number of the islands as part of its management program. For example, preliminary research is presently being conducted to see whether damage to the native *Pisonia* forest in Palmyra Island and Rose Atoll caused by an introduced scale insect is being further exacerbated by the presence of an introduced ant species⁶³. Unfortunately, many of these eradication and research programs lack adequate funding.

THREATS TO THE ISLANDS

The central Pacific islands suffer a variety of threats. Human use of the Pacific Ocean has intensified significantly in the last 40 years. Within the assessment areas, most research has concentrated on the islands proper and their near shore waters and seafloor, and not on the larger surrounding pelagic and benthic ecosystems. 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.

Here we discuss the principal threats to the eight islands. Fundamental to this discussion is the problem of disunity of federal management caused by a long standing jurisdictional dispute between NOAA and FWS.

Federal Agency Conflict

A significant problem in the assessment areas (except Wake and Rose) is uncoordinated federal management due to a dispute between the Department of Commerce (NOAA) and the Department of the Interior (FWS) over the legitimacy of refuge boundaries around the islands, and over the controlling legal authorities that apply. This clash manifests itself especially in commercial fisheries management and nautical chart production. NMFS asserts that the Magnuson-Stevens Fishery Conservation and Management Act gives it authority to regulate marine fishing in all waters of the US EEZ not controlled by a state or territory, which would mean up to the high water mark of the islands. When NMFS issues fishing permits in the US EEZ, NMFS does not mandate that the holder stay out of waters managed by FWS as refuges,

⁶³ Flint, Beth. FWS. Personal Communication.

but rather directs the permittee to contact the FWS for further information about fishing requirements for refuge waters. Do they? Not according to FWS. This has understandably produced interagency friction and confusion, and undercuts effective enforcement because to make an arrest you have to have sound cause. FWS complains that some US vessels may be illegally fishing in refuge waters, but cannot prove it.

For law enforcement purposes, including the effective prosecution of violators, the controlling manager must be able to cite which statutes are applicable in the area under US control, and which uses are allowed or prohibited in the controlled area. Furthermore, the proper boundaries of the legal enforcement zone must be made clear—formally published in the Federal Register, put on US nautical charts by NOAA, and publicized to vessels that may enter the management area. None of these conditions are being met now.

This inter-agency stand-off needs to be addressed in any monument proclamation so as to resolve the diverse legal arguments that have confused protection of marine resources. The President has the power to address the issue under the Antiquities Act by establishing the degree of protection applicable to any proclaimed area, and by designating the federal agency with primary management responsibility for the area. In addition, the designation could recognize the applicable laws for protecting the marine resources. Finally, the review and approval by the Office of Legal Counsel, Department of Justice, of the terms of any proclamation could be a de facto resolution of the legal controversy. It should be noted that the NOAA-FWS dispute also manifested itself in the Northwestern Hawaiian Islands. President Bush addressed the issue there through the detailed protective overlay proclaimed for Papahānaumokuākea Marine National Monument. The same paradigm could be considered for a central Pacific monument.

Fishing

Commercial fishing is a threat to the ecosystems of the eight islands because by definition fishing can remove large numbers of fish which in turn has ecosystem impacts. Commercial fishing, especially for tuna, has been occurring in the islands' waters for many years. Regrettably, its cumulative effects have not been assessed. Nevertheless, we know that population growth and economic globalization is placing an enormous strain on fisheries everywhere. 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 fish⁶⁴. Jackson

⁶⁴ Myers, R.A. and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. *Nature* 423:280-283

indicates that more important than the percentage of decline is the shift in species abundance and composition.⁶⁵

These analyses highlight the need for precautionary management and point to the need for establishing large ecosystem reserves in the oceans. Therefore, we recommend commercial fishing be prohibited in the eight islands' EEZs. A more detailed discussion of fishing, including recreational fishing may be found in Appendix 3.

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, as discussed above.

It is prohibited for foreign vessels to fish in the entire EEZs of the eight 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 five 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 2006.⁶⁶

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 Coast Guard is now working in partnership with the State Department and NOAA Fisheries to address this case

⁶⁵ Jackson, J. 2008. Ecological extinction in the brave new ocean. PNAS. 105:11458-11465

⁶⁶ United States Coast Guard. 2007. Report on illegal incursions into the United States exclusive zone by foreign fishing vessels.

via diplomatic channels. The US will request the government of Ecuador to take enforcement action against the vessel and prevent further occurrences⁶⁷.

Landscape Alterations and Settlements

Many of the islands have been altered by military use, especially Palmyra, Kingman, Wake, Baker, Howland and Johnston. Landscapes and seascapes were disturbed and changed by base and airfield construction, the dredging of shipping and sea plane channels, and building construction. Civilian settlements were built on Baker, Howland and Jarvis islands in the mid-1930s. These alterations pose a challenge to FWS managers who seek to restore natural functioning ecosystems. Despite the negative impacts of former uses, the reef ecosystems of the islands are in relatively good condition, especially compared to degraded islands in the rest of the Pacific. Restoration action is desirable at most of the islands, including restoring natural water flows, removing discarded equipment and structures, and dealing with waste disposal sites.

Invasive Species

Human exploration and occupation brought many invasive species to the islands, including various plants, insects, and cats and rodents that preyed on bird populations. The FWS has eliminated most invasive mammalian predators from all islands except Palmyra (where rat eradication is still ongoing) and Wake. DOD eliminated cats on Wake and is now targeting rats. A house mouse, *Mus musculus*, continues to populate Jarvis, Johnston and Baker Islands; FWS hopes to eradicate it in the near future. Such removals of invasive species have promoted the healthy increase of bird populations and the restoration of nearly extirpated species, like the black-footed and Laysan albatrosses. This is especially important since populations of some of the same species have declined on non-US islands.

In addition, all of the central Pacific islands have alien ant species that have caused significant ecological damage. For instance, at Palmyra and Rose Atoll an introduced scale insect, *Pulvinaria urticae*, has been implicated in the destruction of part of the native *Pisonia* forest – a tree species that has been degraded elsewhere⁶⁸. Furthermore, there are a number of introduced plant species requiring management. These include the coconut palms planted at Palmyra atoll for the coconut meat and oil, but now are out-competing native taro vine forest trees. The invasive plant species, *Leucaena* (Haole Koa) and *Casuarina* (Ironwood) are currently

⁶⁷ United States Coast Guard. 2007. Report on illegal incursions into the United States exclusive zone by foreign fishing vessels.

⁶⁸ Flint, Beth. 2008. FWS. Personal communication.

of concern at Johnston Atoll and an incipient population of Sandbur grass (*Cenchrus echinatus*) was recently eradicated Rose Atoll⁶⁹.

Vessel Groundings

A major concern associated with allowing fishing vessels or ocean freighters near the islands is the danger of a catastrophic grounding due to human error, weather or mechanical failure. Fishing vessels, whether fishing or not, and small freighters passing thorough are of particular concern because in general, their navigation and seamanship skills are not as good as those of large vessels. Groundings are not an idle concern. Three fishing vessels have grounded in the islands in the recent past. In 1991, a 121-foot Taiwanese fishing boat sank on Palmyra Atoll; a 135-foot long Taiwanese fishing vessel grounded in 1993 on Rose Atoll; and an abandoned 85-foot fishing vessel was discovered on Kingman Reef in August 2007. With great expense and over a period of years, the Rose wreck was removed by FWS, but not before it significantly harmed the reef and wildlife. The Palmyra wreck is still on the reef and continues to damage the ecosystem by accelerating the rapid growth of an invasive coralliamorph that smothers the reef ecosystem. The Kingman reef wreck also remains and is showing early signs of the invasive coralliamorph, and also an elevated growth of blue-green algae which in time can cause algal blooms that block sunlight to the reef below.

Future groundings could create a major fuel spill that would be hard to contain and clean up because salvage vessels and oil spill response crews are far away. Fuel and oil spills could contaminate the reefs and kill large numbers of marine life and resident birds. In addition to physical damage to reefs, grounding could possibly release more invasive species to an island, including the return of rats where they have been eliminated. The logistics of dealing with a grounding and spill on remote islands would be difficult and costly; therefore, groundings risk should be reduced as much as possible.

A preventative strategy is needed to minimize groundings risk to US islands. Unfortunately, one does not exist. The refuges are not well identified on NOAA charts partly because of the reluctance of NOAA to concede the refuge boundaries claimed by FWS. Furthermore, neither FWS nor NOAA is using potentially available tools to adequately monitor vessel entries near the islands; Coast Guard patrols are infrequent due to lack of budget and priority. Finally, the US has not sought to nominate the islands for designation as Particularly Sensitive Sea Areas (PSSAs) by the International Maritime Organization (IMO). The IMO designates areas that are vulnerable to damage and need special protection from maritime shipping because of their ecological, economic, cultural or scientific significance. For an area to be considered a PSSA, it

⁶⁹ *ibid.*

must also have at least one established Associated Protected Measure (APM) such as areas to be avoided, no anchoring areas, or discharge restrictions. Securing PSSA status for each of the island areas would lead to needed international protections from ship traffic and reduce groundings risk. Commercial vessel traffic lane locations are shown in Appendix 8.

Marine Debris

Marine debris has become one of the most widespread pollution problems in the world's oceans and waterways⁷⁰. Once thought of as simply something unpleasant to look at, research has proven that debris has serious effects on the marine environment, marine wildlife, the economy and human health and safety. Marine debris is wreaking havoc on our oceans and the species that depend on the ocean for survival. Reports of death by entanglement of marine mammals, many of them endangered or threatened, and of sea turtles and seabirds continue to grow. The numbers of animals killed are staggering and bring to light the urgency of immediate action to reduce these occurrences.

Marine debris comes in many shapes and sizes. Derelict fishing gear is a common source of marine debris, consisting of lines and nets that entangle marine mammals, sea turtles, sea birds and catch fish long after the gear is able to be retrieved. Pieces of plastic—often mistaken for food by sea birds, and plastic bags—mistaken for jellyfish (the primary diet of the critically endangered leatherback sea turtle), are also a huge contributor to marine debris. Perhaps the most well known marine debris problem is the Pacific “garbage patch” formed by the the North Pacific Anti-cyclonic Gyre, which dominates the circulation and current systems of the North Pacific Ocean. This system deposits large amounts of marine debris in the Northwestern Hawaiian Islands (NWHI)—an estimated 57 tons every year⁷¹.

The eight assessment islands are not as hard hit by marine debris as are the NWHI, but debris is nevertheless a growing a problem whose precise dimensions have yet to be quantified. Of special concern are lost and discarded nets from Asian fishing fleets and other plastic debris. Due to their location, Baker, Howland and Jarvis miss the brunt of the debris transported by the North Pacific gyre. Kingman and Palmyra are at the southern edge of the gyre and marine debris accumulates along their shorelines. The two islets of Rose Atoll are very small and the perimeter reefs are steep, so accumulation of marine debris is small.⁷²

⁷⁰ <http://marinedebris.noaa.gov/marinedebris101/welcome.html>

⁷¹ Bamford, H. July, 2008.

⁷² Maragos, J. 2007, November 1. Coral Reef Biologist, FWS. Interviewer: William Chandler

Another source of marine debris in the central and western Pacific is fish aggregation devices (FADs). FADs are floating fishing gear used to attract species that like to congregate under floating objects, usually highly migratory species that are otherwise difficult to find. Many species of fish, most notably tuna, are drawn to naturally occurring floating objects such as wood or seaweed mats that are usually found in convergence zones where food and nutrients are plentiful, in what is otherwise a relatively 'barren' open ocean. Commercial fishers deploy FADs in open-water areas to attract and concentrate tuna and other pelagic species, essentially bringing the fish to their boats instead of having to hunt them down. While FADs have increased the efficiency of off-shore fishing, there is increasing evidence that they can have a harmful effect on marine ecosystems and fish populations. For example:

- FADs may wash up on reefs and beaches as marine debris, harming or killing wildlife through entanglement. Fishing vessels may harm coral reefs and other sensitive habitat if they run aground in an attempt to retrieve the FADs.
- There is concern that the use of FADs may intensify the overfishing of species that are already under stress.
- FADs may set an "ecological trap" for tuna and other species. A recent study found that 74% of FADs-associated skipjack tuna were caught with empty stomachs, compared to only 13% of free-swimming schools. The FADs-associated fish also showed less "plumpness," which could reflect a deficiency in energy-reserve accumulation. The research could not conclusively say that FADs had a negative impact on tuna lifecycles, but it did suggest that FADs are affecting both migration distances and directions, and possibly luring tuna to inappropriate waters with scarcer food supplies⁷³.

FADs are becoming a concern globally, and the negative effects of these devices in US waters is a growing threat that needs to be dealt with. According to FWS, most of the assessment islands are afflicted with FADs lost by tuna purse seine vessels. Full protection of the islands' EEZs from tuna fishing would end direct US sources of FADs. Measures may still be required to limit FADs intrusions from outside the US EEZ.

National Recognition Means Stronger Protection

EDF and MCBI recommend that the eight islands and their complete EEZs be proclaimed by President Bush as marine national monuments, and managed as no-take reserves to protect and restore their ecology. This is a visionary idea whose time has come, and whose realization is imminently feasible. The pelagic realm of the open ocean and the underlying seafloor is the

⁷³ Institut de Recherche Pour le Développement. 2008. Does fishing on drifting fish aggregation devices endanger the survival of tropical tuna? Retrieved July 28, 2008. Science Daily: <http://www.sciencedaily.com/releases/2008/05/080515094614.htm>

largest but least protected ecosystem in the world. Now is the time to protect relatively intact portions of it while we can.

If fully protected as marine national monuments with no extractive uses, the eight areas 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 restoration benchmarks for other Pacific nations who are increasingly working to restore their own degraded coral island and pelagic ecosystems. Also, the islands would be ideal places to monitor and study the ocean impacts of global climate change, such as coral bleaching and ocean acidification.

Another reason for declaring these areas national monuments is that it would clarify management objectives and enhance US management and enforcement. *The ongoing dispute between NOAA in the Department of Commerce and FWS in the Department of the Interior over who has control over the nearshore marine waters of the islands needs to be resolved and can be by the President.*

Finally, recognition usually brings with it a heightened sense of purpose and potentially more funding. The eight islands have languished out of the public eye, known mainly to a few hundreds of scientists and federal employees. Consequently, federal budgets for management, restoration, and research have been modest if not bare boned. Important work is not getting done. For example, FWS has not budgeted the estimated \$500,000 needed to remove a derelict 85-foot fishing vessel that drifted onto Kingman Reef—the most pristine reef in US possession! A year later, the boat is still there, damaging the reef.

Use of Antiquities Act

EDF and MCBI believe the Antiquities Act is the most appropriate tool for the President to use to permanently protect the islands. The key operative language of the Antiquities Act is as follows:

"That the President...is hereby authorized, in his discretion to declare by public proclamation historic landmarks, historic and prehistoric structures, and objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and may reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with proper care and management of the objects to be protected⁷⁴."

⁷⁴ Antiquities Act 16 U.S.C. §431 (2000).

As previously mentioned, several visionary presidents have used the Antiquities Act to permanently protect lands and waters of unique importance interest to America’s natural and cultural heritage because of their scientific values. Since first used by Theodore Roosevelt, all but two succeeding presidents have used the Act to establish one or more national monuments.

The Antiquities Act has many attributes that commend its use for protecting the eight islands:

- **Authority.** The Act may be used by the President to protect lands and waters controlled by the US including waters and submerged lands in the US EEZ. An Office of Legal Counsel opinion issued in 2000 found that:

“The President may use his authority under the Antiquities Act to establish a national monument in the territorial sea.” [and that] “The President may use his authority under the Antiquities Act to establish a national monument in the exclusive economic zone to protect marine resources⁷⁵.”

- **National interest.** The President is uniquely positioned to determine the national interest. The courts have given him wide discretion to determine which objects are of historic or scientific interest to the nation, and therefore how large a monument may be. A large marine ecosystem could be included within a monument because the courts have determined that a monument may be as large as necessary to encompass the objects of scientific or historic interest.
- **Timeliness.** The Act allows the president to take immediate, unilateral action to proactively protect important cultural, historic, and natural areas that face immediate threat of destruction or ongoing degradation. Designation by Act of Congress or pursuant to other statutory authority requiring executive agency action, such as the National Marine Sanctuaries Act or the National Wildlife Refuge Administration Act, is far more time consuming; in that time, precious resources and their values may be irrevocably degraded or destroyed.
- **Permanent Protection.** The Act's proclamation authority is "one-way"; i.e., the president can unilaterally establish or enlarge national monuments, but does not have

⁷⁵ In 2000, the Office of Legal Counsel (OLC) concluded that “the President could establish a national monument in the EEZ to protect marine resources.” Op. Off. Legal Counsel, *Administration of Coral Reef Resources in the Northwest Hawaiian Islands* (Sep. 15, 2000).

the power to shrink or abolish them once established. The courts have determined that the president's power under the Act is broad.

- **Strongest Presidential Action.** Other presidential actions do not have the force of law that proclamations made under the Act's authority have. Withdrawals of land for conservation or protection by Executive Order, for example, may be ignored, modified, or overturned by future presidents.
- **Precautionary Protection with Congressional Review.** Designation of a national monument by presidential proclamation allows for protection of resources and their values while preserving for the Congress its constitutional right to determine the ultimate future disposition of the protected area. For example, a number of national monuments later became National Parks through Acts of Congress. Congress has even abolished a few monuments, but not many, thus indicating its concurrence with the President's judgment most of the time.

Presidential Leadership

Action by President George W. Bush to conserve the areas is appropriate and timely for a number of reasons. First, President Bush already has demonstrated his personal interest in the oceans through implementation of his Ocean Action Plan. Furthermore, in 2006, the President employed his authority under the Antiquities Act to proclaim the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands, a 140,000 square mile pelagic marine and islands ecosystem with scientific and ecological values comparable to those in the central and western Pacific. Protecting the rest of our Pacific island ecosystems would be a natural and culminating step on the President's part.

Second, protection is politically feasible because the islands are under federal control, mostly uninhabited, and already partly dedicated to conservation. Six of the eight islands are federal national wildlife refuges in their entirety, managed by the US Fish and Wildlife Service. Part of Johnston also is a refuge. Although Wake and Johnston are under Department of Defense (DOD) management, their nearshore waters are closed to a distance of 3 nm for defense purposes, thereby providing de facto conservation zones. All of the islands are uninhabited except for a handful of scientific researchers and government staff at Palmyra, and about 125 personnel who maintain the Air Force base at Wake.

Fishing is the only current extractive use of the islands. FWS allows limited recreational fishing at Palmyra, but has closed all the other refuges to recreational fishing and all island refuge

waters to commercial fishing. Commercial fishing, mainly for four species of tuna, occurs episodically in the US exclusive economic zones (EEZ) of Howland, Baker, Johnston, Palmyra, Kingman, Jarvis and Johnston. Managers believe the tuna fisheries of the Central and Western Pacific oceans are close to fully exploited, although science reports suggest that biomass levels are greatly reduced over the past 50 years, as much as 90% in the case of some populations. The fish caught in these pelagic waters make up about 7% of the Honolulu-based longline fleet's annual catch, and about 3% of the purse seine vessel catch, or about 5% of the catch of the combined fleets. Both tuna fleets obtain most of their catch outside the assessment areas, either around Hawaii or on the high seas.

Third, full protection of the islands will be well received by other Pacific nations and by the public at large. President Bush's permanent protection of the Northwestern Hawaiian Islands generated an outpouring of praise from scientists, conservationists and the public at large (see Appendix 8). Why? Because there is widespread recognition that the oceans need more protection, especially no-take reserves, to protect and restore marine life. There is a growing movement among Pacific states, large and small, to protect and recover their pelagic and coral reef ecosystems and manage their fisheries more sustainably. Soon after President Bush proclaimed Papahānaumokuākea Marine National Monument, the island state of Kiribati established a marine protected area approximately 158,000 square miles in size. Other nations like Australia and New Zealand have been developing national systems of marine reserves for a number of years. Protecting all of our own unique islands and their surrounding pelagic areas, would make the US a world leader in ocean conservation.

In sum, the natural resource values of our eight Pacific islands are superb, the need for their conservation is clear, and the timing is right for bold leadership by President Bush who is the only one with the ability and authority to act swiftly and decisively to protect these national treasures. Should the President protect these places, he would make conservation history by laying the foundation for a national system of ocean protected areas. Theodore Roosevelt laid the seeds for the national park system through his proclamation of 18 national monuments. President Bush can leave a comparable ocean legacy by protecting our unique Pacific islands on an ecosystem scale.

STRATEGIC ISSUES

Military Uses

EDF and MCBI recognize there has been a long history of military use of the islands and that military activities are continuing, albeit in a different pattern. President Bush stated in his

Memo of August 25, 2008 that any protection action recommended⁷⁶ should not compromise the DOD mission in the Pacific at large or around islands it now manages. MCBI and EDF recognize and accept this need, but believe there are opportunities for DOD to be constructively engaged in defense *and* conservation.

Currently, Johnston and Wake Island are under the management of the U.S. Air Force. As a result of conversations with Air Force staff, it is our understanding that DOD has vacated Johnston and seeks to transfer it to another administrator. Thus, Johnston has become a non-issue in terms of defense needs. We recommend that Johnston be transferred in its entirety to FWS, including the waters and submerged lands to a distance of 12nm. FWS should manage the islands to restore and protect its terrestrial and marine wildlife, and prohibit all extractive uses in the refuge. NOAA, in consultation with FWS, should be mandated with determining if and when an experimental monk seal population should be established at Johnston. If NOAA determines such a population should be established, FWS should provide appropriate assistance to NOAA.

Wake Island is still an active airbase. In 2007, the Air Force made the decision to keep the base open for training, contingency operations, emergency landings, and as a stopover spot for transpacific missions. In addition, the Navy has informed us that they conduct training operations in the EEZ waters around Wake; the exact nature of these activities and their impacts on the ecosystem is not known to us. Because of the rich biodiversity of Wake's marine waters and the potential to restore terrestrial wildlife, we support the concept of cooperative conservation and planning between DOD and FWS to effectively manage the natural resources on Wake and within the 12 nm territorial sea. In particular, we believe the marine waters to 12 nm should be set aside as a wildlife refuge with FWS managing the waters under its authorities, including regulation of recreational fishing, in consultation with DOD. The 12 nm zone would in effect be a FWS "overlay" refuge, with DOD still having the ability to maintain or extend the naval defensive sea zone, and to exercise exemptions to refuge purposes as it deems necessary for the national defense; we hope these exemptions would be few.

We recommend the 12 to 200nm zone be managed as a no-take marine reserve by NOAA. Again, DOD would still be able to exempt its activities in this zone as necessary. However, we would urge that DOD be required to consult with NOAA on conservation and biodiversity preservation issues and research expeditions at the request of NOAA and vice versa.

⁷⁶ President G.W. Bush. Memo to The Secretary of Defense, The Secretary of the Interior, The Secretary of Commerce, the Chairman of the Council of Environmental Quality. 25 August 2008

Fishing

The vision of a fully protected biological 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 NWHI marine national monument, which prohibits all fishing (except sustenance fishing) within 50 nm of the island chain. At the time of the proclamation there was little recreational fishing taking place in the NWHI, 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.

A similar situation pertains in the eight Pacific islands, with minor exceptions. There is virtually no recreational fishing occurring in the near shore and open ocean waters, because among other things, there are no people in these remote regions. There is no NMFS-managed recreational fishery.

FWS has closed all its refuges to recreational and commercial fishing, except at Palmyra where it permits limited recreational fishing by resident FWS and Nature Conservancy staff and visitors. Research is being conducted on the impacts of the bonefish fishery; FWS has the option under its authorities to close this fishery should it find that fishing is incompatible with resource protection. Base personnel at Wake are allowed to recreationally fish under base fishing guidelines; the take of certain rare species like the humphead wrasse is prohibited. The impacts of the recreational fishery have not been independently assessed. Enforcement is a potential issue at Wake, as there is no NOAA or FWS law enforcement officer present. There have been cases of illegal marine wildlife shipments from Wake; MCBI has submitted a Freedom of Information Act request to FWS for more details, but have not yet received an answer. In sum, recreational fishing could be prohibited in all of the islands with little on-the-ground controversy except for the two situations mentioned above. We recommend recreational fishing be prohibited permanently everywhere it does not exist now, but allow FWS to regulate it at Wake and Palmyra under the Refuge Administration Act.

Commercial fishing managed by NMFS and Western Pacific Fishery Management Council (WESPAC) does occur in the EEZ areas of the islands. According to NMFS, as of January 2008, there were eight existing permits in the so called PRIA EEZ fisheries, including pelagic trolling and handline (4), lobster (3), and bottomfish (1). Since then, several of these permits have expired; CEQ should request the latest number from NMFS. The various permits are held by three fishermen based in Honolulu; according to NMFS, not all of these permits are being used.

These fishers most likely would fish around Johnston, Kingman, and Palmyra, the places nearest to Honolulu, though technically the permits allow fishing in any island EEZ except Rose. Catch levels of this very minor fishery are not publically available from NMFS due to data confidentiality concerns, but are reportedly small. There are no fisheries-independent biological assessment of these near shore fisheries.

NMFS also issues permits to the long line tuna fleet based in Honolulu, totaling 164 boats; in 2007 only 83 of these permits were active. These fishermen, who target bigeye and yellowfin, are allowed to fish in the US EEZ areas of all the eight islands except Rose (which is covered by a different NMFS office), in the EEZ of Hawaii, and on the high seas. Tuna fishermen basically chase tuna, which are highly migratory. The longliners concentrate their greatest fishing effort in the triangular area formed by the points of Kingman-Palmyra, Oahu, and Johnston. The proportion of the longline fleet's total catch coming from the assessment areas is relatively small—about 7% over the last 5 years. (See Appendix 3.) Islands that experience very light longline fishing include Baker, Howland, and Jarvis; Wake is apparently little fished, if at all; and there is no longlining near Rose, according to American Samoan officials.

Purse seine tuna boats target schools of skipjack tuna, which is canned for sale. There are 13 US permitted purse seine boats fishing in the Central Pacific. Catch locations of skipjack are highly variable from year to year. Due to the more tropical distribution of skipjack, most of the fishing by the US fleet occurs in the Baker, Howland and Jarvis EEZ's. Less than 3 % of the fleets' total annual catch comes from the eight island EEZs.

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.

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 coral reef refuges into the adjacent pelagic waters

will provide a unique opportunity to study the linkages between ocean and coastal tropical atolls.

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 eight assessment areas. 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.

Scientific Research

The eight US Pacific 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. As mentioned earlier, 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.

An estimated 14 million seabirds representing 19 species use the islands as critical stopover points, as well as breeding areas and feeding grounds. The eight islands serve as critical components of flyways for seabirds and migratory shorebirds. If fully protected from fishing, large tunas that inhabit the pelagic waters of the region will continue to provide their ecological function of driving smaller prey to the surface where it is easily caught by seabirds. The community dynamics that reveal themselves to scientists in untrammelled waters cannot be gained in areas under heavy exploitation.

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 annually⁷⁷. Scientists have mapped and monitored all US-affiliated islands in the Pacific, allowing for status and health comparisons between the eight 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.

Research already has provided stunning examples of the tremendous biomass of large fishes that reefs can harbor when they are left un-fished. The incredible biomass of large fish and sharks that inhabit these reefs, and the inverted predator-dominated food webs that result might readily be dismissed if scientists did not have the proof from these islets and atolls. 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 tunas 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.

⁷⁷ Brainard, Rusty. 2008. Personal Communication.

The community dynamics that reveal themselves to scientists in these untrammelled 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 200 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. EDF and MCBI 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. We recommend an additional \$5 million annually to start. In an ocean where impacts from so many different activities weigh heavily on the ecosystems, the eight islands offer unparalleled opportunities for the study of naturally intact ecosystems and new discoveries.

RECOMMENDATIONS FOR PROTECTION

General Recommendations and Use

In general, we recommend that the eight islands be fully protected to the outer boundary of the US EEZ as marine national monuments in order to safeguard these rare, relatively pristine and intact ecosystems. Rose is the only exception due to the Governor's recommendation that a monument extend to 12 nm. 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 FWS presence on the ground and its extensive management knowledge and experience in the islands, we recommend FWS retain its full and exclusive authority over the islands and nearshore waters to a distance of 12nm, where it has such jurisdiction now, and that jurisdiction be expanded to 12 nm at the rest of the islands where it currently has a 3 nm boundary. With the exception of Rose Atoll, NOAA should manage the 12 to 200 nm zone around the islands as a pelagic biological 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 area around Rose should be cooperatively managed with the Government of American Samoa. Furthermore, adequate funds must be provided to NOAA and FWS for effective outreach and education to increase understanding of these rare natural gems, as well as for monitoring and enforcement of the areas with the assistance of the Coast Guard, which also needs additional funds.

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 fishing is prohibited in the 12 nm zone.
- Commercial fishing in the 12 to 200 nm zone is capped at the average catch level for the last five years, and terminated within three years.
- Recreational fishing is prohibited in the 0- 12 nm zone and the 12- 200 nm zone. Exceptions are that fishing in the 0-12nm zone around Palmyra Island is capped at the average catch level for the last five years. FWS is authorized to manage recreational under the Refuge Administration Act and consistent with the management goals of the monument.

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. Recreational fishing in the 0-12nm zone around Wake Island is capped at the average catch level for the last five years; or if such statistics are not available, appropriate regulations should

be issued by FWS. 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.

Conclusion

In sum, the natural resource values of our eight Pacific islands are superb, the need for their conservation is clear, and the timing is right for bold leadership by President Bush who is the only one with the ability and authority to act swiftly and decisively to protect these national treasures. Should the President protect these places, he would make conservation history by establishing the world's largest protected area and laying the foundation for a national system of ocean reserves. Theodore Roosevelt laid the seeds for the national park system through his proclamation of 18 national monuments. President Bush can leave a comparable ocean legacy by protecting our unique Pacific island ecosystems.