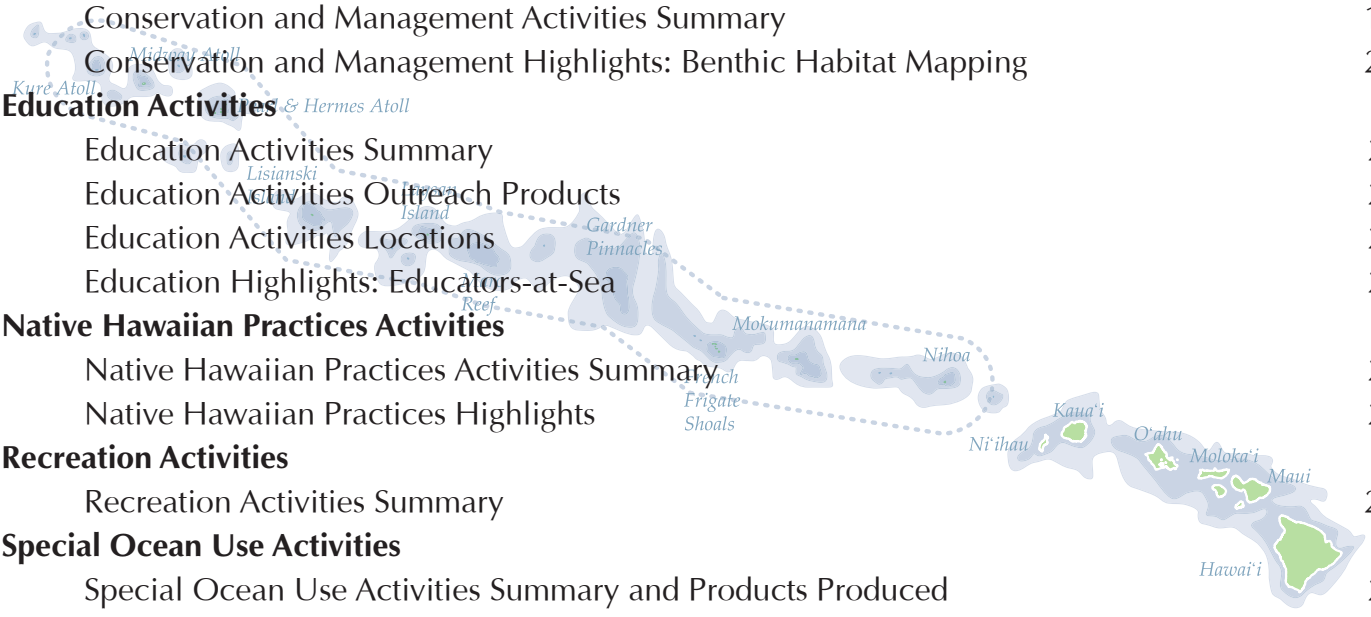
PAPAHĀNAUMOKUĀKEA
MARINE NATIONAL MONUMENT

Photo: James Watt

PERMITTED ACTIVITIES
2008 ANNUAL REPORT

Contents



Introduction

Photo: James Watt

Papahānaumokuākea Marine National Monument, encompassing the Northwestern Hawaiian Islands, is the largest protected area in the United States and one of the largest marine reserves in the world. At 89,500,000 acres, Papahānaumokuākea consists of vast areas of unique marine and terrestrial ecosystems and contains significant cultural and historic resources. Under the management of three Co-Trustee agencies, the Department of Commerce (National Oceanic and Atmospheric Administration), Department of the Interior (U.S. Fish and Wildlife Service), and the State of Hawai'i (Department of Land and Natural Resources), in cooperation with the Office of Hawaiian Affairs, access to Papahānaumokuākea is limited through a permitting process. This permitting system allows only those activities that are consistent with the Presidential Proclamation that established Papahānaumokuākea and other state and federal laws. This report presents information on the permitted activities that took place in Papahānaumokuākea in 2008, and it compares the level of use in 2008 to that of 2007. Similar summary reports will be produced annually to provide an indication of the levels of human presence and activities in Papahānaumokuākea over time.

History of Human Activities in the Northwestern Hawaiian Islands

Although activities in the Northwestern Hawaiian Islands are now managed through Papahānaumokuākea's permitting process, a variety of levels of human presence and types of activities have occurred historically within the Northwestern Hawaiian Islands. Many of these historical uses affect the activities that are currently conducted in Papahānaumokuākea, or they impact the specific protections that are now in place to conserve the unique natural and cultural resources of the Northwestern Hawaiian Islands.

1000 A.D. – Present: Native Hawaiian Cultural Practices on Nihoa and Mokumanamana

Traditional chants and stories, as well as artifacts on Nihoa and Mokumanamana, indicate that Native Hawaiians inhabited the first two islands of the Northwestern Hawaiian chain perhaps as long ago as 1000 A.D. While Mokumanamana was likely visited occasionally for ceremonial purposes, the island of Nihoa may have supported permanent populations of up to 175 people. Although no longer inhabited after approximately 1700 A.D., Nihoa, Mokumanamana, and the rest of the Northwestern Hawaiian Islands continue to play an important role in Native Hawaiian cultural and spiritual practices. Studies of the cultural sites on Nihoa and Mokumanamana help to pass traditional knowledge from one generation to the next, and they tie past pilgrimages and ceremonies to present-day cultural and spiritual practices.

1932-1997: U.S. Military Presence in the Northwestern Hawaiian Islands

Beginning in the early 1930s, the U.S. Navy conducted military exercises and established base camps and Naval Air Stations at French Frigate Shoals, Pearl and Hermes Atoll, Midway Atoll, and Kure Atoll. The air stations served as refueling points for fighter planes making the 1,300-mile flight from Pearl Harbor to Midway Atoll, and they were home to more than 3,000 sailors and Marines at Midway and 125 Naval personnel at French Frigate Shoals during the peak of World War II. After successfully defending the Northwestern Hawaiian Islands from the Imperial Japanese Navy at the Battle of Midway in 1942, the U.S. Navy maintained a presence at Midway through the end of the last century. The Naval facility at French Frigate Shoals was decommissioned in 1946 but was soon replaced by a U.S. Coast Guard Long Range Aids Navigation (LORAN) Station, which

Timeline of U.S. Military Presence

1903: Midway Atoll secured as a U.S. possession.

1932-1940: East Island, French Frigate Shoals temporary base camps established for Naval vessel and aircraft exercises

1936-1937: Southeast Island, Pearl and Hermes Atoll temporary base camps established for Naval vessel and aircraft exercises

1940: Midway Naval Air Station established for protection of U.S. during World War II (4000 Naval, Marine, and support personnel stationed at Midway)

1942: U.S. Navy defeated Imperial Japanese Navy during the Battle of Midway

1942: Tern Island, French Frigate Shoals Naval Air Station built (120-130 Naval personnel stationed on Tern Island)

1943: East Island, French Frigate Shoals Coast Guard Long Range Navigation (LORAN) Station built (25-30 USCG personnel stationed on East Island)

1946: Tern Island, French Frigate Shoals Naval Air Station decommissioned

1952: Tern Island, French Frigate Shoals Coast Guard LORAN Station built (20-25 USCG personnel stationed on Tern Island)

1960: Green Island, Kure Atoll Coast Guard LORAN Station built (18-20 USCG personnel stationed on Green Island)

1961: Tern Island, French Frigate Shoals Pacific Missile Range Facility established (100 PMR personnel stationed on Tern Island)

1961: Tern Island, French Frigate Shoals Pacific Missile Range Facility decommissioned

1978: Midway Naval Air Station downgraded to Naval Air Facility

1979: Tern Island, French Frigate Shoals Coast Guard LORAN Station decommissioned

1993: Green Island, Kure Atoll Coast Guard LORAN Station decommissioned

1993: Midway Naval Air Facility decommissioned

1997: Final contingent of Navy personnel departed Midway Atoll

was manned by a crew of 25 to serve the central Pacific through 1979. The final contingent of Navy personnel departed Midway Atoll in 1997.

1902-Present: Scientific Surveys and Monitoring in the Northwestern Hawaiian Islands

The first Western scientific expedition to the Northwestern Hawaiian Islands occurred in 1902 on the U.S. Fish Commission steamer Albatross. In addition to documenting terrestrial species, the expedition collected new species of deep water fishes. During the early 1920s, a team of 11 scientists, including biologists, geologists, and archaeologists, travelled throughout the Northwestern Hawaiian Islands aboard the converted World War I minesweeper, the USS Tanager. Terrestrial surveys and collections made during these expeditions resulted in the discovery of many of the species endemic to the Northwestern Hawaiian Islands, including the Nihoa carnation, Nihoa millerbird, and Laysan finch. These expeditions also resulted in the only-existing movie footage of the now-extinct Laysan rail and Laysan apapane, landbird species that were extirpated following the introduction of rabbits to Laysan by guano miners in the early 1900s.

As with the Tanager Expeditions of the 1920s, one of the goals of the Smithsonian Institution's Pacific Ocean Biological Survey Program (POBSP) in the 1960s was to conduct surveys of the terrestrial ecosystems of the Northwestern Hawaiian Islands. Unlike the Tanager Expeditions, however, the Smithsonian's work involved detailed surveys of all of the islands and atolls of the chain, resulting in complete species lists of plants, birds, insects, and other invertebrates. POBSP also focused on the large-scale banding of several seabird species at French Frigate Shoals; this work made possible the current mark-recapture studies by the U.S. Fish and Wildlife Service to assess seabird survival, and it has provided information on the longevity of these species. We now know that Laysan and black-footed albatrosses and great frigatebirds have maximum lifespans of more than 57 years.

Following the Smithsonian Institution's POBSP program, in 1975 the NOAA National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.H. Sea Grant Program, and Hawai'i Division of Fish and Game established a program to conduct surveys and assessments of the Northwestern Hawaiian Islands. This 5-year Tripartite Cooperative Agreement was the first large-scale effort to document the marine resources of the Northwestern Hawaiian Islands. Surveys of the marine ecosystems of

Papahānaumokuākea have been continued through the present time through the Reef Assessment and Monitoring Program (RAMP). Initiated in 2000, RAMP is a collaborative effort between the NOAA Office of National Marine Sanctuaries, NOAA National Marine Fisheries Service, State of Hawai'i Division of Aquatic Resources, and the University of Hawai'i. RAMP surveys and monitoring have served to provide baseline information on marine species and habitats throughout the islands and atolls of Papahānaumokuākea, and continued monitoring will allow for assessment of changes in these marine ecosystems over time.

1903-Present: Ecosystem Protections for the Northwestern Hawaiian Islands

During the late 19th and early 20th centuries, formal protections did not exist for the unique and fragile resources of the Northwestern Hawaiian Islands, and during that time, feather, egg, and guano harvesting, hunting of marine turtles, and introductions of alien species such as rabbits resulted in the severe damage of some native populations and even the complete extinction of endemic species. In response to this devastation, in 1903, President Theodore Roosevelt secured Midway Atoll as a U.S. possession and assigned the protection of the natural resources of the atoll to the U.S. Navy. In 1909, Roosevelt designated all of the islands and reefs of the Northwestern Hawaiian Islands as the Hawaiian Islands Bird Reservation, later to be renamed as the Hawaiian Islands National Wildlife Refuge. Throughout the remainder of the 20th century, several federal and state agencies, including the Department of Defense, Department of Agriculture, Department of the Interior, the Department of Commerce, and the State of Hawai'i, were assigned stewardship responsibilities in the Northwestern Hawaiian Islands.

By the beginning of the 21st century, extensive protections had been provided to the Northwestern Hawaiian Islands through a combination of National Wildlife Refuges, a State Seabird Sanctuary and Marine Refuge, and a Coral Reef Ecosystem Reserve. In 2006, President George W. Bush instituted comprehensive protections for the unique and pristine habitats of the northwestern islands, signing a proclamation that established the Northwestern Hawaiian Islands Marine National Monument, now Papahānaumokuākea, the single largest protected area in the United States and one of the largest marine reserves in the world.

Timeline of Ecosystem Protections

1903: Midway Atoll secured as a U.S. possession by President Theodore Roosevelt. The U.S. Navy was assigned stewardship responsibilities for the wildlife and habitat of Midway Atoll.

1909: Hawaiian Islands Reservation established by President Theodore Roosevelt U.S. Department of Agriculture Biological Survey (the predecessor of the U.S. Fish and Wildlife Service) was assigned stewardship responsibilities for the islets and reefs of the Northwestern Hawaiian Islands.

1940: Hawaiian Islands National Wildlife Refuge established by President Franklin D. Roosevelt U.S. Fish and Wildlife Service revised management responsibilities for the previously-designated Hawaiian Islands Reservation as its status was changed to a National Wildlife Refuge.

1988: Midway Atoll National Wildlife Refuge established by President Ronald Reagan U.S. Fish and Wildlife Service assumed wildlife stewardship responsibilities for Midway Atoll.

1993: Kure Atoll designated a State Seabird Sanctuary State of Hawai'i Department of Land and Natural Resources assumed full management responsibilities for Kure Atoll.

1996: Midway Atoll administration transferred to U.S. Fish and Wildlife Service by President Bill Clinton U.S. Fish and Wildlife Service assumed full management responsibilities for Midway Atoll after 1993 decommission of Midway Naval Air Facility.

2000: Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve established by President Bill Clinton NOAA National Ocean Service was assigned stewardship responsibilities for all marine areas of the Northwestern Hawaiian Islands 3 to 50 nautical miles from emergent lands.

2000: Battle of Midway National Memorial Lands and waters of Midway Atoll National Wildlife Refuge designated as the Battle of Midway National Memorial, "so that the heroic courage and sacrifice of those who fought against overwhelming odds to win an incredible victory will never be forgotten."

2005: Northwestern Hawaiian Islands State Marine Refuge established by Governor Linda Lingle State of Hawai'i Department of Land and Natural Resources was assigned stewardship responsibilities for all marine areas 0 to 3 nautical miles around emergent lands, except Midway Atoll.

2006: Papahānaumokuākea Marine National Monument established by President George W. Bush NOAA National Marine Sanctuaries Program, U.S. Fish and Wildlife Service National Wildlife Refuge System, and State of Hawai'i Department of Land and Natural Resources were assigned Co-Trustee responsibilities for all land and marine areas of the Northwestern Hawaiian Islands (a distance of 1,043 nautical miles and width of 100 nautical miles).

Permit Applications and Permit Issuance

Photo: James Watt

Papahānaumokuākea Marine National Monument is comprised of fragile terrestrial and marine ecosystems. It is home to 23 federally and state threatened and endangered species, including eight endangered species found only in the Northwestern Hawaiian Islands. In addition, many areas of the archipelago contain important cultural and historic resources. To minimize the potential impacts of human activities on these resources, the Monument agencies manage human uses through a joint permitting program.

As detailed in the Presidential Proclamation (Proclamation 8031) that established the Northwestern Hawaiian Islands Marine National Monument, all activities are prohibited, with limited exception, except by Monument permit. All permit applications are reviewed, and permits issued jointly, by the Co-Trustee agencies. Applications for permitted activities are reviewed by managers, scientists, and other experts within the management agencies and by Native Hawaiian cultural reviewers. In addition, permit applications are posted for public notification, and all applications for activities in State waters are approved by the State of Hawai'i Board of Land and Natural Resources.

In order for any project to be permitted, it must meet all of the Findings of Presidential Proclamation 8031. In addition, all permitted activities must meet National Environmental Policy Act and Chapter 343 Hawai'i Revised Statutes (the State Environmental Impact Assessment Act) requirements and must comply with all other applicable federal and state laws and regulations.

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 Papahānaumokuākea regulations, as well as comply with Papahānaumokuākea agency's mandates, regulations, and policies. All permits also specify the requirements for compliance with quarantine protocols to avoid introduction of alien invasive species, and list prohibited activities such as the disturbance of cultural or historic artifacts or sites. Special Conditions may also be applied to particular permits, placing additional restrictions on activities in order to minimize impacts to Monument resources.

Information on Papahānaumokuākea permit application procedures is available at:
http://papahanaumokuakea.gov/resource/permits.html

Findings of Presidential Proclamation 8031:

All activities occurring in Papahānaumokuākea must meet ten Findings laid out in Presidential Proclamation 8031. Additional Findings apply to one or more specific permit types, including Special Ocean Use, Native Hawaiian Practices, and Recreation permits.

- 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 proposed 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

Upon permit application approval, one of six permit types is issued to the permittee. These permit types include Research, Conservation and Management, Education, Native Hawaiian Practices, Recreation, and Special Ocean Use.

Photo: James Watt

Research

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

Conservation and Management

Photo: James Watt

Conservation and Management permits are issued for general management of Papahānaumokuākea. This may include activities associated with resource management, such as field station operations, marine debris removal, development and maintenance of infrastructure, species and habitat restoration, 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 detection.

Photo: James Watt

Education

Education permits are issued for activities that further the educational value of Papahānaumokuākea. These activities may enhance the understanding of ecosystems, improve resource management decision making, promote Native Hawaiian knowledge and values, or aid in enforcement and compliance efforts. 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 classes. Offsite interpretation of natural, historic, and cultural resources may include the collection and removal of samples to be used to highlight the flora, fauna, and ecosystems of Papahānaumokuākea. Limited numbers of specimens may therefore be collected for exhibit in offsite educational facilities or for offsite education or interpretation programs, including, for example, Bishop Museum; NOAA's Mokupāpapa Discovery Center; the University of Hawai'i Waikīkī Aquarium; the Federal Law Enforcement Training Center and USFWS National Fish and Wildlife Forensics Laboratory for training and identification for law enforcement; and secondary schools and universities.

Native Hawaiian Practices

Photo: James Watt

Native Hawaiian Practices permits are issued for activities that are 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 Papahānaumokuākea. 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. Permit conditions and protocols will continue to be developed by the Papahānaumokuākea Co-Trustees and the Office of Hawaiian Affairs through consultation with the Native Hawaiian Cultural Working Group and the Native Hawaiian community.

Recreation

Recreation permits are issued for all recreational activities and are limited to the Midway Atoll Special Management Area. Recreation activities may not be associated with any for-hire operation or involve any extractive use. Examples of activities that may be permitted include snorkeling, wildlife viewing, and kayaking.

Special Ocean Use

Photo: James Watt

Special Ocean Use permits are issued for projects related to commercial ocean uses, such as ecotourism or documentary filmmaking, that have a net benefit to Papahānaumokuākea. 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 activity or use. Activities that could potentially qualify as another permit type but that directly generate revenue or profit for one of the persons involved in the activity must be permitted as Special Ocean Use. In addition, Special Ocean Use proposals involving activities outside of the Midway Atoll Special Management Area must be for educational or research purposes that directly benefit conservation and management of Papahānaumokuākea.

Exempted Activities

Four exemptions from the permitting process exist. These include activities conducted by the U.S. military and Coast Guard, law enforcement activities, actions related to emergency response, and uninterrupted passage by vessels through Papahānaumokuākea. As of May 2008, all non-permitted U.S. vessels and foreign flag vessels en route to U.S. port passing through Papahānaumokuākea must report entry into and exit from Papahānaumokuākea using the U.S. vessel reporting system, CORAL SHIPREP.

Additional Requirements for Work in the Monument

In addition to the permit requirements of Papahānaumokuākea, several other federal and state laws, permits and/or consultations are applicable for much of the work conducted in the Northwestern Hawaiian Islands. For example, all work with threatened or endangered species must be permitted under the Endangered Species Act statutes. Anyone handling any bird species must obtain one or more permits from the U.S. Fish and Wildlife Service Office of Migratory Bird Management and Hawai'i Department of Land and Natural Resources Division of Forestry and Wildlife. All scientists working with marine mammals must obtain one or more permits from the NOAA Fisheries Office of Protected Resources. Consultations may also be necessary under the U.S. Endangered Species Act (ESA) and State endangered species laws, or Environmental Protection Agency (EPA) and State Department of Health regulations. Activities that may affect cultural resources must undergo a consultation process under Section 106 of the National Historic Preservation Act through the DLNR State Historic Preservation Division. Finally, although bottomfishing within Papahānaumokuākea boundaries will be phased out by 2011, all current bottomfishing operations are required to have valid federal fishing permits and State commercial marine licenses and fishing vessel registrations.

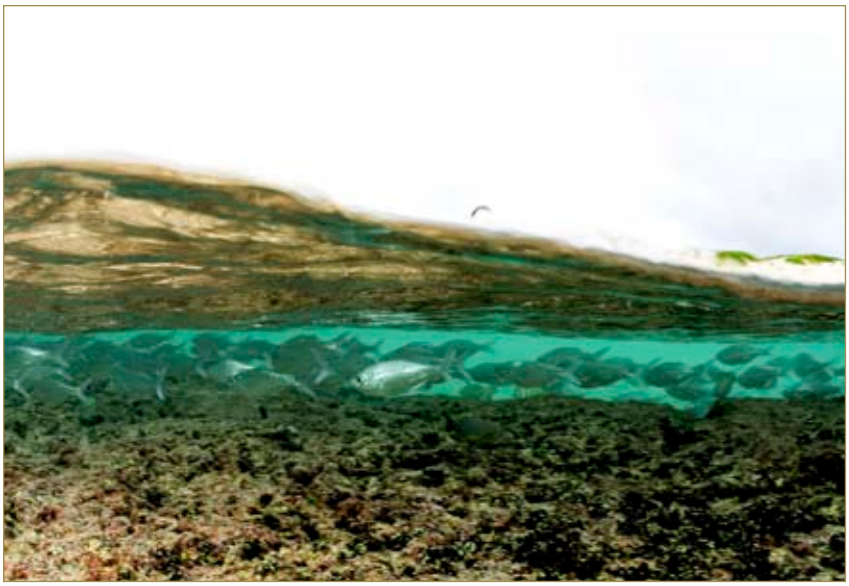


Photo: James Watt

2008 Permitted Activities

Conducted Within the Monument

Permit Issuance and Levels of Human Activity

Photo: James Watt

Permits Issued in 2008

Table 1 presents information on the number of permits issued, by permit type, for activities conducted in Papahānaumokuākea in 2008, with 2007 information given for comparison. The numbers of permitted projects that were new in 2008 versus those that were renewals (i.e. ongoing or long-term projects initiated in previous years) are also shown. As Papahānaumokuākea's permitting system continues to be refined, the number of permits issued within each permit type each year may reflect changes in the permitting process, rather than changes in the number of activities conducted.

The number of Research permits granted in 2008 was lower than in 2007 (30 in 2008, versus 37 issued in 2007), and 26 of the 30 Research permits were for ongoing or long-term projects. Ten Conservation and Management permits were issued in 2008, with all 10 projects consisting of long-term monitoring or management activities conducted by the Monument Co-Trustee agencies.

For the remaining permit types, three Education projects were conducted in 2008, compared to two in 2007, and one Native Hawaiian Practices permit was issued in both 2007 and 2008. Two Recreation permits were issued in 2008, up from one in 2007, and three Special Ocean Use projects were permitted in 2008, down from five projects in 2007. Additional information on the projects permitted in 2008 is given in the Details of 2008 Permitted Activities section of this report.

Table 1. Numbers and types of permits granted in 2007 and 2008.

Permit Type	Number of Monument Permits Granted 2007	Number of Monument Permits Granted 2008	Number of New NWHI Projects 2008	Number of Renewal NWHI Projects 2008
Research	37	30	4	26
Conservation & Management	5	10	0	10
Education	2	3	2	1
Native Hawaiian Practices	1	1	1	0
Recreation	1	2	2	0
Special Ocean Use	5	3	2	1
TOTAL	**51**	**49**	**11**	**38**

Levels of Human Presence

The overall level of human presence in Papahānaumokuākea in 2008 is indicated in Table 2, with 2007 information shown for comparison. In 2008, vessel cruises and a total of 112 flights transported permitted personnel and supplies to and from Papahānaumokuākea. While the number of vessel cruises decreased from 2007, and the number of flights to and from French Frigate Shoals remained constant, the number of flights to and from Midway Atoll increased from 86 in 2007 to 99 in 2008.

The average number of people aboard vessels per day throughout the year in 2008 was 30, and the average number of people on land throughout Papahānaumokuākea was 83, for a total average of 113 people in Papahānaumokuākea per day in 2008 (compared to 115 per day in 2007). The average number of people on land was highest at Midway Atoll, with an average human population of 70. Human presence on all other islands and atolls was an order of magnitude lower, with an average of 5.7, 4.5, and 2.2 people on land per day at French Frigate Shoals, Laysan, and Kure Atoll, respectively, and fewer than 0.5 persons per day on all other islands and atolls in the chain.

Table 2. Number of vessel cruises and flights, and average number of people on land per day in the Monument in 2007 and in 2008.

TRANSPORTATION	2007	2008		
Number of Vessel Cruises	18	15		
Number of Flights				
French Frigate Shoals	13	13		
Midway Atoll	86	99		
VISITATION		**Min**	**Max**	**Mean**
Average Number of People on Land per Day				
Nihoa	0.02	0	3	0.03
Mokumanamana	0.06	0	2	0.04
French Frigate Shoals	6.30	2	26	6.47
Laysan Island**	4.20	7	14	8.63
Lisianski	0.30	0	6	0.81
Pearl and Hermes Atoll	0.80	0	5	0.22
Midway Atoll*	70.0	68	209	57.07
Kure Atoll	1.50	0	14	2.28
TOTAL	83			75.55
Average Number of People on Ships per Day	32	30		
Average Number of People in Monument per Day	115	113		

* Data for MANWR includes imputed values for employees, contractors and other persons on Midway Atoll National Wildlife Refuge.

**Laysan Island data assumes 8 "permanent" personnel, employees and volunteers of FWS, each day throughout the year. More detailed information was not available at the time of publication.

Permitted Versus Actual Visitation

As in 2007, the number of personnel who actually entered Papahānaumokuākea in 2008 was lower than the number applied for and permitted. In some cases, permitted projects were not conducted at all. In other cases, fewer personnel travelled to Papahānaumokuākea than had been allowed under a given permit, possibly due to funding or logistics limitations. Table 3 provides information for all permits issued, by permit type, the number of personnel who were permitted in 2008 and the number of personnel who actually entered Papahānaumokuākea. In total, 871 people were permitted access to Papahānaumokuākea, but only 602 (69.1%) actually entered.

Table 3. Number of permitted personnel versus actual number of people entering Papahānaumokuākea in 2008.

Permit Type	Number of Personnel Permitted into Monument	Number of Personnel who Entered Monument
Research	230	97
Conservation & Management	276	248
Education	55	38
Native Hawaiian Practices	10	6
Recreation	7	5
Special Ocean Use		
Visitor Program at Midway Atoll	132	104
66th Anniversary of the Battle of Midway	147	101
National Geographic Documentary	5	3
Total Special Ocean Use	284	208

* See Table 4 for additional information on Conservation and Management permitted personnel

Although the number of personnel entering Papahānaumokuākea was higher for Conservation and Management permits than for other permit types, more than 62% of Conservation and Management personnel (155 of 248) were in Papahānaumokuākea to conduct year-around operations, maintenance, and management activities at the permanent U.S. Fish and Wildlife Service field stations at French Frigate Shoals, Laysan, and Midway Atoll (Table 4). The remaining personnel working under Conservation and Management permits entered Papahānaumokuākea for shorter periods to conduct work such as marine mammal monitoring or vessel-based marine debris removal.

Table 4. Number of USFWS personnel working under a Conservation and Management permit to operate, maintain, and conduct management activities throughout the year at permanent field stations within Papahānaumokuākea in 2008.

Location	USFWS Staff	USFWS Volunteers	USFWS Contractors	Total USFWS
Laysan	9	8	0	17
French Frigate Shoals	7	22	2	31
Midway Atoll	11	16	110	137
TOTAL	27	46	112	185

Photo: James Watt

Locations of Permitted Activities

The following map (Figure 1) indicates locations where permitted activities occurred in Papahānaumokuākea in 2008. Of the 49 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.

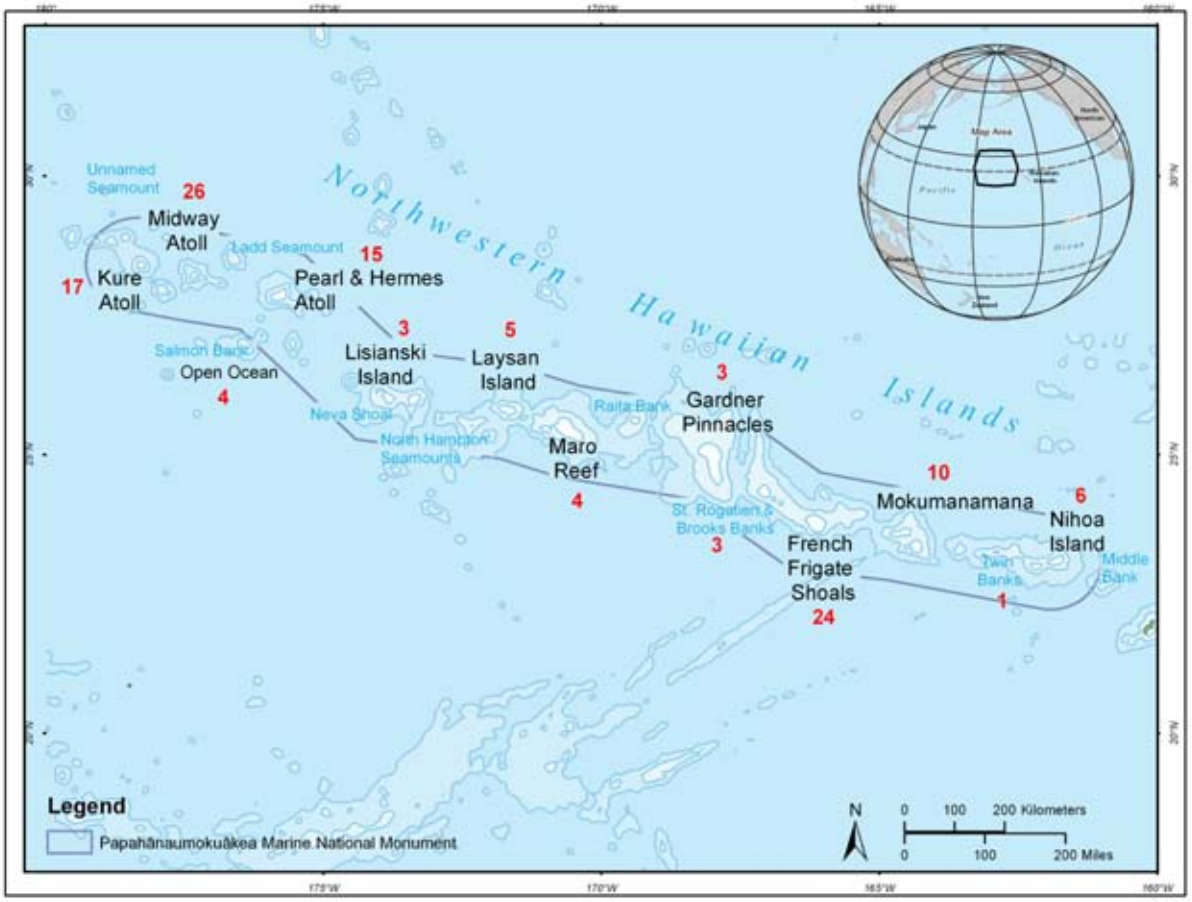


Figure 1. Locations of the 49 permitted activities within Papahānaumokuākea in 2008. Many projects were conducted at multiple locations; thus, the total number of projects in the map adds to more than 49.

Permitted *Research Activities*

Summary

A total of 30 Research permits were issued by the Monument for work conducted in 2008 (Table 5). Research permits were issued to NOAA personnel, university researchers, and non-governmental organizations to conduct work on seabirds, fish, corals, lobsters, marine mammals, algae, terrestrial insects, marine debris, and archaeology.

Table 5. Affiliations of Research permittees and permitted projects in 2008.

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Projects
NOAA National Marine Fisheries Service Pacific Islands Fisheries Science Center	6	Reef Assessment and Monitoring Program (RAMP) Surveys of recruit reef fishes at Midway Atoll Lobster population monitoring Hawaiian monk seal foraging* Hawaiian monk seal captive care* Shark deterrence at French Frigate Shoals
NOAA Office of National Marine Sanctuaries	1	Marine debris research at Midway Atoll
University of California Santa Cruz	3	Coral reef assessment at Midway Atoll (2) Albatross satellite tagging
University of Hawai'i	6	Assessment of Native Hawaiian cultural sites Lobster population genetics Baseline study and identification of marine algae of the NWHI Characterization of bottom environment and associated scavengers Collection of Nysius seed bugs for phylogenetic studies Study of Hyposmocoma moths
University of Hawai'i Hawai'i Institute of Marine Biology	7	Coral genetics Genetic survey of reef-associated fishes Comparative life history analysis of reef fishes Identification and monitoring of coral disease and/or bleaching Study of apex predator movement Study of coral microbial community structure Population genetics of reef invertebrates

*Research takes place under ESA/MMPA permits

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Projects
University of Maine	1	Invertebrate survey and plant seed collection at Midway Atoll
Saint Mary's University	1	Mark-recapture of burrow-nesting seabirds
Washington University	1	Population genetics of moray eels
Sandia Laboratories	1	Operation of radionuclide aerosol detector sampler analyzer
Friends of Midway Atoll	2	Marine debris survey and removal at Midway Atoll (2)
NWHI Bottomfishing Hui	1	Uku tagging research

Research Activities by Location

Islands and atolls with the highest levels of permitted Research activities in 2008 included Midway Atoll, French Frigate Shoals, Pearl and Hermes Atoll, and Kure Atoll. Non-emergent banks and reefs, including Brooks Banks and Twin Banks, saw the lowest levels of Research activities, while Lisianski Island had the fewest number of Research activities conducted on land.

Photo: James Watt

Research Projects:
Non-Biological, Observational and Sample Collections Activities

The Research projects conducted in 2008 included a variety of activities: four of the Research projects conducted did not involve the study of organisms (Table 6), including marine debris research at Midway Atoll, land-based marine debris surveys and removal, operation of a radionuclide aerosol detector at Midway Atoll, and assessment of Native Hawaiian cultural sites at Nihoa and Mokumanamana. Approximately one fourth of Research projects that involved the study of organisms consisted of observational work only; that is, work in which biological or other samples were not taken. Observational work included activities such as surveying, population monitoring, and satellite or acoustic tagging of animals. The remainder of the Research projects involved collection of physical samples, such as sediment or rocks, or biological samples, including feathers, blood, blubber biopsies, fin clips, or, for some projects, whole fish or invertebrate organisms.

Photo: James Watt

Sample collections for all projects are listed in Table 6. Although some sample collections were conducted at single islands/atolls, such as albatross feather and blood samples taken at French Frigate Shoals, sample collections for most projects were taken from multiple locations throughout Papahānaumokuākea and from multiple species within each taxonomic group. To provide one example, the 357 coral biopsies collected for a population genetics study of reef invertebrates included 2-cm^3 samples of 7 different species collected at 4 atolls throughout Papahānaumokuākea. This resulted in an average of 13 individual biopsies per coral species.

Photo: Claire Johnson

Table 6. All Research projects conducted in 2008, including non-biological research, observational work, and sample collections.

Permitted Research Project	Non-biological Research Conducted	Observational Research Conducted	Physical Samples Collected	Biological Samples Collected
Reef Assessment and Monitoring Program (RAMP)		•	1308 liters seawater	9 coral biopsies 48 algae samples
Surveys of recruit reef fishes at Midway Atoll		•		9 fish
Lobster population monitoring				400 lobster tails 600 lobster dactyls
Hawaiian monk seal foraging		•		15 blood samples* 15 blubber samples 15 oral/nasal swabs 24 scat samples
Galapagos shark deterrence at French Frigate Shoals		•		
Marine debris research at Midway	•	•		
Coral reef assessment at Midway Atoll				Permit report not yet due.
Albatross satellite tagging		•		68 blood samples 68 feathers
Assessment of Native Hawaiian cultural sites	•	•	30 coral rocks 8 quarts soil	
Lobster population genetics				36 lobster antennae 459 lobster dactyls
Baseline study and identification of marine algae of the NWHI			455 algae-encrusted rocks	22 partial coralline algae 7 whole coralline algae
Characterization of bottom environment and associated scavengers		•		
Collection of Nysius seed bugs for phylogenetic studies				14 seed bugs
Study of Hyposmocoma moths				Permit report not yet due.
Coral genetics				1209 coral biopsies
Genetic survey of reef-associated fishes				247 fish 4 shark tissue plugs
Comparative life history analysis of reef fishes				123 fish

*Collected under ESA/MMPA permits

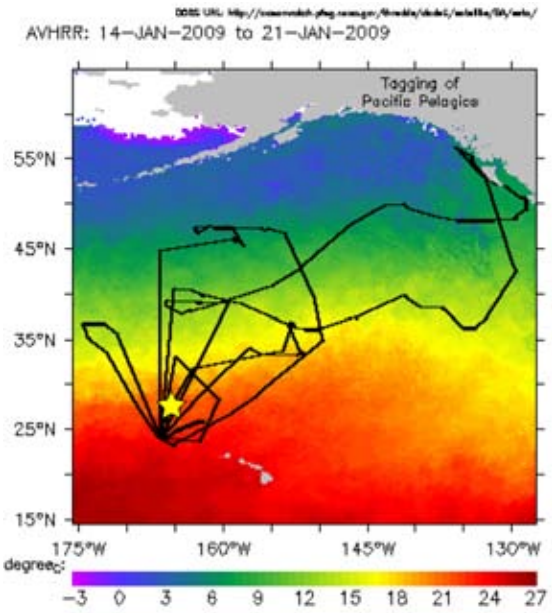
Identification and monitoring of coral disease and/or bleaching			15 grams sand 15 liters seawater	130 coral biopsies 240 protists 18 zooxanthids
Study of apex predator movement		•		
Study of coral microbial community structure			63 liters seawater	265 coral biopsies
Population genetics of reef invertebrates				357 coral biopsies 8 shrimp claws 8 octopus biopsies 185 seastar appendages 25 sea cucumber skin plugs 65 urchin spines or feet 42 whole urchins 103 hermit crabs
Mark-recapture of burrow-nesting seabirds		•		
Population genetics of moray eels				9 eels
Operation of radionuclide aerosol detector sampler analyzer	•			
Marine debris survey and removal at Midway Atoll	•	•	1983 pieces land-based marine debris	
Uku tagging research		•		
Comparisons of arthropod communities in native and non-native plant stands and determination of propagation procedures for native plants to support Verbesina eradication on Midway Atoll		•		7 beetles 2 caterpillars 7 flies 2 flatids 10 ants 1 Hawaiian beet webworm 4 black flower thrips
Juvenile Monk Seal Enhancement Activities				10 blood samples 70 orifice swabs 20 blubber biopsies Translocated 6 weaned juveniles from Tern Island, French Frigate Shoals to Nihoa

Albatross Movement

Laysan albatross with satellite tag mounted on back and geolocation tag on leg band. Photo: Michelle Kappas.

Although many marine and terrestrial species occur in the Northwestern Hawaiian Islands year-around, with all foraging, mating, and offspring-rearing activities taking place inside Papahānaumokuākea boundaries, many other species travel hundreds or thousands of miles from Papahānaumokuākea to find mates or to forage for necessary food resources in other areas of the Pacific. Humpback whales, which are now known to use waters of the Northwestern Hawaiian Islands for raising their calves, swim thousands of miles between their polar summer foraging ranges and the subtropical wintering areas of Papahānaumokuākea. In a similar way, the two albatross species that breed in the Northwestern Hawaiian Islands, the Laysan and black-footed albatrosses, fly hundreds to thousands of miles between Papahānaumokuākea breeding colonies and their foraging ranges. These flights occur not only between the breeding and non-breeding periods, but also within the breeding season, as albatrosses must continue to obtain food for themselves and their chicks during their 8-month nesting period.

Because these seabird species use habitats outside of Papahānaumokuākea boundaries to obtain food resources, an understanding of their foraging ranges, diet, and factors affecting food availability are critical in understanding the observed population dynamics of these species within Papahānaumokuākea, and in formulating collaborative management actions across international jurisdictional boundaries. To quantify foraging locations and sea surface conditions of foraging areas, researchers from the University of California, Santa Cruz, have been tracking the movements of Laysan and black-footed albatrosses during the breeding and non-breeding periods for the past six years. In 2008, satellite tags, GPS tags, and geolocation tags were deployed on adult albatrosses of both species at French Frigate Shoals and at Midway Atoll. In addition, satellite tags were placed on juvenile albatrosses just before fledging at Midway Atoll. Information from this ongoing research has already shown that Laysan albatrosses forage in the cooler waters of the central and western North Pacific, while black-footed albatrosses use the warmer waters of the central and eastern Pacific. The multiple years of data collected on the foraging ecology of these species will allow for analysis of relationships between oceanographic conditions and albatross reproductive success within Papahānaumokuākea, and they continue to provide information on potential overlaps between seabird foraging ranges and Pacific fisheries activities.



The figure to the right maps the movements of a Laysan albatross tagged with a satellite transmitter. The star shows the location at which the bird was tagged (Midway Atoll); the black line indicates movements over a 1-week period in January 2009, and the color shades indicate sea surface temperatures during that time period.

Permitted
Conservation & Management Activities

Summary

Ten Conservation and Management permits were issued in 2008 (Table 7). One permit was issued to the Monument Co-Trustee agencies for conservation and management activities conducted within Papahānaumokuākea (including, for example, the operation and maintenance of field stations and camps at French Frigate Shoals, Laysan, Midway Atoll, and Kure Atoll; marine debris removal activities; and alien species monitoring and removal). Two permits were issued for the operation of NOAA vessels, the OSCAR ELTON SETTE and HI'IALAKAI; three were issued to NOAA NMFS Pacific Islands Fisheries Science Center to conduct benthic habitat mapping, monitor Hawaiian monk seal populations, and operate and maintain remote viewing cameras for green turtle monitoring at French Frigate Shoals. One permit was issued to NOAA NMFS Pacific Islands Regional Office to allow for permitting of bottomfish vessel anchoring, and one was issued to NOAA Office of National Marine Sanctuaries to carry out maritime heritage conservation and management activities. Finally, two Conservation and Management permits were issued to universities: one to the University of Hawai'i for the operation and maintenance of tide and weather station equipment at French Frigate Shoals, and one to Texas A&M University to conduct spinner dolphin monitoring.

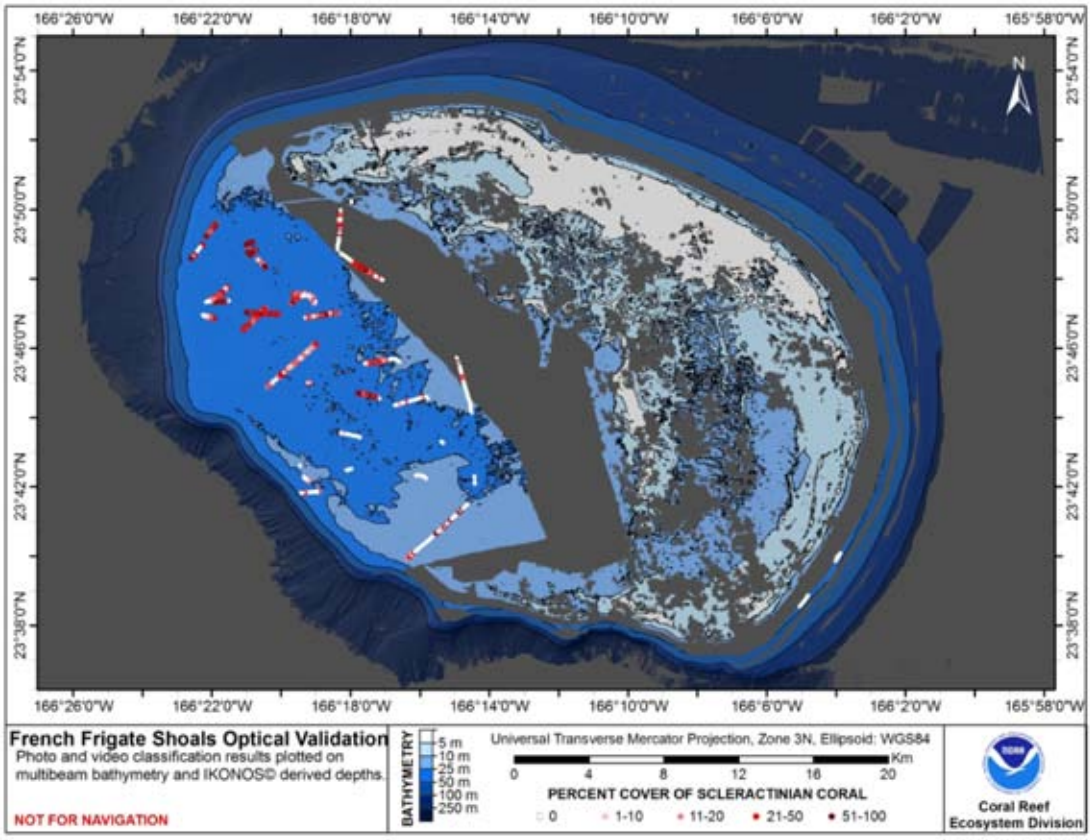
Table 7. Affiliations of Conservation and Management permittees and permitted projects in 2008.

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	Vessel permit for R/V Hi'ialakai Vessel permit for R/V Oscar Elton Sette
NOAA National Marine Fisheries Service Pacific Islands Fisheries Science Center	3	Benthic habitat mapping Monitoring Hawaiian monk seal subpopulations Maintenance of green turtle remote cameras at FFS
NOAA National Marine Fisheries Service Pacific Islands Regional Office	1	Bottomfish vessel anchoring
NOAA Office of National Marine Sanctuaries	1	Maritime heritage conservation and management activities
University of Hawai'i	1	Maintenance of tide and weather stations at FFS
Texas A&M University	1	Monitoring of Spinner dolphins

Benthic Habitat Mapping

One of the fundamental pieces of information necessary to properly conserve and manage an area is an understanding of the types and locations of habitats that occur within the ecosystem. Since 2001, the Pacific Islands Fisheries Science Center Coral Reef Ecosystem division, in conjunction with the University of Hawai'i Pacific Islands Benthic Habitat Mapping Center, has conducted bathymetric, backscatter, and multibeam habitat mapping and diver habitat validation surveys in the Northwestern Hawaiian Islands. Such mapping provides baseline ocean depth information used for nautical charts; characterization and mapping of the benthic habitats that occur in Papahānaumokuākea; and information on changes in seafloor characteristics over time.

As part of this long-term mapping project, in 2008, habitat mapping personnel spent three weeks aboard the NOAA vessel HI'IALAKAI at French Frigate Shoals, conducting bathymetric and backscatter mapping of almost all of the shallow marine areas (< 20 m) from the 25' survey launch AHI In addition, multibeam mapping was conducted from the HI'IALAKAI in deeper waters surrounding Mokumanamana, Brooks Banks, and French Frigate Shoals. Habitat mapping validation surveys were conducted in these areas using both towed camera systems and diver surveys.



Map of French Frigate Shoals created using multibeam bathymetry, satellite imagery, and towed camera and diver validation data. Image from http://www.soest.hawaii.edu/pibhmc/pibhmc_nwhi_ffs_optical.htm.

Permitted
Education Activities

Summary

Three Education permits were issued in 2008. One permit was issued to NOAA Office of National Marine Sanctuaries for a vessel-based Educators-at-Sea expedition, and two were issued to universities: one to University of Hawai'i at Hilo and one to Duke University. Both university Education permits were issued for field study courses conducted at Midway Atoll (Table 8).

Table 8. Affiliations of Education permittees and permitted projects in 2008.

Education Permittee Affiliation	Number of Permits Issued	Permitted Education Projects
NOAA Office of National Marine Sanctuaries	1	Educators-at-Sea International Year of the Reef Expedition
University of Hawai'i, Hilo	1	Comparison of ecological frameworks between Midway Atoll and the Island of Hawai'i
Duke University	1	Conservation ecology field course at Midway Atoll

Education/Outreach Products Produced

The three Education permits granted in 2008 resulted in several education/outreach products on the Northwestern Hawaiian Islands. The NOAA Office of National Marine Sanctuaries Educators-at-Sea expedition resulted in two weeks of web reporting (http://educatorexpedition.honadvblogs.com) and three videos (http://selky1.blip.tv/file/1094119/; http://selky1.blip.tv/#1112181; http://selky1.blip.tv/file/1134291/). The University of Hawai'i, Hilo project resulted in web reporting (http://weblog.uhh.hawaii.edu/~misaki/Blog-Ku%27ula%20visits%20Pihemanu%20%28Midway%20Atoll%29/Archive.html), 11 public presentations at Mokupāpapa Discovery Center, student reports, and a video composed of photographs taken during the course. Finally, the Duke University conservation field ecology course at Midway Atoll resulted in web reporting (http://nicholas.duke.edu/hawaii).

Education Activities by Location

The NOAA Office of National Marine Sanctuaries Education activities took place almost entirely aboard vessel and during shallow-water snorkeling, with visits onto land made at Nihoa and at Tern Island, French Frigate Shoals. Marine sites visited included Nihoa Marine Area, Mokumanamana Marine Area, and French Frigate Shoals. University of Hawai'i, Hilo, and Duke University Education activities took place entirely at Midway Atoll.

Educators-at-Sea

The 2008 NOAA Office of National Marine Sanctuaries Educators-at-Sea expedition was carried out under the banner of the 2008 International Year of the Reef. Educators for this expedition were selected from across Oceania, and during the voyage in Papahānaumokuākea were given opportunity to share with other educators the condition of marine resources in their home environments, and the methods they use to empower their students and communities to improve management and use of their local resources. The expedition facilitated sharing of information and practices among several Oceania communities, and it laid the foundation for a network of cross-Pacific marine educators to help improve stewardship of shared marine and island resources. During the expedition, Native Hawaiian cultural experts also immersed the educators in the cultural history and protocols of the Northwestern Hawaiian Islands.

Porites eydouxi. Photo: NOAA

PERMITTED *Native Hawaiian Practices*

Summary

A single Native Hawaiian Practices permit was issued in 2008, to the NOAA Office of National Marine Sanctuaries (Table 9). This project included conducting cultural research on Native Hawaiian mythologies, the Hawaiian moon calendar, and traditional marine resource management.

Table 9. Affiliations of Native Hawaiian Practices permittees and permitted projects in 2008.

Native Hawaiian Practices Permittee Affiliation	Number of Permits Issued	Permitted Native Hawaiian Practices Projects
NOAA Office of National Marine Sanctuaries	1	Cultural research in traditional Native Hawaiian resource management

Native Hawaiian Practices Highlights

Archaeological evidence indicates that Native Hawaiians lived on Nihoa and conducted cultural ceremonies on Mokumanamana for a period of 700 years, beginning in approximately 1000 A.D. The nearly pristine natural resources of the Northwestern Hawaiian Islands, including a predator-dominated ecosystem, high levels of endemism, crystalline waters, and unharvested marine resources, continue to be of great cultural significance to Native Hawaiian people. In 2008, four cultural activities were undertaken in Papahānaumokuākea under a Native Hawaiian Practices permit. The first activity involved practitioners of hula and ʻoli from the island of Kaua'i who retraced the paths taken by Hawaiian akua (gods), Kahoaaliʻi and Pele, by locating and experiencing various wahi pana (significant sites) that are referenced in Hawaiian mythologies. This study enabled hula and ʻoli practitioners to gain deeper insight into the multiple meanings of various mele (song) and hula (dance) by experiencing the surrounding natural environment from which the literature is inspired.

The second study involved spatial differences in the Hawaiian moon calendar between the main and Northwestern Hawaiian Islands. The application of the Hawaiian moon calendar to the marine environment within the Northwestern Hawaiian Islands will help redevelop an understanding of spawning cycles, fish recruitment, and aggregation patterns across the Hawaiian archipelago. The third project consisted of a comparative study between community-managed areas in the main Hawaiian Islands and the ecosystems of the Northwestern Hawaiian Islands. Information from these project will allow for refinement of cultural resource management strategies in the main Hawaiian Islands.

The last project involved examining the basic ecology of ʻopihi populations within the Northwestern Hawaiian Islands. A standard ʻopihi monitoring protocol which is inclusive of Hawaiian methods of monitoring, was developed to monitor populations within select locale on Maui and Kahoʻolawe islands. In 2008, cultural researchers began to assess areas containing ʻopihi habitat in the Northwestern Hawaiian Islands. This multi-year project conducted in the Northwestern Hawaiian Islands will facilitate a better understanding of ʻopihi health relative to populations located in the main Hawaiian Islands.

Photo of historical Native Hawaiian cultural site on Nihoa (Photo: NOAA).

Permitted
Recreation Activities

Summary

Two Recreation permits were issued in 2008, one to the U.S. Fish and Wildlife Service for the Visitor Services Program at Midway Atoll, and one to an individual for a sailboat trip to Midway Atoll (Table 10). Recreation activities are permitted in Papahānaumokuākea only within the Midway Atoll Special Management Area. Under the permit issued to an individual, a group of 5 permittees conducted a 2-week sailboat trip to Midway Atoll.

Table 10. Affiliations of Recreation permittees and permitted projects in 2008.

Recreation Permittee Affiliation	Number of Permits Issued	Permitted Recreation Projects
U.S. Fish and Wildlife Service	1	Administering the Visitor Services Program at Midway Atoll
Individual	1	Sailboat trip to Midway Atoll

Midway. Photo: Charles Delbeek

Special Ocean Use Activities

Summary

Three Special Ocean Use permits were issued in 2008 (Table 11). One permit was issued for recreational activities conducted at Midway Atoll. Under this permit, over the course of the year 104 visitors conducted activities such as wildlife viewing, photography, and snorkeling at Midway Atoll. One Special Ocean Use permit was issued for the commemoration of the 66th Anniversary of the Battle of Midway, and the final permit was issued to the National Geographic Society for documentary filming for the Wild Spaces National Geographic Series.

Table 11. Affiliations of Special Ocean Use permittees and permitted projects in 2008.

Special Ocean Use Permittee Affiliation	Number of Permits Issued	Permitted Special Ocean Use Projects
Oceanic Society	1	Recreational activities at Midway Atoll
Military Historical Tours	1	Commemoration of the 66th Anniversary of the Battle of Midway
National Geographic Society	1	Documentary filming for Wild Spaces National Geographic Series

Special Ocean Use Products Produced

Outreach projects resulting from 2008 Special Ocean Use permits include portions of National Geographic's Wild Spaces series (http://channel.nationalgeographic.com/channel/series/americas-wild-spaces). "America's Wild Spaces: Hidden Hawaii" is aired on the National Ge ographic Channel Monday, July 20, 2009, and DVD copies of the segment.

Bringing The Place To The People

Because protection of the NWHI's fragile ecosystems and cultural and historic resources requires strict limits on visitation to Papahānaumokuākea, some projects are allowed that will bring the place to the people, rather than the people to the place. In 2008, a Special Ocean Use activity was permitted that provides this resource: the National Geographic Society, in conjunction with a NOAA vessel cruise to conduct permitted Research activities, conducted documentary filming of the marine and terrestrial habitats of the Northwestern Hawaiian Islands, and included footage and descriptions of the research projects that took place during the cruise. The resulting film was broadcast on the National Geographic Channel to more than 140 countries and in 25 languages.

Photos: NOAA and USFWS

National Geographic film crew at French Frigate Shoals, June 2008 (Photos: NOAA and USFWS).