

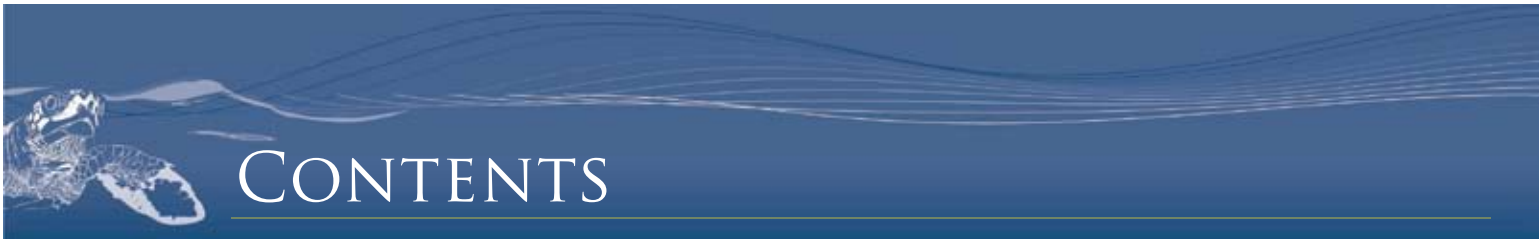


PAPA HĀNAUMOKUĀKEA

MARINE NATIONAL MONUMENT



Photo: Cynthia Vanderlip



INTRODUCTION

Designation of Papahānaumokuākea Marine National Monument	3
Permitted Activities in the Monument	4
Managing Human Uses	4
Permit Applications and Permit Issuance	5
Types of Permits Issued	6
Exempted Activities	7
Additional Federal and State Permits and Consultations Required for Work in the Monument	7

2007 PERMITTED ACTIVITIES CONDUCTED WITHIN THE MONUMENT

Permit Issuance and Levels of Human Activity	8
Permits Issued in 2007	8
Levels of Human Presence	9
Permitted Personnel Versus Actual Visitation	10
Locations of Permitted Activities	11

Details of 2007 Permitted Activities

Research Activities

Research Activities Summary	12
Research Activities by Location	13
Research Projects: Non-Biological, Observational and Sample Collections	14
Research Highlights: Humpback Whales Wintering Habitat	18
Research Highlights: Discovering Maritime Heritage Archaeology Sites	19

Conservation and Management Activities

Conservation and Management Activities—Summary and by Location	20
Conservation and Management Highlights: Removing Derelict Gear-Marine Debris	21
Conservation and Management Highlights: Eradicating Alien Species	22

Education Activities

Education Activities Summary, Outreach Products and Locations	23
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Native Hawaiian Practices Activities

Native Hawaiian Practices Activities Summary	24
Native Hawaiian Practices Highlights: Observing Summer Solstice	24

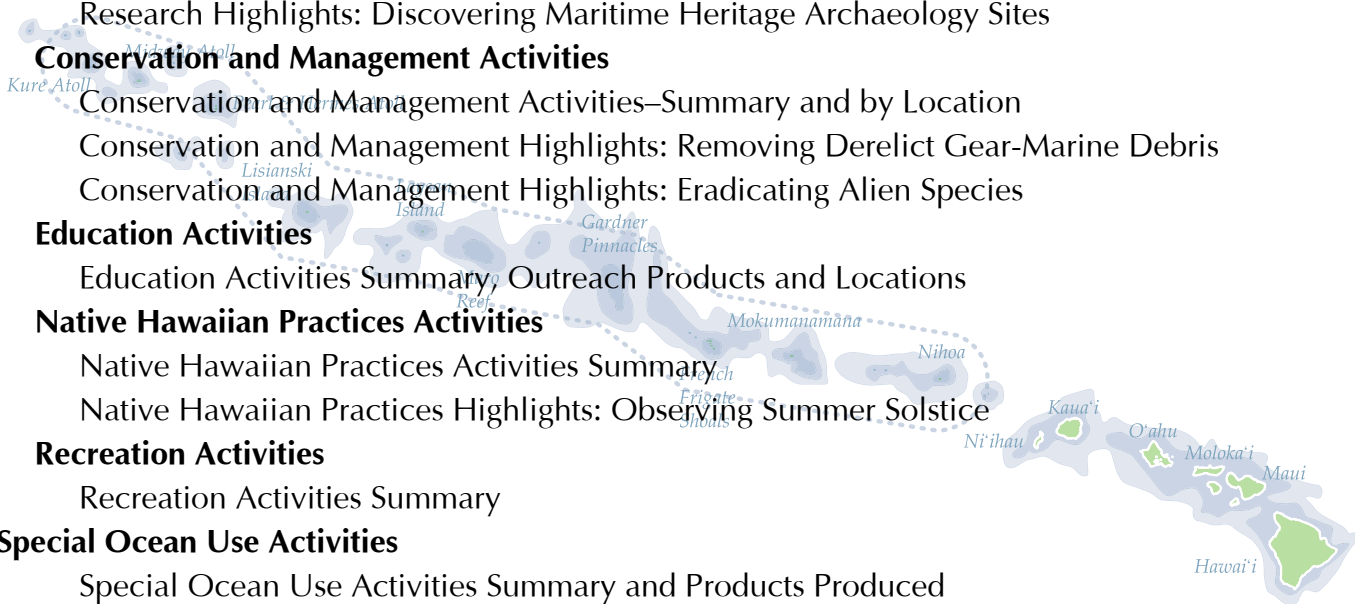
Recreation Activities

Recreation Activities Summary	25
-------------------------------	----

Special Ocean Use Activities

Special Ocean Use Activities Summary and Products Produced	26
Special Ocean Use Highlights: Honoring the 65th Anniversary of the Battle of Midway	27

PMNM RELATIVE SIZE AND VISITATION RATES	28
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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, the Monument consists of vast areas of unique marine and terrestrial ecosystems and contains significant cultural and historical 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), access to the Monument is limited through a permitting process. This permitting system minimizes human impacts by allowing only

those activities that are consistent with the Presidential Proclamation that established the Monument, and with agency-specific laws and regulations.

Following the 2006 establishment of Papahānaumokuākea Marine National Monument, 2007 was the first full year in which permits were issued jointly by the Monument for activities conducted in the Northwestern Hawaiian Islands. This report presents information on the newly implemented Monument permitting process and summary information on the activities that were permitted and that occurred in the Monument in 2007. Similar reports will be produced each year to provide indication of the levels of human presence and activities in the Monument over time.

Designation of Papahānaumokuākea Marine National Monument



Throughout the 20th century, several federal and state agencies, including the Department of Defense, Department of Agriculture, Department of the Interior, the State of Hawai'i, and the Department of Commerce,

were assigned stewardship responsibilities in the Northwestern Hawaiian Islands. In addition, military defense needs during and after World War II resulted in the presence of U.S. Navy and Coast Guard stations on several islands throughout the northwestern archipelago. By the year 2000, areas of the northwestern islands were managed separately by the U.S. Fish and Wildlife Service, the State of Hawai'i, and the National Oceanic and Atmospheric Administration.

In June 2006, President George W. Bush recognized the importance of the unique ecosystems of the Northwestern Hawaiian Islands and signed a proclamation establishing the Marine National Monument, later named Papahānaumokuākea. The Monument is now managed jointly by the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, and the State of Hawai'i Department of Land and Natural Resources, such that each of these Co-Trustee agencies contributes its expertise toward a streamlined and cooperative conservation effort. The Office of Hawaiian Affairs is also represented on the Monument Management Board, allowing for Native Hawaiian management input on this area that has played a significant cultural role for several centuries.

Managing Human Uses



Photo: James Watt

The Monument is comprised of fragile terrestrial and marine ecosystems. It is home to 23 federally threatened and endangered species, including 8 federally endangered species found only in the northwestern islands. In addition, many areas of the Monument contain important cultural and historical resources. To minimize the potential impacts of human activities on these resources, the Monument Co-Trustees manage human uses through a permitting program.

Prior to the establishment of the Monument, the separate agencies responsible for management of the northwestern islands had their own processes of permit application review and issuance and their own permit reporting requirements. Under Co-Trustee management, activities in the Northwestern Hawaiian Islands are prohibited, with limited exception, except by Monument permit, and applications for all activities are reviewed and permits issued jointly by the three Co-Trustee agencies.



Photo right: James Watt
Photo left: Kekuwa Kikilo



Permit Applications and Permit Issuance

A joint Monument permit application template and review process were developed and implemented in 2007. All applications are reviewed by managers, scientists, and other experts within the three Monument Co-Trustee 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 Department of Land and Natural Resources Land Board.

In order for a project to be permitted, it must meet National Environmental Policy Act (NEPA) requirements and must comply with all other required federal and state permits and consultations. In addition, any permitted activity must meet all of the Findings of the Presidential Proclamation (Proclamation 8031) establishing the Monument.

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 invasive species, and list prohibited activities such as the disturbance of cultural or historical 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 Monument permit application procedures is available at <http://papahānaumokuākea.gov/resource/permits.html>.

Photo: James Watt



Findings of Presidential Proclamation 8031:

- 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.

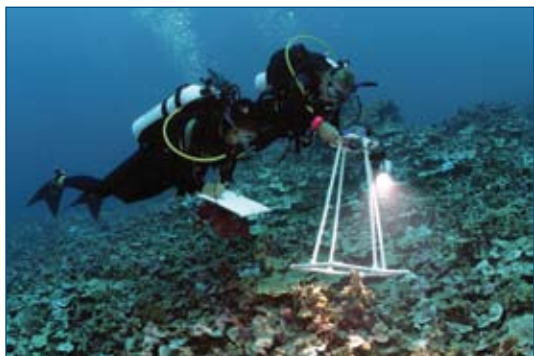


Photo: James Watt

Research

Research permits are required for activities that enhance the understanding of Monument resources 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, benthic mapping, habitat characterization, restoration investigations, cultural studies, and terrestrial and marine archaeological research.

Conservation and Management

Conservation and Management permits are required for general management of the Monument. 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: US Fish and Wildlife Service



Photo: Andy Collins

Education

Education permits are required for activities that further the educational value of the Monument. 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.

Native Hawaiian Practices

Native Hawaiian Practice permits 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 protocols will continue to be developed by the Monument Co-Trustees and the Office of Hawaiian Affairs through consultation with the Native Hawaiian Cultural Working Group and the Native Hawaiian community.



Photo: Kekuwa Kikilo





Photo: James Watt

Recreation

Recreation permits are required 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.

Photo: James Watt

Special Ocean Use

Special Ocean Use permits are required for projects related to commercial ocean uses, such as 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 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 the Monument.



Photo: James Watt

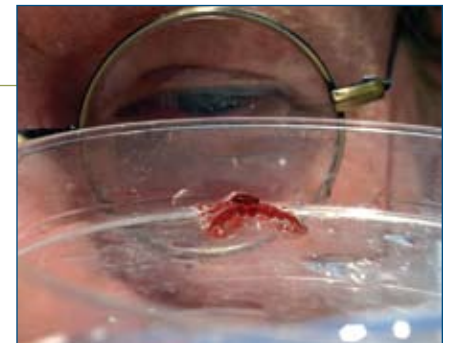
Exempted Activities

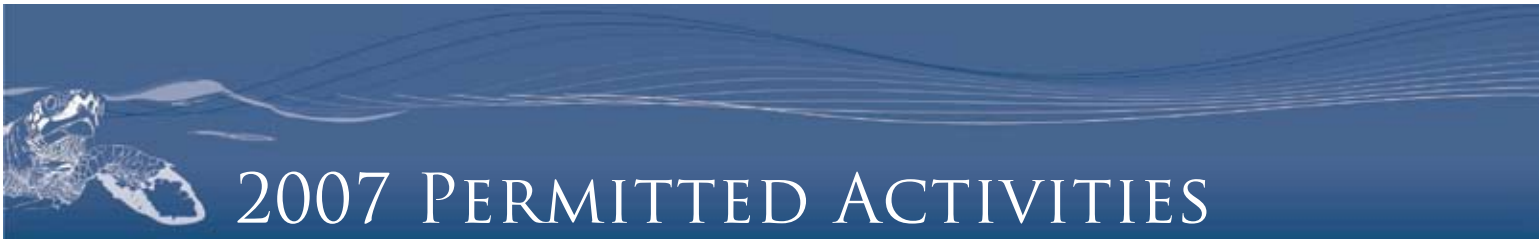
Four exemptions from the permitting process exist. These include activities conducted by the U.S. military and Coast Guard, law enforcement activities, actions related to emergency response, and uninterrupted passage by vessels through the Monument. However, an internationally adopted reporting system called CORAL SHIPREP became operational on May 1, 2008. Every ship crossing the reporting area boundary must send notification in a prescribed format to the shore-based authority.

Photo: James Watt

Additional Federal and State Permits and Consultations Required for Work in the Monument

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 have endangered species permits. 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 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 U.S. Endangered Species Act (ESA) or Environmental Protection Agency (EPA) regulations. Finally, although bottomfishing within the Monument 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.





Conducted Within the Monument

Permit Issuance and Levels of Human Activity

Photo: James Watt



Permits Issued in 2007

2007 was the first full year in which permits were issued by the Monument. Prior to June 2007, the State of Hawai'i issued separate State permits for the Monument. Of a total of 51 permitted projects in the Monument in 2007, 6 were issued both Monument and State permits. The remaining 45 projects were issued a single joint Monument permit, issued by all three Co-Trustee agencies. Table 1 presents information on the number of permits issued, by permit type, for activities conducted in the Monument in 2007. The numbers of permitted projects that were new versus those that were renewals (i.e. ongoing or long-term projects initiated in previous years) are also given.

Research and Conservation and Management projects comprised the majority of work conducted in 2007, with 37 Research permits and five Conservation and Management permits issued. Five Special Ocean Use projects were also permitted, including a one-day event at Midway Atoll to commemorate the 65th anniversary of the Battle of Midway, a two-week documentary filming project by the British Broadcasting Corporation, and two projects to conduct filming and still photography in conjunction with NOAA Education and Research activities. Two Education projects were conducted in conjunction with NOAA research cruises, and a single Native Hawaiian Practices permit was issued for cultural ceremonies at Nihoa and Mokumanamana. Finally, a Recreation permit was granted for a single flight to Midway for a historical and wildlife interpretive tour of the atoll. Additional information on the projects permitted in 2007 is given in the Details of 2007 Permitted Activities sections of this report.

Table 1. Numbers of Monument permits granted, by permit type, for activities conducted in 2007. Numbers of projects that were newly-initiated in 2007, or that were renewal projects (ongoing or long-term projects initiated in previous years), are also listed.

Permit Type	Total Number of Monument Permits Granted	Number of New Projects	Number of Renewal Projects
Research	37	16	21
Conservation & Management	5	0	5
Education	2	2	0
Native Hawaiian Practices	1	1	0
Recreation	1	1	0
Special Ocean Use	5	5	0
TOTAL	51	25	26



Levels of Human Presence

The overall level of human presence in the Monument in 2007 is indicated in Table 2. Eighteen ship cruises and a total of 99 flights transported permitted personnel and supplies to and from the Monument. The average number of people aboard ship per day throughout the year (across 365 days) was 32, and the average number of people on land throughout the Monument was 83, for a total average of 115 people in the Monument per day in 2007.

The average number of people on land per day 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 6.3, 4.2, and 1.5 people on land per day at French Frigate Shoals, Laysan, and Kure Atoll, respectively, and fewer than 1 person per day on all other islands and atolls in the chain.



Photo: US Fish and Wildlife Service

TRANSPORTATION	
Number of Ship Cruises	18
Number of Flights	
French Frigate Shoals	13
Midway Atoll	86
VISITATION	
Average Number of People on Land per Day	83
Nihoa	0.02
Mokumanamana	0.06
French Frigate Shoals	6.30
Laysan	4.20
Lisianski	0.30
Pearl and Hermes Atoll	0.80
Midway Atoll	70.0
Kure Atoll	1.50
Average Number of People on Ships per Day	32
Average Number of People in Monument per Day	115

Table 2. Number of ship cruises and flights, and average number of people (across 365 days) on land and on vessels per day in the Monument in 2007.

Permitted Versus Actual Visitation

The number of personnel who actually entered the Monument in 2007 was lower than the number applied for and permitted. This occurred, to a large extent, because extra individuals were listed on many permit applications in the case that illness, injury, or unforeseen scheduling conflicts would require substitution of personnel. To provide an example of permitted versus actual visitation on a single permit: NOAA's Maritime Heritage Coordinator for the Pacific Region submitted a 2007 permit application requesting that 6 people work in the Monument for 49 days (a total of 294 requested person-days). The work was conducted, however, by 4 people during a period of 10 days (a total of 40 actual person-days in the Monument). An estimate of human presence in the Monument based upon permit information, then, would have over-estimated by more than 7 times the level of human presence in the Monument. This example is typical of differences between the content of the issued permit and the work that was actually conducted on any particular project. To address this issue, as of April 2008 the Monument no longer permits a full list of personnel that includes all possible illness/injury substitutions; instead, a number of permitted "roles," or a maximum number of personnel allowed per visit, is specified on each permit.

Table 3 provides information for all permits issued, by permit type, on the number of personnel who were permitted into the Monument in 2007 versus the number of personnel who entered the Monument. For Conservation and Management, Native Hawaiian Practices, Recreation, and Special Ocean Use projects, permitted and actual numbers of personnel were equal or nearly equal. For Research permits, however, only 201 of 364, or 55%, of permitted personnel actually entered the Monument to conduct the permitted activity. Excluding the one-day Special Ocean Use activities involving the commemoration of the Battle of Midway, 484 of 653, or 74%, of permitted personnel entered the Monument in 2007.

Table 3. Number of permitted personnel versus actual number of people entering the Monument in 2007.

Permit Type	Number of Personnel Permitted into Monument	Number of Personnel who Entered Monument
Research	364	201
Conservation & Management	243	239
Education	4	2
Native Hawaiian Practices	16	16
Recreation	12	12
Special Ocean Use		
Film and still photography projects	14	14
65th Anniversary of the Battle of Midway	1646	1646

Although the number of personnel entering the Monument was higher for Conservation and Management permits than for other permit types, more than 80% of Conservation and Management personnel (194 of 239) were in the Monument to operate, maintain, and conduct 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 the Monument for shorter periods to conduct work such as ship-based marine debris removal.

Table 4. Number of USFWS personnel working under a Conservation and Management permit to operate, maintain, and conduct management activities at permanent field stations within the Monument in 2007.

Location	USFWS Staff	USFWS Volunteers	USFWS Contractors	Total USFWS
Laysan	8	3	-	11
French Frigate Shoals	4	17	1	22
Midway Atoll	7	50	104	161
TOTAL	19	70	105	194





Photo: James Watt

Locations of Permitted Activities

The following map (Figure 1) indicates locations at which permitted activities occurred in the Monument in 2007. Of the 51 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.

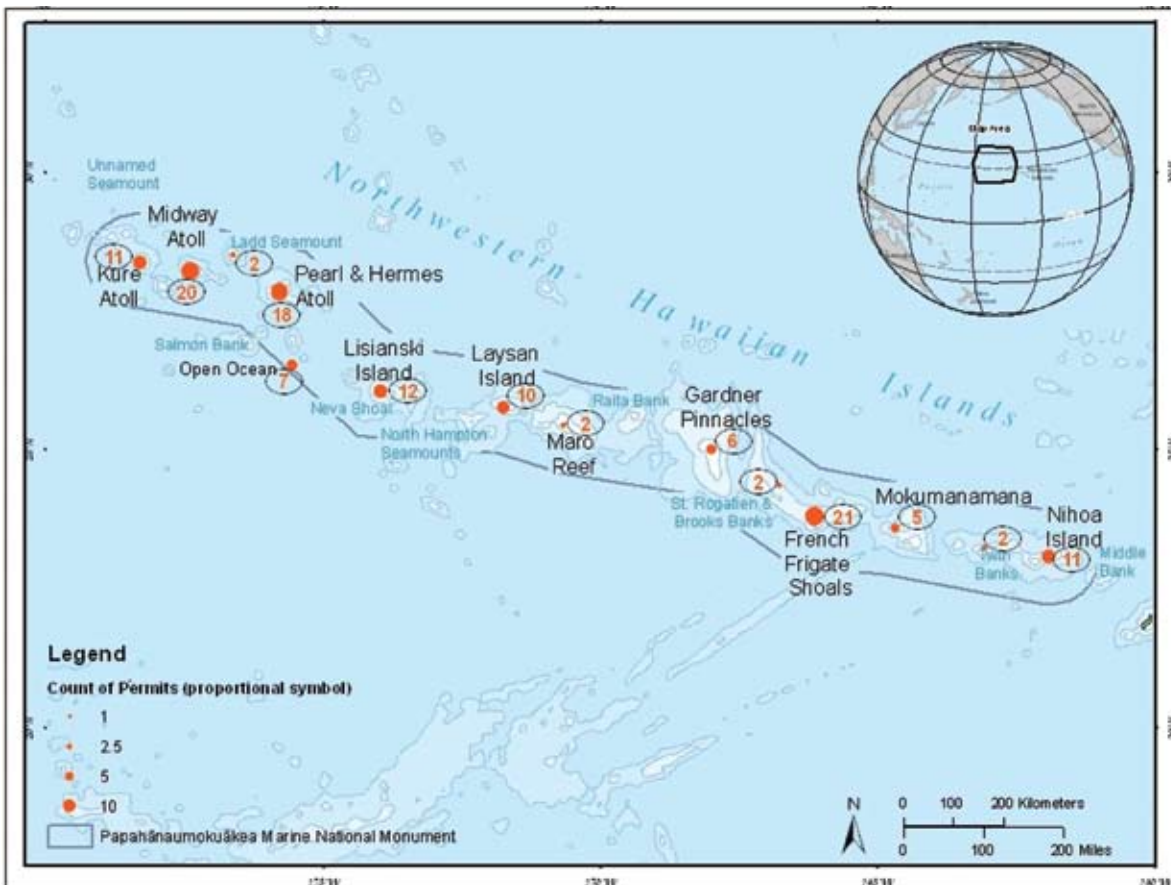


Figure 1. Locations of all permitted activities within the Monument in 2007.

PERMITTED

Research Activities

Summary

A total of 37 Research permits were issued by the Monument for work conducted in 2007 (Table 5). Four of these permits were issued to NOAA and University of Hawai'i research vessels that transported permitted personnel within the Monument. The remaining 33 permits were issued to NOAA personnel and university researchers to conduct work on seabirds, fish, lobsters, corals, marine mammals, algae, terrestrial insects, maritime archaeology, seafloor mapping, and installation and maintenance of research equipment.

Table 5. Affiliations of Research permittees and permitted projects in 2007.

Research Permittee Affiliation	Number of Permits Issued	Permitted Research Projects
NOAA Office of Marine and Aviation Operations	2	Vessel permit for NOAA Ship <i>Hi'ialakai</i> Vessel permit for NOAA Ship <i>Oscar Elton Sette</i>
NOAA National Marine Fisheries Service Alaska Fisheries Science Center	1	Albatross research at Midway Atoll
NOAA National Marine Fisheries Service Pacific Islands Fisheries Science Center	9	Surveys of recruit reef fishes at Midway Atoll Lobster community resource monitoring Lobster population monitoring Submersible dives to measure and monitor gold coral colonies Coral Reef Ecosystem Division research activities Cetacean monitoring Hawaiian monk seal monitoring Maintenance of remote cameras for green turtle monitoring Shark control at French Frigate Shoals
NOAA Office of National Marine Sanctuaries	2	Reef Assessment and Monitoring Program (RAMP) Maritime archaeology surveying and monitoring
Texas A&M University	1	Spinner dolphin monitoring
University of California Santa Cruz	2	Coral reef assessment at Midway Atoll Albatross satellite tagging
University of Hawai'i	8	Baseline study and identification of marine algae of the NWHI Collection of white tern and Laysan albatross feather and carcass samples for population genetic analyses Characterization of bottom environment & associated scavengers Collection of Nysius seed bugs for phylogenetic studies Study of Hyposmocoma moths Multibeam mapping and deep water surveys Installation of tide monitoring station at French Frigate Shoals Vessel permit for M/V <i>Ka'imikai O Kanaloa</i>



Research Permittee Affiliation	Number of Permits Issued	Permitted Research Projects
University of Hawai'i Hawai'i Institute of Marine Biology	8	Genetic survey of reef-associated fishes Comparative life history analysis of reef fishes Identification and monitoring of coral disease and/or bleaching Mapping and sediment collection Study of coral diversity Study of apex predator movement Study of coral microbial community structure and disease Study of reef invertebrates
University of Hawai'i Hawai'i Undersea Research Laboratory	2	Submersible dives to collect and study deep sea corals HURL deep water work
University of Maine	1	Invertebrate survey and plant seed collection at Midway Atoll
University of Miami	1	Great frigatebird research at French Frigate Shoals

Research Activities by Location

Islands and atolls with the highest levels of permitted Research activities in 2007 included French Frigate Shoals, Pearl and Hermes Atoll, and Midway Atoll. Non-emergent banks and reefs, including Twin Banks, St. Rogatien and Brooks Banks, and Maro Reef, saw the lowest levels of Research activities, while Mokumanamana and Gardner Pinnacles had the fewest number of Research activities conducted on emergent lands.



Photo: James Watt

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

The Research projects permitted in 2007 included a variety of activities. Eight of the Research permits issued were for work that did not involve the study of organisms (Table 6), including permits for research vessels, maritime archaeology work, maintenance of remote cameras, and installation of a tide monitoring station. The majority of Research projects that involved the study of organisms consisted of observational work, or work in which biological or other samples were not taken. This observational work included activities such as surveying, population monitoring, and satellite or acoustic tagging of animals. Finally, many of the Research projects also 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 the albatross feather clips taken at Midway Atoll and blood samples taken from albatrosses and great frigatebirds at French Frigate Shoals, sample collections for most projects were taken from multiple locations throughout the Monument and from multiple species within each taxonomic group. To provide one example, the 1336 fish sampled for the genetic survey of reef-associated fishes included samples of 37 different species collected at 7 islands or atolls throughout the Monument. This resulted in an average sample size of 5 individuals per species per island/atoll.

All Research projects permitted in 2007 contributed to an enhanced understanding of Monument natural or historical resources and will aid in future management decisions. For example, data from the Reef Assessment and Monitoring Program (RAMP) are being used to estimate current population sizes and monitor long-term population changes for many marine species. Based on 2007 RAMP survey data, population sizes of the manybar goatfish (*Parupeneus multifasciatus*) can now be estimated for French Frigate Shoals (4,019,000 individual fish, +/- 9.4%) and Pearl and Hermes Atoll (2,781,000 individual fish, +/- 13.6%).

Monitoring data are also useful in determining acceptable levels of sample collections at specific locations for particular species. For instance, in 2007, manybar goatfish tissue samples were collected at Pearl and Hermes Atoll: 10 individual *Parupeneus multifasciatus* were caught and fin clips taken, such that 10 of 2,781,000 fish (0.00036% of the population) were disturbed for sample collections work. Similar assessments can be made for coral species: based upon habitat mapping data, at Pearl and Hermes Atoll there are 5,016 acres of hardbottom habitat with >10% live coral. In 2007, sizes of individual coral samples taken at Pearl and Hermes Atoll ranged from 1 to 6 cm³, and the total of all coral samples collected by all projects at that atoll combined would fit into a 1.25 gallon container.



Table 6. For all Research projects in 2007, those that included non-biological research, observational work, and collections of physical or biological samples.

Permitted Research Project	Non-biological Research Conducted	Observational Research Conducted	Physical Samples Collected	Biological Samples Collected
Vessel permit for NOAA Ship <i>Hi'ialakai</i>	•			
Vessel permit for NOAA Ship <i>Oscar Elton Sette</i>	•			
Albatross research at Midway Atoll				253 feather clips
Surveys of recruit reef fishes at Midway Atoll		•		
Lobster community resource monitoring		•		100 lobsters
Lobster population monitoring		•		200 lobsters 34 eel fin clips 60 crab biopsies 79 reef shark fin clips
Submersible dives to measure and monitor gold coral colonies		•		3 coral biopsies 1 dead coral colony
PIFSC research activities		•		96 crown-of-thorn sea stars
Cetacean monitoring		•		10 blubber biopsies
Hawaiian monk seal monitoring		•		391 scat 7 spew 12 necropsies 14 placentae 0 ticks
Maintenance of remote cameras for green turtle monitoring	•			
Galapagos shark control at French Frigate Shoals				0 Galapagos sharks
Reef Assessment and Monitoring Program (RAMP)		•		214 algae samples
Maritime archaeology surveying and monitoring	•			
Spinner dolphin monitoring		•		
Coral reef assessment at Midway Atoll		•	27 250ml jars of sediment	1216 urchins 6 coral biopsies Marine invertebrates Algae
Albatross satellite tagging		•	135 pieces of rubble	20 blood samples
Baseline study and identification of marine algae of the NWHI			447 algae-encrusted rocks	197 algae samples

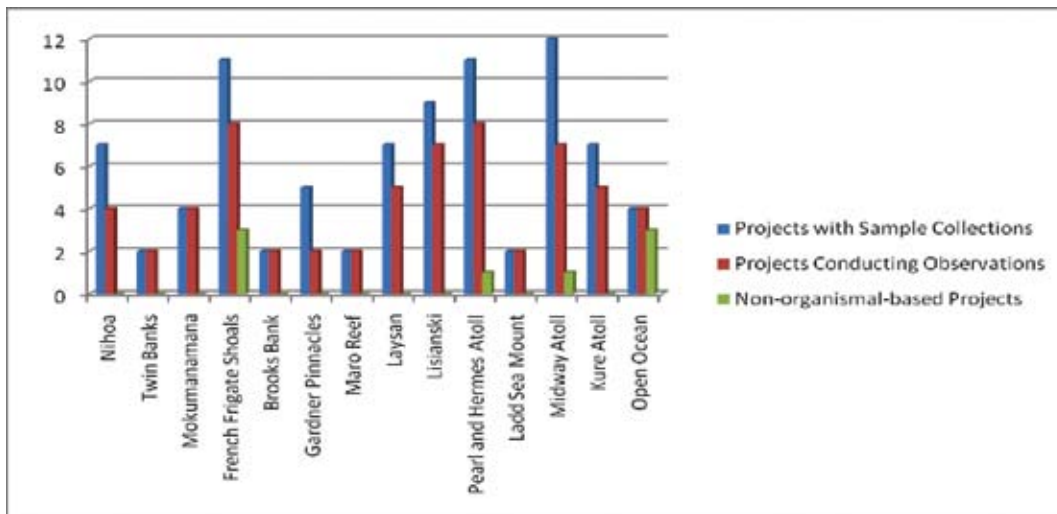
Collection of white tern and Laysan albatross feather and carcass samples for population genetic analyses				Feathers from 21 white tern carcasses Feathers and tissue from 50 Laysan albatross carcasses
Characterization of bottom environment and associated scavengers		•		0 samples
Collection of Nysius seed bugs for phylogenetic studies				31 seed bugs
Study of <i>Hyposmocoma</i> moths				30 moths
Multibeam mapping and deep water surveys		•	15 10cm diameter rocks	34 biopsies 17 whole organisms
Installation of tide monitoring station at French Frigate Shoals	•			
Vessel permit for <i>M/V Ka'imikai O Kanaloa</i>	•			
Genetic survey of reef-associated fishes				1336 fish 22 eels
Comparative life history analysis of reef fishes				89 fish
Identification and monitoring of coral disease and/or bleaching		•		824 coral biopsies
Mapping and sediment collection	•	•	83 small scoops of sediment	
Study of coral diversity		•		944 coral biopsies
Study of apex predator movement		•		
Study of coral microbial community structure and disease			51 liters of seawater	333 coral biopsies
Study of reef invertebrates				396 biopsies 345 marine invertebrates
Submersible dives to collect and study deep sea corals		•		5 coral colonies 4 coral biopsies
HURL deep water work	•			
Invertebrate survey and plant seed collection at Midway Atoll		•		80 terrestrial invertebrates 600 seeds
Great frigatebird research at FFS		•		250 bloods samples



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

The following figure (Figure 2) indicates, by island or atoll, the numbers of Research projects in which sample collections were made, observational work was conducted, or non-biological projects were done. Many projects consisted of both observational and collections work and were done at multiple islands or atolls, so the numbers in this figure add to more than 37 (the total number of permitted Research projects).

Figure 2. Numbers of permitted Research projects, by location, in which sample collections, observational work, and non-biological research was conducted in 2007.



Identifying Humpback Whale Wintering Habitat

Humpback whales (*Megaptera novaeangliae*) have one of the longest migration patterns on Earth, with individual whales travelling up to 16,000 miles between their summer foraging ranges and winter breeding areas each year. The main Hawaiian Islands have been home to breeding humpbacks for the past 200 years, with mothers and calves using warm, shallow waters around the islands from December through April before travelling to their northern feeding grounds.

Although the Northwestern Hawaiian Islands also contain many warm, shallow areas near islands and atolls that would seem to be ideal humpback wintering habitat, expeditions and surveys conducted through the 1970s revealed no evidence of humpback whales in the northwestern islands. Harvesting of whales in the north Pacific during the early 1900s had reduced the entire humpback whale population from 15,000 to fewer than 1,500 individuals. But with an international ban on commercial killing of humpbacks in 1965, and protection of the species under the U.S. Endangered Species Act in 1973, population size began to slowly increase.

Biologists in the main Hawaiian Islands began detecting increases in humpback whale population sizes in the late 1970s' researchers in the Northwestern Hawaiian Islands eventually began sighting humpbacks, as well, with incidental observations first made during the winter months beginning in the mid-1990s. However, the number of humpback whales using the northwestern islands, and the extent of the area used, remained unknown.

Additional cetacean surveys in the Monument will provide more information on the number of humpback whales using the Northwestern Hawaiian Islands during the winter breeding period and will help to identify those areas of the Monument that are most important in the continued protection of this endangered species.

Humpback Research

In March and April of 2007, cetacean biologists from NOAA's Pacific Islands Fisheries Science Center conducted whale surveys along the length of the Monument. Researchers detected at least 24 whales during the two-week survey, including two mothers and calves. Most excitingly, these observations were not limited to a small area or to the southern part of the northwestern chain, but extended from Nihoa to Lisianski Island, a distance of 800 miles.



Humpback Whale at Mokumanamana. Photo: NOAA.



Discovering New Maritime Historical Features

In October 2005, divers from NOAA PIFSC marine debris team found previously-undiscovered artifacts at French Frigate Shoals, including three large iron anchors, twisted wire rope, and broken equipment. Following the marine debris divers' discovery, in 2007 maritime archaeologists from NOAA Office of National Marine Sanctuaries Pacific Island Region and Papahānaumokuākea Marine National Monument began an assessment of the site, documenting the nature and distribution of the artifacts. Subsequent analysis of the ship's pumps, deck machinery, anchors, and rigging indicates that the site is likely the wreck of the 600-ton four-masted schooner *Churchill*, first launched in Oregon in April 1900.



Anchors discovered at French Frigate Shoals. Photo: Tane Casserley

In addition to studying the newly discovered shipwreck at French Frigate Shoals, NOAA's maritime archaeologists use diver tow board surveys, video and photograph documentation, and mapping to assess and inventory some of the more than 60 additional ships that have been lost in the Monument, including 19th century whalers and Civil War Navy steamers. Maritime archaeology sites also include aircraft such as the F4U-1 Corsair Navy plane that was downed during World War II off of Midway Atoll. Discovery and assessment of these archaeological sites provides important information for management of the Monument's historical resources, and also illuminates the special role of the Northwestern Hawaiian Islands in the maritime history of the Pacific region.



Maritime Archaeology

In late September 1917, the four-masted wooden schooner *Churchill* was carrying dried coconut meat (copra) from Nukualofa, Tonga, to the west coast of the United States when she ran aground in the Northwestern Hawaiian Islands. After hitting the reef at French Frigate Shoals, the 12-man crew were rescued by a passing ship. The crew later reported that the captain had intentionally tried to destroy the ship, apparently even setting her afire after grounding. The anchors, pumps, and blocks and rigging analyzed by NOAA's maritime archaeologists indicate that the artifacts discovered at French Frigate Shoals are likely the remains of the destroyed 178-foot *Churchill*.

The *Churchill*. Photo: Prikse Collection

PERMITTED

Conservation & Management Activities

Summary

Five Conservation and Management permits were issued in 2007 (Table 7). Two permits were issued to the U.S. Fish and Wildlife Service for management activities at Hawaiian Islands National Wildlife Refuge, including monitoring and/or restoration projects at Nihoa, French Frigate Shoals, Laysan, and Pearl and Hermes Atoll, and for activities at Midway Atoll National Wildlife Refuge. One permit was issued to the State of Hawai'i Department of Land and Natural Resources for marine debris removal activities at Kure Atoll. The final two Conservation and Management permits were issued to NOAA, one to the Pacific Islands Fisheries Science Center for marine debris removal at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Atoll, and Kure Atoll, and one to the Pacific Islands Regional Office to allow for the permitting of anchoring of commercial bottomfish vessels.

Table 7. Affiliations of Conservation and Management permittees and permitted projects in 2007.

Conservation and Management Permittee Affiliation	Number of Permits Issued	Permitted Conservation and Management Projects
U.S. Fish and Wildlife Service	2	Hawaiian Islands National Wildlife Refuge Management Permit Midway Atoll National Wildlife Refuge Management Permit
State of Hawai'i Department of Land and Natural Resources	1	Marine debris removal at Kure Atoll
NOAA National Marine Fisheries Service Pacific Islands Fisheries Science Center	1	Permitting of anchoring of bottomfish vessels
NOAA National Marine Fisheries Service Pacific Islands Regional Office	1	Permitting of anchoring of bottomfish vessels

Conservation and Management Activities by Location

U.S. Fish and Wildlife Service Conservation and Management activities took place at Nihoa, French Frigate Shoals, Laysan, and Pearl and Hermes Atoll (within Hawaiian Islands National Wildlife Refuge), and at Midway Atoll (Midway Atoll National Wildlife Refuge). State of Hawaii DLNR activities took place at Kure Atoll, and NOAA PIFSC marine debris removal activities occurred at French Frigate Shoals, Laysan, Lisianski, Pearl and Hermes Atoll, and Kure Atoll.



Photo: Cynthia Vanderlip



Removing Derelict Fishing Gear

A significant conservation activity currently taking place in Papahānaumokuākea Marine National Monument is the removal of thousands of pounds of marine debris that accumulate every year on coral reefs and beaches. NOAA's Pacific Islands Fisheries Science Center has led the effort in the Northwestern Hawaiian Islands for the past decade to remove derelict fishing nets that pose potentially lethal entanglement hazards to Hawaiian monk seals, green turtles, and seabirds. By December 2007, PIFSC's marine debris program had removed a total of more than 640 tons - more than a million pounds - of derelict nets from reef and island habitat in the Northwestern Hawaiian Islands, creating safer breeding and foraging areas for the Monument's protected marine species.



Pacific Islands Fisheries Science Center divers removing derelict fishing gear from reef habitat. Photo: NOAA.

Disentangling an Endangered Monk Seal



Hawaiian monk seal found entangled in marine debris in October 2007. Photo: Darla White.

Although the removal of hundreds of tons of derelict fishing gear from the Monument has decreased entanglement hazards for Hawaiian monk seals, sea turtles, and other protected species, some animals do remain at risk of being caught in masses of netting and rope that accumulate on coral reefs. In early October 2007, researchers diving from the NOAA ship *Hi'ialakai* at Pearl and Hermes Atoll discovered a young Hawaiian monk seal that had become entangled in a large ball of marine debris and was swimming with netting and rope wrapped around its body. A second group of researchers, working from the NOAA ship *Oscar Elton Sette*, located the entangled seal again in late October. Included in this group was a monk seal biologist from NOAA's Pacific Islands Fisheries Science Center. Under the authority of the NOAA Marine Mammal Health and Stranding Response Program (MMHSRP), the seal was successfully caught, disentangled from the marine debris, and set free.



U.S. Fish and Wildlife Service staff removing alien invasive plants on Laysan Island. Photo: Crystal Bechaver.

Eradicating Alien Invasive Species

During guano harvesting, feather and egg collection, and exploration of the Northwestern Hawaiian Islands through the nineteenth and early twentieth centuries, many non-native species were introduced onto the islands and atolls. Small predatory mammals such as rats and mice found open niches in these island habitats, and alien plant species that were able to outcompete native plants spread across acres of sand islets from French Frigate Shoals to Kure Atoll.

In 2007, USFWS continued the work of eradication of terrestrial invasive species in Papahānaumokuākea Marine National Monument, with efforts focused on plant species such as golden crownbeard (*Verbesina encelioides*) at Midway Atoll, and dropseed (*Sporobolus pyramidatus*) and Bermuda grass (*Cynodon dactylon*) on Laysan. These year-around efforts to eradicate invasive species will protect threatened populations of native plants and animals and will aid in the restoration of native island habitat.

Common Sandbur

One alien plant species, the common sandbur (*Cenchrus echinatus*), was first documented on Laysan in the 1960s, and by the early 1990s this invasive grass had covered 160 of the 520 vegetated acres of the island. To preserve native plant species and protect burrow-nesting seabird habitat, in 1991 the U.S. Fish and Wildlife Service began efforts to eradicate the common sandbur from Laysan. Through over a decade of constant effort, USFWS was able to rid the island of this noxious invasive species, and the last common sandbur was seen on Laysan in 2003. A similar seven-year effort to eradicate Polynesian rats (*Rattus exulans*) from the Northwestern Hawaiian Islands resulted in the complete extirpation of this species in the northwestern islands by the year 2000.



Laysan Ducks. Photo: James Watt



PERMITTED *Education Activities*

Summary

Two Education permits were issued in 2007, one to NOAA Office of National Marine Sanctuaries, and one to the State of Hawai'i Department of Land and Natural Resources (Table 8). Both Education projects were based from the NOAA ship *Hi'ialakai* and were conducted in conjunction with Research and Special Ocean Use projects. The main purpose of the ONMS Education project was to produce an educational video focused on ship-based marine research in the Monument, including interviews with the permitted scientists. The goal of the Hawai'i DLNR Education project was to develop educational materials such as video footage, photographs, and website reporting to present research and management information to the public.

Table 8. Affiliations of Education permittees and permitted projects in 2007.

Education Permittee Affiliation	Number of Permits Issued	Permitted Education Projects
NOAA Office of National Marine Sanctuaries	1	NOAA ONMS Education Activities
State of Hawai'i Department of Land and Natural Resources	1	State of Hawai'i DLNR Education Activities



Teacher Dena Deck gets familiar with the species found in the Archipelago. Photo: Hans Van Tilburg/NOAA

Education/Outreach Products Produced

The NOAA Office of National Marine Sanctuaries Education project resulted in five media interviews with KHNL (www.khnl.com), a news story (www.honolulustarbulletin.com), and daily web reporting at www.hawaiianatolls.org during the course of the trip. The DLNR Education project resulted in an interview with Punahou School, several K-12 classroom products, and daily web reporting and photos posted at www.hawaiianatolls.org throughout the course of the trip. In addition, the Monument partnered with Outrigger Hotels and Resorts to offer the public a month-long series of events focusing on the research that occurred.

Education Activities by Location

NOAA Office of National Marine Sanctuaries Education activities took place almost entirely aboard ship and during shallow-water snorkeling, with visits onto land made only at Midway Atoll and Kure Atoll. Sites visited, and at which photos and video footage were taken, included Nihoa, Gardner Pinnacles, Laysan, Lisianski, Pearl and Hermes Atoll, Midway Atoll, and Kure Atoll. DLNR Education activities took place aboard ship and during shallow-water snorkeling at French Frigate Shoals, Pearl and Hermes Atoll, and Midway Atoll. Photos and video footage were taken at each of these sites.

PERMITTED *Native Hawaiian Practices*

Summary

A single Native Hawaiian Practices permit was issued in 2007, to the University of Hawai'i. Activities conducted under this permit included an overnight stay on Mokumanamana to conduct traditional ceremonies in observance of the summer solstice, and a stop offshore of the island of Nihoa to conduct additional ceremonies aboard ship (Table 9).

Table 9. Affiliations of Native Hawaiian Practices permittees and permitted projects in 2007.

Native Hawaiian Practices Permittee Affiliation	Number of Permits Issued	Permitted Native Hawaiian Practices Projects
University of Hawai'i	1	Mokumanamana Huaka'i

Native Hawaiian Practices Highlights

Observing Summer Solstice and Ke Ala Nui Polohiwa a Kāne

The islands of Nihoa and Mokumanamana have played a significant role in Hawaiian cultural tradition for hundreds of years, with residential and agricultural terraces and religious shrines on the islands dating back to 1000 A.D. In continuing Native Hawaiian cultural and spiritual practices on these islands, Pualani Kanahale led a group of cultural practitioners to Mokumanamana during June of 2007. This group conducted ceremonies during the summer solstice, and they carried out cultural research to examine the function of heiau, or ceremonial sites, on the ancestral islands in relation to the northern pathway of the sun (ke ala nui polohiwa a Kāne).

As described by Pualani Kanahale, "These types of cultural activities benefit the Native Hawaiian community because they strengthen the reciprocal relationship and spiritual life force (mauli ola) between Hawaiian ancestors and living descendants. The continuation of ho'omana (worship) and honoring our kūpuna (ancestors) gives renewed strength to our community and directly impacts the spiritual health and well-being of every Native Hawaiian today."



Mokumanamana. Photo: NOAA



PERMITTED

Recreation Activities

Summary

One Recreation permit was issued in 2007, to the Travelers Century Club (Table 10). Recreation activities are permitted in the Monument only within the Midway Atoll Special Management Area. Under the one issued permit, a group of 12 permittees flew to Midway Atoll for a two-day historical and wildlife interpretive tour.

Table 10. Affiliations of Recreation permittees and permitted projects in 2007.

Recreation Permittee Affiliation	Number of Permits Issued	Permitted Recreation Projects
Travelers Century Club	1	Historical and Wildlife Interpretive tour of Midway Atoll



Visitors touring Midway. Photo: NOAA

PERMITTED

Special Ocean Use Activities

Summary

Five Special Ocean Use permits were issued in 2007 (Table 11). Two of these permits were associated with the commemoration of the 65th Anniversary of the Battle of Midway and involved flight and ship transportation of World War II veterans and their families to Sand Island, Midway Atoll for the one-day celebration. A third Special Ocean Use permit was issued to the British Broadcasting Corporation for high-definition filming of tiger shark predation on albatross fledglings at French Frigate Shoals. The final two Special Ocean Use permits were issued for two individuals to conduct filming and still photography associated with NOAA Education and Research activities.

Table 11. Affiliations of Special Ocean Use permittees and permitted projects in 2007.

Special Ocean Use Permittee Affiliation	Number of Permits Issued	Permitted Special Ocean Use Projects
Historical Military Tours	1	Commemoration of the 65th Anniversary of the Battle of Midway
Princess Cruises	1	Commemoration of the 65th Anniversary of the Battle of Midway
British Broadcasting Corporation	1	Documentary filming: albatross fledglings and tiger shark predation at French Frigate Shoals
For the Sea Productions	1	Commercial permission for film and still photography coinciding with ship-based Education activities
SeeMore Wildlife Systems	1	Documentary filming coinciding with NOAA PIFSC green turtle remote camera maintenance at French Frigate Shoals

Special Ocean Use Products Produced

Outreach projects resulting from 2007 Special Ocean Use permits include portions of the BBC high-definition DVD series *South Pacific* (<http://www.guardian.co.uk/media/2007/apr/16/broadcasting.bbc3>), and a video documentary by SeeMore Wildlife Systems scheduled to be aired on CBS Sunday Morning in the fall of 2008.



Honoring the 65th Anniversary of the Battle of Midway

Following the bombing of Pearl Harbor in December 1941, the Imperial Japanese Navy planned to deliver a decisive blow to the U.S. Pacific Fleet in June of 1942. Instead, the United States Navy fought to victory during the 3-day Battle of Midway, winning the most important Pacific engagement of World War II.

On June 4, 2007, the U.S. Fish and Wildlife Service commemorated the 65th Anniversary of the Battle of Midway, hosting U.S. Navy veterans and their families at Midway Atoll National Wildlife Refuge. A U.S. Navy band, color guard, and rifle squad participated in honoring the World War II veterans, and Princess Cruiselines and Military Historical Tours provided ship and flight transportation for veterans for a day of ceremonies and tours at Midway Atoll.



Assistant Secretary of the Navy, BJ Penn at the 65th Anniversary of the Battle of Midway.
Photo: Paul Chang/USFWS.



PMNM RELATIVE SIZE *and Visitation Rates*

Monument and West Coast

Papahānaumokuākea Marine National Monument is the largest protected area in the United States, and is larger than all of the U.S. National Parks combined. It is also larger than most other protected marine areas in the world, including Great Barrier Reef Marine Park. Because of the protections provided to the Monument by the Co-Trustee agencies, including the permitting system established in 2007, the visitation rate to the Monument was much lower in 2007 than the visitation rates to Hanauma Bay Nature Preserve, Yosemite National Park, or the Great Barrier Reef Marine Park (Table 12). The following figure (Figure 3) also illustrates the scale of Papahānaumokuākea Marine National Monument relative to western states on the mainland U.S. The Monument is larger than 46 of the 50 states, and if overlain on the west coast would span an area from Arizona through Nevada, Oregon, and Washington state.

Table 12. Relative size and visitation rates for Hanauma Bay, Yosemite National Park, Great Barrier Reef Marine Park, and Papahānaumokuākea Marine National Monument.

Protected Area	Size	Visitation Rate	People per acre per day
Hanauma Bay Nature Preserve	100 acres	3000 people per day	30
Yosemite National Park	760,000 acres	9600 people per day	0.01
Great Barrier Reef Marine Park	85,100,00 acres	5423 people per day	0.00006
Papahānaumokuākea Marine National Monument	89,500,000 acres	115 people per day	0.000001



Figure 3. Size of the Monument relative to the States on the West Coast of the Mainland U.S.

