IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 21 May 2014

Please note: this is an archived Conservation Outlook Assessment for Papahānaumokuākea. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Papahānaumokuākea

SITE INFORMATION

Country:
United States of America (USA)
Inscribed in: 2010
Criteria:
(iii) (vi) (viii) (ix) (x)

Site description:
Papahānaumokuākea is a vast and isolated linear cluster of small, low lying islands and atolls, with their surrounding ocean, roughly 250 km to the northwest of the main Hawaiian Archipelago and extending over some 1931 km. The area has deep cosmological and traditional significance for living Native Hawaiian culture, as an ancestral environment, as an embodiment of the Hawaiian concept of kinship between people and the natural world, and as the place where it is believed that life originates and to where the spirits return after death. On two of the islands, Nihoa and Makumanamana, there are archaeological remains relating to pre-European settlement and use. Much of the monument is made up of pelagic and deepwater habitats, with notable features such as seamounts and submerged banks, extensive coral reefs and lagoons. It is one of the largest marine protected areas (MPAs) in the world. © UNESCO

SUMMARY

2014 Conservation Outlook

Good

World Heritage values and other biodiversity values have remained stable or improved since inscription Papahānaumokuākea staff are engaging in effective management to reduce those local threats which it can mitigate and to preserve those conservation values which make the site internationally unique. Many of the current threats identified rank as low and are isolated to specific areas within the site such as visitor impacts and airplane strikes. Of the high ranked threats only one is not actively managed as the threat is little understood and actions to combat the threat of marine disease are minimal. Of the very high ranked threats, some are from activities that occur outside of the site such as marine debris, rising ocean temperatures and other climate related impacts and are being addressed through management actions and planning. Nearly half the threats are low threats to the overall health of the site.
The highest potential threats to the site are from impacts outside the boundaries of the site regionally or globally such as climate change, invasive species and marine debris. Strict protocols are in place to manage for and anticipate introductions from alien species. The climate change impacts are also being planned for but are difficult to manage. The most significant threats, particularly those associated with climate change, are long term and likely to occur over decades but have the potential to greatly alter the landscape at this site where the islands low-lying and sea level rise could have profound effects on habitat.

Current state and trend of VALUES

Low Concern
Trend: Stable

World Heritage values have remained stable or improved since inscription. Sea level rise will gradually change the landscape, but has not had a significant effect since inscription. Long term global climate change impacts could have significant effects on the evolution and development of terrestrial, fresh water, coastal and

marine ecosystems and communities of plants and animals. The site is a significant natural habitat for in-situ conservation of biological diversity. The relative remoteness, strict control over access and consistent monitoring help insure minimal human impact on resources and natural processes other than global processes such as climate change.

Overall THREATS

Low Threat

The most significant threats, particularly those associated with climate change, are long term. Many of the threats identified rank as low and are isolated to specific areas within the site, including airport runway and wildlife disturbance at Midway Atoll, as well as land fill contaminants from former military use at some of the Atolls. Of the high ranked threats, including invasive alien plant and insect species, coral disease and threats from lead paint on buildings at Midway Atoll affecting some bird species, only the threat of marine diseases is not actively managed as the threat is little understood and actions to combat this threat are minimal. Of the very high ranked threats, including marine debris, some are from activities that occur outside of the site and are being addressed through management actions and planning. Nearly half the threats are low threats to the overall health of the site.

The highest potential threats to the site are from impacts outside the boundaries of the site regionally or globally such as climate change, invasive alien species, vessel strikes, hazardous cargo and marine debris. Strict protocols are in place to manage for and anticipate introductions from alien species. While the potential for vessel strikes from vessels permitted to be operating in the site do exist, vessel strikes from vessels passing outside the boundaries of the site are limited by the International Maritime Organization’s designation of the site as a Particularly Sensitive Sea Area. The climate change impacts are also being planned for but are difficult to manage given the global influences that are driving this change.

Overall PROTECTION and MANAGEMENT

Mostly Effective

The overall protection and management of the site is mostly very effective. Monitoring is ongoing and happens at various sites throughout the site on an

annual basis.
There is a GIS database incorporating research data, habitat classifications, species distributions, cultural sites and data, a spatial bibliography of published literature and information on activities carried out under permit in the monument. Importantly, this also includes a Management Plan Tracking Tool, which incorporates indicators and activities defined in relation to priorities identified in the management plan.
The site is actively managed and has shown significant recovery from some of the key threats due to the efforts to address invasive terrestrial species and to remove marine debris.
Biological research is highly effective and ongoing when weather allows for access. The research for the archaeological sites is still limited. A Natural Resources Science Plan was published in April 2011 to guide the research agenda over the course of the next 5 years and is tied directly to the management framework for the site. Midway Atoll serves as the “window” to Papahānaumokuākea Marine National Monument, but its remoteness makes it difficult to bring educational groups to the atoll. In keeping with the Monument’s goal of bringing the place to the people rather than the people to the place, the site is exploring ways to use telepresence technologies such as real-time video transmission, underwater video cameras, virtual field trips, and website interfaces for educational purposes.
Partnerships with entities like the Waikīkī Aquarium play a significant role in the mission to bring the monument to the people. However, more collaboration on education and interpretive programs between the agencies is needed.
Management aims, objectives and jurisdictions are laid out in a Monument Management Plan, which includes strategic objectives and detailed thematic action plans that address priority needs. There are clear and effective governance arrangements including a Monument Management Board, composed of representatives of NOAA, FWS, the State of Hawai’i and the Office of Hawaiian Affairs, which carries out the day-to-day management and coordination of Monument activities. However, capacity for implementation of monument management activities varies among the three co-trustees, both in terms of finances and human resources. There is a high level of staff training and development, however, additional training should be conducted between co-managing agencies to ensure that they are all aware of each others’ requirements and mandates. There is also a strong component of the site management that considers this stakeholder input into the overall management of the site.
Compared to other sites globally, this site is well financed, however, the funds to

maintain and improve critical infrastructure are lacking.
The boundaries are well documented and effective. The boundaries of the property are all located in the ocean, but nevertheless have been clearly defined, demarcated on navigational charts and communicated widely.
A significant legal and management framework is in place to limit access, manage uses and monitor vessel activities within the site. Enforcement is regular and effective, however, the site is remote and expensive to enforce.
The site is also a world leader in collaboration with other larger marine protected areas across the globe and co-convened for the Big Ocean initiative. The overall purpose of the Big Ocean network is straightforward: to provide a forum for communication and networking through which professional managers of large-scale MPAs can work together to be more efficient and effective in their management efforts.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **Illustrating example of island hotspot progression**
  Criterion:(vii)

  The property provides an illustrating example of island hotspot progression, formed as a result of a relatively stationary hotspot and stable tectonic plate movement. Comprising a major portion of the world's longest and oldest volcanic chain, the scale, distinctness and linearity of the manifestation of these geological processes in Papahānaumokuākea are unrivalled and have shaped our understanding of plate tectonics and hotspots (SoOUV, 2009).

- **Multitude of habitats and species assemblages**
  Criterion:(ix)

  The large area of the property encompasses a multitude of habitats, ranging from 4,600 m below sea level to 275 m above sea level, including abyssal areas, seamounts and submerged banks, coral reefs, shallow lagoons, littoral shores, dunes, dry grasslands and shrublands and a hypersaline lake. The size of the archipelago, its biogeographic isolation as well as the distance between islands and atolls has led to distinct and varied habitat types and species assemblages (SoOUV, 2009).

- **Remarkable example of ongoing evolutionary and bio-geographical processes**
  Criterion:(ix)

  The size of the archipelago, its biogeographic isolation as well as the distance

between islands and atolls has led to distinct and varied habitat types and species assemblages. Papahānaumokuākea constitutes a remarkable example of ongoing evolutionary and bio-geographical processes, as illustrated by its exceptional ecosystems, speciation from single ancestral species, species assemblages and very high degree of marine and terrestrial endemism. For example, a quarter of the nearly 7,000 presently known marine species in the area are endemic. Over a fifth of the fish species are unique to the archipelago while coral species endemism is over 40% (SoOUV, 2009).

► Unique reef ecosystems

Criterion:(ix)

Because of its isolation, scale and high degree of protection the property provides an unrivalled example of reef ecosystems which are still dominated by top predators such as sharks, a feature lost from most other island environments due to human activity (SoOUV, 2009).

► Endangered and vulnerable species

Criterion:(x)

The terrestrial and marine habitats of Papahānaumokuākea are crucial for the survival of many endangered or vulnerable species the distributions of which are highly or entirely restricted to the area. This includes the critically endangered Hawaiian Monk Seal, four endemic bird species (Laysan Duck, Laysan Finch, Nihoa Finch and Nihoa Millerbird), and six species of endangered plants such as the Fan Palm (SoOUV, 2009).

► Largest tropical seabird rookery in the world

Criterion:(x)

With 5.5 million sea birds nesting in the monument every year and 14 million residing in it seasonally it is collectively the largest tropical seabird rookery in the world, and includes 99% of the world’s Laysan Albatross (vulnerable) and 98% of the world’s Black-footed Albatross (vulnerable) (SoOUV, 2009).

Assessment information

Threats

Current Threats

Low Threat

Many of the threats identified rank as low and are isolated to specific areas within the site. Of the high ranked threats only one is not actively managed as the threat is little understood and actions to combat the threat of marine disease are minimal. Of the very high ranked threats, some are from activities that occur outside of the site and are being addressed through management actions and planning. Nearly half the threats are low threats to the overall health of the site.

▶ Other Activities

Low Threat
Inside site

While the number of each permit type often varies from year to year within the site, the total number of permits issued annually over the last three years has remained relatively constant at 50, 52, and 50 for 2008, 2009, and 2010, respectively. The bulk of these permits are issued for research activities. The number of permitted aircraft and vessel entries into the Monument is one method of measuring the level of human presence, as access is limited to these two modes of transportation. Within the past two years (2008-2010), there was a 38 percent decrease in the total number flights in the Monument from a high of 99 in 2008 to only 61 in 2010. The number of vessel trips remained relatively constant between 2008 and 2010 with 20 in 2008, 19 in 2009 and 19 in 2010. All aircraft and vessels must have permits to enter the site and are fitted with mobile transceiver units. There are only four exemptions to the permitting process: (1) Emergencies; (2) Law enforcement activities; (3) Armed forces actions; and (4) Passage without interruption or “innocent passage.” Excluding Midway, the highest concentrations of people

on an atoll or reef area was at Laysan Island, which had up to 18 people throughout 2010. On average, the other islands, reefs and atolls averaged about 10 individuals. It should be noted that much of the activity was not for research, but for periodic management activities. Research and education activities were a small portion of these effort (Papahānaumokuākea Marine National Monument, 2011)

► Tourism/ visitors/ recreation

Low Threat
Inside site
Outside site

Midway Atoll continues to have the highest concentration of human presence, sustaining an average population of 75-80 individuals necessary to operate Midway facilities and support the small number of visitors at the site (Papahānaumokuākea Marine National Monument, 2011). Currently all tours to Midway are interpretive with an accompanying guide and US Fish and Wildlife Staff in attendance, thereby greatly reducing the threat of wildlife disturbance. However, given the larger concentrations of people on this island, disturbance, while minimal, is a given.

► Invasive Non-Native/ Alien Species

High Threat

In the past, several of the islands and atolls of Papahānaumokuākea have been heavily inundated by terrestrial alien species. Both Midway Atoll and Laysan Island have incurred multiple introductions, some of which transformed the landscapes. Some of the most invasive introductions were intentional during the days of guano mining, such as vegetation, rats, and rabbits that caused extensive damage. To date, rats and rabbits have been successfully exterminated in Papahānaumokuākea, but various other alien species still plague the inhabited islands and atolls. The number of alien land plants in Papahānaumokuākea varies from only three introduced at Nihoa, to 249 introduced at Midway Atoll. Numerous efforts have been made to eradicate and restore the emergent lands to their native conditions, particularly at Laysan Island and Midway Atoll. Other management and restoration efforts are undertaken annually during the late spring through mid-fall field season. To prevent further importation of invasive plants, animals insects, mandatory quarantine protocols are enforced for any visitors

to all the islands of Papahānaumokuākea, with the exception of Midway Atoll.(Papahānaumokuākea Marine National Monument, 2009)

► Water Pollution

Very High Threat
Outside site

The major form of marine pollution both inside and outside of Papahānaumokuākea Marine National Monument boundaries is marine debris. As with many marine ecosystems around the world, marine debris is a constant threat to certain components of the ecosystems of the site (Selkoe et al. 2008). Although no commercial or recreational fishing is permitted in Papahānaumokuākea waters, derelict fishing nets and gear, plastics and other ocean-borne debris are concentrated by ocean currents and wash up on the reefs and beaches of the islands. Entanglement in marine debris has been identified as a major threat to the endangered Hawaiian Monk Seal. Debris entanglement also threatens sea turtles, seabirds, cetaceans and coral reef organisms. An estimated 1.5 tons of marine debris was generated from the Japan Tsunami 14 months ago (Honolulu Star Advertiser, 3/29/2012). While it is difficult to predict, it is not anticipated that this will all wash ashore at the site, but large and perhaps unprecedented amounts could become a major management concern over the course of the next 5 years. To date more than 700 metric tons of marine debris has been removed from the Monument (Honolulu Star Advertiser, July 2012).

► Earthquakes/ Tsunamis

High Threat
Outside site

In 29 March 2011, the Japan Tsunami washed over large portions of the islands and atolls of PMNM. On Midway 110,000 Black foot and Laysan Albatross chicks were killed representing 22% of the seabird population. An additional 500-600 Black-foot Albatross chicks were killed at Kure Atoll. Tens of millions of dollars in structural damage were also done to Midway Atoll. (Honolulu Star Advertiser, 3/18/2011)

► Habitat Shifting/ Alteration

High Threat
Inside site

Outside site

Sea-level rise poses a significant threat to the terrestrial ecosystem. Recent modeling scenarios indicate that between 5% and 69% of some terrestrial habitats in Papahānaumokuākea could be lost due to rising sea levels by the year 2100 (Baker et al. 2006). Sea-level rise is likely to have a significant deleterious effect on Hawaiian monk seal pupping sites, green turtle nesting areas and Laysan finch habitat, in addition to numerous other endangered and endemic species (Selkoe et al. 2008).

► Temperature changes

High Threat
Inside site
Outside site

Elevated sea surface temperatures such as those projected by the International Panel on Climate Change can lead to coral bleaching events, when corals expel their symbiotic algae and become white, or bleached. This phenomenon, which has already been observed in Papahānaumokuākea (Aeby et al. 2011), generally leads to partial or total mortality of the bleached coral and increases corals’ susceptibilities to various diseases.

► Other

High Threat
Inside site
Outside site

The incidence of diseases affecting marine organisms is increasing globally, but the factors contributing to disease outbreaks remain poorly known. The overall average prevalence of coral disease is quite low in the Northwestern Hawaiian Islands as compared to other coral reef areas (Aeby 2006). Recent studies have begun to document these disease baselines in corals and other associated marine animals such as fish and sea turtles. In 2011, one site previously surveyed and monitored at French Frigate Shoals (FFS) had seen a significant reduction in the density of Acropora cytherea due to colonies dying from one of the growth anomalies and ‘white syndrome’ associated with the diseases found in the Northwestern Hawaiian Islands. Most other monitored sites have not seen significant reductions in densities of corals to date (Karl S. 2012).

► Housing/ Urban Areas

High Threat
Inside site

Some of the buildings on Midway date to 1903, with most of them dating to the period between 1939 and 1993, when the atoll was used as a U.S. Navy base. Studies conducted by the U.S. Fish and Wildlife Service and others between the late 1980s and 2009 showed that Laysan albatross chicks exhibited symptoms of lead toxicity, which causes their wings to droop and prevents them from developing the ability to fly and forage for food, leading to death. The studies found their exposure is likely related to ingestions of lead-based paint chips and soil contaminated with the chips, which the birds often pick up and place into their nests. One study estimated that eliminating the chick mortality from lead poisoning would increase the Laysan population at Midway in 50 years by as many as 360,000 birds over the projected population size without lead-based paint removal. (U.S. Fish and Wildlife Service Press Release, Jan 19, 2011)

► Shipping Lanes

High Threat
Inside site
Outside site

Hazards to shipping and other forms of maritime traffic such as shallow submerged reefs and shoals are inherent in the Northwestern Hawaiian Islands. The region is exposed to open-ocean weather and sea conditions year-round, punctuated by severe storm and wave events in winter. Hence vessel groundings and the release of fuel, cargo, and other items would pose real threats to the Northwestern Hawaiian Islands (Selkoe et al. 2008). This threat is greatly reduced by the national and international maritime management measures in effect for this site. Historically, there have been numerous spills and shipwrecks in the property, and a few in more recent times. In April 2008, a designation by the International Maritime Organization (IMO), declared the waters of Papahānaumokuākea a “Particularly Sensitive Sea Area” (PSSA), implemented a mandatory ship reporting system and expanded and consolidated existing Areas To Be Avoided (ATBA) into four larger ATBAs (Papahānaumokuākea website May 12, 2012).

► Flight Paths

Low Threat

Aircraft landing at Midway Atoll or Tern Island pose certain risks to wildlife and other resources, including bird strikes, introduction of alien species, aircraft crashes, and fuel spills. Certain management practices, such as requiring night landings and runway sweeps during albatross season at Midway or runway sweeps during any landing at Tern, as well as alien species inspections, minimize these risks.

► Industrial/ Military Effluents

High Threat
Inside site

Uncharacterized, unlined landfills remain on some of these islands. Kure Atoll and French Frigate Shoals both have point sources of PCBs due to former U.S. Coast Guard LORAN stations. While the Coast Guard has mounted cleanup actions at Kure Atoll, elevated levels of contamination remain in island soils, nearshore sediment, and biota. The Navy also left landfills behind on Midway Atoll. Studies have shown that soil can constitute up to 30% of the material a bird consumes, and hence soil contamination from the above substances is a substantial threat to the bird populations (Hui and Beyer 1998; Beyer et al. 1994).

Potential Threats

High Threat

The highest potential threats to the site are from impacts outside the boundaries of the site regionally or globally such as climate change, invasive alien species, vessel strikes, hazardous cargo and marine debris. Strict protocols are in place to manage for and anticipate introductions from alien species. While the potential for vessel strikes from vessels permitted to be operating in the site do exist, vessel strikes from vessels passing outside the boundaries of the site are limited by the International Maritime Organization’s designation of the site as a Particularly Sensitive Sea Area. The climate change impacts are also being planned for but are difficult to manage given the global

influences that are driving this change.

► Other

Very High Threat

A total of 11 marine alien fish, invertebrates and algae species have been recorded in the Northwestern Hawaiian Islands. Alien species may be introduced accidentally, such as with vessel discharge, marine debris, or aquaculture, or intentionally, as in the case of a few species of snappers, grouper and algal species (PIFSC-CRED unpublished data.) To date, none of these species has caused significant problems in Papahānaumokuākea Marine National Monument, however, there are a variety of marine invasive species (particularly 5 species of algae) in the main Hawaiian Islands, which if transported to the Papahānaumokuākea Marine National Monument, could cause significant changes in species composition.

► Chemical changes in oceanic waters

High Threat
Inside site
Outside site

Ocean acidification, resulting from elevated CO_2 levels that occur in conjunction with climate change, would have multiple impacts to coral reef ecosystems, including decreased abundance of aragonite (a major building block for coral reefs) and the dissolution of coral substrate and structures (Vitousek 1994). These effects lead to pronounced decreases in coral growth rates (Hoegh-Guldberg 2005). Ocean acidification does not only affect submerged reefs; it would similarly affect the carbonate-based island atolls, further expediting the natural subsidence of these islands and atolls.

Protection and management

Assessing Protection and Management

► Relationships with local people

Mostly Effective

The agencies that make up Papahānaumokuākea include a couple of

community-based advisory groups that provide input into the management of the site. These include the Monument's Native Hawaiian Cultural Working Group and the NWHI Coral Reef Ecosystem Reserve Advisory Council that formally advises the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, an office within NOAA and the larger Department of Commerce, one of three Monument Co-Trustees.

There is a strong component of site management that values stakeholder input into the overall management of the site. Since designation, there has been a delay in forming the Monument Alliance, a stakeholder-based community advisory group that provides formal advice to all Monument managers, rather than one. Further development of the Monument Alliance has been delayed due to the Federal Advisory Committee Act process (Personal Communication)

IUCN noted the engagement of representatives of the indigenous Hawaiian community in the management of the property during its evaluation mission, meeting with a variety of Native Hawaiian stakeholders and leaders, and interaction with members of the Centre for Hawaiian Studies at the University of Hawai'i, the Native Hawaiian Cultural Working Group of the monument and the Office of Hawaiian Affairs. (IUCN Evaluation Report, May 2010)

► Legal framework and enforcement

Mostly Effective

A significant legal and management framework is in place to limit access, manage uses and monitor vessel activities within the site. Enforcement is regular and effective, however, the site is remote and expensive to enforce. While the remote location of the Northwestern Hawaiian Islands has helped to protect them, it also provides a potential source of cover for those interested in exploiting the area illegally. Illegal access to the monument, discharge, dumping, and poaching are particular causes of concern. While the establishment of the monument provides an additional layer of protection to the area, protections remain difficult to enforce. Historically, enforcement has relied on occasional U.S. Coast Guard over-flights and vessel patrols, as well as reports passed along by fishermen, researchers, and agency personnel working in the area. Now Monument managers are investigating the potential of remote surveillance techniques e.g. satellites, radar, and vessel monitoring systems to inform on-the-water law enforcement officers of

potential violations as well. (Papahānaumokuākea website, Nov 2012).

► Integration into regional and national planning systems

Highly Effective

The site has ‘sister site’ agreements with other large Pacific Marine Protected Areas (MPAs) such as the Phoenix Islands. IUCN recently highlighted the sister site agreement between the Governments of the United States of America and Kiribati on the management of Papahānaumokuākea Marine National Monument and Phoenix Islands Protected Area respectively, and encouraged State Parties to continue and, as possible, expand on this collaboration. (IUCN Evaluation Report, May 2010).
Recognizing the need to learn from each other, site managers from the world’s largest MPAs met on December 6, 2010 in Honolulu and launched Big Ocean: A Network of the Worlds Large-Scale Marine Managed Areas. Co-convened by the Papahānaumokuākea Marine National Monument and World Heritage Site and the Phoenix Islands Protected Area and World Heritage Site under a bi-lateral “sister-site” relationship, this historic, inaugural meeting produced the first ever Managers’ Communiqué on the importance, contributions and needs of large-scale MPAs. The overall purpose of the Big Ocean network is straightforward: to provide a forum for communication and networking through which professional managers of large-scale MPAs can work together to be more efficient and effective in their management efforts (Big Ocean website, Nov 2012).

► Management system

Mostly Effective

Management aims, objectives and jurisdictions are laid out in the Monument Management Plan, which includes strategic objectives and detailed thematic action plans that address priority needs. It is important that these efforts are sustained with the aim to increase streamlining, including of mechanisms for supporting monument activities, stakeholder participation and outreach. (IUCN Evaluation Report, May 2010)

Management responsibilities rest with three co-trustees: the State of Hawai’i, through the Department of Land and Natural Resources (DLNR); the U.S. Department of the Interior, through the Fish and Wildlife Service (FWS); and

the U.S. Department of Commerce, through the National Oceanic and Atmospheric Administration (NOAA). The co-trustees have entered into a Memorandum of Agreement setting out mechanisms for managing the Monument including roles and responsibilities, decision making and coordinating bodies. There are clear and effective governance arrangements including a Monument Management Board, composed of representatives of NOAA, FWS, the State of Hawai'i and the Office of Hawaiian Affairs, which carries out the day-to-day management and coordination of Monument activities. An Interagency Coordinating Committee has been established to engage other state and federal agencies that support monument operations. Protection of, and research into, the traditional and cultural values of the monument are inscribed both in the Presidential Proclamation establishing the monument and its management plan. (IUCN Evaluation Report, May 2010).

Active management occurs on several islands. However, the annual strategies for how the site will be managed across and among agencies and within their various authorities is still not well integrated. (Personal Communication). Each co-trustee still operates institutionally disconnected processes with separate procedures, budgets, staff etc. Although the complex management structure of the monument is a product of the terms of the Presidential Proclamation establishing the monument, and federal law, there may be a case for studying options for even more far-reaching integration, e.g. into a single management authority for the monument with unified budgets and co-located staff. (IUCN Evaluation Report, May 2010)

► Management effectiveness

Highly Effective

There is a GIS database incorporating research data, habitat classifications, species distributions, cultural sites and data, a spatial bibliography of published literature and information on activities carried out under permit in the monument. Importantly, this also includes a Management Plan Tracking Tool, which incorporates indicators and activities defined in relation to priorities identified in the management plan. (IUCN Evaluation Report, My 2010)

The site is actively managed and has shown significant recovery from some

of the key threats due to the efforts to address invasive terrestrial species and to remove marine debris. For example, an extensive habitat restoration project (initiated in 1992) is underway on Laysan Island, where the refuge maintains a year-round field camp. Natural restoration is occurring in the wake of this removal, and the refuge staff has reintroduced terrestrial invertebrates, plants and one land bird species that were extirpated from the island, but which still occur within the Hawaiian Archipelago. Laysan ducks that have been reintroduced at Midway are doing well, as are Nihoa Millerbirds, which were reintroduced on Laysan Island. (USFWS websites, Nov 2012)

► Implementation of Committee decisions and recommendations

Mostly Effective

The following recommendations were made by the Committee and include an associated response:
a) That research and awareness-raising should consider the geological linkages with the Hawaii Volcanoes National Park and World Heritage property. Both sites are working collaboratively together on this awareness raising effort. (Personal communication).
Interpretive programs are being developed at both the Papahānaumokuākea Visitor Center in Hilo, Hawaiʻi and at the Volcanoes National Park visitor center. Planning for collaborative outreach programs is underway (Personal communication).
b) Develop a response plans for the property related to climate change. On June 12-14, 2012 PMNM hosted a workshop to summarize the current understanding of climate change impacts on Monument resources in order to develop adaptive management strategies. The workshop brought together 30 experts from Hawaiʻi with relevant expertise in management, culture, and science. A framework for a climate change action plan was developed as part of the workshop, for potential incorporation into the upcoming management plan review of the Monument. (Papahānaumokuākea website, Nov 2012
c) Ensure the management system achieves an equitable balance between the protection of cultural and natural attributes with the support of a cultural heritage specialist. A cultural heritage specialist has been hired and plans are in the works to hold a workshop with the Native Hawaiian community to develop a research plan for cultural heritage and traditional ecological knowledge initiatives. (Personal communication)

e) In order to address the fragility of, and disruption to, the archaeological remains from plants and animals, put in place deterrents to ensure archaeological sites are not disturbed by burrowing animals of plants. Limited plans to address this issue have been developed to date. (Personal communication)
f) Develop monitoring arrangements to monitor the impact of natural processes on the archaeological resources. Monitoring of the archaeological resources is still infrequent and documentation of the natural processes on these resources is still limited. (Personal communication)
d) Provide clear documentation of the physical cultural resources based on the outcomes of the current archaeological investigations. Published data on the outcomes of the current archaeological research is still limited, however research by a PhD candidate was recently published and provides significant additional analysis to support current archaeological investigations (Hana Hou-The Magazine of Hawaiian Airlines, Aug/Sept. 2010). Documentation is ongoing but access is difficult.
e) Ensure no military training activities take place on Nihoa and Mokumanamana islands. No military training activities are taking place on these islands. (Personal communication)

► Boundaries

Highly Effective

The site has no buffer zone, as it is in an extremely remote region and its boundaries have been set at 50 nautical miles (~100km) out over open sea from each of the islands and atolls. Access to/through the site is very strictly controlled and there are four designated 50 nautical miles wide Areas to be Avoided (ATBAs) by ship traffic. All vessels must notify Federal authorities if they come within 10 nautical miles (~20km) of the Property’s outer boundaries. (ICOMOS Evaluation Report, March 2010).

The Papahānaumokuākea Particularly Sensitive Sea Area (PSSA) has the same boundaries as the Monument, and four Areas to be Avoided (ATBA) have also been adopted by the International Maritime Organization (IMO), each extending out 50 nautical miles or 92.6 kilometres from the centre of islands or atolls. (IUCN Evaluation Report, May 2010)

The boundaries of the site are all located in the ocean, but nevertheless have

been clearly defined, demarcated on navigational charts and communicated widely. (SoOUV, 2009). The boundaries are well documented and effective.

► Sustainable finance

Mostly Effective

Compared to other sites globally, this site is well financed, however, the funds to maintain and improve critical infrastructure are lacking. The Papahānaumokuākea Marine National Monument Management Plan (2008) provides long-term guidance for management decisions over a 15-year horizon and sets forth desired outcomes, with strategies and activities to reach those outcomes, including the agencies' best estimate of future needs. These estimates are sometimes above current budget allocations. However, they are included primarily for strategic planning and program prioritization purposes. All funding for current and possible future activities of Papahānaumokuākea Marine National Monument is subject to the budgeting and appropriations processes of the Federal and State governments (Papahānaumokuākea Marine National Monument, 2008).

► Staff training and development

Mostly Effective

Capacity for implementation of monument management activities varies among the three co-trustees, both in terms of finances and human resources. (IUCN Evaluation Report, May 2010).

There is a high level of staff training and development; however, additional training should be conducted amongst co-managing agencies to ensure that they are all aware of each others' requirements and mandates could be more collaborative (Personal communication).

► Sustainable use

Highly Effective

There is no sustainable use allowed

► Education and interpretation programs

Highly Effective

More collaboration on education and interpretive programs between the agencies is needed. A new initiative for outreach was recently launched between the Waikīkī Aquarium and the Monument. On August 18, 2011, the Waikīkī Aquarium unveiled its Northwestern Hawaiian Islands exhibit, its first major new exhibit in six years. Partnerships with entities like the Waikīkī Aquarium play a significant role in the mission to bring the monument to the people. (Papahānaumokuākea Accomplishments Report, 2011). However, this is the first collaborative exhibit in 6 years. Individually the various interpretive centers, and education programs focusing on the site are outstanding, but greater and more featured collaborations are still needed (Personal communication).

► Tourism and interpretation

Highly Effective

Midway Atoll serves as the “window” to Papahānaumokuākea Marine National Monument, but its remoteness makes it difficult to bring educational groups to the atoll. An educator’s workshop is held on Midway annually, with the goal of providing an experience and knowledge teachers and community leaders can disseminate more broadly back at home. Colleges and universities also are encouraged to bring classes in marine ecosystems to Midway. In keeping with the Monument’s goal of bringing the place to the people rather than the people to the place, the site is exploring ways to use telepresence technologies such as real-time video transmission, underwater video cameras, virtual field trips, and website interfaces for educational purposes. (USFWS Midway Atoll National Wildlife Refuge website, Nov 2012) The visitor program also seeks to foster public awareness of the importance and sensitivity of remote atoll ecosystems. Guided tours interpret both the biological and historic importance of Midway and Papahānaumokuākea, and visitors also learn of the cultural significance of the Northwestern Hawaiian Islands for Native Hawaiians. (USFWS Midway Atoll National Wildlife Refuge website, Nov 2012)

► Monitoring

Mostly Effective

Monitoring is ongoing and happens at various sites throughout the site on an annual basis. To date however, the much of the data from these annual

monitoring and assessment activities has not been fully analyzed, nor published (Personal communication).
Focused research on genetic connectivity, coral health and population structure, and apex predator tracking which compares populations in the main and northwestern Hawaiian Islands has been highly productive with over 500 publications produced. (Papahānaumokuākea website, Nov 2012).

► Research

Mostly Effective

Biological research is highly effective and ongoing when weather allows for access. The research for the archaeological sites is still limited. A Natural Resources Science Plan was published in April 2011 to guide the research agenda over the course of the next 5 years and is tied directly to the management framework for the site. (Papahānaumokuākea website, Nov 2012)

Overall assessment of protection and management

Mostly Effective

The overall protection and management of the site is mostly very effective. Monitoring is ongoing and happens at various sites throughout the site on an annual basis.
There is a GIS database incorporating research data, habitat classifications, species distributions, cultural sites and data, a spatial bibliography of published literature and information on activities carried out under permit in the monument. Importantly, this also includes a Management Plan Tracking Tool, which incorporates indicators and activities defined in relation to priorities identified in the management plan.
The site is actively managed and has shown significant recovery from some of the key threats due to the efforts to address invasive terrestrial species and to remove marine debris.
Biological research is highly effective and ongoing when weather allows for access. The research for the archaeological sites is still limited. A Natural Resources Science Plan was published in April 2011 to guide the research agenda over the course of the next 5 years and is tied directly to the management framework for the site. Midway Atoll serves as the “window” to Papahānaumokuākea Marine National Monument, but its remoteness makes it

difficult to bring educational groups to the atoll. In keeping with the Monument's goal of bringing the place to the people rather than the people to the place, the site is exploring ways to use telepresence technologies such as real-time video transmission, underwater video cameras, virtual field trips, and website interfaces for educational purposes.

Partnerships with entities like the Waikīkī Aquarium play a significant role in the mission to bring the monument to the people. However, more collaboration on education and interpretive programs between the agencies is needed.

Management aims, objectives and jurisdictions are laid out in a Monument Management Plan, which includes strategic objectives and detailed thematic action plans that address priority needs. There are clear and effective governance arrangements including a Monument Management Board, composed of representatives of NOAA, FWS, the State of Hawai'i and the Office of Hawaiian Affairs, which carries out the day-to-day management and coordination of Monument activities. However, capacity for implementation of monument management activities varies among the three co-trustees, both in terms of finances and human resources. There is a high level of staff training and development, however, additional training should be conducted between co-managing agencies to ensure that they are all aware of each others' requirements and mandates. There is also a strong component of the site management that considers this stakeholder input into the overall management of the site.

Compared to other sites globally, this site is well financed, however, the funds to maintain and improve critical infrastructure are lacking.

The boundaries are well documented and effective. The boundaries of the property are all located in the ocean, but nevertheless have been clearly defined, demarcated on navigational charts and communicated widely.

A significant legal and management framework is in place to limit access, manage uses and monitor vessel activities within the site. Enforcement is regular and effective, however, the site is remote and expensive to enforce.

The site is also a world leader in collaboration with other larger marine protected areas across the globe and co-convened for the Big Ocean initiative. The overall purpose of the Big Ocean network is straightforward: to provide a forum for communication and networking through which professional managers of large-scale MPAs can work together to be more efficient and effective in their management efforts.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Mostly Effective

The overall effectiveness of protection is highly or mostly effective. Threats to the site emanating outside its boundaries include marine debris, hazardous cargo, future exploration and mining, military operations, Illegal, Unregulated and Unreported (IUU) fishing, commercial fishing, anchor damage, vessel strikes and Invasive Alien species. (IUCN Evaluation Report, May 2010). Plans are in place to address threats from both within and outside of the site, to the extent that data exists to address these threats.

► Best practice examples

The Papahānaumokuākea Natural Resources Science Plan (Science Plan) published in April 2011, is the first of a number of “step-down” plans called for in the Management Plan. The Science Plan aims to facilitate the Management Plan’s goal for understanding and interpreting the NWHI, and to provide the information required to support management actions, such as managing threats, permitting activities, and evaluating the effectiveness of management efforts. Among the threats to Monument resources, the direct and indirect effects of climate change, including sea level rise, changing weather patterns, and ocean acidification, are significant, cross-cutting concerns. Current science suggests that climate change is likely to have profound effects on the NWHI’s ecosystems and protected species; thus, understanding climate change impacts and adaptation options is reflected throughout the Science Plan. Additionally, the Monument offers a unique opportunity to understand climate variability and its impacts in the absence of confounding factors, such as human uses and pressures. The Science Plan aims to use this advantage to inform broader management efforts to support ecosystem resilience. Overall, this Science Plan establishes a research and monitoring framework, and a prioritized list of research activities, to inform management of the Monument’s natural resources.

State and trend of values

Assessing the current state and trend of values

World Heritage values

► Illustrating example of island hotspot progression

Low Concern
Trend:Stable

Sea level rise will gradually change the landscape, but has not had a significant effect since inscription. More collaboration and outreach to showcase the unique nature of the evolution of the Hawaiian archipelago with links to Volcanoes National Park is needed. IUCN recently recommended that research and awareness raising should consider the geological linkages with the Hawaii Volcanoes National Park and this World Heritage property. (IUCN Evaluation Report, May 2010)

► Multitude of habitats and species assemblages

Low Concern
Trend:Stable

The marine ecosystems of PMNM are in exceptionally good health compared to most other sea areas in the world, in large part due to historically low and presently strictly limited use of the area. However, long term global climate change impacts could have significant effects on the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals (IUCN Evaluation, 2010).

► Remarkable example of ongoing evolutionary and bio-geographical processes

Low Concern
Trend:Improving

Long term global climate change impacts could have significant effects on the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals. Climate change and its resultant effects are now major criteria determining research priorities. (Draft 2011 Marine Conservation Science Action Plan Assessment)

► Unique reef ecosystems

Low Concern
Trend:Stable

Papahānaumokuākea's reefs are remote, nearly pristine and thus represent one of the last remaining intact large-scale predator dominated coral reef ecosystems. The prevalence of coral disease is low in the Northwestern Hawaiian Islands, and only a handful of introduced marine invertebrate species have been found there
compared to 287 in the main Hawaiian Islands (IUCN Evaluation, 2010).

► Endangered and vulnerable species

Low Concern
Trend:Stable

The site is a significant natural habitat for in-situ conservation of biological diversity. The relative remoteness, strict control over access and consistent monitoring help insure minimal human impact on resources and natural processes other than global processes such as climate change (IUCN Evaluation Report, May 2010). However, there is some concern about certain species, such as the Hawaiian monk seal. Despite recovery efforts, seal populations have exhibited an overall decline of ~4% per year for the last two decades. However, the observed decline in the seal population in the Northwestern Hawaiian Islands has in recent years been mitigated
by an increase in seals in the Main Hawaiian Islands (Parish et al., 2012). The Hawaiian population of green turtles has been monitored for more than 30 years, following the cessation of harvesting in the 1970s, and has shown a steady recovery from its depleted state
(Balas and Chaloupka 2004a).

► Largest tropical seabird rookery in the world

High Concern
Trend:Stable

The last complete inventory of Northwestern Hawaii Islands (NWHI) breeding populations was done between 1979 and 1984 (Fefer et al. 1984). Population trends since then have been derived from more intensive monitoring at three islands. Population trends in the NWHI are stable or increasing for most

species, but there is concern for a few, especially the albatrosses. The conservation status of seabirds in Hawaiʻi was assessed as part of the North American
Waterbird Conservation Plan. Eleven of the 21 species were classified as highly imperilled or of high conservation concern at the broad scale of the plan. At the regional scale (Pacific Islands), 6 species were included in these highest concern categories: Laysan, black-footed, and short-tailed albatrosses; Christmas shearwater; Tristram's storm-petrel; and blue noddy. (Papahānaumokuākea Management Plan, 2008).

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**

Low Concern

Trend: Stable

World Heritage values have remained stable or improved since inscription. Sea level rise will gradually change the landscape, but has not had a significant effect since inscription. Long term global climate change impacts could have significant effects on the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals. The site is a significant natural habitat for in-situ conservation of biological diversity. The relative remoteness, strict control over access and consistent monitoring help insure minimal human impact on resources and natural processes other than global processes such as climate change.

Additional information

Key conservation issues

▶ **Marine Debris**

Regional

Marine debris originates outside the site. Fishing nets, in particular, could be reduced by means of developing and enforcing means for identification of the

origin of nets.

▶ Climate Change

Global

The reduction of greenhouse gases requires developing and implementing international agreements.

▶ Invasive species

Regional

The reduction of some alien species within the site can be accomplished through site management. Preventing or reducing the introduction of new species requires education of visitors, continued careful control over access to the site and continued monitoring.

▶ Ship groundings/vessel strikes

Regional

While the Monument boundaries are well documented and clearly marked on all navigational charts, as well as having a required protocol for vessels wishing to enter the site, there is still the potential for vessel strikes either from vessels authorized to operate in the site or from elsewhere. Vessels operating in the Monument must carry vessel monitoring devices, so can be easily tracked, however vessels that enter without permission or are disabled and have to steerage may still pose a problem in this remote and vast region. Continued surveillance and enforcement using new technologies to monitor activity in the site are needed and still in development.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects

1	University of Hawaii and other academic institutions	Researchers from multiple institutions provide the necessary information on population dynamics, identification of new species, and to understand impacts from climate change on the site.
2	US FWS	US FWS continues efforts to remove alien plants at Laysan Island and Midway Atoll and re-vegetate with native species. They have also increased survival of two endangered birds by moving some of the breeding pairs from their one isolated island to colonies on additional islands with great success. At Tern Island - FFS, Laysan Island and Midway Atoll they continue to monitor seabirds.
3	NOAA	Continues to monitor Hawaiian monk seal populations, coral reefs, Mesophotic reefs and sea turtle populations to look for creative management strategies to increase the declining populations of these species and ecosystems. They also continue to support annual marine debris removal efforts, coral reef monitoring programs and characterization of both nearshore and deep reef areas. They have an extensive outreach program in the Main Hawaiian Islands to support ‘Bringing the place to the people and not the people to the place”. They are also the lead agency for the development of a Maritime Heritage plan and a Native Hawaiian research plan for the site. They have also taken the lead on the development of an interagency climate change plan for the site.
4	State of Hawaii	State of Hawaii continues to activity work to remove invasive plant species and monitor seabirds and Hawaiian monk seals at Kure Atoll.
5	Office of Hawaiian Affairs	OHA manages the Native Hawaiian Cultural Working Group and is working with NOAA as the lead for the development of the Native Hawaiian research plan.

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	UH and other academic institutions, NOAA	Marine disease impacts and potential mitigation measures	
2	NOAA, US Army Corps of Engineers	Sea level rise scenario planning and mitigation	
3	NOAA, US Coast Guard and the State Department	All possible methods to address increasing marine debris	

№	Site need title	Brief description of potential site needs	Support needed for following years
4	OHA and NOAA	Additional compilation of Native Hawaiian chants, stories and legends of the site	
5	UH and other academic institutions, NOAA and US FWS	Additional archaeological research	

REFERENCES

№	References
1	Aeby GS, Williams GJ, Franklin EC, Kenyon J, Cox EF, et al. (2011) Patterns of Coral Disease across the Hawaiian Archipelago: Relating Disease to Environment. In PLoS ONE 6(5): e20370. doi:10.1371/journal.pone.0020370
2	Baker, J.D., C.L. Littnan and D.W. Johnston. 2006. Potential effects of sea level rise on the terrestrial habitats of endangered and endemic megafauna in the Northwestern Hawaiian Islands. Endangered Species Research 4(1): 1-10.
3	Gilmartin, W., S. Canja, C. Vanderlip and J. Mangel. 1990. Managing human activity aids recovery of endangered Hawaiian Monk Seals at Midway Islands. Abstract in: Society for Marine Mammalogy Proceedings of the 13th Biennial Conference on the Biology of Marine Mammals. pp. 67.
4	Gilmore, Roland. 2010. Mystery Islands in: Hana Hou-The Magazine of Hawaiian Airlines. Vol 13 No.4, August/September 2010.
5	Godwin, S. 2005. Preliminary species inventory for marine invertebrates associated with the coral reef communities of the Northwestern Hawaiian Islands. Report submitted to the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Honolulu, HI.
6	Hoegh-Guldberg, O. 2005. Low coral cover in a high-CO2 world. Journal of Geophysical Research 110: C09S06, doi:10.1029/2004JC002528.
7	Honolulu Star Advertiser, (2011). “Officials say 110,000 albatross chicks on Midway killed in tsunami”, March 18, 2011.
8	Hui, C.A. and W.N. Beyer. 1998. Sediment ingestion of two sympatric shorebird species. Science of the Total Environment 224 (1998): 227-233
9	ICOMOS, Evaluation of Papahānaumokuākea (United States of America) No. 1326, March 2010.
10	IUCN, World Heritage Nomination-Technical Evaluation Papahānaumokuākea Marine National Monument (United States of American) Id No. 1326, May 2010.
11	National Oceanic and Atmospheric Administration, Papahānaumokuākea Accomplishments Report 2011.

№	References
12	Papahānaumokuākea Marine National Monument (2008). Management Plan. December 2008.
13	Papahānaumokuākea Marine National Monument. (2009). United States of America's Nomination of Papahanaumokuakea Marine National Monument for Inscription on the World Heritage List. Honolulu, Hawaii. Jan. 2009.
14	Papahānaumokuākea Marine National Monument. (2011). Permitted Activities. 2010 Annual Report. Honolulu, Hawaii.
15	Parish et al. (2012). Estimating the carrying capacity of French Frigate Shoals for the endangered Hawaiian monk seal using Ecopath with Ecosim. MARINE MAMMAL SCIENCE, 28(3): 522–541 (July 2012)
16	Selkoe K.A, Halpern B.S. and Toonen R.J. (2008). 'Evaluating anthropogenic threats to the Northwestern Hawaiian Islands' in Aquatic Conservation: Marine and Freshwater Ecosystems Volume 18, Issue 7. 17 Jun 2008
17	Steven, Karl. (2012). Papahānaumokuākea Marine National Monument Permit Application "Coral Disease Research on Acropora cytherea". Honolulu, Hawaii
18	U.S. Fish and Wildlife Service Press Release. (2011). "Study assesses lead-based paint cleanup at Midway Atoll National Wildlife Refuge". Jan 19, 2011. Honolulu, Hawaii
19	Vitousek, P.M. 1994. Beyond global warming: ecology and global change. Ecology 75: 1861-1876.