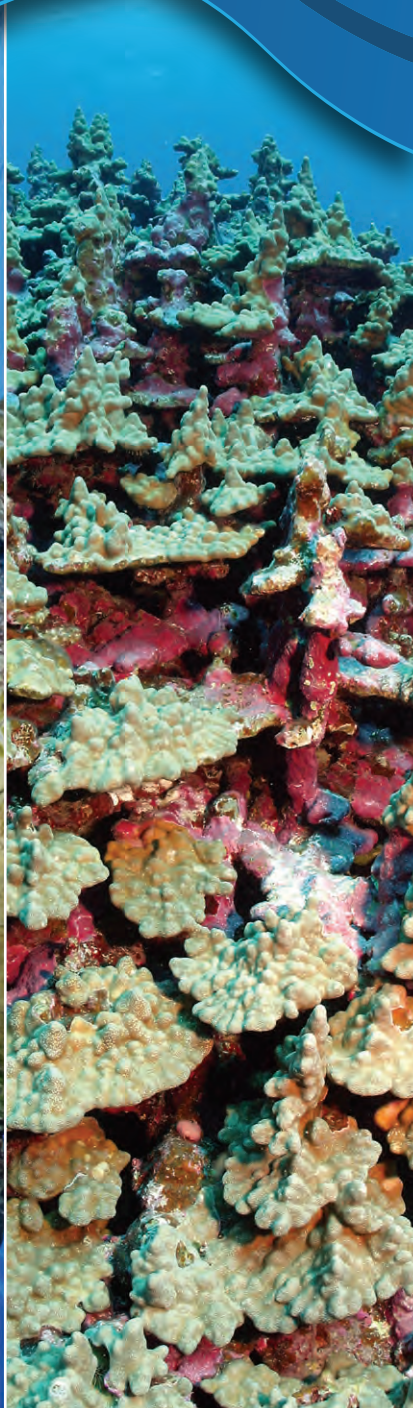




PAPA HĀNAUMOKUĀKEA Marine National Monument



PERMITTED ACTIVITIES
2010 ANNUAL REPORT





TABLE OF CONTENTS

INTRODUCTION 4
Timeline of Ecosystem Protections.....6

JOINT PERMITTING PROCESS 8
Presidential Proclamation 8031 10
Types of Permits Issued 10
Research..... 10
Conservation and Management..... 11
Education..... 11
Native Hawaiian Practices..... 11
Recreation 11
Special Ocean Use 11

2010 PERMITTED ACIVITIES CONDUCTED
WITHIN THE MONUMENT 12
Permits Issued in 2010..... 12
Levels of Human Presence..... 14
Permitted Versus Actual Visitation Records 16
Locations of Permitted Activities..... 17

DETAILS OF 2010 PERMITTED ACIVITIES 18

RESEARCH 18
Summary..... 18
Research Activities by Location 20
*Research Projects: Physical or biological collection activities, catch and release
surveys, and instrumentation devices*..... 20
Research Highlights.....24
Testing Methods to Assess and Detect New Alien Marine Invertebrates.....24
Unique Hawaiian Fishes Comprise Deep Coral Reefs..... 25

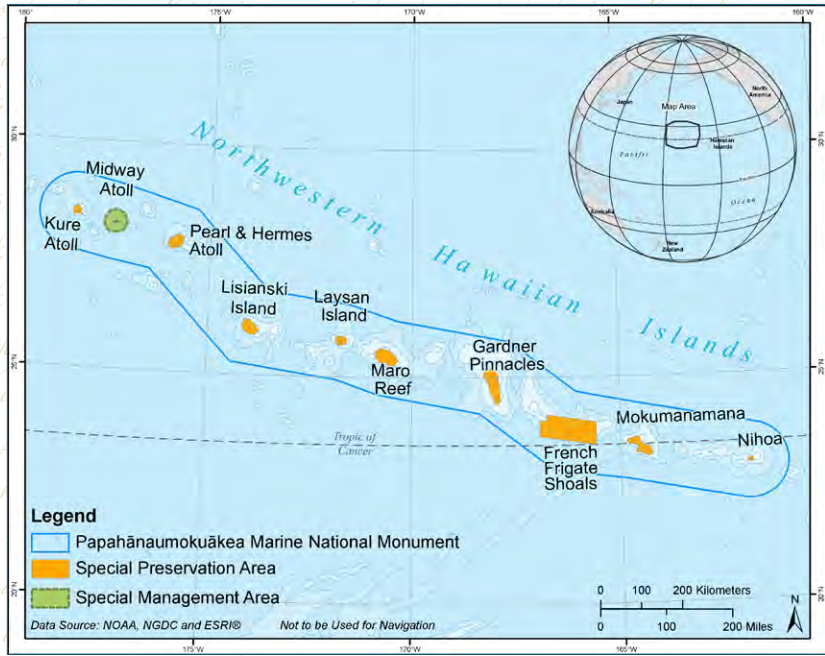


CONSERVATION AND MANAGEMENT.....	26
<i>Summary</i>	26
<i>Conservation and Management Highlights</i>	27
<i>Developing Appropriate Techniques for Monitoring and Translocation of the Nihoa Millerbird</i>	27
<i>Salvage of Sailing Vessel Grendel at Kure Atoll</i>	28
EDUCATION	29
<i>Summary</i>	29
<i>Education Highlights</i>	30
<i>Students Bridge Native Hawaiian and Western Science Methods</i>	30
<i>Holo i Moana: 'A'ohe Pau ka 'Ike i ka Halau Ho'okahi: "To seek deeper knowledge: Not all knowledge is found in one school," An Interdisciplinary Expedition</i>	31
NATIVE HAWAIIAN PRACTICES	32
<i>Summary</i>	32
<i>Native Hawaiian Practices Highlight</i>	33
<i>Honoring Ancient Kāhili</i>	33
RECREATION	34
<i>Summary</i>	34
SPECIAL OCEAN USE	35
<i>Summary</i>	35
<i>Special Ocean Use Highlights</i>	36
<i>Artist Chris Jordan Visits Midway Atoll</i>	36
<i>World Heritage Dignitaries and Guests Visit Midway Atoll</i>	36
WHAT DOES IT MEAN TO BE A MIXED NATURAL AND CULTURAL WORLD HERITAGE SITE?	37
<i>World Heritage Significance</i>	37
<i>Mele No Papahānaumokuākea</i>	38

Mālamalama ka lā nui a Kane puka i Hu'eha'e
Apakau ke kukuna i ka 'ili kai o nā kai 'owalu
He 'ike makawalu ka'u e 'ano'i nei,
'O nā au a hō'ia i ka 'ano'i nei,

INTRODUCTION

He Hu'aka
Ki'ono'ono
'O Ku i ka
Mann o ku
'O Hinapi
'O Hinapi
'O Hina k
'O Hinaik
Hua ka 'o
Aloka kaku
Hanau ka
He 'ina'i
Manomano
Keiko'i lu
Hanohano
No Papahānaumokuākea lā'he inoa



Presidential Proclamation 8031, issued by President George W. Bush on June 15, 2006, set aside the Northwestern Hawaiian Islands (NWHI) as the Papahānaumokuākea Marine National Monument (Monument or Papahānaumokuākea), creating one of the world's largest marine protected areas, managed to protect ecological and cultural integrity. The management of Papahānaumokuākea is administered jointly by three Co-Trustees – the Department of Commerce through the National Oceanic and Atmospheric Administration (NOAA), the Department of Interior through the U.S. Fish and Wildlife Service (FWS), and the State of Hawai'i through the Department of Land

and Natural Resources (collectively, the Co-Trustees). In addition, the Co-Trustee agencies work in close collaboration and consultation with the Office of Hawaiian Affairs to ensure that both cultural and natural resources are protected in a manner appropriate and with reverence to the Native Hawaiian host culture. This unique management partnership of Papahānaumokuākea allows for the protection of the entire ecosystem, from remote sub-tropical islands to the deep sea.

Papahānaumokuākea includes a number of existing federal conservation areas: the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, managed by the U.S. Department of Commerce through NOAA; and Midway Atoll National Wildlife Refuge, Hawaiian Islands National Wildlife Refuge, and Battle of Midway National Memorial, managed by the U.S. Department of Interior through FWS. These areas remain intact within the Monument, subject to their applicable laws and regulations in addition to the provisions of the Proclamation. Papahānaumokuākea also include State of Hawai'i lands and waters, managed by the State through the Department of Land and Natural Resources as the Northwestern Hawaiian Islands Marine Refuge and the State Seabird Sanctuary at Kure Atoll. These areas also remain in place and are subject to their applicable laws and regulations. Inscription of Papahānaumokuākea as a World Heritage Site in 2010 added to the genealogy of the NWHI, as the only mixed natural/cultural seascape in the world. This honor culminates more than 100 years of protections for the area, starting with protections of Midway Atoll in 1903, when President Theodore Roosevelt sent the Marines to stop the slaughter of seabirds at Midway Atoll.

Despite the continued protection of the NWHI, and its relative isolation in the Pacific, significant threats to habitats and wildlife arise from human activities occurring beyond Monument boundaries. Issues such as global climate change, sea level rise, ocean acidification, marine and terrestrial alien species, vessel groundings, and marine debris continue to be major concerns. Papahānaumokuākea's stringent permitting process is the first line of defense against many of these threats. The permitting process allows for managing, monitoring, and reporting of activities to evaluate and mitigate cumulative impacts.

Facilitated by the permitting process, numerous accomplishments occurred in 2010 relating to ecosystem and cultural resource protection. A unique partnership between Monument managers and the U.S. Navy allowed Navy Salvage divers to recover and successfully recycle the sailing vessel, *Grendel* which wrecked on the reef at Kure Atoll in 2007. In addition, the Monument management agencies facilitated

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The knowledge of Kanaloa who lives in the ocean
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a groundbreaking interdisciplinary partnership between traditional western scientists and Native Hawaiian cultural practitioners through an expedition to the NWHI named Holo I Moana: 'A'ohe Pau ka 'Ike i ka Halau Ho'okahi: "To seek deeper knowledge: Not all knowledge is found in one school." This expedition featured archaeologists and marine biologists collaborating with cultural practitioners and Monument managers to observe Papahānaumokuākea through different disciplines.

Love for

A final and significant accomplishment in 2010 culminated on July 30, as delegates to the United Nations Educational, Scientific and Cultural Organization's (UNESCO's) 34th World Heritage Convention in Brasilia, Brazil, agreed to inscribe Papahānaumokuākea Marine National Monument as one of only 26 mixed (natural and cultural) World Heritage sites in the world. The celebration of World Heritage designation was fittingly coupled with a celebration recognizing the 10th anniversary of the establishment of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

This report, produced annually since 2007, highlights the Monument's joint permitting process, summarizes all permitted activities that have occurred in 2010, and their benefit to managing the resources of Papahānaumokuākea. Where applicable, data from previous years are provided as a comparison to the current reporting year.



Photo by: Jessica Carew



Photo by: Russell Amimoto

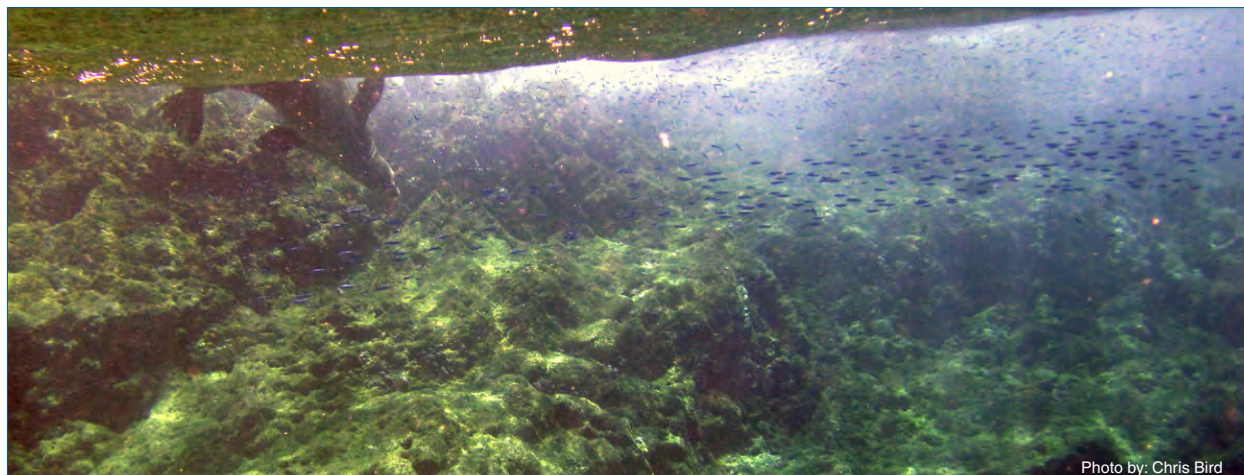


Photo by: Chris Bird



Timeline of Ecosystem Protections

1903

In response to U.S. Navy reports that large numbers of seabirds were being slaughtered for feathers and eggs, President Theodore Roosevelt signs Executive Order No. 199A, placing Midway Atoll under control of the Navy.

1909

President Theodore Roosevelt issues Executive Order No. 1019 creating the Hawaiian Islands Bird Reservation around islands from Nihoa Island to Kure Atoll, to further protect these islands and their resources.

1940

President Franklin D. Roosevelt signs Presidential Proclamation No. 2416 changing the name of the Hawaiian Islands Bird Reservation to the Hawaiian Islands National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service and broadening refuge purposes to protect all wildlife.

1988

President Ronald Reagan signs legislation assigning stewardship responsibilities for Midway Atoll to the U.S. Fish and Wildlife Service.

1993

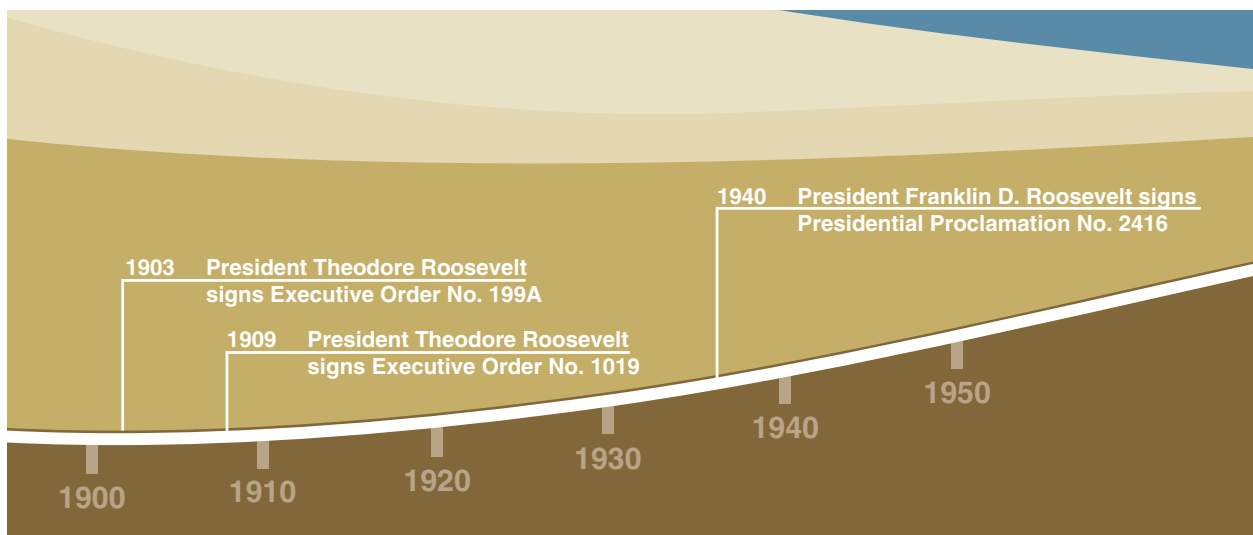
The State of Hawai'i Board of Land and Natural Resources designates Kure Atoll a State Seabird Sanctuary.

1996

President William Clinton issues Executive Order No. 13022, transferring Midway Atoll management responsibilities from the U.S. Navy to the U.S. Fish and Wildlife Service.

2000 and 2001

President William Clinton issues Executive Order No. 13158, directing the development of a plan to protect the NWHI coral reef ecosystem, and calls for public participation in the design of additional protection measures for the NWHI. As a result of public comments and negotiations between President Clinton and Congress, the 2000 Amendments to the National Marine Sanctuaries Act authorized creation of a NWHI Reserve. President Clinton issued Executive Orders No. 13178 and No. 13196 in December 2000 and January 2001, creating the NWHI Coral Reef Ecosystem Reserve to include areas adjacent to state waters extending seaward to approximately 50 nm.





2005

Hawai'i State Governor Linda Lingle signs regulations establishing the NWHI Marine Refuge, which includes all state waters extending three miles seaward from any coastline between and including Nihoa Island and Kure Atoll, but excluding Midway Atoll. This designation allows for the management and long-term conservation of marine resources within state waters.

2006

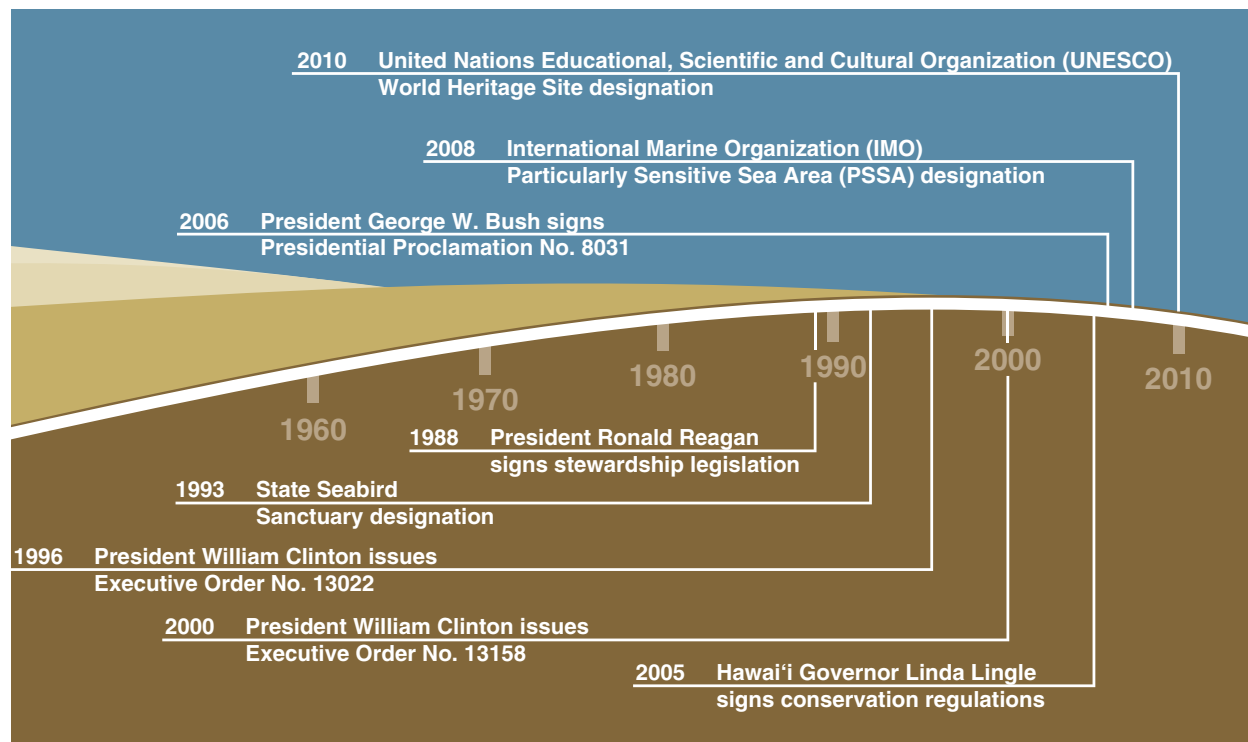
President George W. Bush signs Presidential Proclamation 8031, establishing the NWHI Marine National Monument with contiguous boundaries to include the NWHI Coral Reef Ecosystem Reserve, the Midway National Wildlife Refuge, the Hawaiian Islands National Wildlife Refuge, the Battle of Midway National Memorial, Kure Atoll Wildlife Sanctuary, and the Hawai'i State NWHI Marine Refuge. This designation is the first step towards coordinated management of the unique resources within the NWHI region.

2008

The International Maritime Organization (IMO), a specialized agency of the United Nations designates the Monument as a Particularly Sensitive Sea Area (PSSA). This designation allows for the implementation of a ship reporting system (CORAL SHIPREP) requiring all transiting vessels with the intent to enter a U.S. port or place to notify when entering and exiting Monument boundaries; other international transiting vessels are recommended by the IMO to avoid Papahānaumokuākea waters or participate in the reporting system. The Monument is the second marine protected area in the United States to receive PSSA designation. It joins ten other PSSAs worldwide, including the Florida Keys, the Great Barrier Reef and the Galapagos.

2010

Delegates to UNESCO's 34th World Heritage Convention in Brasilia, Brazil unanimously vote to inscribe the Monument as one of only 26 mixed (natural and cultural) World Heritage Sites in the world.



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Apakau ke kukuna i ka 'ili kai o nā kai 'ewala
He 'ike makawala kā'u e 'ano'i nei,
'O nā au a hō'ole'ole
He Hu'aka

JOINT PERMITTING PROCESS

The permitting process is administered to manage access and monitor human uses of the Monument. In accordance with Presidential Proclamation 8031 and codifying regulations in 50 CFR Part 404, all activities in the Monument, with limited exceptions, require a permit. Activities are either prohibited (not allowed), exempted (no permit is needed), or regulated (must be considered through the Monument's joint-permitting process).

Prohibited activities include:

- Exploring for, developing, or producing oil, gas, or minerals within the Monument;
- Using or attempting to use poisons, electrical charges, or explosives in the collection or harvest of a Monument resource;
- Introducing or otherwise releasing an introduced species from within or into the Monument; and
- Anchoring on or having a vessel anchored on any living or dead coral with an anchor, anchor chain, or anchor rope.

Exempted activities include:

- Response to emergencies threatening life, property, or the environment;
- Law enforcement purposes;
- Activities and exercises of the Armed Forces (including the United States Coast Guard); and
- Passage without interruption.

The codifying regulations in 50 CFR Part 404 provide further details and rules to manage access and use of Monument resources. Any vessel or persons passing through Papahānaumokuākea without interruption does not constitute a permitted activity, however domestic vessel notification must be provided prior to entering and leaving the Monument. Notification of entry must be provided at least 72 hours, but no longer than one month, prior to the entry date. Notification of departure from the Monument must be provided within 12 hours of leaving. For more information regarding the Monument's ship reporting requirements, please see our website at:

http://www.papahanaumokuakea.gov/resource/ship_reporting.html.

In addition to the Monument's ship reporting requirements, all activities and exercises of the Armed Forces must be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on Monument resources and qualities.

All other activities not prohibited or exempted must be authorized by a Monument permit signed by all Co-Trustee agencies. Permit applications are reviewed by managers, scientists, and other experts within the Co-Trustee agencies and by Native Hawaiian cultural reviewers. In order for an application to be drafted into a Monument permit, the application must be approved by the Monument Management Board. In addition, permit applications are posted on the Monument website for public notification. All applications for activities in State waters must be approved by the State of Hawai'i Board of Land and Natural Resources. Permit applications must also meet the Findings of Presidential Proclamation 8031 that established the Monument, prior to undergoing the Monument review process. For a listing of all Findings of Presidential Proclamation 8031, please see inset box on page 10.

In order for any project to be permitted, it must meet both the federal National Environmental Policy Act (NEPA) and State of Hawai'i Environmental Policy Act (HEPA) requirements. In addition to the permit requirements of the Monument, several other federal and state permits and/or consultations are required for

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much of the work conducted in the Northwestern Hawaiian Islands. For example, all personnel working with threatened or endangered species must have an endangered species permit. Anyone proposing to handle bird species must obtain appropriate permits from the U.S. Fish and Wildlife Service Division of Migratory Bird Management. Scientists working with marine mammals must obtain appropriate permits from the NOAA National Marine Fisheries Service Office of Protected Resources. Proposed activities near potential or known historical or cultural sites require a concurrence of no adverse effect from the State of Hawai'i Historic Preservation Division and consultations with the Office of Hawaiian Affairs, and other interested Native Hawaiian individuals and organizations, pursuant to the National Historic Preservation Act (NHPA). Consultations may also be necessary under the U.S. Endangered Species Act (ESA) or Environmental Protection Agency (EPA) regulations.

Following the Monument review process, all issued permits contain a Permitted Activity Description, including information on the number of permitted personnel; Permitted Activity Locations; and General Terms and Conditions that satisfy Proclamation 8031 and Monument regulations, and that comply with Monument Management Board agency mandates and policies. All permits also specify the requirements for compliance with quarantine protocols to avoid introduction of alien species, and list prohibited activities such as the disturbance of cultural sites or historic artifacts. Special Conditions may also be applied to particular permits, placing additional restrictions on activities in order to minimize impacts to Monument resources.

In 2010, the Monument management agencies published a tri-fold brochure to better inform the public about the Monument's joint permitting process. The Permit Requirements brochure was developed in consultation with the Monument Management Board. The brochure serves as a handy reference to aid public understanding of agency regulatory and permitting responsibilities.

The Permit Requirements brochure and detailed information on permit application procedures is available at <http://papahānaumokuākea.gov/resource/permits.html>.



Photo by: Kalei Nu'uhiwa



Photo by: Kaleo Wong



Photo by: Randall Kosaki



Presidential Proclamation 8031

Findings of Presidential Proclamation 8031 that must be met before a permit is granted:

- The activity can be conducted with adequate safeguards for the resources and ecological integrity of the Monument.
- The activity will be conducted in a manner compatible with the management direction of the Proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument resources, qualities, and ecological integrity; any indirect, secondary, or cumulative effects of the activity; and the duration of such effects.
- There is no practicable alternative to conducting the activity within the Monument.
- The end value of the activity outweighs its adverse impacts on Monument resources, qualities, and ecological integrity.
- The duration of the activity is no longer than necessary to achieve its stated purpose.
- The applicant is qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
- The applicant has adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
- The methods and procedures proposed by the applicant are appropriate to achieve the proposed activity's goals in relation to their impacts to Monument resources, qualities, and ecological integrity.
- The applicant's vessel has been outfitted with a mobile transceiver unit approved by NOAA Office of Law Enforcement and complies with the requirements of Proclamation 8031.
- There are no other factors that would make the issuance of a permit for the activity inappropriate.

Types of Permits Issued

Permits are issued in one of six categories, if Co-Trustees find that the activity: 1) is research designed to further understanding of Monument resources and qualities; 2) will assist in the conservation and management of the Monument; 3) will further the educational value of the Monument; 4) will allow Native Hawaiian practices; 5) will allow recreational activities; or 6) will allow a special ocean use.

Research

Research permits are for activities that enhance the understanding of Papahānaumokuākea's resources and activities and improve resource management decision-making. Priority is given to research proposals that help to meet the management needs of the Monument Co-Trustee agencies. The types of activities that may be conducted under research permits include biological inventories, ecosystem-based research, habitat characterization, restoration investigations, and terrestrial and marine archaeological research.



Photo by: Clarence 'AKU' Hauapio



Conservation and Management

Conservation and Management permits are for activities that make up the general management of Papahānaumokuākea. This may include activities such as field station operations, marine debris removal, development and maintenance of infrastructure, and long-term resource monitoring programs such as monitoring of endangered species, seabird populations, and terrestrial native plant communities. Conservation and Management permits also provide a mechanism enabling response and follow-up to urgent events in the Monument that may not have been anticipated, such as vessel groundings, coral bleaching episodes, and invasive species detections.



Education

Education permits are for activities that further the educational value of Papahānaumokuākea. These activities may assist a broader audience in understanding the ecosystems within the Monument, share lessons learned in resource management with outside partners, promote Native Hawaiian knowledge and values, or aid in outreach education with schools and community groups. Permits are considered for activities that have clear educational or public outreach benefits and that promote “bringing the place to the people, rather than the people to the place.” Examples of potential projects include teacher-at-sea programs, distance learning projects, and university field classes.

Native Hawaiian Practices

Native Hawaiian Practice permits are for activities that constitute Native Hawaiian cultural practices. Activities under this permit must be noncommercial, deemed appropriate and necessary by traditional standards, benefit the Northwestern Hawaiian Islands and Native Hawaiian community, perpetuate traditional knowledge, and restrict the consumption of harvested resources from the Monument. Examples of permitted activities include the entry of vessels for the purpose of applying and transferring knowledge of traditional navigation techniques and conducting ceremonies at historic cultural sites on Nihoa or Mokumanamana. Permit conditions and guidelines are developed by the Co-Trustees and the Office of Hawaiian Affairs in consultation with the Native Hawaiian Cultural Working Group and the broader Native Hawaiian community.

Recreation

Recreation permits are for activities conducted for personal enjoyment, limited to occur only within the Midway Atoll Special Management Area. Recreation activities must not result in the extraction of Monument resources or be involved in a fee-for-service transaction. Examples of activities that may be permitted include snorkeling, wildlife viewing, and kayaking.

Special Ocean Use

Special Ocean Use permits are for activities related to commercial ocean uses, including ecotourism or documentary filmmaking, that have a net benefit to the Monument. Special Ocean Use is defined as any activity or use of the Monument to generate revenue or profits for one or more of the persons associated with the proposed activity, and will not destroy, cause the loss of, or injure Monument resources. Special Ocean Use proposals involving activities outside of the Midway Atoll Special Management Area must be for educational or research purposes and directly benefit conservation and management of the Monument.

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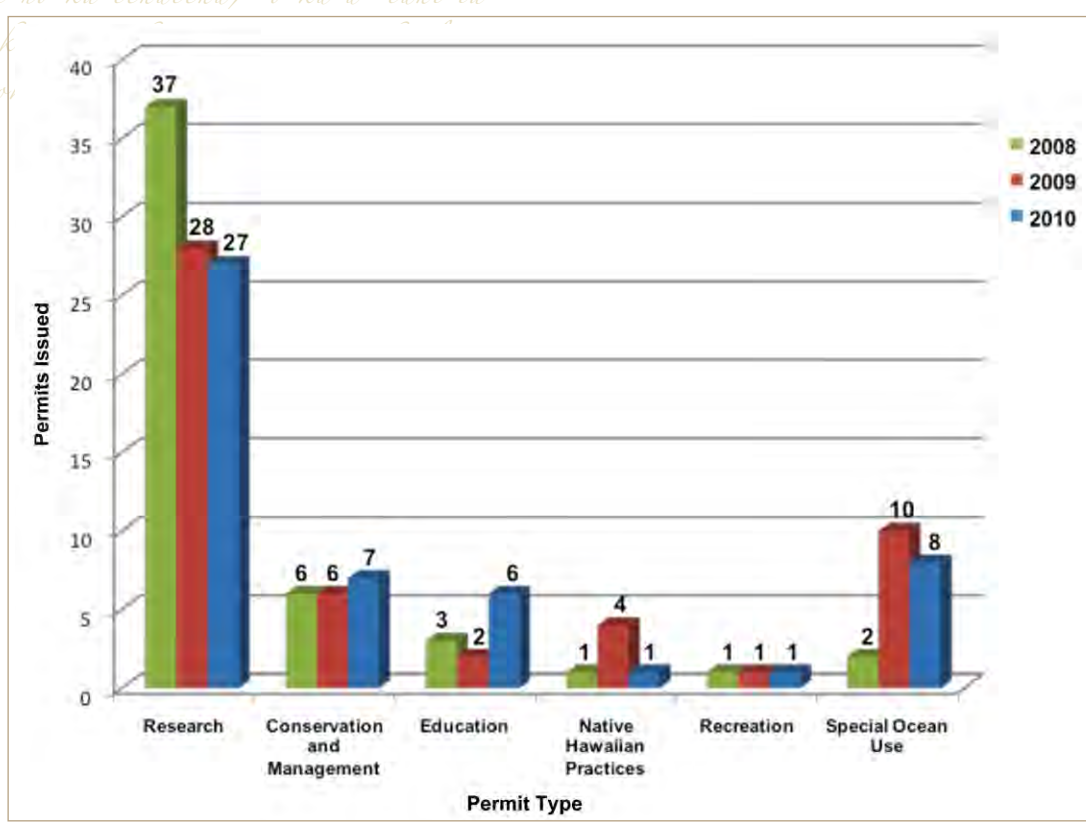
He Hu'aka  **2010 PERMITTED ACTIVITIES**

CONDUCTED WITHIN THE MONUMENT
Permits Issued in 2010

Fifty-seven permit applications were received in 2010. Of these applications, 50 successfully completed the joint-permitting system and environmental review process and were issued. Five applications were withdrawn by the respective applicant at different stages of the permitting process. The remaining applications are pending compliance with permitting criteria. Figure 1 displays a comparison of the number of permit types issued from 2008-2010. While the number of each permit type often varies from year to year, the total number of permits issued annually over the last three years has remained relatively constant at 50, 51, and 50 for 2008, 2009, and 2010, respectively.

In 2010, the largest increase in permit type issued occurred in the education category, where six permits were issued in 2010, compared to two in the previous year. For more information regarding educational activity highlights, please refer to the education sub-section of the 2010 Permitted Activities by Permit Category chapter of this report.

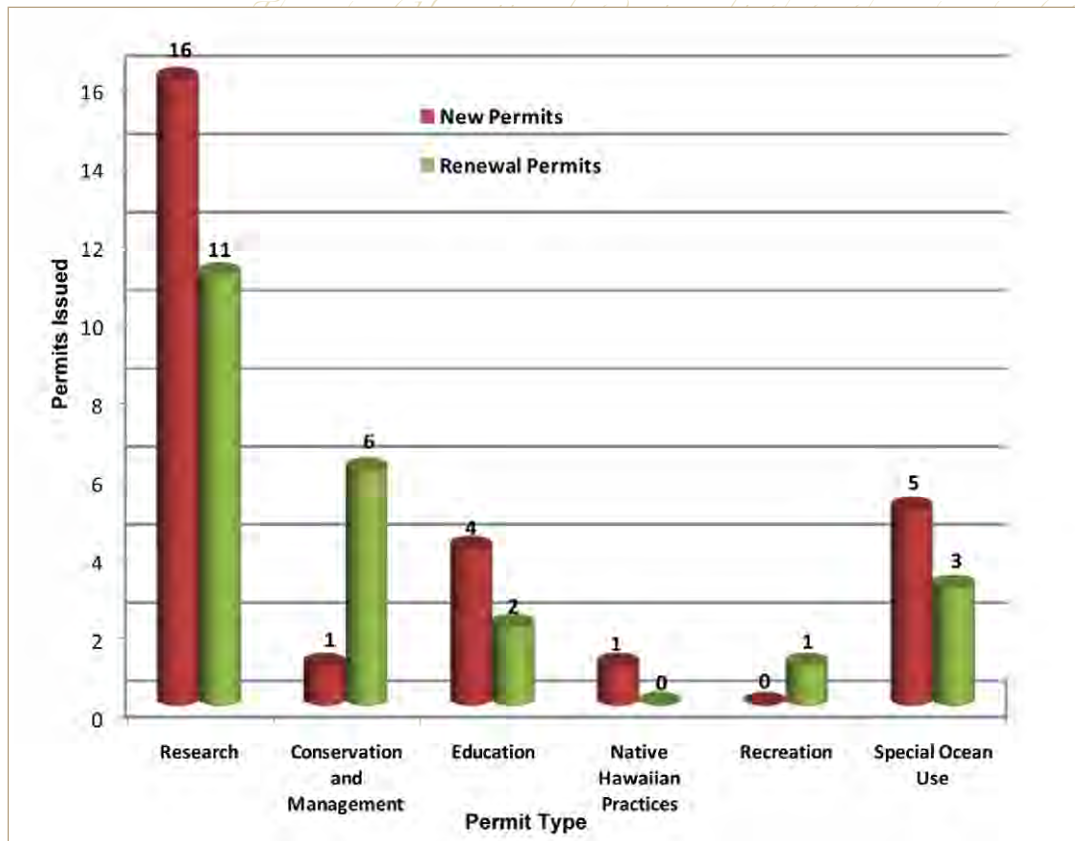
Figure 1. Number of Monument permits issued by permit type in 2008-2010.



The sunrise of Kane at Ha'aha'e shines bright
 The rays of the sun spread throughout Hawai'i
 1 year for the deep knowledge
 The knowledge of Kanaloa who lives in the ocean
 The Hu'akai wind is of Lehua that grows in the sea

In the previous Permitted Activities Report, the Monument Management Board began reporting the number of new and renewal permits issued. This metric provides a quick estimate of the number of new projects permitted or the addition of a new principal investigator to a project. Figure 2 shows the number of new versus renewal Monument permits issued in 2010. In order for a permit application to be considered a renewal, it must have been a previously permitted project activity. Both new and renewal applications undergo the same rigorous joint-permitting review process.

Figure 2. New and renewal permits in 2010 by permit category.



The Monument Co-Trustees grant both single and multi-year permits. A multi-year permit is a permit set to expire more than a year after it was issued. Multi-year permits are for projects that must span two or more calendar years to complete the project objective. Because these projects fall under more than one calendar year, these project activities are reported during each year the permit is used. For example, the Levels of Human Presence section below includes data on permits that were issued in 2010, as well as permits that were issued prior to 2010 but had activities that occurred in 2010. In 2008, 2009, and 2010 there were 8, 15, and 18 multi-year permits issued, respectively.

In accordance with Hawaii Administrative Rules, the duration for a permit in State waters is limited to no longer than one year from the date of issuance (HAR Title 13 § 60.5-6). Monument permits in State waters that span two calendar years but are less than one year in duration, are considered off-calendar permits and are reported on for each calendar year activities are conducted. New, renewal, single-year, and multi-year permit metrics are used to summarize and track Monument permits.



Levels of Human Presence

Effectively tracking Monument permits allows for accurate reporting of levels of human presence. The level of human presence in the Monument is strictly regulated and continually evaluated to monitor and mitigate for cumulative impacts. Human presence in the Monument is necessary to carry out resource management objectives and conduct necessary scientific and cultural research. The number of permitted aircraft and vessel entries into the Monument is one method of measuring the level of human presence. Midway Atoll National Wildlife Refuge operates a small functioning airport, and Tern Island within French Frigate Shoals contains a small airstrip. These two areas within Papahānaumokuākea are the only locations equipped to accept aircraft. Table 1 indicates the number of permitted flights that occurred to and from the Monument in 2008-2010. Within the past two years (2009-2010), there was a 28 percent decrease in the total number flights in the Monument.

Table 1. The number of flights permitted to and from the Monument, in 2008 through 2010.

Airport/Airstrip Location	2008	2009	2010
French Frigate Shoals	13	13	11
Midway Atoll	99	87	61

Permitted vessel entries and exits are defined as any instance in which a vessel is permitted to enter the Monument to conduct authorized activities and subsequently exits the Monument. Any further authorized entry of the vessel is counted as a second vessel entry, for the purposes of reporting. Table 2 provides the number of vessel entries and exits, as well as the number of individual vessels used during the years 2008-2010. The majority of resource management actions and research are supported by several well-equipped NOAA ships that are utilized by more than one project activity and enter the Monument on more than one occasion during the year. The limited number of marine vessels utilized ensures that all commanding officers/captains and crew are well versed with all Monument vessel compliance measures and rules to protect Monument resources.

Table 2. The number of permitted vessel entries into the Monument, from 2008 through 2010.

	2008	2009	2010
Vessel Entries and Exits (roundtrips)	20	18	19
Individual Vessels Used	11	8	6

In accordance with Monument regulations, all vessel effluent discharge and anchoring is highly regulated within the Monument, and in many areas, prohibited. Authorized vessels must have an operating vessel monitoring system on board at all times within the Monument to pinpoint the vessel's location to law enforcement officers at any time, if needed. Vessels are also required to have passed a hull and rodent inspection prior to receiving a Monument permit. Permits for authorized vessels may often restrict speed, in addition to discharge, anchoring, and locations authorized within the Monument.



Another metric to account for levels of human presence is the individual number of people on land. Due to the fragility and remote nature of Papahānaumokuākea’s islands and atolls, any human presence on land has the potential to impact resources. Table 3 provides the minimum, maximum, and average number of people recorded on land per day on each island or atoll in the Monument in 2009 and 2010. Due to very low numbers of people on land per day throughout the reporting year, data in Table 3 are in decimal form and are not rounded to the nearest whole number. Midway Atoll continues to have the highest concentration of human presence, sustaining an average population of 75-80 individuals necessary to operate Midway facilities.

Table 3. The minimum, maximum, and average number of individuals on land per day at each island or atoll in 2009 and 2010.

Island / Atoll	2009			2010		
	Min	Max	Average	Min	Max	Average
Nihoa	0	9	0.17	0	6	0.22
Mokumanamana	0	11	0.12	0	10	0.07
French Frigate Shoals	1	11	3.25	1	16	6.98
Laysan Island	0	6	1.61	6	18	8.09
Lisianski	0	2	0.48	0	2	0.44
Pearl and Hermes Atoll	0	3	0.74	0	4	0.66
Midway Atoll	58	78	70.36	69	88	79.82
Kure Atoll	0	5	0.28	0	13	3.36
TOTAL			77.01			99.64



Photo by Heidi Kai Guth



Permitted Versus Actual Visitation Records

Often the number of individuals permitted to access the Monument and conduct activities is not reflective of the actual number of people who conducted work in the Monument. For example, conservation and management permits authorize personnel with qualifications necessary to conduct activities; however the actual number of individuals who worked in the Monument to complete the conservation and management activity is often less than the amount permitted. In other instances, special ocean use permittees may have visitor cancellations, further lowering the number of people who actually enter the Monument. Table 4 shows the difference in the number of permitted individuals compared to the actual number of individuals who took part in a permitted activity.

Table 4. Number of individuals permitted in 2010, compared to the actual number of people who conducted permitted activities in the Monument by permit type.

Permit Type	Number of People Permitted	Actual Number of People Who Performed Permitted Activities
Research	298	216
Conservation & Management	392	292
Education	123	106
Native Hawaiian Practices	4	0
Recreation*	1	-
Special Ocean Use	435	267
TOTAL	1253	881

*Individuals conducting activities under the FWS recreation permit under the Visitor Services Program were authorized to enter the Monument under another permit category to conduct activities (i.e., Research, Special Ocean Use, etc.).

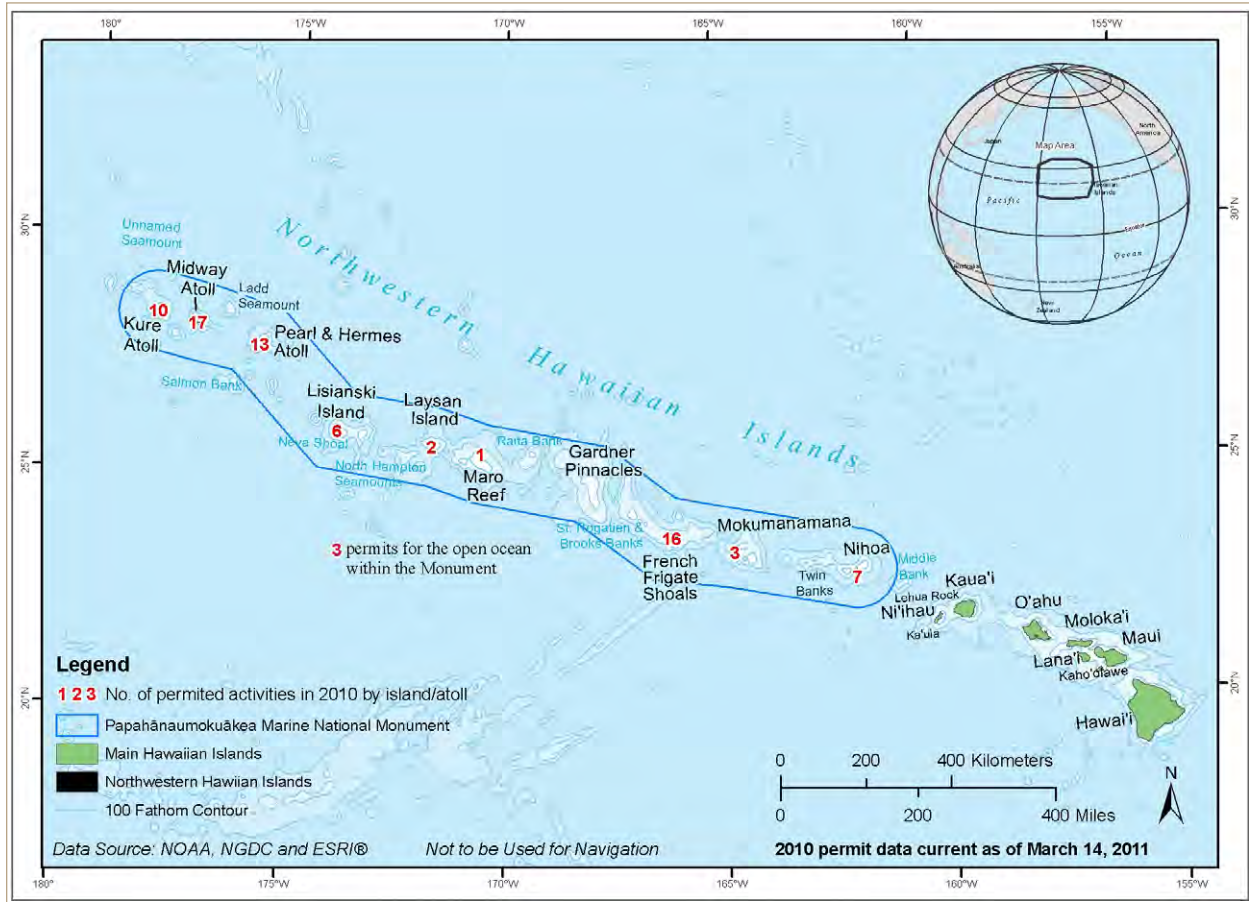


Locations of Permitted Activities



The map in Figure 3 indicates locations at which permitted activities occurred in 2010. Of the 50 permits issued, many allowed for work to be conducted at multiple locations. Thus, for example, a single permit may have included work only at French Frigate Shoals, or it may have allowed for visits to all islands and atolls.

Figure 3. Locations where 2010 permitted activities occurred. The number of permitted projects at each island or atoll is indicated in red.



*Mālamalama ka lā nui a Kāne puka i Ha'eha'e
 Apakau ke kukuna i ka 'ili kai o nā kai 'owalu
 He 'ike makawalu ka'u e 'ano'i nei,*

'O nā au a hō'ole'ole
 He Hu'aka  **DETAILS OF 2010 PERMITTED ACIVITIES**

Kū'ono'ono **RESEARCH** *Kū'ono'ono i ke kapa 'ehukai o Ka'ula
 'O Kū i ka loulou, ulu a'e ke aloha no Nihou moku manu
 Manu o kū i ka 'ānu'i, he aloha'i na ka lāhui*
Summary

'O Hinapū A total of 27 research permits were issued in 2010. Table 5 lists research permits issued for each organization
'O Hinapū or institution, together with project titles. Research permits were issued to Co-Trustee agency personnel,
'O Hina K university researchers, and non-governmental organizations to conduct work on seabirds, fish, corals,
'O Hinaikamalama marine mammals, algae, and terrestrial insects, as well as work involving archaeology and submersible
 diving technology.

Hua ka 'ohua, hō'ole'ole
Aloha kahi limo 'ānu'i, he aloha'i ia e ka 'ākala noho i uka
Table 5. Affiliations of Research permittees and their respective projects that were issued a permit in 2010.

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Project
Hawai'i Institute of Marine Biology, University of Hawai'i at Mānoa	7	<ul style="list-style-type: none"> • Top Predator Movement Research Activities • Coral Endosymbiont Research • Characterizing the Genetic Variation and the Role of Temperature in Coral Reefs at French Frigate Shoals and Pearl and Hermes Atoll • Comparing the Biological Community Structure and Diversity at Maritime Heritage Resource Sites with that of Surrounding Areas • Deployment and Maintenance of Ecological Acoustic Recorders (EARS) • Reef Invertebrate Genetic Survey Research • Reef Fish Genetic Survey Research
University of Hawai'i, Department of Plant and Environmental Protection Services	1	<ul style="list-style-type: none"> • Terrestrial Sampling of Endemic Hawaiian <i>Hyposmocoma</i> Moths*
Institute of Marine Sciences University of California, Santa Cruz	4	<ul style="list-style-type: none"> • Evaluating the Potential for Successful Restoration of Primary Frame-Building Coral on Nearshore Patch Reefs at Midway Atoll • Detecting Sediment Composition Changes and Rates of Sedimentation From Shallow Marine Sites at Midway Atoll • Monitoring of Coral Ecology, Community Dynamics, Sedimentation and Effects of Urchin and Large Bivalve Abundance • Quantifying Processes Affecting Reef Growth and Reef Degradation at Midway Atoll

*The sunrise of Kane at Ha'aha'e shines bright
 The rays of the sun spread throughout Hawai'i
 I yearn for the deep knowledge
 The knowledge of Kanaloa who lives in the ocean
 The Hu'akai wind is of Lehua that swims in the sea*

Love for

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Project
NOAA National Marine Fisheries Service, Pacific Islands Fisheries Science Center	6	<ul style="list-style-type: none"> • Hapu'upu'u Growth Studies on Kure and Midway Atolls • Activities to Enhance Understanding of Hawaiian Monk Seal Foraging Ecology and Population Characteristics at Nihoa Island • Collection of Geodetic Differential GPS (dGPS) Data within Terrestrial Areas in Papahānaumokuākea to Generate High Resolution Digital Elevation Models (DEMs)* • Deployment of High-Frequency Acoustic Recording Packages (HARPs) For Year-Round Cetacean Monitoring • Pacific Reef Assessment and Monitoring Program • Efforts to Increase Juvenile Monk Seal Survival
NOAA National Ocean Service Office of National Marine Sanctuaries, Papahānaumokuākea Marine National Monument	2	<ul style="list-style-type: none"> • Documenting the Biodiversity of Deep Reefs and the Occurrence of Alien/Invasive Species Using Conventional and Technical SCUBA Diving Technology • Inventory and Abundance of Alien Marine Invertebrate Species Associated with Natural and Man-Made Habitats
NOAA, National Marine Fisheries Service, Southwest Fisheries Science Center & Pacific Fisheries Science Center	1	<ul style="list-style-type: none"> • Abundance and Distribution of Cetaceans
Hawai'i Pacific University, Oceanic Institute	2	<ul style="list-style-type: none"> • Petrel Species Research on Plastic Ingestion • Analysis of Carbonate Chemical Make-up of Waters Surrounding Atoll Systems
NWHI Bottomfishing Hui	1	<ul style="list-style-type: none"> • Retrieval of Movement Data from Previously Tagged Uku in Federal Waters at Nihoa Island, Mokumanamana, and Twin Banks*
International Archaeological Research Institute, Inc	1	<ul style="list-style-type: none"> • Sediment Sampling on Lisianski Island to Determine Historical Ecology*
University of Hawai'i, Hawai'i Undersea Research Laboratory (HURL)	1	<ul style="list-style-type: none"> • Support for Permitted Research Activities Using the Pisces IV and Pisces V Submersibles and RCV-150 Remotely Operated Vehicle*
Monterey Bay Aquarium Research Institute	1	<ul style="list-style-type: none"> • Vertical History of Gardner Pinnacles and the Impact of Past Climate Change on the Development and Drowning of Submerged Reef Terraces*

* Research permitted project was not conducted in 2010.



Research Activities by Location

Islands and atolls with the highest levels of permitted research activities in 2010 included Midway Atoll, French Frigate Shoals, and Pearl and Hermes Atoll. Non-emergent banks and reefs, including Neva Shoals and Maro reef, saw the lowest levels of research activities. Laysan and Mokumanamana (Necker) had the fewest number of research activities conducted on emergent lands.

Research Projects: Physical or biological collection activities, catch and release surveys, and instrumentation devices

The research projects permitted in 2010 included a variety of activities aimed at monitoring ecosystem dynamics, studying the genetic connectivity of marine organisms, monitoring the presence or absence of cetaceans, researching the effects of plastic ingestion, and developing vaccination protocols to increase Hawaiian monk seal survival. Table 7 lists all catch and release or observational research conducted, as well as all biological or physical samples collected in 2010. Of the 27 research permits issued, 18 of these involved catch and release, observational, or collection activities. Catch and release activities involved the use of satellite tagging devices attached to top predators and several cetacean species found within the Monument. Observational activities entailed survey transects or cameras and are often the basis of much of the scientific work conducted in the Monument. Half of the research permits issued involved collection activities requiring the removal of a minimum amount of specimens needed for thorough examination and completion of the project objective.



Other research activities involve the use of temporary devices to remotely monitor habitat variations, such as temperature, salinity, or changes in sedimentation or organism recruitment. These instruments are essential to obtaining long-term ecological data, necessary in effective resource management in the face of climate change and other global threats to Monument resources. Table 8 lists temporary instruments installed in 2010 for specific permitted research projects.





Table 7. Observational, catch and release, and collection activities that occurred under research permits in 2010.

Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Top Predator Movement Research Activities	<ul style="list-style-type: none"> The following were tagged and released: 33 Ulua; 2 Hawaiian groupers; 5 Blacktip sharks; 4 Galapagos sharks; 1 Tiger shark. 	
Inventory and Abundance of Alien Marine Invertebrate Species Associated with Natural and Man-Made Habitats		<ul style="list-style-type: none"> 2 oysters; 1 anemone; 40 barnacles; 10 bryozoans; 4 clams; 11 colonial tunicates; 22 hydroids; 16 marine worms; 4 mussels; 20 Amphipoda; 3 plume worms; 7 solitary tunicates; 16 sponges; 63 tube worms; 22 worm shells.
Coral Endosymbiont Research		<ul style="list-style-type: none"> 80 (<1 cm) biopsies of cauliflower coral
Characterizing the Genetic Variation and the Role of Temperature in Coral Reefs at French Frigate Shoals and Pearl and Hermes Atoll		<ul style="list-style-type: none"> 500 (3 cm²) lace coral fragments 250 (3 cm²) lobe coral fragments
Petrel Species Research on Plastic Ingestion		<ul style="list-style-type: none"> 14 naturally deceased Tristram storm-petrel chicks
Comparing the Biological Community Structure and Diversity at Maritime Heritage Resource Sites with that of Surrounding Areas	<ul style="list-style-type: none"> Twenty-nine 30m transects surveyed 	<ul style="list-style-type: none"> 95 (1 mm²) biopsies of cauliflower coral
Activities to Enhance Understanding of Hawaiian Monk Seal Foraging Ecology and Population Characteristics at Nihoa Island	<ul style="list-style-type: none"> 14 camera drops, 5 minute videos ~60 Hawaiian Monk Seals surveyed 	



Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Documenting the Biodiversity of Deep Reefs and the Occurrence of Alien/Invasive Species Using Conventional and Technical SCUBA Diving Technology		<ul style="list-style-type: none"> • 4 cm diameter coral fragments of the following genus: 28 staghorn coral; 2 table coral; 10 oval cup coral; 4 foliose coral; 15 ocellated coral; 3 wedge coral; 15 mushroom coral; 5 bewick coral; 8 encrusting coral; 1 ridge coral; 4 spotted coral; 11 crust coral; 4 Hawaiian plate coral; 3 rough plate coral; 3 leaf coral; 24 rice coral; 11 pore coral; 8 blue rice coral; 8 spreading coral; 10 Duerden's coral; 4 maldive coral; 10 corrugated coral; 11 lace coral; 4 antler coral; 14 Hawaiian cauliflower coral; 11 cauliflower coral; Brigham's coral; 3 deep lobe coral; 21 finger coral; 6 thick finger coral; 9 Evermann's coral; 4 Hawaiian porites; 17 lobe coral; 1 flat coral; 12 stellar coral; 3 Verrill's lump coral; and 33 coral fragments from 7 different species of corals with no established common names. (Identification and documentation to the species level subsequent to genetic analyses.)
Evaluating the Potential for Successful Restoration of Primary Frame-Building Coral on Nearshore Patch Reefs at Midway Atoll	<ul style="list-style-type: none"> • Eighteen 20x100 m² rectangular survey fish counts • Nineteen 10 m transect surveys • Forty-five 1 m² survey plots for urchins 	<ul style="list-style-type: none"> • 90 (10 cm) finger coral fragments
Detecting Sediment Composition Changes and Rates of Sedimentation from Shallow Marine Sites at Midway Atoll	<ul style="list-style-type: none"> • Testing of sediment corer in surface substrate (no sediment collected) 	
Reef Invertebrate Genetic Survey Research		<ul style="list-style-type: none"> • 34 (2 cm branchlet) of black coral • 7 (2 cm) biopsies of brittle star • 41 cheliped biopsy of coral banded shrimp • 46 (5 cm) antenna segment of Spiny lobster
Reef Fish Connectivity		<ul style="list-style-type: none"> • 167 whole-fishes including, damselfish, parrotfish, and sergeant reef fish species



Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Analysis of Carbonate Chemical Make-up of Waters Surrounding Atoll Systems		<ul style="list-style-type: none"> • 73 gallons of sea water
Monitoring of Coral Ecology, Community Dynamics, Sedimentation and Effects of Urchin and Large Bivalve Abundance	<ul style="list-style-type: none"> • 250 spat collectors surveyed for Black-lipped pearl oysters • 8 sea water temperature readings 	<ul style="list-style-type: none"> • 3 Black-lipped pearl oysters • 6 gallons of sediments and rubble • 470 pieces of loose rubble (16 oz)
Quantifying Processes Affecting Reef Growth and Reef Degradation at Midway Atoll	<ul style="list-style-type: none"> • One 10x2m² transect surveyed • 10 reef growth stations measured 	<ul style="list-style-type: none"> • 20 (2 cc) biopsies of blue rice coral • 40 (2.5 cc) biopsies of cauliflower coral • 16 (2.5 cc) biopsies of finger coral • 40 (2.5 cc) biopsies of lace coral • 37 (2.5 cc) biopsies of lobe coral • 15 (2.5 cc) biopsies of rice coral • 7 urchins; 1 starfish • 5 (< 25 cm) sediment core • 4 (< 18 cm) sediment core
Pacific Reef Assessment and Monitoring Program	<ul style="list-style-type: none"> • Eighty-eight 25 m transects surveyed • Ninety-two 50 m transects surveyed • Seventy-six 50 min video footage clips • 76 towed-diver surveys 	<ul style="list-style-type: none"> • 53 marine algae samples • 109 gallons of sea water (microbial and plankton studies) • 3 (< 7 cm) fragments of cauliflower coral • Various invertebrate colonizers on 14 Autonomous Reef Monitoring Structures (ARMS), each retrieved ARMS ~30 cm²
Abundance and Distribution of Cetaceans	<ul style="list-style-type: none"> • 2 False killer whales satellite tagged • 56 Rough-toothed dolphins tagged • 192 transect surveys • 14 sound recordings 	<ul style="list-style-type: none"> • Skin and biopsy samples of the following species: Bottlenose dolphins, Bryde's whale, False killer whale, Pilot whale, Rough-toothed dolphin, Sperm whale, and Striped dolphin. • 292 gallons of sea water
Efforts to Increase Juvenile Monk Seal Survival	<ul style="list-style-type: none"> • 11 Hawaiian Monk Seals received de-worming vaccination 	



Table 8. Remote monitoring instruments installed under research permits in 2010.

Permitted Research Project	Instruments Installed for Remote Monitoring
Comparing the Biological Community Structure and Diversity at Maritime Heritage Resource Sites with that of Surrounding Areas	<ul style="list-style-type: none"> • 9 quarter-sized temperature data loggers
Evaluating the Potential for Successful Restoration of Primary Frame-Building Coral on Nearshore Patch Reefs at Midway Atoll	<ul style="list-style-type: none"> • 9 subsurface buoys
Deployment and Maintenance of High-Frequency Acoustic Recording Packages (HARPs) for Year-Round Cetacean Monitoring	<ul style="list-style-type: none"> • 1 High-Frequency Acoustic Recording Package (HARP)
Monitoring of Coral Ecology, Community Dynamics, Sedimentation and Effects of Urchin and Large Bivalve Abundance	<ul style="list-style-type: none"> • 14 quarter-sized temperature data loggers • 70 spat collectors for bivalve recruitment
Quantifying Processes Affecting Reef Growth and Reef Degradation at Midway Atoll	<ul style="list-style-type: none"> • 30 invertebrate recruitment tiles
Pacific Reef Assessment and Monitoring	<ul style="list-style-type: none"> • 50 oceanographic instrumentation arrays

Research Highlights

Testing Methods to Assess and Detect New Alien Marine Invertebrates

A critical aspect of Monument management is to prevent further introductions of alien species and to prevent damage from the alien species already established. Central to this goal is finding adequate methods for detecting changes in known alien species populations, detecting new introductions of species from established populations in the Main Hawaiian Islands, and detecting unexpected introductions. This was the first year of a new collaboration between Scott Godwin, Resource Protection Specialist for Papahānaumokuākea Marine National Monument, NOAA Office of National Marine Sanctuaries, and Dr. Megan Donahue, Assistant Researcher at Hawai'i Institute of Marine Biology that focused on developing efficient detection and monitoring protocols for alien marine invertebrate species in the Northwestern Hawaiian Islands (NWHI).





On a research cruise in May 2010, there were two goals: (i) perform broad surveys and collections for alien species focused in areas with substantial anthropogenic structures, such as the docks, sea walls, and discarded materials found at most atolls, and (ii) compare previous survey methods for detection and assessment of alien species populations focused on pier structures at Midway Atoll.

Surveys and collections for alien marine invertebrates were performed at Tern Island and La Pouse Pinnacle at French Frigate Shoals; shallow nearshore locations at Lisianski Island; Southeast Island at Pearl & Hermes Atoll; and the Tug Pier, East Island Pier, Fuel Piers, and Inner Harbor seawall at Midway Atoll. As of December 2010, the preliminary analysis of samples collected during the May 2010 cruise has produced five new records of alien marine invertebrates in the NWHI: *Zoobotryon verticillatum*, a bryozoan found at Midway Atoll, a new record for the NWHI; *Sabellestarte spectabilis* (see image), a feather duster worm recorded at Midway Atoll, a new record for the NWHI; *Polycarpa aurita*, an alien tunicate found at Pearl & Hermes Reef, previously found at French Frigate Shoals in 2008; *Microcosmus exasperatus*, an alien tunicate found at Pearl & Hermes Reef and Kure Atoll, a new record for NWHI; and *Phallusia nigra*, an alien tunicate found at Midway Atoll, a new record for NWHI.

When comparing previous methods for detection and assessment of alien marine populations, several challenges to alien species detection were encountered: (i) large variation in the abundance of focal species requires different detection methods for different taxa; (ii) clear differences in habitat preference among taxa, even in a small area, indicate the necessity of stratified sampling; and (iii) the presence of unknown hydroids and unknown bryozoans indicate the benefit of expert surveyors and the combination of in-situ quantification with photo-documentation and collection. These research challenges are the next step in developing stringent alien marine detection protocols.

Unique Hawaiian Fishes Comprise Deep Coral Reefs

Another year of groundbreaking discoveries from Papahānaumokuākea Marine National Monument included the finding that deep coral reef fish communities are dominated by endemic fishes found only in Hawai'i. Scientists on a 2010 research cruise used technical diving equipment to reach depths as great as 250 feet to continue the characterization of deep reef ecosystems. Newly discovered species include one species of butterflyfish, one species of branching coral, and many possible new species of marine algae. Unique Hawaiian endemic species were found to comprise



more than 90% of the fish communities at these depths, representing the highest level of endemism recorded in any marine ecosystem on earth. These discoveries underscore the importance of the protected status of the Northwestern Hawaiian Islands and the need for continued research in the mesophotic zone, which lies between shallow waters researched by traditional diving methods and extreme depths researched by deep sea submersibles. Papahānaumokuākea is a hotbed for previously undiscovered Hawaiian endemic species due to its geographic isolation and ancient age. Future studies aim to more fully characterize the organisms that live in these depths, in order to better understand the complexity and uniqueness of Papahānaumokuākea Marine National Monument.

Mālamalama ka lā nui a Kāne puka i Ha'eha'e
 Apakau ke kukuna i ka 'ili kai o nā kai 'owalu
 He 'ike makawalu ka'u e 'ano'i nei,

He Hu'aka  **CONSERVATION AND MANAGEMENT**

Kū'ono'ono ka lā nui a Kāne puka i ke kapa 'ehukai o Ka'ula
 Summary

Seven conservation and management permits were issued in 2010 (Table 9). Four permits were issued for the operation of research vessels in support of separately permitted activities. One permit was issued to conduct maritime heritage conservation and management activities, and another permit was issued for Hawaiian monk seal conservation.

Table 9. Affiliations of Conservation and Management permittees and their respective projects that were issued a permit in 2010.

Conservation and Management Permittee Affiliation	Number of Permits Issued	Permitted Conservation and Management Projects
Monument Co-Trustees	1	<ul style="list-style-type: none"> Co-Trustee conservation and management activities
NOAA Office of Marine and Aviation Operations	3	<ul style="list-style-type: none"> Support for Permitted Activities Aboard NOAA Ship <i>Oscar Elton Sette</i> Support for permitted activities aboard NOAA Ship <i>Hi'ialakai</i> Support for permitted activities aboard NOAA Ship <i>McArthur II</i>
NOAA National Ocean Service Office of National Marine Sanctuaries	1	<ul style="list-style-type: none"> Maritime Heritage Conservation and Management Activities
NOAA National Marine Fisheries Service Office of Protected Resources	1	<ul style="list-style-type: none"> Monitoring Shark Activity at Select Hawaiian Monk Seal Pupping Sites of French Frigate Shoals and the Removal of Predatory Sharks from These Areas
University of Hawai'i, Marine Center	1	<ul style="list-style-type: none"> Support for Permitted Research Activities Using University of Hawaii Research Vessel <i>Ka'imikai-o-Kanaloa</i>*

* Conservation and management permitted project was not conducted in 2010.

In addition, a single conservation and management permit is issued annually, pending a stringent review process, to the Monument Co-Trustee agencies for conservation and management activities conducted within the Monument (including, for example, the operation and maintenance of field stations and camps at Midway Atoll, Laysan, and French Frigate Shoals; marine debris removal activities; and invasive and endangered species monitoring). A conservation and management permit of this nature is necessary for continued cooperative and effective management of Monument resources.

Table 10 outlines the activities permitted under the conservation and management Monument Co-Trustee permit. Reports of activities conducted under this permit are logged and monitored in the same manner as activities conducted under separate permits; and all reports are shared among Co-Trustee agencies in order to facilitate cooperative management of all Monument resources.

Reports of management activities can be found online at http://papahānaumokuākea.gov/management/managers_reports.html.

The sunrise of Kane at Ha'aha'e shines bright
 The rays of the sun spread throughout Hawai'i
 I yearn for the deep knowledge
 The knowledge of Kanaloa who lives in the ocean
 The Ha'akai wind is of Lehua that swims in the sea

Table 10. Activities conducted under the conservation and management Monument Co-Trustee permit in 2010, for the Department of Commerce, National Oceanic and Atmospheric Administration; the Department of the Interior, U.S. Fish and Wildlife Service; and the State of Hawai'i, Department of Land and Natural Resources.

Marine Vessel <i>Grendel</i> Salvage Activity	Management and Operation of Laysan Island Field Station
Nihoa Millerbird Translocation Project	Management, Operation, and Maintenance of Midway Atoll Field Station
Lead Contaminated Soil Removal Assessment at Midway Atoll	Management and Operation of French Frigate Shoals, Tern Island Field Station
Polychlorinated biphenyls (PCB) Remediation Study on Kure Atoll	Maintenance and Operation of Hawaiian Monk Seal Monitoring Field Stations
Installation of Video Camera at Trig Island, French Frigate Shoals for Shark Monitoring	Management and Operation of Kure Atoll Field Station
U.S. Department of Agriculture Mosquito Surveys at Midway Atoll	Midway Tide Gauge Station Maintenance

Love for

Conservation and Management Highlights

Developing Appropriate Techniques for Monitoring and Translocation of the Nihoa Millerbird

The U.S. Fish and Wildlife Service (FWS) conducted a Nihoa Millerbird monitoring expedition in September-October 2010. The principal objectives of the expedition were to develop Nihoa Millerbird translocation methods and standardize population monitoring, including habitat preferences. The Nihoa Millerbird is critically endangered, endemic to Nihoa Island, and found only in the Northwestern Hawaiian Islands.

Activities included mist-netting and banding individual birds for future identification and population monitoring. Limited captive feeding trials were also conducted in order to develop appropriate translocation methods. Transect locations were determined by the use of an aerial photograph of the island and Global Positioning System (GPS) coordinates that were obtained during a previous October 2008 census. Fifty-two transects on Nihoa Island were carefully surveyed, totaling an area of 214,500 ft². Within this area, 16 millerbirds were detected. Compared to previous years, more banded individuals were re-sighted during this trip than in 2009. Continued emphasis in the future on



banding and collecting quality re-sight data could eventually allow the use of mark-recapture models to better understand Nihoa Millerbird population dynamics. This information would be critical in future management actions to stabilize the Nihoa millerbird population on Nihoa. The feeding trials were successful in demonstrating the use of appropriate techniques required to support the birds for the time necessary to translocate them from Nihoa to Laysan Island. This potential translocation would provide a buffer against catastrophic declines in the current natural population.

*Malamalama ka lā nui a Kane puka i Ha'eha'e
Apakau ke kukuna i ka 'ili kai o nā kai 'owalu
He 'ike makawalu ka'u e 'ano'i nei,
'O nā au a hō o Kanaloa Haunawela noho i ka moana nui
He Hu'aka makani o Lehua 'au i ke kai*

In order to carry out the project, FWS partnered with Pacific Rim Conservation to assist in managing field operations. Ms. Walterbea Aldeguer, of the Native Hawaiian Cultural Working Group, also took part in the expedition as a Native Hawaiian cultural guide on Nihoa.

These partnerships are an example of incorporating varied skill sets and knowledge systems to ensure the protection of all of the resources within Papahānaumokuākea.

Salvage of Sailing Vessel Grendel at Kure Atoll

A team from the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Navy returned to Pearl Harbor in late July, with the remains of a 33-foot-long, steel-hulled sailboat that ran aground on a reef off Kure Atoll in late 2006 or early 2007. Monument managers enlisted the support of the Navy Mobile Diving and Salvage Unit One (MDSU-1) and United States Naval Ship (USNS) *Salvor*, tasked by Commander, Pacific Fleet, to salvage the sailing vessel (SV) *Grendel* and bring it to Honolulu to be recycled. The SV *Grendel* was last seen inside Kure Atoll lagoon with its solo captain in October 2006. The wreckage of the boat was discovered in about 10 feet of water in June 2007. Scott Godwin, Papahānaumokuākea's Resource Protection Specialist for NOAA Office of National Marine Sanctuaries, guided MDSU-1 to the SV *Grendel* and provided oversight as divers removed large quantities of sand and debris from the sailboat and began attaching lift bags to the hull. After the boat was refloated, it was towed into deeper water and lifted by crane onto the deck of USNS *Salvor*. The steel hull and other metal from the SV *Grendel* were transported to Schnitzer Steel Hawaii Corp. for recycling. Non-metal debris was taken to Covanta Energy's H-POWER Plant to be burned to produce electricity. In addition, USNS *Salvor* hauled back accumulated marine debris from Kure Atoll and scrap metal from Midway Atoll for recycling on O'ahu. Both Schnitzer Steel Hawaii Corp. and Covanta Energy are private-sector partners in the NOAA Marine Debris Removal Program. The Navy divers used the opportunity to practice their salvaging as an innovative readiness training (IRT) evolution, which allows for improvements in military readiness while providing quality services to the community. For MDSU-1 the project provided real-world training in a relatively non-threatening environment. David Swatland, Papahānaumokuākea's NOAA Deputy Superintendent for Policy and Programs said, "This successful cooperative venture between the Monument managers and the Navy will hopefully be a model for future efforts to remove marine debris from the Northwestern Hawaiian Islands. Marine debris poses serious danger to marine life and the entire ecosystem and is accumulating in the Monument faster than authorities can remove it."



US Navy diver during the lifting phase of the S/V *Grendel* in Kure Atoll lagoon. Photo by: L. Scott Godwin



Loading the S/V *Grendel* aboard the USNS *Salvor* outside of the lagoon at Kure Atoll. Photo by: L. Scott Godwin

The sunrise of Kane at Ha'eha'e shines bright
 The rays of the sun spread throughout Hawai'i
 I yearn for the deep knowledge
 In the ocean

EDUCATION

Summary

Six education permits were issued in 2010 (Table 11). Of these permits, three were issued to conduct university-level field classes and study-aboard courses to further the educational value of the Monument. One permit was issued to provide an environment for increased integration of western science and Native Hawaiian traditional knowledge systems. Another education permit was granted to the Waikiki Aquarium in affiliation with the University of Hawai'i, to gather selected reef fish and coral samples in minimal quantities necessary to create an educational exhibit showcasing the unique natural resources of Papahānaumokuākea for a wide audience to experience and appreciate.

Table 11. Affiliations of Education permittees and their respective projects that were issued a permit in 2010.

Education Permittee Affiliation	Number of Permits Issued	Permitted Education Projects
Duke University, Division of Marine Science and Conservation	1	<ul style="list-style-type: none"> Marine Conservation Biology Field Studies Course on Midway Atoll
NOAA National Ocean Service Office of National Marine Sanctuaries, Papahānaumokuākea Marine National Monument	2	<ul style="list-style-type: none"> Holo i Moana: 'A'ohē Pau ka 'Ike i ka Halau Ho'okahi: To Seek Deeper Knowledge: Not All Knowledge Is Found In One School Increasing Knowledge and Appreciation of PMNM by Producing Outreach Products, Including Photography and News Features For Use with KGMB, KHNL, and KFVE Stations*
University of Hawai'i at Mānoa, Department of Geography	1	<ul style="list-style-type: none"> "UH @ SEA," Marine Conservation Field Studies Expedition
University of Hawai'i at Hilo, Department of Marine Science	1	<ul style="list-style-type: none"> Comparison of Ecological Frameworks between Midway Atoll and Hawai'i Island in Alignment with Native Hawaiian Worldview of Kinship and Connectivity between Man and the Environment
Waikiki Aquarium	1	<ul style="list-style-type: none"> Live Reef Fish and Coral Collection Activities

* Education permitted project was not conducted in 2010.



Duke University students taking part in habitat restoration on Midway. Photo by: Dave Johnston



Education Highlights

Students Bridge Native Hawaiian and Western Science Methods

University of Hawai'i (UH) Hilo students visited Midway Atoll (or Pihemanu) April 12-19, 2010, as part of a marine science course entitled, "Kū'ula: Integrated Sciences in Hawai'i." The course was taught by Marine Science Associate Professor Misaki Takabayashi and Kīpuka Native Hawaiian Student Center. The group consisted of four graduate students, six undergraduates, two Kīpuka faculty members, the course instructor, and two Monument staff.

The purpose of the semester-long course was to integrate Native Hawaiian epistemology into research that underlines resource management in Hawai'i. Students in the Kū'ula class explored ways to understand the natural environment of Hawai'i Island and Pihemanu by quantitative methods that drew from both Native Hawaiian and Western sciences with assistance from cultural practitioners, academics, and agency partners. "Western science is often accepted as the only method of inquiry, even in Hawai'i," Takabayashi said. "This course integrates Native Hawaiian and Western knowledge systems to understand the environment of Hawai'i today, which reflects the direction that conservation science is now taking."



Kū'ula 2010 participants.
Photo by: Narrissa P. Spies

One group of students researched the process of interpreting Hawaiian place names, including the *ike*, or knowledge, of the resources found within a place-name. Another group combined traditional methods with nutrient analysis to investigate the possibility of using different types of abundant vegetation found on Pihemanu and Hawai'i Island as fertilizer or mulch. Other students applied their prior knowledge of traditional navigation to better understand the celestial cues influencing marine life. The shark, or *manō*, attracted the attention of another group of students motivated to research and map historical *mo'olelo* (stories), *ka'ao* (legends), and contemporary sightings of sharks as *'aumakua* and sharks as predators. These students created a geodatabase to illustrate the locations of these accounts, complete with English translations and species information for the Main Hawaiian Islands and Pihemanu. The projects connected the students to Native Hawaiian scholars like Kalei Nu'uhiwa and Roxanne Stewart of the Edith Kanaka'ole Foundation, ancestral knowledge found in *heiau* architecture, *mele* (poetry) and *mo'olelo*, and in themselves as *keiki o ka 'āina* (children of the land).

All student projects were presented at the Monument's Mokuāpapa Discovery Center in Hilo, Hawai'i in May 2010 and at the 2010 Hawai'i Conservation Conference in August. Professor Takabayashi and a select group of students were also invited to the 2010 Science in Society Conference held in Madrid, Spain in November to share further successes of the Kū'ula program. Another of the many accomplishments of the 2010 Kū'ula class was strengthening partnerships among Monument management agencies and a sharing of cultural knowledge with staff on Pihemanu. Supporters and sponsors for the 2010 project included NOAA, U.S. Fish and Wildlife Service, and the National Science Foundation's Center for Research Excellence in Science and Technology project at Hilo.



Holo i Moana: ‘A‘ohe Pau ka ‘Ike i ka Halau Ho‘okahi: “To seek deeper knowledge: Not all knowledge is found in one school,” An Interdisciplinary Expedition

In June 2010, a group of western scientists, Native Hawaiian cultural researchers, Monument managers, educators and cultural practitioners journeyed to Nihoa, Mokumanamana and French Frigate Shoals aboard NOAA Ship *Hi‘ialakai* as part of an interdisciplinary cruise known as Holo i Moana. The group joined forces to conduct standardized ‘opihi survey protocols in order to document the abundance and size of ‘opihi and other intertidal inhabitants within the NWHI. Cultural practitioners, Monument managers and educators also worked with western scientists on an apex predator (large fishes and sharks) tagging project and accompanied a Fish and Wildlife Service archeologist on land at Mokumanamana and Nihoa to conduct surveys and observations. The group worked together on all three projects to analyze and interpret the data collected on the expedition through different scientific, cultural, and educational “lenses.” All participants spent a lot of time aboard *Hi‘ialakai* talking and educating each other about their backgrounds and interactions with the natural environment. B. Kaleo Wong, a natural resources conservation worker and a member of the Holo i Moana expedition, supports the concept of marrying scientific approaches with traditional knowledge. “It’s a great idea,” he said. “We can’t just have one and think that’s the way we should do everything, especially dealing with Hawaiian species and environment. To the Hawaiian people we see that we are part of the environment, not just people who came here. We evolved with the environment, so we have lineal connections to these species.”



*Mālamalama ka lā nui a Kane puka i Ha'eha'e
 Apakau ke kukuna i ka 'ili kai o nā kai 'owalu
 He 'ike makawala ka'u e 'ano'i nei,*

'O nā au a... **NATIVE HAWAIIAN PRACTICES**

Kū'ono'ono ka... **Summary**

'O Kū i ka... Presidential Proclamation 8031 recognized Papahānaumokuākea's cultural significance to Native Hawaiians and a connection to early Polynesian culture worthy of protection and understanding. Highlighting that importance is Papahānaumokuākea's Native Hawaiian Practices permit category, allowing specifically for activities to perpetuate traditional knowledge and strengthen indigenous connections to the Northwestern Hawaiian Islands. In 2010, one Native Hawaiian Practices permit was issued to perpetuate traditional feather gathering activities (Table 12). The following section provides details highlighting the partnerships involved in initiating such a project.

Hua ka 'ohua, **Table 12. Affiliations of Native Hawaiian Practice permittees and their respective projects that were issued a permit in 2010.**

Native Hawaiian Practices Permittee Affiliation	Number of Permits Issued	Permitted Native Hawaiian Practices Projects
Daughters of Hawai'i, Royal Order of Kamehameha Ekahi	1	<ul style="list-style-type: none"> Traditional Feather Gathering Activities for the Restoration of Hawaiian Cultural Implements*

* Native Hawaiian Practices project was not conducted in 2010.



Night view of cultural sites on Mokumanamana. Photo by: B. Kaleo Wong

The sunrise of Kane at Ha'aha'e shines bright
The rays of the sun spread throughout Hawai'i
I yearn for the deep knowledge
The knowledge of Kanaloa who lives in the ocean
The Ha'akaa wind is of Lehua that swims in the sea

Native Hawaiian Practices Highlight

Honoring Ancient Kāhili

In 2010, work began to obtain the necessary permits and authorizations to bring a group of Native Hawaiian practitioners to Midway Atoll (or Pihemanu) to perform traditional protocols and practices necessary to gather feathers for the construction of kāhili, to be preserved at Queen Emma Summer Palace in Nu'uuanu, O'ahu. The project required several migratory bird permits issued from the U.S. Fish and Wildlife Service (FWS) under the Migratory Bird Treaty Act, as well as a Papahānaumokuākea Native Hawaiian Practices permit to gather feathers found on the ground from the Laysan albatross or moli, the Red-tailed tropicbird or koa'e ula, and the Frigate bird or 'iwa.



Original kāhili from the estate of Queen Lili'uokalani. Photo by: Lasha-Lynn Salbosa

The FWS Refuge Manager for Midway Atoll National Wildlife Refuge has been providing logistical support for the project which is overseen by the Daughters of Hawai'i. Since 1915, the Daughters of Hawai'i have cared for several regalia kāhili originally from the estate of Queen Lili'uokalani. The Daughters of Hawai'i founded in 1903, own and maintain the Queen Emma Summer Palace (also known as Hānaiakamālama) and the Hulihe'e Palace at Kailua-Kona, Hawai'i. *Na Kiamanu O Hānaiakamālama* (the Feather Gatherers of Hānaiakamālama), as the group has been called, has received a grant from the Office of Hawaiian Affairs.

Initially the project was only to clean the existing regalia kāhili in the Palace. Working together, Shad Kāne, noted cultural practitioner and expert kāhili maker, and Gerry Miyamoto, former Regent of the Daughters of Hawai'i, consulted other museums in Hawai'i as to the best method to proceed. They and the Board of Directors of the Daughters concurred that cleaning would be the best approach; they would leave the kāhili in their original state after the cleaning process. This way, visitors and students to the Palace would be able to view the kāhili as they were constructed originally. Adding to or altering the kāhili would not give the viewer an accurate picture of ancient methods. To bring the kāhili as close as possible to their original state would further enhance an appreciation of what the Hawaiians of old accomplished in earlier times in this particular task.

However, as the work progressed, the cleaning project morphed into another more interesting direction. The practice of feather gathering had largely been forgotten in recent Hawaiian culture; so the two workers decided to try to recreate the ancient practice, using Hawaiian protocol, in the 21st Century. Five individuals are involved, each having a specific kuleana once arriving on Pihemanu: The project director is responsible for overseeing all details; the kahuna, as a protocol specialist; the videographer/recorder; and two kiamanu, Kāne and Miyamoto, tasked with feather gathering and keeping a written journal of each day's activities.

The final outcome of this endeavor is twofold; each is equally important. Resurrecting the past practice of feather gathering and bringing it into the future is one aspect. The new kāhili to be constructed will be a symbol, a visual form of the project to give the community a better understanding of this ancient part of the Hawaiian culture and our present connection to the Northwestern Hawaiian Islands.

"We are grateful to the Office of Hawaiian Affairs for recognizing the importance of this project and for the funding it has provided," Miyamoto says. "We are also grateful to the Daughters of Hawai'i for their support and the continuation of their mission via this educational venture." After much preparation, the group is not slated to begin on Pihemanu until summer 2011.



Revered kāhili on display at Queen Emma Summer Palace. Please consult museum officials before attempting to photograph items on display. Photo by: Lasha-Lynn Salbosa

*Malamalama ka lā nui a Kane puka i Ha'eha'e
 'Apakau ke kukuna i ka 'ili kai o nā kai 'ewalu
 He 'ike makawala ka'u e 'ano'i nei,*



RECREATION

*He Hu'akaa'ka mukani o Lenua 'ua i ke kua
 Kū'ono'ono ka lā Summary ana i ke kapa 'ehukai o Ka'ula*

A single recreation permit was issued in 2010, to the U.S. Fish and Wildlife Service National Wildlife Refuge System, to administer the Visitor Services Program at Midway Atoll, in accordance with refuge system requirements (Table 13). Under Monument regulations (Proclamation 8031) recreation activities are permitted in the Monument only within the Midway Atoll Special Management Area. All research permittees that may visit Midway Atoll to resupply are also covered under the FWS recreation permit.

Table 13. Affiliations of Recreation permittees and their respective projects that were issued a permit in 2010.

Recreation Permittee Affiliation	Number of Permits Issued	Permitted Recreation Projects
U.S. Fish and Wildlife Service, National Wildlife Refuge System	1	<ul style="list-style-type: none"> Administering the Visitor Services Program at Midway Atoll

*Hua ka 'ōpua lū'ua ke kōkō
 Aloha kaha
 Hanau ka
 He 'ina'i
 Manomano ka 'ike lū'ua o ka noupo o Kanaloa
 Koiko'i lua ho'i no ka lehulehu, 'o ku'u luki ia
 Hanohano wale ka 'aina kūpuna, 'o nā moku lē'ia
 No Papahānaumokuākea lā he inoa*



Photo by: Andy Collins

The sunrise of Kane at Ha'aha'e shines bright
 The rays of the sun spread throughout Hawai'i
 1 year for the deep knowledge
 In the ocean

SPECIAL OCEAN USE

Summary

Eight special ocean use permits were issued in 2010 (Table 14). One permittee is seeking to create multimedia art projects, to raise awareness of effects of plastic pollution and further 'bring the place to the people.' A second permittee sought to conduct remote amateur radio activities. The remaining special ocean use projects all provided an opportunity for visitors to experience briefly the extent and beauty of Papahānaumokuākea, and give back to these resources by means of limited and supervised volunteer work on Midway.

Table 14. Affiliations of Special Ocean Use permittees and their respective projects that were issued a permit in 2010.

Special Ocean Use Permittee Affiliation	Number of Permits Issued	Permitted Special Ocean Use Projects
WINGS Birding Tours	1	• Tour Group Activities to Midway Atoll for Bird Watching and Natural History Observation
Joseph Van Os Photo Safaris	1	• Photo Documentary Activities on Wildlife, Cultural and Historic Features of Midway Atoll
DUMA Naturreisen	1	• Guided Eco-tourism Activities on Midway Atoll
Oceanic Society	1	• Educational and Volunteer Activities on Midway Atoll
Oceanic Wildlife Society	1	• Guided Eco-tour and Volunteer Activities on Midway Atoll*
Wildlife and Nature Travel	1	• Wildlife and Nature Travel Tour to Midway Atoll
Chris Jordan Photography	1	• Collection of Albatross Photographs and Limited Marine Debris to Generate Multimedia Art Focusing on the Effects of Plastic on the Albatross Population at Midway Atoll
Galapagos Travel	1	• Filming Ham Radio Activities on Midway Atoll

* Special Ocean Use project was not conducted in 2010.

The sunrise of Kane at Ha'aha'e shines bright
The rays of the sun spread throughout Hawai'i
I yearn for the deep knowledge
In the ocean

WHAT DOES IT MEAN TO BE A MIXED NATURAL AND CULTURAL WORLD HERITAGE SITE?

World Heritage Significance

On July 30, 2010, Papahānaumokuākea Marine National Monument was added to the prestigious United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage List at its annual meeting in Brasilia, Brazil. Papahānaumokuākea is the nation's first site designated for its outstanding value as both a natural and cultural heritage site. World Heritage listing acknowledges the historical, cultural or natural value of a site, as well as the commitment of the sovereign nation and the site's owners to its long-term protection and management.

The islands and seascape were inscribed as a spectacular example of evolution in isolation, resulting in a great number of marine and terrestrial flora and fauna unique to Papahānaumokuākea. The tiny islands and atolls provide nesting and foraging grounds for 14 million seabirds, making it the world's largest tropical seabird rookery. Sharks and other large apex predators are abundant in the waters of Papahānaumokuākea. Additionally, the region provides the only remaining habitat for several endangered species, such as the Laysan duck and Nihoa millerbird and provides critical habitat for the Hawaiian monk seal. Two of the islands in Papahānaumokuākea feature the highest concentrations of ritual sites in Hawai'i and bear remarkable testimony to the shared historical origins of Polynesian societies. In predominant Native Hawaiian tradition, Papahānaumokuākea is believed to lie within the place where life originates and to which it returns.

World Heritage designation does not change the Monument's management structure and Papahānaumokuākea will continue to be managed to ensure the conservation and preservation of the Monument's relatively pristine ecosystems and significant cultural heritage for future generations.

The United States nominated the Monument as a World Heritage site in 2009. The remote chain of atolls and surrounding waters is the first U.S. site to be added to the World Heritage List in 15 years. It joins 20 U.S. sites currently on the list, including the Grand Canyon and the Statue of Liberty.

- Visitation Facts: Three thousand miles from the nearest continent, Papahānaumokuākea spans a distance of 1,931 km (1,200 mi) across the North Pacific Ocean in the Hawaiian Archipelago and is approximately 185 km (115 mi) wide.
- Composing the northernmost three-fourths of the Hawaiian Archipelago, Papahānaumokuākea has become Hawai'i's second World Heritage Site. The first, Hawaii Volcanoes National Park, was inscribed in 1978.
- The remote reefs, islands and waters of Papahānaumokuākea are home to more than 7,000 species, approximately 25% of which are found nowhere else in the world.
- The Monument Management philosophy is to "Bring the place to the people," through a variety of media and web-based interactive experiences in order to help limit the human footprint on the remote region's near pristine ecosystems and cultural heritage for future generations.
- With the Monument philosophy in mind and by regulation, all access to and activities within the Monument are by permit only.
- The Monument's Mokupāpapa Discovery Center in Hilo on the island of Hawai'i offers virtual visitor opportunities to Papahānaumokuākea through exhibits, events, and educational programs.
- Strict carrying capacity guidelines limit visitor access and restrict it to Midway Atoll.

For more information, visit the Monument's web site: www.papahanaumokuakea.gov



Mele No Papahānaumokuākea

Cultural practitioners Kainani Kahaunaele and Halealoha Ayau made a gift of this *mele* (name song), *No Papahānaumokuākea*, to the Papahānaumokuākea Marine National Monument in November 2007. This *mele* celebrates Papahānaumokuākea's outstanding natural, historical, and cultural resources, and exemplifies the way in which the site's natural and cultural significances are intertwined. When chanted, such as in opening public meetings, the *mele* is offered in honor of and to give thanks to the place and to the *kūpuna* (elders).

No Papahānaumokuākea

Mālamalama ka lā nui a Kāne puka i Ha'eha'e
'Apakau ke kukuna 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 Hu'akai ka makani o Lehua 'au i ke kai
Kū'ono'ono ka lua o Kūhaimoana i ke kapa 'ehukai o Ka'ula
'O Kū i ka loulu, ulu a'e ke aloha no Nihoa 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 koholā
Aloha kahi limu kala, kia'i 'ia 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 huna o ka pa'akai
Manomano ka 'ike li'u o ka houpō o Kanaloa
Koiko'i lua ho'i no ka lehulehu, 'o ku'u luhi ia
Hanohano wale ka 'āina kūpuna, 'o nā moku lē'ia
No Papahānaumokuākea lā he inoa

- Na Kainani Kahaunaele a me Halealoha Ayau

The sunrise of Kāne at Ha'eha'e shines bright
The rays of the sun spread throughout Hawai'i
I yearn for the deep knowledge
The knowledge of Kanaloa who lives in the ocean
The Hu'akai wind is of Lehua that swims in the sea
Rich is the pit of Kūhaimoana in the seaspray of Ka'ula
Kū is of the loulu (endemic fan palm) and our respect grows for
Nihoa, isle of birds
Manu o kū (white tern) flies in a bunch and leads the nation
The multiple forms of Hina of coral and moon
The 'ōhua (juvenile wrasse, tang, unicorn, parrot fish) spawns,
the whale dives
Love for the limu kala (Sargassum seaweed), whose land
counterpart is the 'ākala (Hawaiian raspberry)
The pe'a (Hawaiian bat) gives birth to the pe'ape'a (starfish) in
the sea
The 'ina (endemic sea urchin) is the seasoning, delicious with salt
The deep knowledge of our Kūpuna lies in the depths
Extremely important for us to grasp, it is my passion
Honored of the land of my ancestors, the abundant islands
A name song for Papahānaumokuākea

- by Kainani Kahaunaele and Halealoha Ayau



Standing approximately 4 ft tall and 2 ft wide, Papahānaumokuākea's World Heritage site commemorative inscription plaque was created by Native Hawaiian artist and craftsman, McD Philpotts. The piece was designed as a Wa'a Hanauna or generational canoe, one that symbolizes the seamless unbreakable bond between the natural and supernatural. Embodying the journey made by our people across the vast Pacific in the ancient past, and today reaffirms that navigation and voyaging are our common Pacific Heritage. The Wa'a forms are used vertically to represent the generational voyage we are on to preserve our culture and the environment that sustains us.

The carving on each level of this piece is a traditional Hawaiian pattern that represents the human form with out-stretched arms to symbolize a unified community horizontally, which then supports each succeeding generation vertically. This pattern represents the multitude of generations, of which we are but one – the most recent in a long line of caretakers who set the foundation of how to mālama, care for, the Northwestern Hawaiian Islands. If we do our job right we will follow in their footsteps and ensure that this tradition of caring for Papahānaumokuākea is perpetuated.

Hanohano wale ka 'āina kūpuna, 'o nā moku lē'ia
No Papahānaumokuākea lā he inoa.



World Heritage Site Commemorative Inscription Plaque.
Photo by: Christopher Mew