

Mālamalama ka lā nui a Kane puka i Hū'ehū'e
 Apakau ke kakuna i ka 'ili kai o nā kai 'ewalu
 He 'ike makawalu ka'u e 'ano'i nei,

'O nā au walu o Kanaloa Haunawela noho i ka moana nui
 He Hū'akāi ka makani o Lehua 'au i ke kai

Kū'ono'ono ka lua o Kahaimoana i ke kapa 'ehukāi o Ka'ula

'O Kū i ka loulou, ulu a'e ke aloha no Nihōa moku manu

Manu o kū i ka 'āhui, he alaka'i na ka lāhui

'O Hinapūko'a

'O Hinapūhalako'a

'O Hina kupukupu

'O Hinaikamalama

Hua ka 'ōhua, lu'u ke kohōla

Aloha kahi limu kaho, kia'i 'a'e ka 'ākala noho i uka

Hānau ka pe'a, puka ka pe'ape'a i ke kai

He 'ina'i ka 'ina, 'ono i ka hūna o ka pa'akau

Manomano ka 'ike lū'u o ka houpo o Kanaloa

Koiko'i lua ho'i no ka luhuleha, o kū'u luhū'ia

Hānohano wale ka 'āina kupunū, 'o nā mekū'ā'ia

No Papahānaumokuākea lā he inoa

- Na Kainani Kakaunaele a me Halealoha



*State of Conservation and Factors
 Affecting the Property*



4. *State of Conservation and Factors Affecting the Property*

4.a Present State of Conservation of the Property

The state of conservation of the property is excellent, both in terms of the physical condition of the resources, as well as the conservation and regulatory measures in place to maintain it. In addition to stringent conservation laws, the preservation of the property is maintained and assured through detailed and thorough management plans, on-site restoration and monitoring activities, and associated practices described in Section 5.

As detailed in Sections 2, 3 and 5, several factors contribute to the property's exceptional state of conservation. These factors include:

1. The extreme isolation of Papahānaumokuākea Marine National Monument. The sheer size and remoteness of the area, situated in the north-central portion of the world's largest ocean, thousands of miles from any continental land mass or heavy human population pressures, has ensured that human-based impacts have been relatively few, and the biological, historic and cultural resources of this site are well preserved.



Sand Anemone or 'okole
(Photo: Susan Middleton & David Liittschwager)

2. Regulatory protections and management initiatives. These are in place to protect ecosystem function and ensure reef resilience and resistance in the face of potential threats from global climate change or other climatic events.
3. Numerous species recovery and restoration plans. These are in place and are being actively implemented.
4. Emergency response and restoration plans. These are either in place or in development for human health and safety, and in response to unanticipated natural and anthropogenic events.
5. Commitment in policy and precedence to incorporating Native Hawaiian traditional knowledge, practice, and values into the management of the site.
6. Conducting, supporting and facilitating Native Hawaiian cultural and historic research relating to the area.
7. Providing access for Native Hawaiian cultural practices at Papahānaumokuākea.
8. Engaging the Native Hawaiian community in the management of Papahānaumokuākea.
9. Restricted public access via permitting systems and vessel monitoring and notification systems.
10. Rigorous quarantine requirements for all activities in Papahānaumokuākea to reduce introduction of alien species.
11. A phase-out of all commercial fishing by 2011, with current fishing limited to only eight active vessels fishing for deep-water species.



Undisturbed terrestrial and marine habitat of Papahānaumokuākea (Photo: James Watt)

Natural

Species trends

More than 7,000 documented species are found within Papahānaumokuākea Marine National Monument and the vast majority of them are thriving. As outlined in Section 2, the property's coral reefs are considered nearly pristine and there is a very low



Papahānaumokuākea is home to a large number of threatened and endangered species (Photo: James Watt)

incidence of invasive species (Friedlander et al. 2005). Green Turtles are considered to be a resounding success story, with the number of females nesting at French Frigate Shoals rising steadily over the past 30 years (Balazs and Chaloupka 2004). Populations of most bird species are considered to be stable or increasing, based on intensive monitoring on three islands (FWS 2005).

As noted in Sections 2 and 3, Papahānaumokuākea is home to a large number of endangered species. Managing such species can be difficult, because they often have small population sizes, low genetic diversity, and other inherent traits that add to the complexity of their management. To properly account for these factors, considerable research on population stability and dynamics is required. Fortunately, a great deal of ongoing work devoted to such endangered species is being conducted within the property.

While the extreme geographic isolation and lack of direct human impacts is beneficial for the organisms of Papahānaumokuākea, it has historically limited the amount and diversity of scientific inquiry. As highlighted in Section 2.b, "History and Development

of the Property", scientific expeditions have been patchy and topic-focused. Periods of exploration in the 1900s and 1920s generated the first views of species assemblages and structures, both above and below water. In the 1960s, research focused primarily on commercially important species, and until early 2000, the majority of scientific work conducted in the marine waters of the NWHI related to commercial fishery targets or rare and endangered species. Only in the last few years has research been expanded to the community- and ecosystem-based levels, incorporating monitoring of non-commercially important species such as smaller reef fish and invertebrates. With the federal and state protections that have been instituted since 2000, exploration and inquiry to quantify and track the status of all species in Papahānaumokuākea's waters have surged. As a result, species trend information will continue to grow for most major taxa.

The following provide examples of some of the species trend data currently available for groups of particular significance.

Algae: Increased efforts have been devoted to quantifying algal abundances and diversity in Papahānaumokuākea in recent years, with impressive results. Comprehensive algal sampling from 2000—2002 at French Frigate Shoals resulted in a 380% increase in the

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Pristine coral reef habitat (Photo: James Watt)

numbers of species known from the region, with four of these species not previously found in the Hawaiian Archipelago (Vroom et al. 2005). As a result of recent investigations, Papahānaumokuākea has been documented to contain the highest percent cover of macroalgal species and lowest percent cover of living coral as compared with other geographic locations. This is likely due to the subtropical location of Papahānaumokuākea, which exposes reef communities to large seasonal variations in water temperature and current patterns as compared to other, more tropical, coral reef locations.



New species are often documented on research cruises (Photo: James Watt)

Corals: The abundance of shallow water corals of Papahānaumokuākea varies greatly between islands or atolls, but has remained fairly consistent in time (Figure 4.1). As noted previously, most locations contain relatively low coral cover with the exception of Maro Reef and Lisianski Island/Neva Shoals. In addition to percent cover, coral colony size–frequency distributions can provide important insight into characteristics of reef communities. Size–frequency distributions of all corals in belt transects throughout Papahānaumokuākea in 2003, 2004 and 2006 indicate generally similar distributions in all three survey years, suggesting stability in the complexity of the structural framework that provides shelter to many species of reef inhabitants (Waddell and Clarke 2008).

Scientists are still encountering new records of species or even new species on a continual basis. One expedition in 2006 yielded 11 new records of corals in Papahānaumokuākea. Although 57 species of corals have been documented in the property, many species occur at such low frequencies that they are not encountered in surveys. Thus, relatively few coral species numerically dominate in Papahānaumokuākea’s waters. Overall, three genera dominate the shallow water reef areas (Section 2, Figure 2.4). Given this, it is expected that the coral species list for Papahānaumokuākea will continue to expand as improving technology and research tools allow exploration and documentation of the generally unknown deeper reefs of the site.

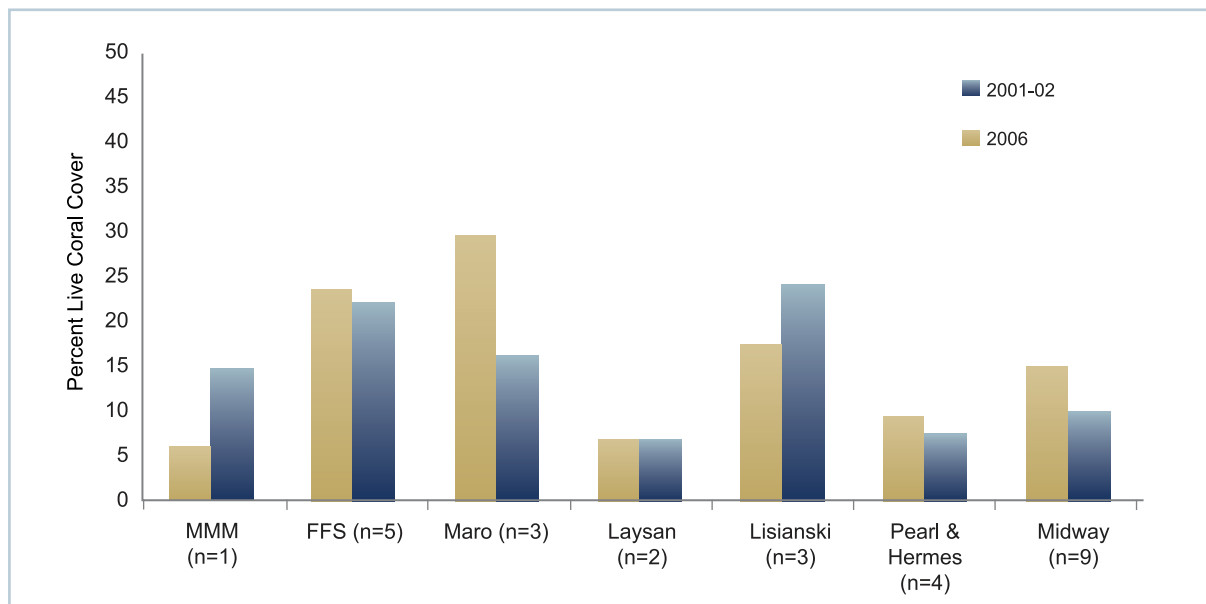


Figure 4.1: Mean coral cover at permanent transects by location (Source: Maragos and Veit, USFWS unpublished data)



Exploring the Unknown – Diving Deep Into Papahānaumokuākea Waters

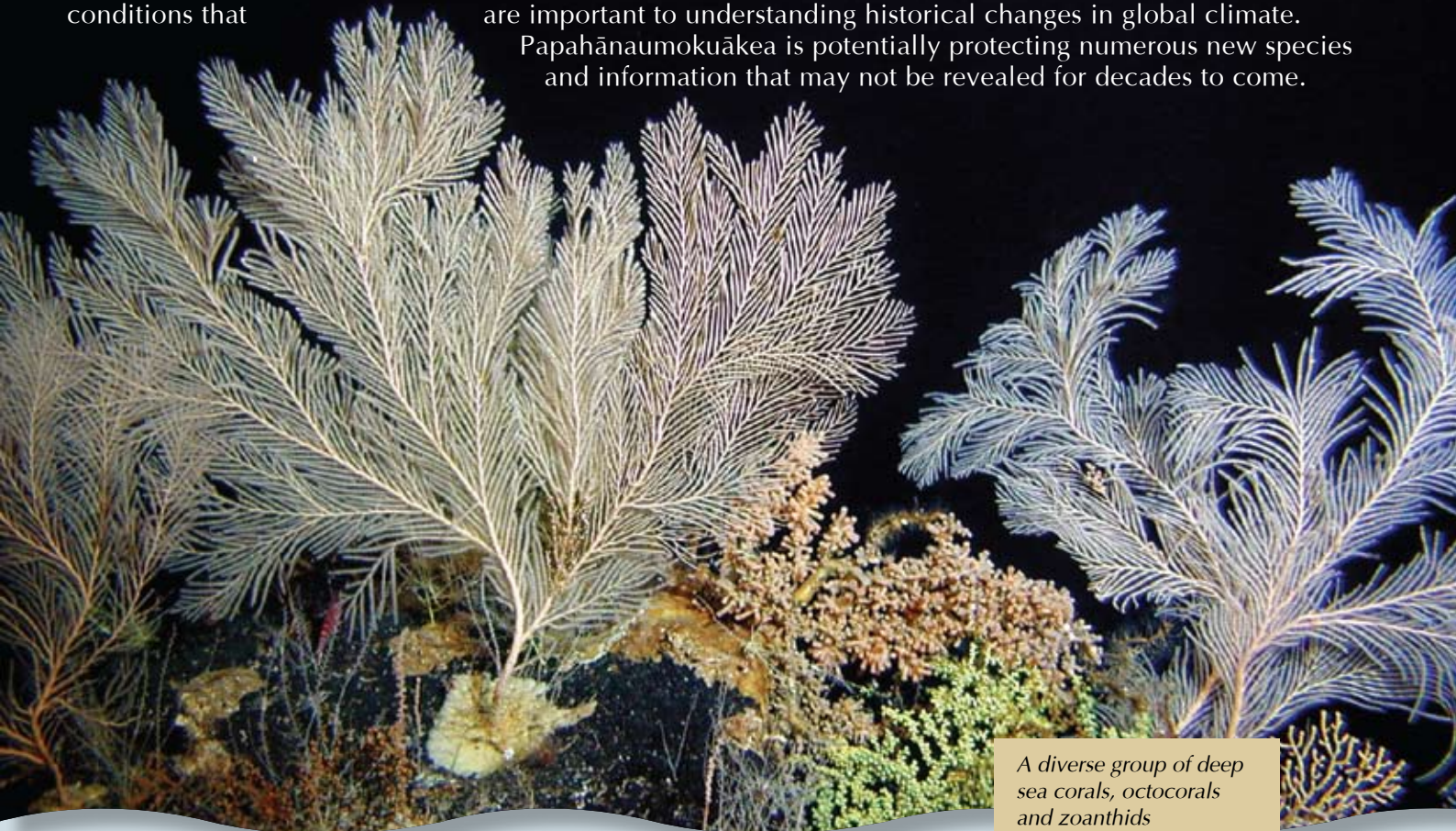
While the islands and atolls of the NWHI are known for their spectacular shallow water coral reefs, the majority of marine habitats residing within Papahānaumokuākea are largely unexplored. Deepwater habitats comprise over 90% of Papahānaumokuākea's area, yet are virtually unknown.

Deepwater portions of Papahānaumokuākea are thriving with organisms uniquely suited to deepwater survival; in recent years, researchers have found entire reefs complete with fish and crustaceans at depths of more than 5,000 feet. Since these areas occur in depths well below the limitations of SCUBA diving, managers and scientists have needed to find more advanced ways to explore the deepwater ecosystems. One such way is through the use of submersibles.

Each trip to the deep waters of Papahānaumokuākea brings records of mysterious new organisms and sheds light on the complexity and diversity of life in the deep. In 2007 scientists from the Hawaii Undersea Research Laboratory (HURL) set out to explore new research sites in Papahānaumokuākea, discovering multiple new deepwater coral and sponge beds in depths of 3,000 to 6,000 feet. During this voyage, the team discovered several new species, including a few so unusual that they may end up representing not only new species, but possibly a new genus. Scientists on this voyage also wanted to get a closer look at deep-sea coral communities. Unlike the corals of shallow waters, very little is known about the biology, ages, and growth rates of deepwater corals. Scientists have estimated that some living deepwater corals date back at least 10,000 years and can grow to more than 25 feet.

The dynamics of these deepwater ecosystems are only beginning to be revealed. Scientists have observed large numbers of commercially important but increasingly rare groupers and redfish among the sheltering structures of deep-sea coral reefs. These reefs may also hold insights to global threats, such as climate change. Because of their longevity, some deep-sea corals can serve as archives of past climate conditions that are important to understanding historical changes in global climate.

Papahānaumokuākea is potentially protecting numerous new species and information that may not be revealed for decades to come.

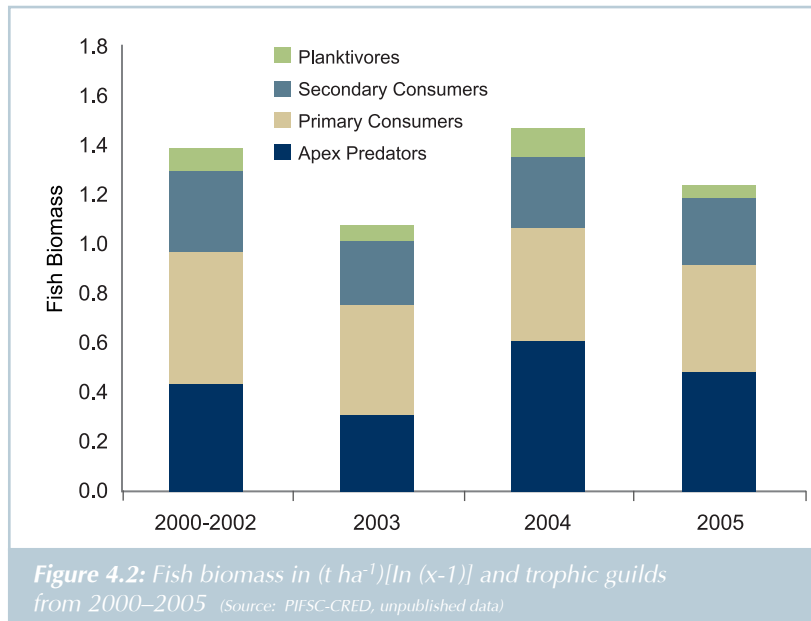


A diverse group of deep sea corals, octocorals and zoanthids

(Photos: Amy Baco-Taylor)

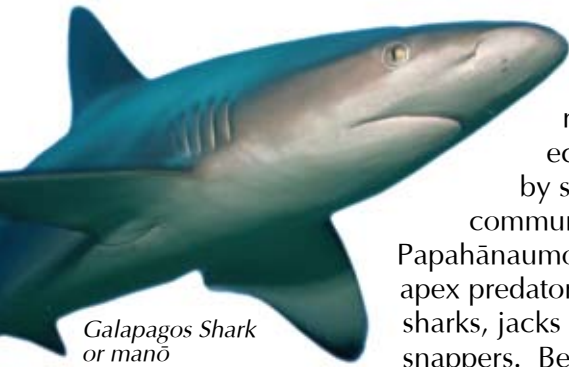
Fishes: Fish assemblages have been examined on an annual basis from 2000 onward, and monitoring data indicates that biomass of fishes of each trophic group (planktivores, secondary consumers, primary consumers and apex predators) have remained stable (Figure 4.2). A majority of the permanent monitoring sites are in the lagoon and backreef locations where sites can be sampled

on a more regular basis than forereef locations that are more vulnerable to weather and surf conditions. Inventories of apex predators account for 55% of the biomass of fishes in forereef locations. However, most of the large predators reside outside the reef, which means that apex predator densities at these permanent sites are underestimated (Friedlander and DeMartini 2002).



Japanese Angelfish (*Centropyge interrupta*)

(Photo: James Watt)



Galapagos Shark
or manō
(Photo: James Watt)

Top predators play important roles in ecosystems by shaping communities. At Papahānaumokuākea, the apex predators consist of sharks, jacks and large snappers. Beginning in 2005, researchers

electronically tagged multiple Gray Reef Sharks, Galapagos Sharks, Tiger Sharks, Whitetip Reef Sharks, Green Jobfish and Giant Trevally to determine where and how far each species travels. Results indicate that most individuals of most species remain at their home atolls or islands. The only predator observed routinely moving among islands was the Tiger Shark, which not only moved between islands in Papahānaumokuākea but also between Papahānaumokuākea and the main Hawaiian Islands (MHI). The other sharks move extensively within atolls, but patterns and frequency of movement vary among species. The Giant Trevally and Green Jobfish (*Caranx ignobilis* and *Aprion virescens*) showed distinct, rhythmic patterns of movement with diel, tidal, and seasonal components (Meyer et al. 2007a, b).

Reptiles: Five species of sea turtles occur in the waters of Papahānaumokuākea, and all are listed under the federal Endangered Species Act. Only one of these species, the Green Turtle (*Chelonia mydas*), utilizes the shores of Papahānaumokuākea to bask and breed, with over 90% of the Green Turtle population in Hawai'i nesting at French Frigate Shoals. Monitoring of this species has taken place for the past 30 years, documenting a steady recovery of Green Turtles from their depleted state in the 1970s (Figure 4.3).

Marine mammals: The waters of Papahānaumokuākea are home to over 20 cetacean species, six of which are recognized as endangered and depleted under the U.S. Endangered Species Act and the U.S. Marine Mammal Protection Act. Papahānaumokuākea also hosts the largest population of one of the last two remaining species of monk seals in the world.

The Hawaiian Monk Seal is the only endangered pinniped occurring entirely within United States waters. The monk seal population is estimated to be approximately 1,200 individuals, a decrease of approximately 60% since the 1950s (Antonelis et al. 2006) (Figure 4.4).



Green Turtle or
honu hatchling
(Photo: Susan Middleton
& David Liittschwager)

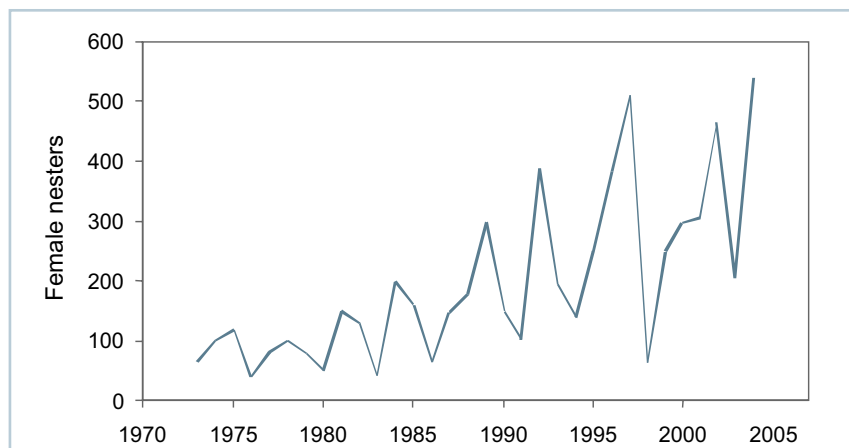


Figure 4.3: Long-term trend in the abundance of female nesting Green Turtles at French Frigate Shoals (Source: Balazs and Chaloupka 2004a)

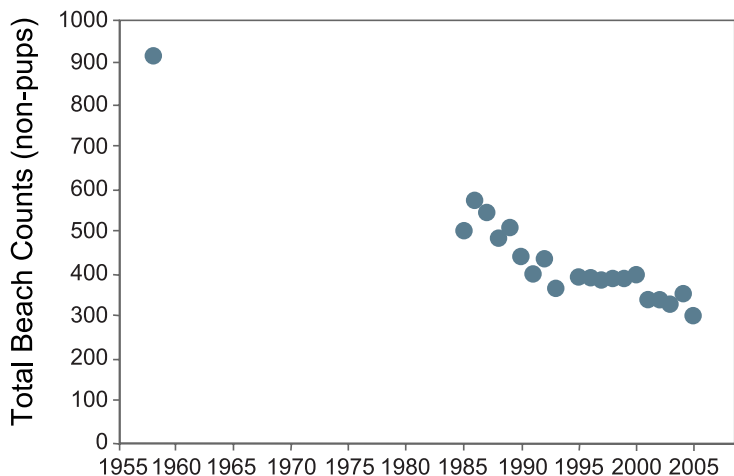


Figure 4.4: Historical trend in non-pup beach counts of Hawaiian Monk Seals at the six main reproductive subpopulations
(Source: Antonelis et al. 2006, updated by Baker, PIFSC)



Hawaiian Monk Seal (*Monachus schauinslandi*) basking (Photo: James Watt)

Even with significant conservation measures in place, in recent years, monk seal numbers have been declining

at five of eight breeding sites in Papahānaumokuākea Marine National Monument (Figures 4.4, 4.5). Hawaiian Monk Seals are the last hope for the continuation of monk seals globally, and considerable efforts have been made over the last two decades to manage, study, and promote recovery of this species. A Hawaiian Monk Seal recovery plan was recently released, building on the conservation and restoration efforts already in effect.

Between 1996 and 2002, the movements and diving patterns of 147 Hawaiian Monk Seals in the NWHI (consisting of a mix of male and female adults, juveniles, and pups) were monitored with satellite-linked depth recorders. Overall findings of these

studies include the following:

- Monk seal foraging range covers an area of approximately 48,156 square kilometers, or almost 14% of the total area of Papahānaumokuākea.
- Seals forage extensively at or near their breeding sites and breeding subpopulations and haulout (basking) sites (95% within 12 km of these sites), except at French Frigate Shoals, where foraging distances were demonstrated to be greater.
- The highest concentration of monk seal activity in Papahānaumokuākea is focused on French Frigate Shoals and surrounding banks.
- Seals move along specific corridors to travel between breeding sites and haulout sites. These corridors are closely associated with the NWHI submarine ridge. Seals likely forage along these corridors around subsurface features like reefs, banks, and seamounts.

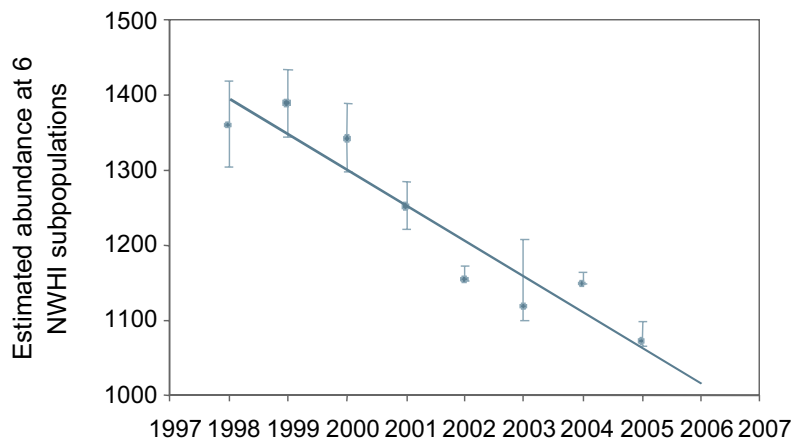


Figure 4.5: Estimated abundance of monk seals at six breeding sites

Seabirds: Seabird colonies in Papahānaumokuākea constitute one of the largest and most important assemblages of tropical seabirds in the world, with 14 million birds representing 21 species (Naughton and Flint 2004). Six of the seabird species residing in Papahānaumokuākea have been classified in the highest concern categories of the North American Waterbird Conservation Plan. More than 98% of the world’s Laysan and Black-footed

Albatrosses nest here. Population trends have been monitored in the NWHI for decades and are stable or increasing for most species, although there is concern for a few, especially the albatrosses (Table 4.1). Monitoring has revealed periodic reductions in reproductive success for two species of albatross, but these reproductive variations appear to be correlated with El Niño weather events; reproductive success is stable for non-El Niño years (Seki 2004).

Table 4.1: Overview of seabird monitoring efforts. Gray boxes indicate species and sites that have not been surveyed since 1984. Brown boxes indicate an apparent increase of greater than 25% since 1984, and green a greater than 25% apparent decrease. Blue boxes indicate little change, and purple boxes represent new records for that species at that location. White boxes indicate that the species was not found at that location.

(Source: FWS, unpublished data)

Species	KUR	MID	PHR	LIS	LAY	GAR	FFS	MMM	NIH
Black-footed Albatross	Brown	Brown	Green	Blue	Blue	White	Blue	Green	Green
Laysan Albatross	Brown	Brown	Green	Gray	Blue	Gray	Brown	Blue	Green
Bonin Petrel	Blue	Brown	Green	Gray	Gray	White	Blue	White	White
Bulwer’s Petrel	Purple	White	Blue	Gray	Gray	Gray	Blue	Gray	Gray
Wedge-tailed Shearwater	Brown	Gray	Green	Gray	Gray	White	Green	Gray	Gray
Christmas Shearwater	Brown	Brown	Green	Gray	Gray	White	Green	Gray	Gray
Tristram’s Shearwater	Gray	White	Blue	Gray	Gray	White	Brown	Gray	Gray
White-tailed Tropicbird	White	Brown	White	White	White	White	White	White	White
Red-tailed Tropicbird	Blue	Blue	Green	Gray	Gray	Gray	Blue	Gray	Gray
Masked Booby	Green	Green	Green	Gray	Green	Blue	Brown	Gray	Gray
Brown Booby	Green	Gray	Blue	Gray	Blue	Blue	Gray	Gray	Gray
Red-footed Booby	Brown	Brown	Green	Gray	Brown	White	Brown	Gray	Gray
Great Frigatebird	Green	Brown	Green	Gray	Brown	White	Blue	Gray	Gray
Little Tern	White	Purple	Purple	White	White	White	White	White	White
Gray-backed Tern	Blue	Brown	Green	Gray	Gray	Gray	Green	Gray	Gray
Sooty Tern	Brown	Gray	White	Gray	Brown	Gray	Blue	Gray	Gray
Blue Noddy	White	White	White	White	White	Gray	Brown	Gray	Gray
Brown Noddy	Brown	Gray	Gray	Gray	Gray	Gray	Brown	Gray	Gray
Black Noddy	Purple	White	Green	White	White	Gray	Green	Gray	Gray
White Tern	Brown	Brown	Blue	Gray	Gray	Gray	Blue	Gray	Gray





Pre-contact Native Hawaiian archaeological sites at Nihoa (Photo: David Boynton)

Cultural

The state of conservation of physical elements of the cultural property (archaeological and cultural sites) is exceptional, both in terms of the physical condition of the resources and the conservation measures in place to maintain them. Native Hawaiian access to the site for the perpetuation of Native Hawaiian use and practices is vibrant and currently in an active period of growth. Conservation measures in place to perpetuate and protect Native Hawaiian practices and culture within Papahānaumokuākea as well as to integrate traditional Hawaiian management practices with Western ones are supported by the vision, goals, strategies and activities of Papahānaumokuākea Marine National Monument.

Native Hawaiian Archaeological Sites

Strong protection measures, both ancient and modern, as well as the archipelago's remoteness from human populations, mean that the historic sites on Nihoa and Mokumanamana are in an excellent state of preservation. The Northwestern Hawaiian Islands have long been revered by Native Hawaiians as a sacred place, and its recent federal and state legal protections have formalized, in the modern age, a triple bond among the islands, Native Hawaiian culture and the general public. The greatest threats to these sites have been from natural processes such as erosion and succession by

native flora and fauna. Some disturbance occurs from burrowing birds and encroachment from root systems of loulou palms, and general exposure to the harsh natural elements.

The condition of Nihoa's and Mokumanamana's archaeological and ceremonial sites benefits greatly from the islands' impediments to access: a prohibitively remote location, rugged terrain with few safe areas for

landing, a stringent permitting process for access, and a several-day journey by boat. All provisions, food, water and shelter must be brought from the main Hawaiian Islands. The islands themselves are exposed to the elements, especially Mokumanamana, where the terrain consists mostly of steep, jagged cliffs, often pummeled by gusting winds. According to the archaeologists who have visited the site most recently (Anan Raymond 7 August 2008, personal communication), this explains why the cumulative on-island time in archaeological research totals only 18 days over an 80-year period, including all archaeological research, from the first studies in 1928 (Emory 1928) through the most recent five-day expedition in July 2008 (Kikilo and Raymond 2008).

Regulated access to Nihoa and Mokumanamana is allowed for small groups of cultural and spiritual practitioners for cultural ceremonies. These practices ensure continuity in the Native Hawaiian connection to Papahānaumokuākea; they also form the basis of the creation of a cultural protocol for all visitors to these islands.

Even with the existing level of preservation, both the U.S. Fish and Wildlife Service and the State Historic Preservation Division are considering a coordinated stabilization project for the archaeological sites in East Palm Valley, Nihoa, to prevent future loss or damage to those sites. East Palm Valley contains residential features and

large, ceremonial features, one of which is comprised of five terraces (Site 50), and another feature with a large terrace platform holding many uprights and a cairn (Site 51). Extensive bird burrowing is disrupting many of the sites, interior surfaces and deposits, and perimeter and retaining walls. Uprooted, dead loulou palms have also upended portions of the surfaces (Site 43). All the uprights of one ceremonial feature in the Valley were removed by a previous expedition (Emory 1928), blurring the perimeter boundaries (Site 45). Potential stabilization sites include many of the terraces in East Palm Valley, in part because data has already been recovered from them, and their front retaining walls are showing significant collapse. The State Historic Preservation Division requires that any stabilization projects be done without the removal of cultural artifacts (see Nihoa Island Archaeological Sites).

Status of Native Hawaiian Access and Perpetuation of Practices in Papahānaumokuākea

Native Hawaiians have a spiritual and practical connection to Papahānaumokuākea that began with the creation story of the Hawaiian people; that connection has persisted in various forms through the present day. Physical remnants of *wahi kupuna* (ancestral places), Hawaiian language archival and oral resources, and historical accounts provide evidence of the various past uses of the NWHI and surrounding oceans by Native Hawaiians (Kaunamano 1862 in *Hoku a ka Pakipika*; Manu 1899 in *Ka Loea Kalaiaina*; Wise 1923 in *Nupepa Kuokoa*). Evidence indicates that Nihoa and Mokumanamana served as a home and a place of worship for at least a 700-year period (Cleghorn 1988) (see also Section 2). However, by the time of Western European contact with the Hawaiian Islands, the majority of the Hawaiian population knew the region only by repute, as relatively few individuals traveled to these remote islands and had seen them with their own eyes, except families from the northwesternmost main Hawaiian Islands of Kaua'i and Ni'ihau (Maly 2003),



Stone terraces at Nihoa (Photo: Monte Costa)

which are geographically closest to the Northwestern Hawaiian Islands. Yet, oral traditions maintaining the people's connection to Papahānaumokuākea persisted. The oral transmission of knowledge and practice has ensured threads of continuity in Hawaiian people's cultural connection to the NWHI, even in periods when access was more limited than in the past. Despite the waning and waxing of actual access to the NWHI, the islands continuously remained in oral tradition. "We always have these cycles in our stories. The sun rising at Kumukahi (Hawai'i Island) and then setting way over in the West. And this [Papahānaumokuākea] is the West," says Pualani Kanaka'ole Kanahale, one of the foremost Native Hawaiian cultural practitioners, during a Solstice Ceremony at Mokumanamana in 2004. Today, Native Hawaiians remain deeply connected to the NWHI on genealogical, cultural, and spiritual levels. These connections are reinforced by Hawaiian wayfinding efforts, the resurgence of Solstice Voyages, and in other efforts to reinforce bonds between the people and the place.

In 2003, *Hōkūle'a* became the first voyaging canoe to visit Nihoa in many years. Its navigators and cultural practitioners aboard voyaged for one express purpose: "We made that trip to let our ancestors know that we didn't forget them, and to apologize to our ancestors for having been away so long" (Wilhelm 2008, personal communication).

Today, Native Hawaiian practices and activities within Papahānaumokuākea are vibrant, and are experiencing a

period of rapid growth. Highlights of significant Native Hawaiian activities at Papahānaumokuākea since 1997 include these events:

- In 1997, an organization called Hui Mālama i Nā Kūpuna o Hawai'i Nei repatriated to Nihoa sets of human remains that had been collected by archaeologists in the 1924–1925 Bishop Museum Tanager Expeditions (Ayau and Tengan 2002).
- In 2003, a cultural protocol group, Nā Kupu'eu Paemoku, traveled to Nihoa on the voyaging canoe *Hōkūle'a* to conduct traditional ceremonies.
- In 2004, *Hōkūle'a* sailed more than 1,900 kilometers to the most distant end of the island chain to visit Kure Atoll as part of a statewide educational initiative called "Navigating Change." The crew officially began their voyage into Papahānaumokuākea by performing cultural protocols at Nihoa. From there, they sailed up the chain, stopping to help remove invasive species and marine debris from the various atolls, pay their respects to each Kupuna Island, and document for school children and

resource managers a basis of comparison of the health of the main Hawaiian Islands' coastal and reef ecosystems.

- In 2005, Nā Kupu'eu Paemoku continued their cultural progress and sailed to Mokumanamana to conduct protocol ceremonies on the summer solstice.
- Nihoa serves as a present-day navigational test for traditional, voyaging wayfinders. The 'Ohana Wa'a (family of Hawaiian voyaging canoes) has begun testing apprentice navigators by determining if they can sail, without instrumentation, to Nihoa from Lehua, a small, 215-meter-high, crescent-shaped island near Kaua'i and Ni'ihau.
- Kekuwa Kikiloī (Ph.D. dissertation, University of Hawai'i at Mānoa) continues to conduct archaeological research at Papahānaumokuākea, studying the historic and cultural sites on Nihoa and Mokumanamana.

Presidential Proclamation 8031, which established the Papahānaumokuākea Marine National Monument, recognizes that the NWHI have great cultural significance to Native Hawaiians and provides a means to



The Hawaiian sailing canoe *Hōkūle'a* navigating using traditional wayfinding methods (Photo: Monte Costa)

promote access to Papahānaumokuākea for cultural purposes by establishing a permit category specifically to allow Native Hawaiian practices. The Proclamation defines these practices as cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment, and strengthening cultural and spiritual connections to Papahānaumokuākea that have demonstrable benefits to the Native Hawaiian community. This may include, but is not limited to, the non-commercial use of Papahānaumokuākea resources for direct personal consumption while in the property.

The Monument Management Plan (MMP) implements the Proclamation and further outlines current and future planning, administrative and field activities to enhance the natural, cultural and historic resources in Papahānaumokuākea over a 15-year period. The Vision, Mission and two of the Goals outlined in the MMP reinforce the need to protect Native Hawaiian cultural access and recognize the cultural significance of Papahānaumokuākea to Native Hawaiians.

Monument Vision: “To forever protect and perpetuate ecosystem health and diversity and Native Hawaiian cultural significance of Papahānaumokuākea.”

Monument Mission: “Carry out seamless integrated management to ensure ecological integrity and achieve strong, long-term protection and perpetuation of NWHI ecosystems, Native Hawaiian culture and heritage resources for current and future generations.”

The following goals and strategies are excerpted from the Monument Management Plan, and are numbered accordingly.

Goal 6: “Support Native Hawaiian practices consistent with long-term conservation and protection.”

Goal 7: “Identify, interpret and protect Monument historic and cultural resources.”



Traditional Hawaiian blessing prior to conducting research in Papahānaumokuākea (Photo: Ann Bell)

Several strategies and activities in the MMP support access to Papahānaumokuākea for Native Hawaiian use and practices. Specifically, the MMP contains a Native Hawaiian Cultural and History Action Plan with a desired outcome to:

“Increase understanding and appreciation of Native Hawaiian histories and cultural practices related to Papahānaumokuākea Marine National Monument and effectively manage cultural resources for their cultural, educational, and scientific value.”

Several strategies are specifically targeted at ensuring Native Hawaiian cultural access is promoted:

Strategy 2: Conduct, support, and facilitate Native Hawaiian cultural access and research of the NWHI over the life of the plan.

Activity 2.1: Continue to compile information and conduct new cultural and historical research about the NWHI.

Activity 2.2: Support Native Hawaiian cultural research needs.

Activity 2.3: Facilitate cultural field research and cultural education opportunities annually.

Activity 2.4: Convene a Native Hawaiian nomenclature working group.

Activity 2.5: Incorporate cultural resources information into the Monument Information Management System.

BRINGING THE PLACE TO THE PEOPLE NAVIGATING CHANGE

“No longer do we seek only the knowledge of how to voyage between islands. We seek lessons to carry home to our children - ways to inspire the present generation to love and preserve our Earth as a sanctuary for those who will inherit it.”

— Nainoa Thompson,
Navigator, *Hōkūle‘a*



Navigator Nainoa Thompson at Pearl and Hermes Atoll. Photo: NOAA.



Kamehameha School students explore NWHI through interactive exhibits at Mokuapāpapa Discovery Center in Hilo. Photos: James Watt.



Mokuapāpapa Discovery Center for Hawai‘i’s Remote Coral Reefs, in Hilo, Hawai‘i. Photo: NOAA.

Painting by Hilo Artist, Layne Luna. This mural covers one large wall at Mokuapāpapa Discovery Center for Hawai‘i’s Remote Coral Reefs, in Hilo, Hawai‘i.

Geologically the oldest in the Hawaiian chain, the Northwestern Hawaiian Islands (NWHI) offer a glimpse back in time to when the lands and waters were healthy and teeming with life. These still-wild ecosystems contain powerful lessons for those of us in the main Hawaiian Islands who are witnessing the decline of our finite island resources. They teach us the importance of caring for the natural world on which our lives and livelihoods depend, and they give us a living model to guide restoration efforts. The Hawaiian Archipelago is one of the few places in the world where large-scale comparisons of impacted and un-impacted reef and island ecosystems of similar species and geography can be made.

But the remoteness of this vast ocean region presents special challenges as to how these lessons can be shared. With access strictly limited, most people are unable to experience the place directly. Thus, the monument and its partners have created a spectrum of educational and experiential opportunities that indirectly connect people with the NWHI and its biological, historical and cultural wonders – in effect, “bringing the place to the people,” rather than the people to the place.

The monument’s educational initiatives include distance learning, presentations and events promoting ocean conservation, teacher workshops, and the Mokuapāpapa Discovery Center for Hawai‘i’s Remote

The new national monument creates a new opportunity for ocean education and research for decades to come. Successful ocean stewardship depends on informed policy makers and an informed public.

— President George W. Bush

Coral Reefs in Hilo. In addition, a few educators each year are able to participate in expeditions to the region and subsequently share their experience with their students and communities. Articles and lesson plans from the past few years can be found at: www.hawaiianatolls.org

In 2001, the NWHI co-trustees, Bishop Museum, the Polynesian Voyaging Society and a host of other community and government agencies joined forces to form the Navigating Change educational partnership. Inspired by the vision of the late Pinky Thompson and his son Nainoa, the partnership built an educational program that extends *Hōkūle‘a* journeys to the NWHI into schools statewide. These classroom voyages of discovery challenge students to change their values, attitudes and behaviors, and encourage them to get actively involved in community efforts to *mālama* and restore the marine and terrestrial environments where they live.

The Hawai‘i Maritime Center, next to Aloha Tower, also hosts an interactive Navigating Change exhibit where visitors can role-play being a scientist exploring the NWHI on a research cruise.

To learn more about Navigating Change curriculum or up-coming teacher workshops, visit: www.navigatingchange.org



Polynesian Voyaging Society
Bishop Museum
U.S. Fish and Wildlife Service
National Fish and Wildlife Foundation
National Oceanic and Atmospheric Administration

Hawai‘i State Department of Land and Natural Resources
Hawai‘i State Department of Education
University of Hawai‘i Mānoa
Harold K. L. Castle Foundation

Activity 2.6: Continue to facilitate Native Hawaiian cultural accesses.

Activity 2.7: Establish agreements with local universities and museums to address possible curation, research, use, return, and repatriation of collections.

Strategy 4: Plan, develop, and implement a Monument Cultural Resources Program over the life of the plan

Activity 4.1: Prepare a Cultural Resources Program Plan.

Activity 4.2: Develop and implement specific preservation and access plans, as appropriate, to protect cultural sites and collections at Nihoa and Mokumanamana.

Activity 4.3: Initiate implementation of the Monument Cultural Resources Program.

Active and meaningful engagement between the Native Hawaiian community and the management of Papahānaumokuākea preceded its establishment as a monument. Since that time, programs engaging the Native Hawaiian community and supporting Native Hawaiian practices have expanded, and new collaborations continue to be established. Native Hawaiian programmatic areas continue to progress and are accentuated by new efforts to meet MMP goals.

Native Hawaiian Cultural Working Group

The Executive Order that designated the NWHI Coral Reef Ecosystem Reserve (the Reserve) in 2000 required that Native Hawaiians, among others, provide advice regarding management of the Reserve and ensuring the continuance of Native Hawaiian practices. It did so through provisions allowing for “culturally significant, noncommercial subsistence, cultural, and religious uses” in the Reserve by Native Hawaiians, and set aside three voting seats on the Reserve Advisory Council for Native Hawaiians. During its first five years of operation, the Advisory Council established a Native Hawaiian Cultural Working Group, which broadened the inclusion of Native Hawaiians in the operations of the Reserve



Mokupāpapa Discovery Center in Hilo, Hawaii
(Photo: PMNM)

and in planning for a proposed National Marine Sanctuary.

The Monument Management Board (MMB) includes representation by the Office of Hawaiian Affairs (OHA). Currently, OHA is the only State agency with a statutory mandate to advocate for Native Hawaiians and to assess the policies and practices of other agencies’ impacts on Native Hawaiians. OHA, on behalf of the MMB, will continue to convene the Native Hawaiian Cultural Working Group to obtain advice and guidance from Native Hawaiian cultural experts, including *kūpuna* (respected elders) and practitioners, on all Monument actions affecting Native Hawaiians and cultural resources at Papahānaumokuākea. Over time, the MMB may develop other mechanisms to bring together Native Hawaiians to participate in Papahānaumokuākea’s activities and management.

The Native Hawaiian Cultural Working Group provides guidance to the MMB through OHA. This group provided Papahānaumokuākea with its name and has offered support on permit review and the continuing development of permit conditions and cultural protocols as it relates to Native Hawaiian practices. The incorporation of Native Hawaiian culture into Monument management will gain the long-term support of, and greater understanding from, the host culture of the Hawaiian Archipelago.

4.b Factors Affecting the Property

(i) Development Pressures

There are no development pressures affecting the property, nor are any anticipated in the future. The site's remoteness, along with stringent conservation laws and robust management practices ensure that development pressures are not a factor in the



Over 586 tons of marine debris have been removed from Papahānaumokuākea over the last 10 years
(Photo: CREW, NOAA)

property's future. Presidential Proclamation 8031 specifically forbids activities such as mining or other extractive practices. In addition, with very limited exceptions, the federal regulations for Papahānaumokuākea prohibit anyone from removing, moving, taking, harvesting, possessing, injuring, disturbing or damaging any of its living or nonliving resources, or attempting any of these actions unless authorized by a Monument permit (50 CFR § 404.7(a)). Modification of existing facilities (e.g., on Midway's Sand Island or Tern Island in French Frigate Shoals) occurs in strict compliance with refuge laws and regulations, applicable historic regulations, and National Environmental Policy Act requirements. The natural, cultural and historic resources of the property are well protected.

All improvements planned for Midway Atoll in the Midway Atoll Conceptual Site Plan (Volume IV of Monument Management Plan) will be made in existing structures or built

on the footprints of existing structures. Any designs for new structures will utilize new sustainable technologies to set an environmentally responsible development standard regarding the inhabited areas of Papahānaumokuākea. Additionally, within the Monument Management Plan outlines are presented for further support of field camps at French Frigate Shoals and Kure Atoll to aid in the monitoring of seabirds, sea turtles and monk seals.



(Photo: Susan Middleton & David Liittschwager)

(ii) Environmental Pressures

Marine pollution

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 Papahānaumokuākea (Selkoe et al. 2008). Although no commercial or recreational fishing is permitted in Papahānaumokuākea's 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 property. 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 ongoing multi-agency marine debris clean-up program has removed more than 586 tons of debris from the property in the past ten years (Figure 4.6).

Fishing elsewhere in the Pacific has the potential to harm Papahānaumokuākea's highly migratory marine species, such as tuna, sharks, seabirds, and marine mammals that may otherwise forage or travel outside of the Papahānaumokuākea's protective boundaries.

Birds are also harmed by debris. Smaller types of marine debris made of plastic, such

as disposable lighters, bottle caps, and other fragments, are ingested by adult albatrosses, shearwaters, and other seabirds when they feed at sea (Fry et al. 1987). These objects are subsequently fed to chicks and can cause direct and indirect injuries, often resulting in the death of young albatrosses. Additionally, this debris may increase the birds' exposure to and ingestion of organochlorine contaminants from plastic surfaces (Carpenter and Smith 1972).

Terrestrial pollution

Past uses have contributed to significant modification and contamination throughout the region, especially at French Frigate Shoals, Midway Atoll, and Kure Atoll. Contamination at all these sites includes offshore and onshore contaminated debris such as batteries (lead and mercury), transformers with PCBs, capacitors and barrels. Debris washing ashore is another source of contamination on the islands. 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). Lead-based paints on the former naval buildings at Midway can affect nearby albatross chicks; chicks that ingest paint chips have been found to have blood lead concentrations that cause immunological, neurological, and renal impairments, significantly decreasing their chances of survival. A significant effort is underway to remove the lead paint and to monitor the contaminated sites.



Marine debris are an ever-present threat for both terrestrial and marine species (Photo: James Watt)

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 both sites, elevated levels of contamination remain in island soils, nearshore sediment, and biota. Additional continued landfills were left behind by the Navy on Midway Atoll. In response to these threats, emergency response mechanisms and ongoing cleanup and restoration activities will be maintained and enhanced.

Alien species

The waters surrounding Papahānaumokuākea are nearly pristine. A total of 11 marine alien fish, invertebrates and algal species have been recorded in the NWHI (Table 4.2). 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.

The magnitude of the problem of marine invasive species is far greater in the MHI than the NWHI. Efforts to control the accelerated introduction of alien species in the NWHI will focus on transport

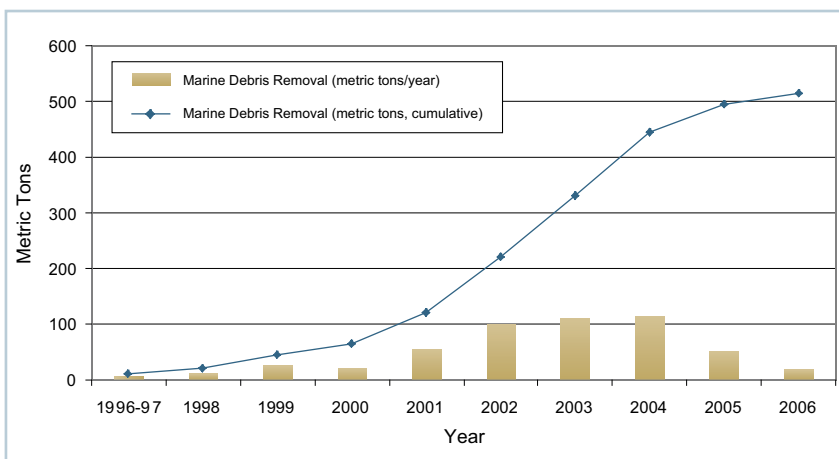


Figure 4.6: Quantity of marine debris removal in Papahānaumokuākea (Source: PIFSC-CRED unpublished data)



Reef Assessment and Monitoring Program team preparing for rapid ecological assessments
(Photo: James Watt)

mechanisms, such as marine debris, ships' hulls, and the discharge of bilge water from vessels originating from the main Hawaiian Islands and other ports. Existing Monument regulations and permitting requirements greatly reduce the chance of new introductions (for complete details see Appendix F, Appendix K Volume 1).

However, several of the islands and atolls of Papahānaumokuākea have been, in the past, heavily inundated by terrestrial alien species. Both Midway Atoll and Laysan Island have incurred multiple introductions, many of which transformed the landscapes. Some of the most invasive introductions were intentional, 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 or insects, mandatory quarantine protocols are enforced for any visitors to all the islands of Papahānaumokuākea, with the exception of Midway Atoll and French Frigate Shoals. These protocols require the use of new or island-specific gear at each site and treatments such as cleaning, using insecticide, and freezing to minimize the transport of potential invasive species to the islands. For a full listing of terrestrial protocols, see Appendix F.

Climate change

Climate change poses a threat to all coral reef ecosystems throughout the world, and the Papahānaumokuākea Marine National Monument is no exception. The increase in average global temperatures, sea-level rise and change in chemical concentrations in the world's oceans are typically cited as the results of global climate change. Regional predictions for the North Central Pacific Gyre area within the next 15 years are for surface temperature increases of 0.5 to 1.0 degrees Celsius, which is a smaller increase than that predicted for the Arctic and Northern hemisphere continental areas. Elevated sea surface temperatures such as those projected can lead to coral bleaching events, when corals expel their symbiotic algae and become white, or bleached. This



Ta'ape (Lutjanus kasmirus), a lutjanid snapper introduced in the main Hawaiian Islands in the 1950s, has spread to the waters of Papahānaumokuākea
(Photo: James Watt)

Table 4.2: Marine alien species in Papahānaumokuākea

Species	Taxa	Native Range	Present Status in Papahānaumokuākea ²	Mechanism of Introduction
<i>Hypnea musciformis</i>	Algae	Unknown; Cosmopolitan	Not Established; in drift only (MAR)	Intentional introduction to main Hawaiian Islands (documented)
<i>Diadumene lineata</i>	Anemone	Asia	Unknown; on derelict net only (PAH)	Derelict fishing net debris (documented)
<i>Pennaria disticha</i>	Hydroid	Unknown; Cosmopolitan	Established (PAH, LAY, LIS, KUR, MID)	Fouling on ship hulls (hypothesized)
<i>Balanus reticulatus</i>	Barnacle	Atlantic	Established (FFS)	Fouling on ship hulls (hypothesized)
<i>Balanus venustus</i>	Barnacle	Atlantic and Caribbean	Not Established; on vessel hull only (MID)	Fouling on ship hulls (documented)
<i>Chthamalus proteus</i>	Barnacle	Caribbean	Established (MID)	Fouling on ship hulls (hypothesized)
<i>Amathia distans</i>	Bryozoan	Unknown; Cosmopolitan	Established (MID)	Fouling on ship hulls (hypothesized)
<i>Schizoporella errata</i>	Bryozoan	Unknown; Cosmopolitan	Established (MID)	Fouling on ship hulls (hypothesized)
<i>Lutjanus kasmira</i>	Fish	Indo-Pacific	Established (NIH, MMM, FFS, MAR, LAY, and MID)	Intentional introduction to Main Hawaiian Islands (documented)
<i>Cephalopholis argus</i>	Fish	Indo-Pacific	Established (NIH, MMM, FFS)	Intentional introduction to Main Hawaiian Islands (documented)
<i>Lutjanus fulvus</i>	Fish	Indo-Pacific	Established (NIH and FFS)	Intentional introduction to Main Hawaiian Islands (documented)
<i>Cnemidocarpa irene</i>	Tunicate	Indo-Pacific	Established (FFS)	Fouling on ship hulls (hypothesized)
<i>Polycarpa aurita</i>	Tunicate	Indo-Pacific and Western Atlantic	Established (FFS)	Fouling on ship hulls (hypothesized)

Notes:

1 Zabin et al. 2003, Godwin 2002, DeFelice et al. 2002, Godwin 2000, DeFelice et al. 1998, McDermid (pers. com.)

2 NIH=Nihoa, MMM=Mokumanamana, FFS=French Frigate Shoals, MAR=Maro, PAH=Pearl and Hermes, LAY=Laysan Island, LIS=Lisianski Island, MID=Midway, KUR=Kure Atoll

phenomenon, which has already been observed in Papahānaumokuākea (Aeby et al. 2003; Kenyon and Brainard 2006), generally leads to partial or total mortality of the bleached coral and increases corals' susceptibilities to various diseases.

Ocean acidification, resulting from elevated CO₂ 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; Henderson 2006). 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.

Additionally, 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 significantly 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).

It should be noted that these environmental pressures are global in nature, and arise predominantly outside the boundaries of the property. The property includes all the key areas and ecosystems to maintain its ecological



A fragile balance (Photo: James Watt)

integrity, and is of sufficient size to maintain associated biological and ecological processes to assure resilience in the face of effects from climate change.

The possibility of cultural resilience, and managing for social-ecological resilience, in the face of global climate change has received increasing attention from academics, managers, and communities worldwide (e.g., MEA 2005) and has become a major topic in the science and management of coral reefs (Hughes et al. 2005). The coupled social-ecological resilience of Papahānaumokuākea remains an area of great concern. Engaging with traditional ecological knowledge and local ecological knowledge is increasingly considered integral to enhancing and managing for resilience (Berkes et al. 2003; Davis & Wagner 2003; Folke 2006).

Traditional Native Hawaiian knowledge and practice can provide a rich example of resilience in the face of extreme environmental and socio-cultural change. To address these current concerns, Monument staff are working

to interweave multiple forms of knowledge into the management of Papahānaumokuākea, as exemplified by the MMP vision, goals and strategies described in preceding sections. For example, Monument staff and Native Hawaiian practitioners hosted a workshop for Hawai'i-based coral reef managers entitled "Response to Climate Change (RtCC)." This five-day workshop, based on one designed by the Great Barrier Reef Marine

Park Authority, was re-designed to incorporate traditional Native Hawaiian knowledge into modern reef management practices.

Diseases

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 NWHI as compared to other coral reef areas (Aeby 2006, Friedlander et al. 2005).

Most diseases are presumed to be caused by anthropogenic impacts. Hence, the nearly pristine nature of the coral reefs of the NWHI provides a unique opportunity to document baseline levels of disease in coral reefs (Aeby 2006). Recent studies have begun to document these disease baselines in corals and other associated marine animals such as fish and sea turtles. With documented cases of disease in the NWHI, protocols have been developed and are now incorporated in all permitted activities (see Appendix F for complete details).

Transportation hazards and groundings

Hazards to shipping and other forms of maritime traffic such as shallow submerged reefs and shoals are inherent in the NWHI. 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 NWHI (Selkoe et al. 2008). Likewise, aircraft landing at Midway Atoll or Tern Island pose certain risks to



(Photo: James Watt)

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, as well as alien species inspections, minimize these risks.

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. The designation puts into effect internationally recognized measures designed to protect marine resources of ecological or cultural significance from damage by ships, while helping keep mariners safe (see Sections 1.e, 5.a and 5.b). While accidents may still happen, careful permitting procedures, restrictions on entry to Papahānaumokuākea Marine National Monument, vast improvements in nautical charts, and vessel safety regulations now in place should keep this threat to a minimum.

Military presence

Activities and exercises of the Armed Forces (including those of the United States Coast Guard) are conducted occasionally within Papahānaumokuākea’s boundaries. Navy vessels conduct training and participate in testing activities in the Hawai’i Range Complex (area encompasses North Central Pacific, within which Papahānaumokuākea

lies). These activities are described and analyzed in detail in the Hawai’i Range Complex Final Environmental Impact Statement (May 2008). In addition, vessels that support missile defense tests occasionally operate in Papahānaumokuākea’s waters.

Although Presidential Proclamation 8031 exempts activities and exercises of

the Armed Forces from the Proclamation’s prohibitions, all activities must be consistent with applicable laws. The Proclamation further states that “All activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on the monument resources and qualities. In the event of threatened or actual destruction of, loss of, or injury to a monument resource or quality resulting from an incident, including but not limited to spills and groundings, caused by a component of the Department of Defense or the USCG, the cognizant component shall promptly coordinate with the Secretaries for the purpose of taking appropriate actions to respond to and to mitigate the harm, and if possible, restore or replace the monument resource or quality.”

These terms establish strong requirements to avoid adverse impacts to Papahānaumokuākea resources, if practicable and consistent with operational requirements, and require prompt coordination with the federal Co-Trustees if a resource loss or injury



3-inch gun, a remnant of the Battle of Midway

(Photo: Michael Lusk, FWS)

occurs or is threatened. Furthermore, the military must adhere to all other applicable laws and regulations such as the Endangered Species Act, the Marine Mammal Protection Act, the National Wildlife Refuge System Administration Act, the National Historic Preservation Act, and the Migratory Bird Treaty Act.

The Monument Management Board (MMB) is working with representatives of the military to develop a consultation process prior to undertaking activities in Papahānaumokuākea, which will ensure that the resources and qualities of the property are not harmed.

Native Hawaiian archaeological sites

Ecological damage to Native Hawaiian archaeological sites to date is limited to that caused by burrowing birds and the root systems of loulu palms. A balance in preserving all of these natural and archaeological resources will be found. Any restoration undertaken should be planned and carried out with consideration to indigenous knowledge and approaches.

The living cultural connection to Papahānaumokuākea

Nature and culture are inseparable in the Native Hawaiian worldview. Thus, to Native Hawaiians, factors affecting the site's natural resources also affect the living cultural association to the site.

In addition, a variety of socioeconomic, political, and other factors have the potential to negatively impact the living cultural association between Native Hawaiians and Papahānaumokuākea. Some of these potential negative effects are exogenous (e.g., global economy; a decline in cultural transmission). However, the MMP has been proactive in its efforts to foster and enhance Native Hawaiian relationships to Papahānaumokuākea, addressing issues like Native Hawaiian access and the ability to practice culture, conduct research and meaningfully engage in Monument management. These activities are addressed thoroughly in Section 4.a, above, and the MMP (see Appendix K, Supporting Materials).

(iii) Natural Disasters and Risk Preparedness

Tropical storms and hurricanes are natural hazards that may occur at Papahānaumokuākea. However, only three hurricanes have approached the land masses in the property in the last fifty years. In 1959, Hurricane Patsy passed between Kure and Midway atolls. The last recorded hurricane affecting Papahānaumokuākea was Nele, which passed near Gardner Pinnacles in 1985. Damage from these rare events is likely to affect each of the islands differently, depending on the nature and severity of the event.

It is possible that the property could be adversely affected by a tsunami such as that experienced in Southeast Asia in 2004. Sea level measurement stations have been established at Midway and French Frigate Shoals as part of the Pacific Tsunami Warning Center's network. These stations provide information during tsunami events to help track the size and paths of tsunamis generated in the Pacific. At least six major tsunamis have affected the main Hawaiian Islands in the past sixty years. Of these six, four were generated in Alaska, one in Chile, and one near the southern coast of Hawai'i Island. In addition to damages caused by terrestrial inundation, tsunamis could also result in broken coral reef structures, as well as damage by sedimentation and piling of debris. As the marine ecosystem has evolved with periodic disturbance by tsunamis and seasonally high wave energy events, its capacity to recover fully from tsunamis and other wave events would be expected.

Contingency plans for dealing with disasters

The U.S. Fish and Wildlife Service (FWS) has various contingency plans for dealing with disasters. There are emergency plans and protocols for staff at Laysan, French Frigate Shoals, and Midway, in case of tsunami or hurricane (FWS 2007; FWS 2006) (see Appendix N). A full plan for Midway is laid out in the Midway Atoll NWR Facility Response Plan, (FWS 1999) (see Appendix N). For general emergency response at Midway, there is a Midway

Airport Emergency Response Plan; Appendix I of the Henderson Field Airport Certification Manual; November 30, 2006. On Laysan, an engineered hurricane shelter is provided for refuge in case of a hurricane. The FWS has also drafted a Rat Spill Contingency Plan (FWS 2000), outlining response protocols to be followed in the event of a ship grounding and subsequent introduction of rats to any of the islands or atolls.

The National Marine Fisheries Service (NMFS) also has extensive emergency plans for its operations conducted within the property (see Appendix N). Plans exist to provide support and guidance in the event of a medical emergency or severe weather event. Field personnel are trained in wilderness first aid and the use of emergency equipment in case of a medical emergency, hurricane, or tsunami. Through satellite phone/email communication with NMFS personnel in Honolulu as well as cooperating agencies (U.S. Coast Guard, Health Force Partners, FWS, DLNR) field personnel would work to determine the best course of action depending on the situation and location.

(iv) Visitor/tourism Pressures

The MMP contains a long-term visitor services plan, which in accordance with Presidential Proclamation 8031 allows recreational visitors only on Midway Atoll. Numbers of overnight visitors are limited to no more than 50 at any one time. The availability of transportation to Midway means that visitation levels are actually much lower than the maximum number allowed. Flights to Midway are infrequent and occur usually no more than once per week on a small, chartered plane. Visitor



(Photo: FWS)



(Photo: James Watt)

programs are closely monitored to ensure they are causing no adverse effects. The property's managers have the ability to wholly control access by visitors through the permitting process. Midway's visitor program, which allows the public to learn about and experience this unique ecosystem, is expected to only bring benefits to Papahānaumokuākea.

In addition to provision for overnight visitors, it is equally important to allow day visitors to come to Midway Atoll—considered the window to Papahānaumokuākea. All visitors learn about and experience its unique wildlife and historic resources, as well as the natural and cultural resources of Papahānaumokuākea and its importance to Native Hawaiians. Day visits via larger aircraft or small passenger vessel allow a broader range of visitors, including World War II veterans and their families, many of whom have close direct ties with the atoll and who might otherwise have difficulty getting to Midway. The number of larger day visits of 50-800 people to Midway is limited to no more than three per year, with no more than 400 people ashore at any one time. In the past, Midway has hosted numerous large groups, numbering from 250 to 1,800 visitors each. However, the largest groups

taxed the ability to provide the high-quality visitor experience desired. Because groups are limited to existing roads and trails and are typically divided into smaller groups for walking tours, no negative impacts from these visits have been documented. Visitors remain in areas where albatrosses are already acclimated to human presence, and they are restricted from any area where Hawaiian Monk Seals or Green Turtles may be present.

These visits have had a strong positive effect on Midway’s guests, with many expressing their commitment to maintaining such special wildlife habitats, doing their part to reduce threats to wildlife, and their appreciation for those who valiantly fought the Battle of Midway. All groups must meet all Monument findings and requirements as specified in Presidential Proclamation 8031 and its implementing regulations at 50 CFR 404.11, including obtaining the appropriate (usually Special Ocean Use) Monument permit. In addition, passenger vessels and aircraft must meet specific Refuge requirements (see Section 5).

(v) Number of Inhabitants Within the Property and the Buffer Zone

Only three sites within Papahānaumokuākea are inhabited year-round and these are Midway Atoll, Laysan Island and Tern Island within French Frigate Shoals. The Laysan Island site is a temporary field camp with tents and other non-permanent structures that house staff and volunteers for up to 12 months at a time (see Table 4.3 for island-by-island occupancy details). Midway Atoll houses FWS staff and volunteers as well as up

to 50 contract workers who manage the daily operations at this site. At Tern Island, French Frigate Shoals, a permanent facility houses a small (2-6) permanent staff. In addition to the permanent staff, a few NOAA biologists are stationed there each summer to undertake population assessments for Hawaiian Monk Seals and Green Turtles.

Annual field camps to undertake population assessments and restoration activities have been set up for several years at Kure Atoll, Pearl and Hermes Atoll and Lisianski Island. The temporary field camps range in size from two to six staff and volunteers for up to six months during the late spring to early fall. The number of camps and personnel is subject to annual funding allocations and opportunities for access to these remote locations. See Appendix O for complete details on island-by-island staffing numbers.

Specifically:

Number of inhabitants within the property and buffer zone

Estimated population located within:

Area of nominated property: 130 (permanent and seasonal staff)

Buffer zone: N/A

Total: 130

Year: 2008

Table 4.3: Anticipated staff on each island/atoll under the Monument Management Plan

	Kure Atoll	Midway Atoll	Pearl and Hermes	Lisianski Island	Laysan Island	French Frigate Shoals	Nihoa	Total
Permanent Staff	0	75	0	0	4	6	0	85
Seasonal Staff	6	20	3	3	3	6	4	45
Total:	6	95	3	3	7	12	4	130