PAPAHĀNAUMOKUĀKEA

Marine National Monument & World Heritage Site

PERMITTED ACTIVITIES
2011 ANNUAL REPORT

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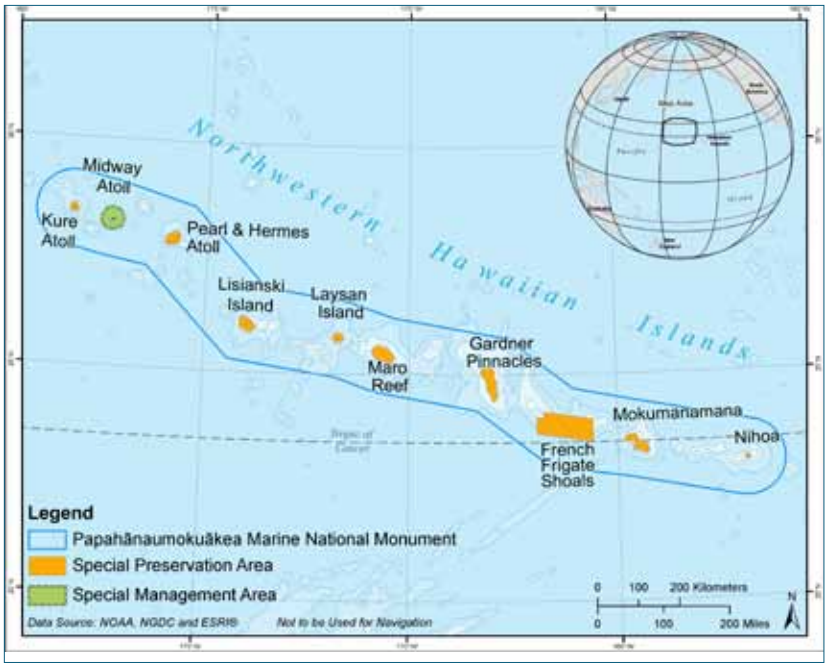
INTRODUCTION

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



The Monument 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 the National Oceanographic and Atmospheric Administration (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 the U.S. Fish and Wildlife Service (FWS). These areas remain in place within the Monument, subject to their applicable laws and regulations in addition to the provisions of the Proclamation. The Northwestern Hawaiian Islands 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 the Monument 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 cumulates over one hundred 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 arose 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. The Monument's stringent permitting process is the first line of defense against many of these threats. The permitting process allows for managing, monitoring, and reporting activities to evaluate and mitigate cumulative impacts.

In 2011, the Monument permitting process facilitated innovative habitat conservation actions, integration of Hawaiian cultural knowledge and practices with western approaches, and allowed scientists, managers and Native Hawaiian researchers to gain crucial knowledge about Papahānaumokuākea's natural and cultural resources through monitoring and observation. In addition, the permitting process provided once-in-a-lifetime opportunities for individuals to experience the Monument first-hand through access to


Photo by: Wayne Levin

Midway Atoll – the “window” to the Monument.

This year a unique partnership between the Hawai‘i Institute of Marine Biology, Papahānaumokuākea Marine National Monument, and the community-based ‘Opihi Project dove deep into integration of Native Hawaiian knowledge with intertidal ecosystem characterization research activities in the rocky intertidal zone at Nihoa, Mokumanamana (Necker Island), and French Frigate Shoals. Scientists from Scripps Institute of Oceanography; the University of Hawai‘i, Hawai‘i Institute of Marine Biology; Native Hawaiian researchers exchanged methods and approaches to observing and monitoring shorelines in the Monument. This unique, unprecedented approach to monitoring an ecosystem yielded the most comprehensive data collected to-date on intertidal ecosystems of the Northwestern Hawaiian Islands, and highlighted the central importance of continued integration of Native Hawaiian perspectives and input into all aspects of Monument management.

In another historic and collaborative project, the U.S. Fish and Wildlife Service (FWS), in partnership with the American Bird Conservancy embarked on an effort to save the Nihoa Millerbird from extinction by translocating Millerbirds from Nihoa to Laysan Island. Twenty-four Millerbirds were successfully released on Laysan Island in September. The release was the result of numerous years of research and detailed planning by biologists and resource managers. Success with the Millerbird translocation project continues - in March a Millerbird fledgling was born on Laysan, the first in nearly a century.

This report, produced annually since 2007, highlights the Monument’s joint permitting process and summarizes all permitted activities that occurred in 2011, 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: Hokuala Johnson


Photo by: NOAA Office of National Marine Sanctuaries

Timeline of Ecosystem Protections

1900's 1910's 1920's 1930's 1940's 1950's 1960's 1970's 1980's 1990's

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.

2000's *2010's*

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.

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.

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.

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.

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 Atoll National Wildlife Refuge, the Hawaiian Islands National Wildlife Refuge, the Battle of Midway National Memorial, Kure Atoll Wildlife Sanctuary, and overlaid with the Hawai'i State NWHI Marine Refuge. This designation is the first step towards coordinated management of the unique resources within the NWHI region.

2010
Delegates to the United Nations Educational, Scientific and Cultural Organization's (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.

MONUMENT PERMITTING PROGRAM

Papahānaumokuākea's permitting program is designed to manage and minimize human impact, while increasing the conservation protection for Papahānaumokuākea's natural, cultural, and historic resources. 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 deal 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. Vessels or persons passing through Papahānaumokuākea without interruption do not require a permit, 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 below.

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 much of the work conducted in the Northwestern Hawaiian Islands. For example, all personnel working with threatened or endangered species must be permitted under the Endangered Species Act. Anyone proposing to handle bird species must obtain one or more permits from the U.S. Fish and Wildlife Service Division of Migratory Bird Management. Scientists working with marine mammals must obtain one or more 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.

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

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

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: Hokuala Johnson

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.


Photo by: N. Kealiʻi Sagum

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 education 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.


Photo by: Lasha-Lynn Salbosa

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. Restrictions may be placed on recreation permits in accordance with the Midway Atoll National Wildlife Refuge Visitors Services Plan.

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.


Photo by: James D. Watt


Photo by: U.S. Fish and Wildlife Service


Photo by: James D. Watt

2011 PERMITTED ACIVITIES

CONDUCTED WITHIN THE MONUMENT

Permits Issued in 2011

Forty-eight permit applications were received in 2011. Of these applications, 37 met the permitting criteria, successfully completed the environmental review process and were issued. Seven applications were withdrawn by the respective applicant at different stages of the permitting process. The remaining four applications were significantly early in submission, and were thus accommodated in the 2012 calendar year for review. Figure 1 displays a comparison of the number of permit types issued from 2009-2011.

Figure 1. Number of Monument permits issued from 2009-2011 by permit type.

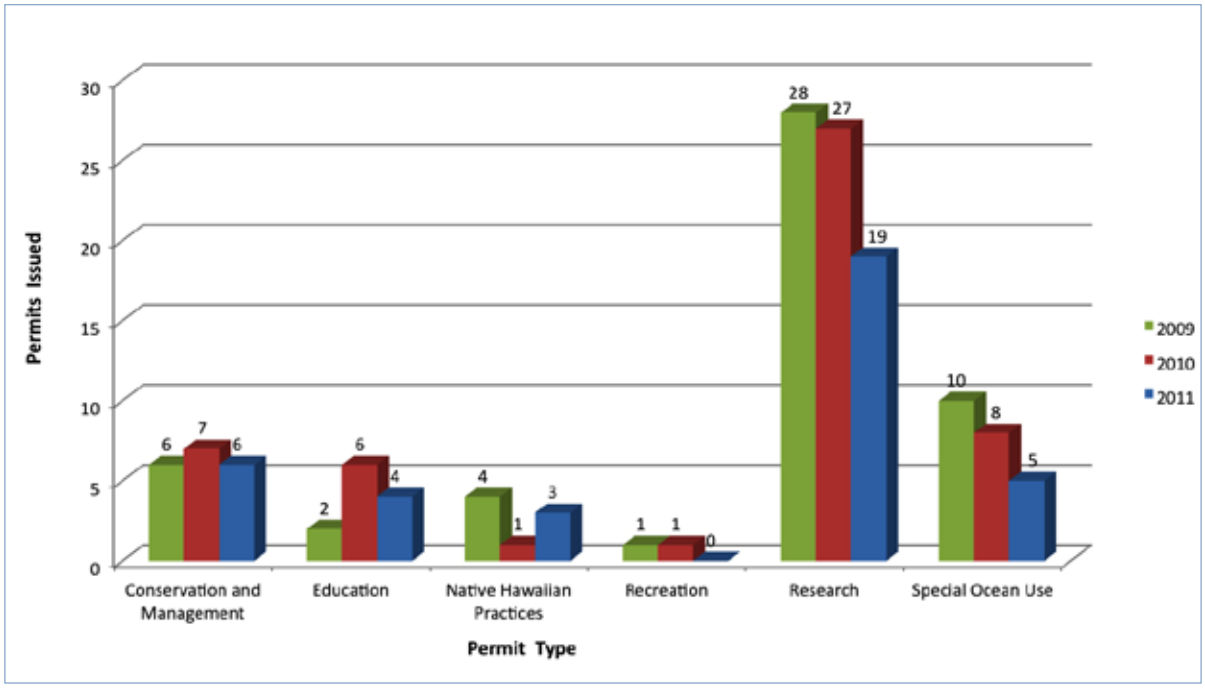



Photo by: U.S. FIsh and Wildlife Service

Although it may seem that fewer permitted activities occurred in 2011 compared to previous years, it is important to note that the Monument Co-Trustees grant both single and multi-year permits. At the beginning of calendar year 2011, the Monument permitting system was already tracking a record 33 permits that were issued prior to 2011 (Figure 2). Activities conducted under these permits occurred in 2011 and thus were monitored for permitting compliance and reporting requirements. For example, the Levels of Human Presence section describes both permits issued in 2011 and multi-year permits that were issued prior to 2011.

Multi-year permits are specifically for projects that must span two or more calendar years to complete the project objective and that occur outside State of Hawai'i waters

(defined as 0-3 nautical miles from emergent land, excluding Midway Atoll). In accordance with Hawaii Administrative Rules, the duration for a Monument permit in State waters is limited to no longer than one year from the date of issuance (HAR Title 13 § 60.5-6).

In the 2010 Permitted Activities Report, the Monument 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 3 shows the number of new versus renewal Monument permits issued in 2011. In order for a permit application to be considered a renewal, it must have been a previously permitted activity. Both new and renewal applications undergo the same rigorous joint-permitting review process. Single-year, multi-year, new, and renewal permit metrics are used to summarize and track Monument permits.

Figure 2. Number of Monument permits active prior to the start of calendar year 2011, 2010, and 2009.

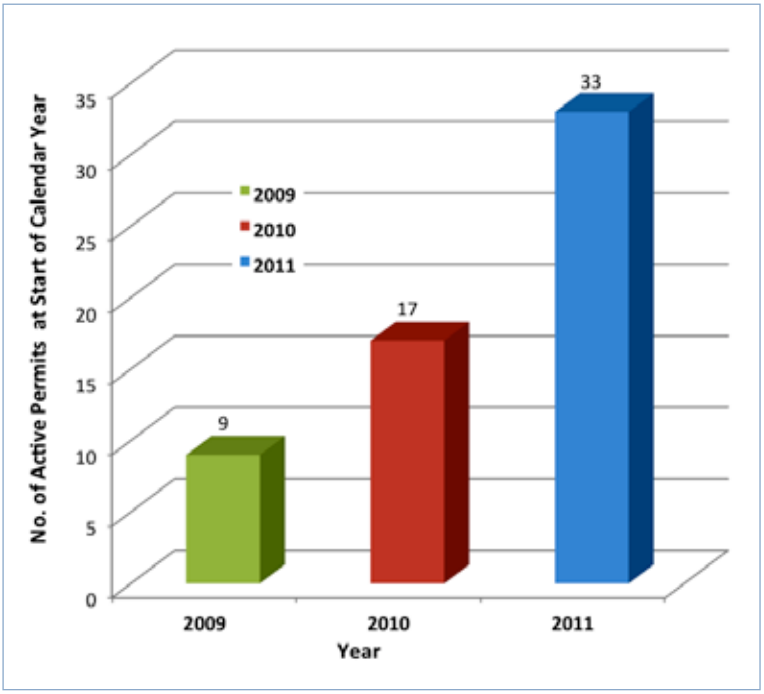
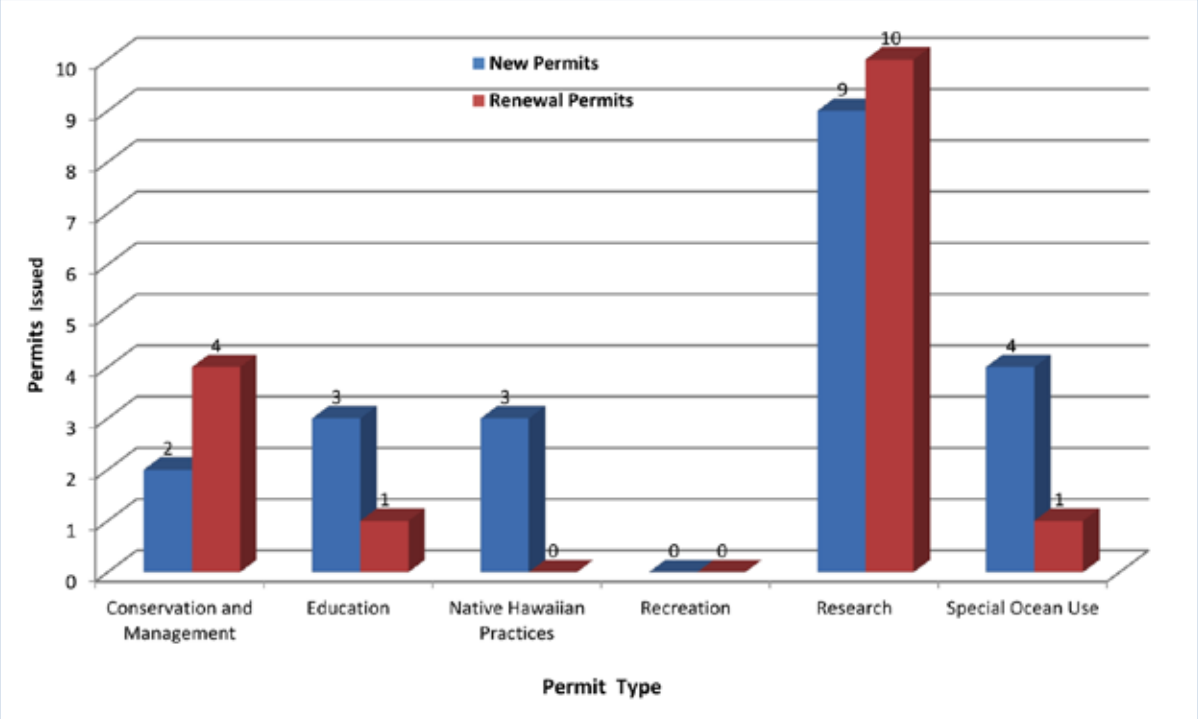


Figure 3. New and renewal permits in 2011 by permit category.



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. Documenting 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 continues to operate a small, functioning airport. In 2011, due to funding constraints and other infrastructure limitations, FWS closed the airstrip at Tern Island within French Frigate Shoals. Thus the only location equipped to accept aircraft within Papahānaumokuākea is the Midway Atoll National Wildlife Refuge. Table 1 indicates the number of permitted flights that occurred to and from the Monument in 2009-2011. Over the past two years (2010-2011), there was a 29 percent decrease in the total number flights in the Monument.

Table 1. The number of flights permitted to and from the Monument, in 2009 through 2011.

Airport/Airstrip Location	2009	2010	2011
French Frigate Shoals	13	11	0
Midway Atoll	87	61	51

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 2009-2011. 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 amount 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.

	2009	2010	2011
Vessel Entries and Exits (roundtrips)	18	19	22
Individual Vessels Used	8	6	8

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 2010 and 2011. Due to very low numbers of people on land per day throughout the reporting year, the data averages 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 74 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 2010 and 2011.

	2010			2011		
Island / Atoll	**Min**	**Max**	**Average**	**Min**	**Max**	**Average**
Nihoa	0	6	0.22	0	11	0.27
Mokumanamana	0	10	0.07	0	12	0.15
French Frigate Shoals	1	16	6.98	0	11	2.78
Laysan Island	6	18	8.09	6	11	2.95
Lisianski	0	2	0.44	0	8	0.74
Pearl and Hermes Atoll	0	4	0.66	0	7	1.81
Midway Atoll	69	88	79.82	59	77	68.67
Kure Atoll	0	13	3.36	0	13	5.22
TOTAL			**99.64**			**82.59**


Photo by: Andy Collins


Photo by: Andy Collins

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 2011, 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
Conservation & Management	362	331
Education	83	55
Native Hawaiian Practices	51	48
Research	251	116
Recreation*	-	-
Special Ocean Use	426	88
TOTAL	**1173**	**638**

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

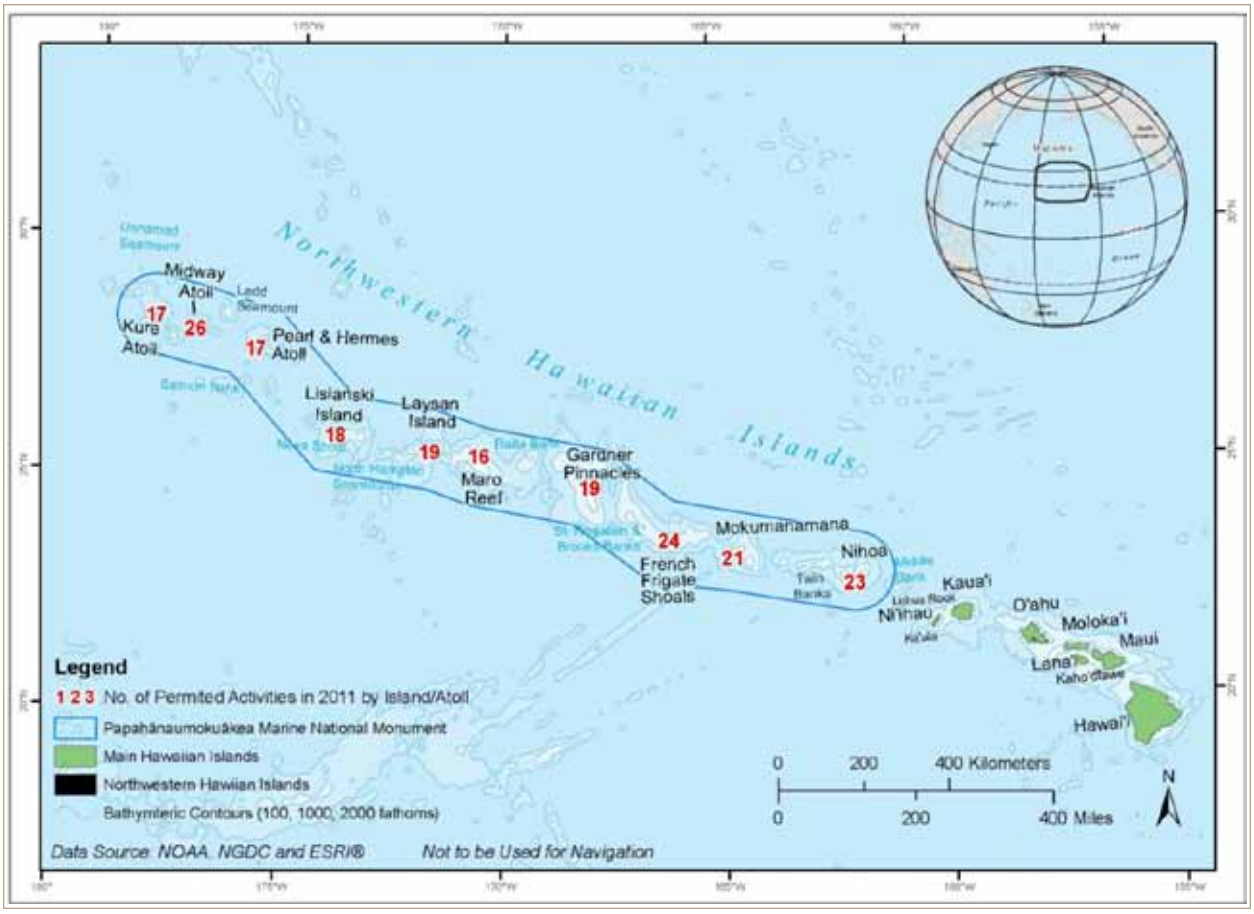

Photo by: James D. Watt


Photo by: James D. Watt

Locations of Permitted Activities

Figure 4 indicates locations at which permitted activities occurred in 2011. Of the 37 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 4. Locations of 2011 permitted activities. The number of permitted projects at each island or atoll is indicated in red.



Conservation and Management

Summary

Six conservation and management permits were issued in 2011 (Table 5). Three 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 5. Affiliations of Conservation and Management permittees and permitted projects in 2011.

Conservation and Management Permittee Affiliation	Number of Permits Issued	Permitted Conservation and Management Projects
Monument Co-Trustees	1	• Co-Trustee Conservation and Management Activities
NOAA Office of Marine and Aviation Operations	2	• Support for Permitted Activities Aboard NOAA Ship Oscar Elton *Sette* • Support for permitted activities aboard NOAA Ship *Hi'ialakai*
NOAA National Ocean Service Office of National Marine Sanctuaries	1	• Maritime Heritage Conservation and Management Activities
NOAA National Marine Fisheries Service Office of Protected Resources	1	• 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	• Support for Permitted Research Activities Using University of Hawaii Research Vessel *Kilo Moana*

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 6 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.

Table 6. Activities conducted under the conservation and management Monument Co-Trustee permit in 2011, 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.

Management, Operation, and Maintenance of Kure Atoll Field Station	Maintenance and Operation of Hawaiian Monk Seal Monitoring Field Stations
Management, Operation, and Maintenance of Midway Atoll Field Station	Nihoa Millerbird Translocation Project
Management, Operation, and Maintenance of Laysan Island Field Station	Monitoring French Frigate Shoals Green Turtle Populations
Management, Operation, and Maintenance of Tern Island Field Station	Seabird Tissue Archival and Monitoring Project (STAMP)
Emergency Repair of Tern Island Generator	Retrieval of One Ecological Acoustic Recorder (EAR) at Kure Atoll
Midway Tide Gauge Station Operation and Maintenance	Vessel Support for Conservation and Management Activities Aboard Marine Vessel Searcher
Marine Debris Cleanup and Recovery Project	Vessel Support for Conservation and Management Activities Aboard Marine Vessel Kahana
Soil Washing of Polychlorinated Biphenyl (PCB)-Contaminated Soils at Kure Atoll	


Photo by: U.S. Fish and Wildlife Service


Photo by: Phyllis Greenberg

Management Efforts to Save Hawaiian Monk Seals from Extinction


Photo by: NOAA/NMFS, ESA-MMPA permit #10137

The Hawaiian monk seal (*Monachus schauinslandi*; Hawaiian name: ʻilio-holo-i-ka-uaua) is one of only two mammal species endemic to Hawaiʻi. The species is critically endangered, with only around 1,100 seals remaining. The overall population is in decline. The majority of the population (~900 individuals) is found in the remote Northwestern Hawaiian Islands (NWHI), but is declining at about 4% per year, due to a host of threats which particularly impact juvenile survival (>80% of pups born die before reaching adulthood). In contrast, the Hawaiian monk seal population in the main Hawaiian Islands (MHI) is much smaller (~ 200 seals), but growing naturally due to high juvenile survival to reproductive age (~60%). NOAA's National Marine Fisheries Service (NOAA Fisheries) has been working for over three decades to manage, study, and recover this species, whose range extends from the main Hawaiian Islands all the way to Kure Atoll, the northernmost atoll in Papahānaumokuākea Marine National Monument ("Monument" or "PMNN"). Primary threats to monk seals in the Monument include food limitation for juveniles, shark predation on pups at some locations, entanglement in marine debris, male seal aggression on females and juveniles, and shoreline habitat loss.

NOAA Fisheries conducts a variety of conservation and management activities to promote the recovery of Hawaiian monk seals, an important species that inhabits all of Papahānaumokuākea's islands and atolls. French Frigate Shoals (FFS) historically had the largest population. However, in recent years FFS has had one of the worst juvenile survival rates of the entire archipelago, so the population is likely to soon crash and may disappear without recovery interventions. In 2011, 37 monk seal pups were born there. Each year, NOAA Fisheries field staff at FFS may disentangle monk seals from marine debris, provide health treatments, conduct translocations of weaned pups to islets with better survival, re-unite nursing mothers and pups, and mitigate male aggression towards pups and juveniles.

In addition to these recovery activities, NOAA Fisheries is faced with a unique challenge at FFS. In the late 1990s, a small number of Galapagos sharks began displaying the unusual behavior of coming into very shallow water and attacking nursing monk seal pups. Shark predation on pups of this age has been exceptionally frequent and consistent at FFS from 1997 to 2011, totaling approximately 212 pup deaths. During the same period of time, shark-caused pup deaths were largely absent at other NWHI monk seal breeding sites. Predation at FFS peaked in 1997-1999, and has since declined, but is still occurring at an unsustainable level of up to 30% of the pups born each year (~6-11 pups per year). While both Galapagos and tiger sharks are present in the area and potentially feed on marine mammals, only Galapagos sharks have been observed attacking and killing pups in near shore waters during thousands of hours of observation.

NOAA Fisheries' Hawaiian Monk Seal Recovery Program has engaged in mitigation activities, including harassment of sharks, intensive observation, translocation of weaned pups, and tests of deterrent devices. For instance, in 2011, 15 weaned pups were translocated within FFS to islets with less incidence of shark predation (prior to weaning, translocation of pups during the nursing period is not an option because

disrupting the maternal bond may result in death). NOAA Fisheries staff also mitigate the threat of predation through monitoring shark activity and attempting to lethally remove a limited number of adult Galapagos sharks that frequent the pupping islets during the monk seal breeding period (~20 individuals). Hawai'i Institute of Marine Biology shark ecologists have estimated the Galapagos population at FFS to be several hundred to over a thousand individuals; therefore, a removal of 20 sharks in the geographic margin of their range (i.e. shallow waters inside the atoll) is not expected to impact the population or the ecosystem. One shark was removed each year in 2010 and 2011.

The decision to remove sharks is a difficult one, especially as sharks (manō) can be 'aumakua (family spirit or guardian) in Hawaiian culture. In 2010, the Hawaiian Monk Seal Recovery Program coordinated with the Office of Hawaiian Affairs to reach out to the Hawaiian community and build relationships with cultural practitioners by having them participate on a monk seal cruise. This relationship continued in 2011 with a member of the PMNM Native Hawaiian Cultural Working Group participating in the FFS field camp for several weeks to observe activities firsthand and share his thoughts and experience. The Monk Seal Recovery Program is committed to working with the Hawaiian community to work towards increased mutual understanding and respect in the future.

Photo by: NOAA/NMFS, ESA-MMPA permit #10137

Photo by: NOAA

Photo by: NOAA/NMFS, ESA-MMPA permit #10137

Translocation Success with Endemic Millerbirds


Photo by: U.S. Fish and Wildlife Service

The islands of Papahānaumokuākea have lost numerous species as a result of human activities, including the Laysan millerbird (*Acrocephalus familiaris familiaris*), which went extinct in the early 1920s following the destruction of Laysan island's vegetation by introduced rabbits and other livestock. In September of 2011, 24 Millerbirds (*A. f. kingi*) were captured on Nihoa Island, where the only population remains, and transported 650 miles northwest by sea to become the first Millerbirds on Laysan Island in almost 100 years. The establishment of a self-sustaining Millerbird population on Laysan thus would re-establish a lost ecological connection on Laysan Island and minimize the risk of extinction for this species. The Millerbirds spent the voyage to Laysan in specially designed cages in a modified passenger cabin aboard the research vessel *M/V Searcher*. They thrived (on a diet mainly of mealworms) under the close supervision of avicultural specialists and a wildlife veterinarian. By September 10, when all 24 Millerbirds were released on Laysan, most birds had gained weight (an average of 5 percent) since their capture.

Two project biologists remained on Laysan to monitor the birds through the fall and winter. This first-ever opportunity to observe Millerbird behavior and ecology year-round, including the full breeding cycle, is a significant advance in the study of this endangered species. Males were singing and both sexes were defending territories within the first few weeks following release. The first evidence of nesting was observed 25 days following release. The initial nesting efforts, although ultimately unsuccessful, were exciting and encouraging: the Millerbirds clearly were acclimating rapidly to their new home. The Millerbirds have ranged greater distances on Laysan than on Nihoa. One bird made multiple trips to the south end of the island, more than a mile one way! However, most birds settled down near the release sites in the northern part of the island. Currently, 21 birds are known to have survived the winter, but given their cryptic, skulking nature, the three missing birds may have only escaped detection.

The project biologists observed the first nest-building activity of 2012 on Valentine's Day. As of this writing, a total of eight pairs are either breeding or intending to do so. One pair is feeding nestlings, two pairs are incubating eggs, another has a completed nest, and four more are nest-building. Two additional pairs are courting and expected to start building any time. The project team now waits with bated breath for the first Millerbird chicks to fledge on Laysan. The first successful nests will be a milestone in the Millerbird translocation project, but a self-sustaining population is still a long way off. A second translocation is planned to ensure a solid foundation for this nascent population; this effort may take place in 2012, funds permitting. The results of the project to date will be reported later this year at the Hawai'i Conservation Conference and the Fifth North American Ornithological Conference. The first manuscript for peer-reviewed publication is under development.


Photo by: U.S. Fish and Wildlife Service

Translocation has been successfully used to reintroduce Laysan ducks to Midway, but small insectivorous passerines pose much greater challenges for captive management, feeding, and veterinary care. This first Millerbird translocation is the culmination of more than five years of research and field work involving more than a dozen partners. The project provides a model of collaborative planning and funding and on-the-ground action for restoration of other endangered birds and island ecosystems.

EDUCATION

Summary

Four education permits were issued in 2011. Of these permits, two 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 gather broadcast news footage of current events and projects in the Monument. Another education permit was granted to the Waikīkī Aquarium in affiliation with the University of Hawai'i, to gather selected reef fish and coral samples in minimal quantities necessary to create enhance an educational exhibit showcasing the unique natural resources of Papahānaumokuākea for a wide audience to experience and appreciate. (Table 7)

Table 7. Affiliations of Education permittees and permitted projects in 2011.

Education Permittee Affiliation	Number of Permits Issued	Permitted Education Projects
KGMB/KHNL/KFVE - TV Stations	1	• Photographs and Video Film for 'Hawai'i News Now' Broadcasting Stations
Sea Education Association	1	• Sea Education Association Marine Conservation Field Studies Expedition
University of Hawai'i, Hawai'i Institute of Marine Biology	1	• Development of Multimedia Resources for Distance Learning Courses and Marine Exchange Programs *
Waikīkī Aquarium	1	• Waikīkī Aquarium Live Reef Fish and Coral Collection Activities

* Education project was not conducted in 2011.


Photo by: David Johnson


Photo by: 'Aulani Wilhelm

Education Highlights

Sea Education Association's Ocean Exploration Course

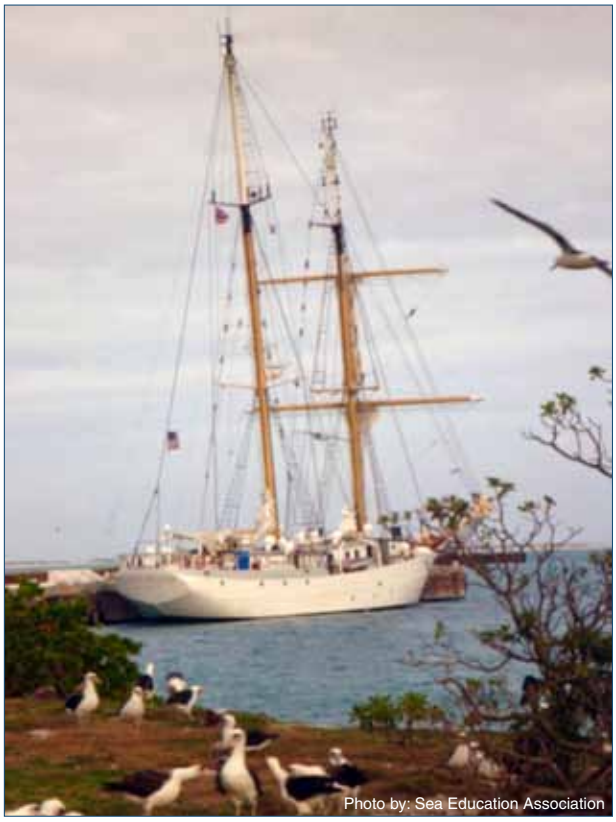


Photo by: Sea Education Association

Undergraduates sailing on voyage S234 aboard the Sailing School Vessel *Robert C. Seamans* experienced a terrific opportunity in their Sea Semester when they visited the Midway Atoll in Papahānaumokuākea Marine National Monument in April 2011. Students sailed from Honolulu, HI to Midway and returned to Honolulu. During this time, students gathered data for Oceanography projects, which they had designed during the six-week shore component in Woods Hole, Massachusetts. This shore phase also included coursework in Pacific history, literature and policy, including marine conservation. This background served to deepen students' appreciation of their visit, as did the welcome sight of land after two weeks at sea. As Jenna Walker Deckhand/Alumna wrote, "The respect shown to the environment, the Battle of Midway Memorial, and the Marine National Monument are very evident and could be felt immediately as we approached Midway."

Even before stepping off the vessel, it was clear that Midway was about wildlife not people, a lesson not lost and clearly appreciated by all. Just looking over the side of the boat after they tied up, student Kristin Forgrave noted, "We have seen fish and small sharks swimming around near the stern, and occasionally a turtle or two. The most amazing feature of the island was the birds, the thousands and thousands of birds in the air, on the ground, and with something to say! The experience of all this was far more visceral than intellectual, but it helped reinforce the lessons that everyone had been teaching and learning over the previous eight weeks. In many ways it was and is the lesson of these great places, reminding us all of the richness of the non-human world."

Sea Education Association (SEA) students stayed at Midway for two days. Half of the students and staff went ashore each day while the other half worked aboard the ship. Deckhand/Alumna Jing Zhong described her day onshore beginning in "the morning with Greg, a wonderful and knowledgeable representative from the U.S. Fish and Wildlife Service (FWS). We spent time learning about the native plant species in the area, and the FWS's efforts to restore more native plants on Midway. We then got out our shovels and pickaxes and went to town replanting dune grass, and pulling invasive weeds."

Each student experienced Midway in their own way, but common to all was a deeper appreciation of the importance of these specks of land, each as much a part of the ocean ecosystems as the ocean itself. As the group sailed back to the main Hawaiian Islands, they collected seawater samples and gathered observations about plastic debris floating north of Midway. But after their experience the story was no longer simply about oceanic junk; it had become a story about the albatross feeding their brown-blob helpless chicks and the health of the oceans. On Midway the group received an education with content, experience and emotion. "It was a deeply satisfying experience for students and staff," recounts Chief Scientist Charles Lea.

NATIVE HAWAIIAN PRACTICES

Summary

Three Native Hawaiian practices permits were issued in 2011 (Table 8). One Native Hawaiian practices permitted project applied traditional ecological knowledge gathered from communities in the main Hawaiian Islands to assess and examine nearshore ecosystems of Papahānaumokuākea. This permit was also coupled with a western science research permit, and both projects complemented one another, providing a more holistic assessment of nearshore and intertidal resources. For more information on this unique joint project, please see the Native Hawaiian practices feature section below. A second project provided for the first ever Hawaiian language immersion program to visit Midway Atoll. Finally, research into the Native Hawaiian cultural uses and practices surrounding Mokumanamana Island was continued in 2011 during the autumnal equinox.

Table 8. Affiliations of Native Hawaiian Practice permittees and permitted projects in 2011.

Native Hawaiian Practices Permittee Affiliation	Number of Permits Issued	Permitted Native Hawaiian Practices Projects
University of Hawai'i at Hilo	1	Using Traditional Ecological Knowledge to Examine Nearshore Ecosystems
University of Hawai'i at Hilo - Ola Nā Iwi Hawaiian Language Program	1	Hawaiian Language Immersion Program (Ola Nā Iwi) on Midway Atoll
University of Hawai'i at Hilo, Kīpuka Native Hawaiian Student Center, Edith Kanaka'ole Foundation, Hawai'i Community College	1	Autumnal Equinox Cultural Research and Native Hawaiian Practices on Mokumanamana (Necker Island)

Photo by: Monte Costa

Native Hawaiian Practices Highlights

Ola Nā Iwi Hawaiian Language Institute visits Midway Atoll National Wildlife Refuge


Photo by: 'Aulani Wilhelm

In June 2011, Midway Atoll National Wildlife Refuge staff greeted the Ola Nā Iwi Hawaiian Language Institute, the first Native Hawaiian Practices permitted project to be conducted on Midway. The purpose for the visit was to allow for a Hawaiian language immersion opportunity on Midway Atoll, in Papahānaumokuākea Marine National Monument (Monument). Participants of the 2011 Ola Nā Iwi Program were also instructed to research past Native Hawaiian newspapers, Hawaiian publications, chants, and stories for information referencing a place-name called Kuaihelani; for some it may have been the traditional Hawaiian name for Midway Atoll or a nearby island. The Ola Nā Iwi project allowed for reconnections into the Native Hawaiian past through cultural ceremonies and a perpetuation of Native Hawaiian culture within Papahānaumokuākea.


Photo by: 'Aulani Wilhelm

The Ola Nā Iwi program is a 15-year-old Hawaiian language program based out of the University of Hawai'i at Hilo, Kīpuka Native Hawaiian Student Center and Ka Haka 'Ula o Ke'elikōlani. The Ola Nā Iwi program is conducted by Kīpuka's Associate Director Mr. Kalani Makekau-Whittaker. The program is held annually and focuses on the oral use of the Hawaiian language in various cultural contexts. The program typically runs for ten days where participants live with University Hawaiian language teachers, kīpuna, and native speakers of various ages from the Ni'ihau community, in a setting which fosters traditional community values. The program is conducted completely in Hawaiian and provides an environment where individuals can be completely immersed in the Native Hawaiian language and culture for the entire period.

While on Midway the Ola Nā Iwi group conducted Hawaiian ceremonies daily to honor ancestral connections to the place, conducted a workshop to introduce beginners to the Hawaiian language for Midway residents, and presented on various cultural research projects led by the Ola Nā Iwi participants. The Ola Nā Iwi visit to Midway was a tremendous cultural sharing and learning experience for both Midway residents and Native Hawaiian speakers. The Āina (land) of Midway or Kuaihelani was able to hear the Native Hawaiian language for the first time in generations. The Ola Nā Iwi visit ultimately highlighted the need to support and perpetuate Native Hawaiian ancestral connections to the Northwestern Hawaiian Islands.


Photo by: 'Aulani Wilhelm

Using Traditional Ecological Knowledge to Examine Nearshore Ecosystems


Photo by: Hokuala Johnson

In October 2011 the Monument's collaborative intertidal monitoring team traveled to the shallow, wave swept rocky shorelines of Nihoa, Mokumanamana and La Perouse Pinnacle in French Frigate Shoals to survey intertidal species using both Native Hawaiian and western research methodologies. The monitoring team consisted of biologists from the Hawai'i Institute of Marine Biology (HIMB), the Scripps Institute of Oceanography, conservation organizations such as The Nature Conservancy, and community members from Hana, Maui and Kalapana, Hawai'i. "Up until three years ago, there really weren't any data collected in the Northwestern Hawaiian Islands on rocky shoreline areas," said Dr. Chris Bird, a scientist with HIMB. "Compared to the main Hawaiian Islands, the rocky shorelines within the Monument are pristine and host many species of invertebrates, fish, and seaweeds but it's a challenging place to work. You have to be part mountain goat, and part, a'ama crab."

This NOAA research cruise continues the Monument's mission to integrate western research activities with Native Hawaiian cultural research. "We added a new component to this trip," said Shauna Kehaunani Springer, a cultural researcher and monitoring team member from Hawai'i Island, "Everyone on the team recorded weather observations, and species interactions on a data sheet which, upon further analysis may provide additional insight into the state of the resources within the intertidal zones in the NWHI from a Native Hawaiian perspective." The cultural data sheets have already been implemented for 'opihi monitoring projects within the main Hawaiian Islands, Springer commented. "The (data sheets) have proved time again that our kūpuna were true Hawaiian scientists, and their mo'olelo (stories), oli (chants), and mele (songs) were the first "data" recorded. Our ancestors really knew how to live within their means and treated their surrounding environment with reverence and respect."

"Although coral reef surveys have been conducted for years in the NWHI," said Hoku Johnson, NOAA's coordinator of the expedition, "the intertidal area from the 'splash zone' to just beneath the breaking waves is in some ways a new frontier, one not previously characterized by scientists with scuba gear. However, it's an area that was of great traditional importance to Native Hawaiians."


Photo by: Hokuala Johnson

"Intertidal shorelines are where Native Hawaiian women went to gather while the men fished," said Springer. "'Opihi and hā'uke'uke (helmet urchin) were eaten, their shells were used as tools for everything from scraping kalo (taro) and niu (coconut) to imprinting kapa cloth. While working in Papahānaumokuākea, it was our responsibility to make sure we honored the areas we worked in by presenting chants and small offerings of water and salt prior to conducting any of our activities," Springer said. "This trip made me hopeful that we if we protect and limit our take in more areas in the main Hawaiian Islands, there will be abundance for future generations which will allow us to continue to teach our children and our grandchildren to keep with the practices of our ancestors."

RECREATION

Summary

Under Monument regulations (50 CFR Part 404), recreation activities are permitted in Papahānaumokuākea only within the Midway Atoll Special Management Area (MASMA). No recreation permits were issued in 2011. A single recreation permit (issued in 2010 to the U.S. Fish and Wildlife Service (FWS)) was active in 2011, authorizing FWS to administer the Visitor Services Program (VSP) at Midway Atoll, in accordance with FWS refuge system requirements. The VSP is designed to offer visitors the opportunity to discover, enjoy, appreciate, protect and honor the unique natural, cultural, and historic resources of the Monument. This permit allowed visitors going to MASMA via aircraft under the direction of the VSP to conduct recreational activities. These activities include wildlife observation and photography, environmental education and interpretation, participation in habitat restoration, non-wildlife dependent beach use (e.g. swimming, snorkeling), non-wildlife related outdoor sports (e.g. volleyball, bicycling, jogging), and amateur radio use. In 2011, a total of 165 individuals visited Midway under the direction of the Midway Atoll Visitor Services Program. This number also includes off-duty personnel stationed on Midway to conduct maintenance operations for Midway Atoll National Wildlife Refuge under the Monument Co-Trustee conservation and management permit.

Photo by: James D. Watt

Photo by: U.S. Fish and Wildlife Service

Photo by: U.S. Fish and Wildlife Service

Summary

A total of 19 research permits were issued in 2011. Table 9 lists research permits issued for each organization or institution, together with project titles. Research permits were issued to Co-Trustee agency personnel and university researchers to conduct work on seabirds, fish, corals, marine mammals, and algae; as well as work involving archaeology and submersible diving technology.

Table 9. Affiliations of Research permittees and permitted projects in 2011.

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Project Titles
Center for Coastal and Ocean Mapping/Joint Hydrographic Center, University of New Hampshire	1	• Bathymetric Mapping of the Intersection of Necker Ridge with the Hawaiian Ridge
Department of Geosciences, Pennsylvania State University	1	• Collection of Bryozoan Specimens
Department of Earth, Ocean, and Atmospheric Sciences, Florida State University	1	• Identification of Deep-Sea Coral and Sponge Beds
Hawai'i Institute of Marine Biology, University of Hawai'i at Mānoa	7	• Documenting the Biodiversity and Ecology of Nearshore Basaltic Reefs • Monitoring Incidence, Growth Rates, and Genetic Relatedness of Coral and Fish Diseases within NWHI Nearshore Reefs • Retrieval of Ecological Acoustic Recorders (EARs) in Deep Marine Areas • Genetic Surveys to Address the Level of Isolation Between Shallow and Deep Reef Ecosystems • Relative Role of Terrestrial Sources of Nutrients for Algae and Bivalve Productivity • Quantify the Movements and Feeding Habits of Top Predators • Coral Reef Bioerosion Rates as Indicators of Community Response to Ocean Acidification
Department of Anthropology, University of Hawai'i at Mānoa	1	• Documentation and Assessment of Native Hawaiian Cultural Sites on Mokumanamana (Necker) Island
Oceanic Institute, Hawai'i Pacific University	2	• Plastic Ingestion of Black Footed and Laysan Albatross • Analysis of Carbonate Chemical Make-up of Waters Surrounding Atoll Systems

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Project Titles
Institute of Marine Sciences, University of California at Santa Cruz	2	• Laysan and Black-footed Albatross Monitoring • Red-footed, Masked, and Brown Booby Monitoring
NOAA, National Marine Fisheries Service, Pacific Islands Fisheries Science Center	2	• Activities to Enhance Understanding of Hawaiian Monk Seal Foraging Ecology at Nihoa Island • Efforts to Increase Juvenile Monk Seal Survival
NOAA, National Ocean Service, Office of National Marine Sanctuaries	2	• Pacific Reef Assessment and Monitoring Program • Documenting the Biodiversity of Deep Reefs Using Conventional and Technical SCUBA Diving Technology

Research Activities by Location

Islands and atolls with the highest levels of permitted research activities in 2011 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 2011 included a variety of activities aimed at monitoring ecosystem dynamics, studying the genetic connectivity of marine organisms, mapping deep sea ridges, exploring unknown deep sea corals and sponge beds, or researching the effects of plastic ingestion on sea birds. Table 10 lists all catch and release or observational research conducted, as well as all biological or physical samples collected in 2011. Of the 19 research permits issued, 17 of these involved either catch and release, observational, or collection activities. Catch and release activities involved the use of satellite tagging or acoustic devices attached to Laysan and Black-footed Albatross or top predator species (fish and sharks) 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 involved 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 11 lists temporary instruments installed in 2011 for specific permitted research projects.

Table 10. The following table describes the observational, catch and release, or collection activities that occurred under research permits in 2011.

Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Plastic Ingestion of Black-footed and Laysan Albatross		• 172 albatross spp. Bolus • 64 Laysan albatross bolus • 36 Black-footed albatross bolus
Bathymetric Mapping of the Intersection of Necker Ridge with the Hawaiian Ridge	• Mapped a total of 47,394 km2 of deep sea ridges and seamounts	
Laysan and Black-footed Albatross Monitoring	• 12 archival tags recovered from Black-footed albatross • 43 archival tags deployed on Black-footed albatross • 11 GPS tags deployed on Black-footed albatross • 11 archival tags recovered from Laysan albatross • 45 archival tags deployed on Laysan albatross • 11 GPS tags deployed on Laysan albatross	• 156 Black-footed albatross feathers • 25 ml Black-footed albatross blood • 100 ml Black-footed albatross stomach oil • 156 Laysan albatross feathers • 26 ml Laysan albatross blood • 100 ml Laysan albatross stomach oil
Collection of Bryozoan Specimens		• Fifteen 2-inch diameter bryozoan samples
Quantify the Movements and Feeding Habits of Top Predators	• 18 Giant trevally tagged • 12 Galapagos shark tagged	• 27 Bluelined surgeonfish • 45 Multi-bar goatfish • 45 Blacktail wrasse • 11 grams Giant trevally muscle biopsies • 7 grams Galapagos shark muscle biopsies
Monitoring Incidence, Growth Rates, and Genetic Relatedness of Coral and Fish Diseases within NWHI	• Fifty 25-meter coral transect surveys • Twenty-eight, 60 minute fish surveys	• Twenty-seven, 3-centimeter table coral colony biopsies
Analysis of Carbonate Chemical Make-up of Waters Surrounding Atoll Systems		• 26 gallons of sea water

Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Pacific Reef Assessment and Monitoring Program	• One-hundred seven, 25-meter coral transect surveys • One-hundred eighty-one, 30-meter fish transect surveys	• 4 whole sea squirts
Genetic Surveys to Address the Level of Isolation Between Shallow and Deep Reef Ecosystems		• 20 Hawaiian sergeant fish • 26 Indo-Pacific sergeant fish • 3 Threadfin butterflyfish • 19 Hawaiian chromis • 12 Three-spot chromis • 15 Yellowfin goatfish • 47 Manybar goatfish • 6 Sidespot goatfish
Relative Role of Terrestrial Sources of Nutrients for Algae and Bivalve Productivity		• 12 rock oysters • 1.85 gallons of sea water
Activities to Enhance Understanding of Hawaiian Monk Seal Foraging Ecology at Nihoa Island	• Filmed 11 camera drop sites	
Coral Reef Bioerosion Rates as Indicators of Community Response to Ocean Acidification	• Six, 1-meter transect surveys of water using acoustic doppler velocimeter • Three, 15-meter video transect surveys for habitat characterization • Thirty-six visual surveys for water motion utilizing dye	• Two-hundred, 125-cubic centimeter calcium carbonate reef substrate samples • 4.68 gallons of sea water
Efforts to Increase Juvenile Monk Seal Survival		• 7 Hawaiian monk seal scat samples

Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Identification of Deep-sea Corals and Sponge Beds		• 4 whole algae spp. • 4 whole anemone spp. • 1 whole barnacle spp. • 2 whole clams spp. • 17 partial coral colonies spp. • 34 whole coral colonies spp. • 1 whole crab spp. • 16 epifauna spp. • 1 whole Galathaieda spp. • 2 whole Halimeda spp. • 11 whole hydroids spp. • 6 whole ophiuroids spp. • 14 whole sponges spp. • 1 whole stalked crinoid spp. • 4 whole worms spp. • 1 whole zooanthid colony spp.
Documentation and Assessment of Native Hawaiian Cultural Sites on Mokumanamana (Necker Island)		• 1 whole coral • 13 (sample size) dead crustose coralline algae samples • 1 soil sample
Documenting the Biodiversity and Ecology of Nearshore Basaltic Reefs	• 100 line transects from highest marine organism to 15 feet water depth	• 64 blenny spp. fin clips • 750 algae spp. samples (< 2cm^2) • 100 whole barnacle spp. • 155 whole bivalve spp. • 50 whole bubble shells • 104 crab leg segments • 338 whole limpet spp. • 496 whole snail spp. • 103 whole urchin spp. • 540 urchin spp. spines

Permitted Research Project	Catch and Release or Observational Research	Biological or Physical Samples Collected
Documenting the Biodiversity of Deep Reefs Using Conventional and Technical SCUBA Diving Technology	• Twenty-six 25-meter x 2-meter fish transect surveys • Twenty-six fish census video transects	• Two 5-centimeter black coral branches • Two 5-centimeter wire coral branches • One 20-centimeter gold coral branch

Table 11. The following table describes the remote monitoring instruments installed under research permits in 2011.

Permitted Research Project	Instruments Installed for Remote Monitoring
Bathymetric Mapping of the Intersection of Necker Ridge with the Hawaiian Ridge	• 54 Expandable Bathymetrograph (XBT) casts • 1 Conductivity Temperature Depth (CTD) cast
Retrieval of Ecological Acoustic Recorders (EARs) in Deep Marine Areas	• Removed 3 Ecological Acoustic Recorders (EARs)
Coral Reef Bioerosion Rates as Indicators of Community Response to Ocean Acidification	• Ninety-five 5-centimeter x 5-centimeter x 2 centimeter bioerosion blocks installed
Quantify the Movements and Feeding Habits of Top Predators	• 25 acoustic receivers and moorings maintained • 9 acoustic receivers and moorings removed • 2 acoustic receivers and moorings installed

RESEARCH HIGHLIGHTS

Tagging and Monitoring Top Predators


Photo by: NOAA and Hawai'i Institute of Marine Biology

Annually since the designation of Papahānaumokuākea Marine National Monument (Monument), the University of Hawai'i's Hawai'i Institute of Marine Biology (HIMB) has led cutting edge research to understand the movement patterns of top predators, including Tiger, Galapagos, and White Tip Reef sharks and Giant and Bluefin Trevally (Ulua) in the Northwestern Hawaiian Islands. This research is vitally important as top predators play an important role in ecosystems by influencing prey behavior and shaping communities through trophic cascades. Understanding interactions of top predator populations is also useful in the conservation and management of the critically endangered Hawaiian monk seal, a mammalian top predator in marine ecosystems.

Research studying the movement of top predators (sharks and large fishes) in the Monument is led by HIMB researcher, Dr. Carl Meyer. In September 2011, Dr. Meyer and a team of scientists aboard NOAA Ship *Hi'ialakai* continued tagging and acoustic monitoring of top predators in marine areas surrounding Nihoa, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Lisianski, and Pearl and Hermes Atoll. During the 2011 field season, the team captured and tagged nine Giant Trevally and six Galapagos sharks with acoustic transmitters. The team also retrieved 30 acoustic receivers complete with movement data collected and stored over the previous year.

Preliminary results from this research have shown that top predators shared three broad movement patterns in coral habitats: site-attached; intermittent wide-ranging; and nomadic. Site-attached behavior appeared most common in large predatory fish (ulua, grouper and snapper), while most Grey Reef and Galapagos sharks were either site-attached or intermittent wide ranging. Results for tagged tiger sharks showed the species to be primarily nomadic with the widest range extending into the main Hawaiian Islands. At French Frigate Shoals, Dr. Meyer has quantified movements of large sharks around monk seal pupping sites to help determine the numbers and species of sharks preying on seal pups at these locations. This information is important in understanding shark predation and developing appropriate strategies to mitigate shark predation on critically endangered monk seal pups. Future research is looking to decipher any predictable patterns of movement and habitat use of these important top predator sharks and fishes.


Photo by: NOAA and Hawai'i Institute of Marine Biology

Summary

Five special ocean use permits were issued in 2011 (Table 12). Two permittees sought to produce hardcopy publications on specific aspects related to Monument conservation efforts in order to educate the general public. A third permittee aimed to gather literary content and experience for a conservation documentary script in Germany. Also from Germany in 2011 was the DUMA-Naturreisen eco-tour group visit to Midway Atoll. Finally, for the first time locally based company Red Sea Ocean Adventures conducted filming and photography activities to further the educational value of the Monument.

Table 12. Affiliations of Special Ocean Use permittees and permitted projects in 2011.

Special Ocean Use Permittee Affiliation	Number of Permits Issued	Permitted Special Ocean Use Projects
DUMA-Naturreisen	1	• Guided Eco-tourism Activities on Midway Atoll
Film und Medien Stiftung NRW and West German Television Cologne	1	• Production of a Script for a German Cinema Documentary
Private Citizen	1	• Literary Publication on Resource Restoration Efforts
Private Citizen	1	• Literary Publication on Midway Tour Activities
Red Sea Ocean Adventures	1	• Filming for *Hawaii Skin Diver* Television Program

Special Ocean Use Revenue Reported

Each permittee issued a special ocean use (SOU) permit is required to "submit an annual report not later than December 31 of each year which describes activities conducted under that permit and revenues derived from such activities during the year." (50 CFR 404.11.f(2006)). In 2011 there were nine SOU permitted projects conducted within the Monument. Several of these SOU permits were issued prior to the start of calendar year 2011. Of these nine SOU permits, four were issued to conduct ecotourism projects. In total, these four ecotourism companies reportedly generated a gross revenue of $723,090 in 2011. The remaining five SOU permitted projects in 2011 developed an outreach or educational product (e.g. film or literary publication) and these reported a $0 revenue generation.

Revenue presented here and gathered from permittee reports do not represent the dollar amount received by the Monument or individual agencies comprising the Monument Management Board. Moreover, initial revenue reports indicated only gross revenue generated (before any costs or expenses were deducted). In order to provide a clearer picture in regards to the economic value (dollar amount) attributed to activities conducted in Papahānaumokuākea, plans are underway to account for both gross and net revenue in future SOU reporting.

Special Ocean Use Highlights

Hawaiian Skin Diver Raises Awareness of Our Fragile Ocean Resources


Photo by: Kyle Nakamoto

Red Sea Ocean Adventures is responsible for producing the local television series hit *Hawaii Skin Diver*, which airs five days a week on Oceanic Time Warner Cable channel 16. In September 2011, Kyle Nakamoto, President for Red Sea Ocean Adventures, filmed and photographed various wildlife and scenes in Papahānaumokuākea Marine National Monument, under the direction and guidance of Monument staff. The purpose of the project was to raise awareness of the important role Papahānaumokuākea plays in sustaining Hawai'i's marine resources, through the eyes of world famous Hawai'i-born freediver, Kimi Werner. As a result of the project, in development are two 30 minute television episodes for *Hawaii Skin Diver* and several articles to be featured in *Lawai'a* Magazine, all welcomed material to further the educational value of the Monument and its continued conservation protections. No Monument resources were harmed while conducting the activities and Red Sea Ocean Adventures continues to advocate for respect of the ocean and its many inhabitants.

Visitors with Galapagos Travel Assist with March 2011 Tsunami Clean-up

The tsunami of March 10, 2011, was not the first tsunami to hit Midway, but it was the first to strike when a visitor group was present. Guests with Galapagos Travel ventured to Midway Atoll National Wildlife Refuge just four days before the tsunami warnings were issued. The varied group included educators, bird-watchers, photographers, artists, scientists, and retired military personnel. Their reasons for visiting Midway and Papahānaumokuākea Marine National Monument also varied; but all shared a similar feeling of awestruck fascination upon arrival. Fortunately, preparation and hard work by Midway staff together with a little luck from Mother Nature combined to result in no loss of human lives. However, many albatross and other seabirds were completely inundated and washed out to sea. Prime seabird nesting habitat was also lost.

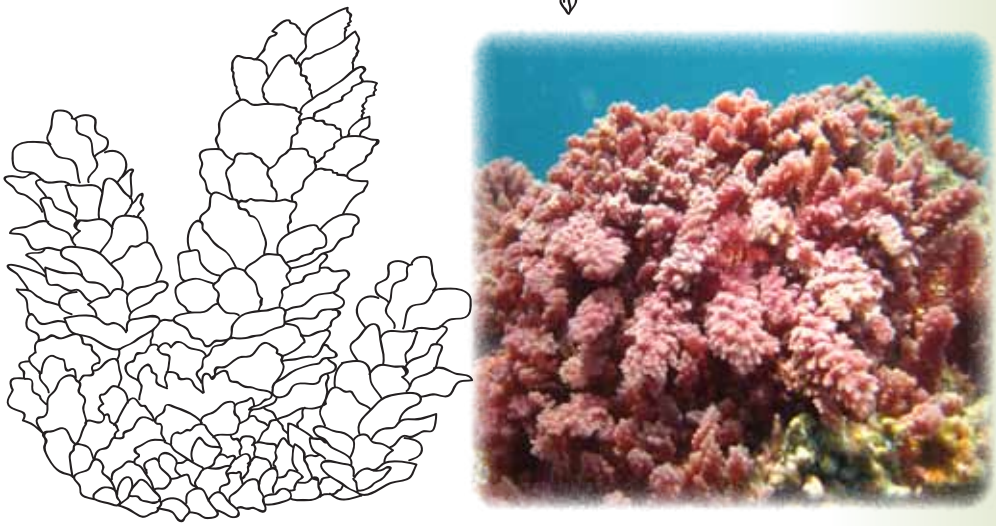
A Galapagos Travel participant recounts; "There was just so much to do, yet so little could be done, and so much loss of life. Yet along the way we witnessed amazing scenes of life, renewal and survival playing out. We found sea turtles far inland and rejoiced when they swam away when returned to the water. We gathered waterlogged adult albatross from the lagoon surface and brought them ashore where they could again dry out and preen their feathers to be able to soar on the winds soon. We dug in the sand where the Bonin Petrel burrows had been the day prior, finding live birds trapped in air pockets in the wet sand – as we'd bring them out into the light they would fly away."


Photo by: Connie Toops

Toward the end of their visit, the group decided to proceed with the originally planned service activity. In addition to all the clean-up efforts they had done, participants felt strongly the need to spend the last morning on the island outplanting native bunch grass to improve future habitat. "I like to think anyone who visits Midway today will want to be a part of its future success. We leave a part of ourselves behind after our visit, and we take a part of Midway with us to share with others," expresses Mark Grantham, President of Galapagos Travel.

CELEBRATING PAPAHĀNAUMOKUĀKEA'S UNIQUENESS

Papahānaumokuākea Marine National Monument is a natural and cultural protected area which provides its managers with deep kuleana, or responsibility to make decisions utilizing both science and Native Hawaiian resource management practices. While challenging at times, this cutting-edge management approach is the only way to properly continue the long history of resource protection in Papahānaumokuākea. The focus on managing nature and culture together also provides the framework to share lessons learned through Papahānaumokuākea with other remote marine managed areas world-wide, as we all strive to be better stewards of the land and oceans. For more information on Papahānaumokuākea Marine National Monument, please visit us on the web at http://www.papahanaumokuakea.gov.



O ke au i kahuli wela ka honua
O ke au i kahuli lole ka lani
O ke au i kukaiaka ka la
E hoomalamalama i ka malama
O ke au o Makalii ka po
O ka walewale hookumu honua ia
O ke kumu o ka lipo, i lipo ai
O ke kumu o ka Po, i po ai
O ka lipolipo, o ka lipolipo
O ka lipo o ka la, o ka lipo o ka po
Po wale hoi
Hanau ka po
Hanau Kumulipo i ka po, he kane
Hanau Poele i ka po, he wahine
Hanau ka Ukukoakoa, hanau kana, he Akoakoa, puka
Hanau ke Koeenuhe eli hoopuu honua
Hanau kana, he Koe, puka
Hanau ka Pea, ka Peapea kana keiki, puka
Hanau ka Weli, he Weliweli kana keiki, puka
Hanau ka Ina, ka Ina
Hanau kana, he Halula, puka
At the time that turned the heat of the earth,
At the time when the heavens turned and changed,
At the time when the light of the sun was subdued
To cause light to break forth,
At the time of the night of Makalii (winter)
Then began the slime which established the earth,
The source of deepest darkness.
Of the depth of darkness, of the depth of darkness,
Of the darkness of the sun, in the depth of night,
It is night,
So was night born.
Kumulipo was born in the night, a male.
Poele was born in the night, a female.
A coral insect was born, from which was born perforated coral.
The earth worm was born, which gathered earth into mounds,
From it were born worms full of holes.
The starfish was born, whose children were born starry.
The phosphorous was born, whose children were born phosphorescent.
The Ina was born Ina (sea egg).
The Halula was born Halula (sea urchin).

The first few sentences of The Kumulipo (A Hawaiian Creation Chant) are graphically illustrated to the right, with citations below.

*Hawaiian text: Kalakaua, David as quoted in The Kumulipo: A Hawaiian Creation Chant, translated and edited with commentary by Martha Beckwith. 1951. University of Chicago Press, Chicago, IL.

*English text: The Kumulipo: A Hawaiian Creation Myth, translated by Queen Lili'uokalani. 1978. Pueo Press, Honolulu, HI.