

**Papahānaumokuākea Marine National Monument**  
RESEARCH Permit Application

**NOTE: *This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).***

**ADDITIONAL IMPORTANT INFORMATION:**

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

**INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED**

Send Permit Applications to:

Papahānaumokuākea Marine National Monument Permit Coordinator  
6600 Kalaniana'ole Hwy. # 300  
Honolulu, HI 96825  
nwhipermit@noaa.gov  
PHONE: (808) 397-2660      FAX: (808) 397-2662

**SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.**

## **Papahānaumokuākea Marine National Monument Permit Application Cover Sheet**

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

### **Summary Information**

**Applicant Name:** Elizabeth Kehn

**Affiliation:** PMNM

**Permit Category:** Research

**Proposed Activity Dates:** October - November 2011

**Proposed Method of Entry (Vessel/Plane):** Plane

**Proposed Locations:** Midway Atoll lagoon <10m depth

**Estimated number of individuals (including Applicant) to be covered under this permit:**

4

**Estimated number of days in the Monument:** 8

**Description of proposed activities:** (complete these sentences):

a.) The proposed activity would...

be a continuation of the research conducted under 2008 permit (PMNM-2008-039). Derelict fishing nets are one of the few remaining direct threats to the reefs of the Northwestern Hawaiian Islands. The currents of the sub-tropical convergence zone gather debris from the Northern Pacific. At certain times these currents travel through the Northwestern Hawaiian Islands, and much of the debris ends up on the reefs and beaches of the PMNM. A previous study found that an estimated 52 metric tons of derelict fishing gear is deposited in the NWHI each year. The derelict fishing nets that are washed onto the reefs often settle on living habitat, smothering the organisms beneath them. Since the late 1990's derelict fishing gear has been being removed from the reefs. Although this work is very important and the positive outcomes far outweigh any negatives, it is possible that removal of the certain nets may cause further disturbance to the benthos, including damage to organisms that have settled on the nets themselves. In 2008 we initiated a study to investigate the impacts from nets entangled on the reefs by tracking the changes in the corals over time. We looked at the changes that occur either after the nets are removed, and also when they are left in place. The data from those surveys has been analyzed and shows that there are statistically significant trends indicating that certain coral species can recover once a net is removed, and others have more difficulty. This was an exciting discovery. But the data failed to show that the corals actually recovered or died after the one year time

period of the first study. We propose a follow up survey of the same sites two years after the last survey was completed in the hopes of determining the long term fate of the study corals.

b.) To accomplish this activity we would ....

To address the long term effects of nets, either left or removed, on the benthic community, we have designed a study which compares the percent cover of benthic species at different types of sites. The site categories are; a) nets left on the reef, b) nets removed from the reef and c) a control, without having any net on the reef. These sites have been previously marked permanently. Using a small boat, we will find the sites using GPS waypoints and photo document them again. The field team conducting this survey will be made up of individuals who are experienced in both marine debris removal techniques and benthic organism identification. The success of this survey is improved by involvement researchers who have previously conducted surveys for the project in 2008/2009.

c.) This activity would help the Monument by ...

This project is the first study that looks directly at the impacts that derelict fishing nets have on the benthic communities of the reefs of the Hawaiian Islands. In fact, to our knowledge it is the first study done anywhere to assess the impacts of derelict fishing nets on reefs. The results will be useful to managers in a number of ways including; influence the determination of whether all nets that are on the reefs should be removed, give managers away to begin to quantify the damage occurring to the benthic communities, and provide the beginnings of a timeline for their potential recovery. These results are readily transferable to reefs outside of the Monument and outside of Hawaii. Furthermore, in the absence of targeted studies for the impacts of other disturbances, such as ship groundings, on Hawaiian reefs, these results can be used to make estimates of damage and predict the recovery rates for these events.

**Other information or background:** Results from the initial surveys have been presented at the 5th International Marine Debris Conference in Honolulu.

## **Section A - Applicant Information**

### **1. Applicant**

Name (last, first, middle initial): Kehn, Elizabeth. E

Title: Research Specialist

#### **1a. Intended field Principal Investigator (See instructions for more information):**

Elizabeth Kehn

#### **2. Mailing address (street/P.O. box, city, state, country, zip):**

[REDACTED]

Phone: [REDACTED]

Fax:

Email: [REDACTED]

For students, major professor's name, telephone and email address:

#### **3. Affiliation (institution/agency/organization directly related to the proposed project):**

Papahānaumokuākea Marine National Monument

#### **4. Additional persons to be covered by permit. List all personnel roles and names (if known at time of application) here (e.g. John Doe, Research Diver; Jane Doe, Field Technician):**

Jason Kehn

Sarah Fangman

TBD

**Section B: Project Information**

**5a. Project location(s):**

<input type="checkbox"/> Nihoa Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Necker Island (Mokumanamana)	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> French Frigate Shoals	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Gardner Pinnacles	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Maro Reef			
<input type="checkbox"/> Laysan Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Lisianski Island, Neva Shoal	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Pearl and Hermes Atoll	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Midway Atoll	<input checked="" type="checkbox"/> Land-based	<input checked="" type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Kure Atoll	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Other			

**Ocean Based**

NOTE: There is a fee schedule for people visiting Midway Atoll National Wildlife Refuge via vessel and aircraft.

Location Description:

The research will be taking place in the shallow water reef areas (<10m). The research team will be staying in Midway during the project duration. The exact study locations are listed below as GPS waypoints. None of these sites are new.

- 1N 28 12.655 177 25.275
- 1C 28 12.647 177 25.265
- 2N 28 11.635 177 24.271
- 2C 28 11.640 177 24.268
- 3N 28 16.097 177 23.107
- 3C 28 16.098 177 23.106
- 4N 28 16.202 177 23.184
- 4C 28 16.201 177 16.201
- 5N 28 16.295 177 23.177
- 5C 28 16.294 177 23.176
- 6N 28 16.333 177 23.130
- 6C 28 16.330 177 23.131
- 7N 28 16.311 177 23.069
- 7C 28 16.312 177 23.068
- 8N 28 16.399 177 23.128
- 8C 28 16.401 177 23.124
- 9N 28 16.423 177 23.055
- 9C 28 16.425 177 23.054
- 10N 28 16.460 177 22.863
- 10C 28 16.457 177 22.860
- 11N 28 16.432 177 23.059
- 11C 28 16.432 177 23.060

12N	28 16.417	177 22.996
12C	28 16.417	177 22.994
13N	28 16.455	177 22.895
13C	28 16.456	177 22.891
14N	28 16.488	177 22.793
14C	28 16.487	177 22.789
15N	28 16.446	177 22.861
15C	28 16.445	177 22.864
16N	28 16.501	177 22.782
16C	28 16.499	177 22.784
17N	28 16.542	177 22.690
17C	28 16.540	177 22.686
18N	28 16.547	177 22.670
18C	28 16.545	177 22.672
19N	28 16.553	177 22.647
19C	28 16.551	177 22.644
20N	28 16.572	177 22.540
20C	28 16.570	177 22.540
21N	28 16.617	177 22.466
21C	28 16.619	177 22.473
22N	28 16.548	177 22.435
22C	28 16.551	177 22.437
23N	28 16.632	177 22.372
23C	28 16.630	177 22.365
24N	28 16.632	177 22.372
24C	28 16.630	177 22.365
25N	28 16.634	177 21.827
25C	28 16.632	177 21.823
26N	28 16.498	177 21.705
26C	28 16.505	177 21.703
27N	28 16.566	177 21.536
27C	28 16.562	177 21.543
28N	28 16.426	177 21.061
28C	28 16.433	177 21.054
29N	28 16.360	177 21.230
29C	28 16.360	177 21.229

**5b. Check all applicable regulated activities proposed to be conducted in the Monument:**

- Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving Monument resource
- Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
- Anchoring a vessel

- Deserting a vessel aground, at anchor, or adrift
- Discharging or depositing any material or matter into the Monument
- Touching coral, living or dead
- Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- Attracting any living Monument resource
- Sustenance fishing (Federal waters only, outside of Special Preservation Areas, Ecological Reserves and Special Management Areas)
- Subsistence fishing (State waters only)
- Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

**6 Purpose/Need/Scope *State purpose of proposed activities:***

Since 1996 NOAA's Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division, along with several partners (including the NWHI Coral Reef Ecosystem Reserve/PMNM), has been removing derelict fishing nets from the reefs of the Northwestern Hawaiian Islands. To date over 500 tons of debris have been removed. However, there has been no quantitative documentation of the impacts of entangled nets on the benthic communities of these reefs. Furthermore, it is unknown whether the actual removal of the nets causes further damage to the benthos, and what length of time is required for recovery of the damaged substrata. In order to address these questions a study was proposed and conducted in 2008/2009. This study monitored within each of the following treatments; reefs with no nets, reefs with removed nets, and reefs with nets left in place. The monitoring involved a quantification of coral cover at the sites using photoquadrats. The analysis of this data indicated that the effects of the nets on the corals was significant, and depended on the coral type. It was not fully conclusive as to whether the corals were able to recover from net damage or if they eventually died as a result, because at the end of the one year time period the corals were still in a state of recovery or decline. This follow up survey, two years later, will determine the eventual long term impact of the derelict fishing nets on the corals.

**7. Answer the Findings below by providing information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Monument:**

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?

The field team conducting these surveys will be consisting of personnel experienced working in the PMNM, and team members who are experienced in marine debris removal techniques and benthic organism identification. The success of this study is improved by the experience that the researchers have in the field and their familiarity with the NWHI. The net removal protocols have been established at CRED over the past eight years, and include very specific methods which reduce the amount of damage to the ecological integrity of the reef. Coral heads live and dead, are cut carefully from the nets, and live coral heads are then placed on a nearby reef, where they have the best chance for survival. Entangled invertebrates are carefully cut out as well when possible. Some of the researchers that will be conducting this work have been through cultural briefings before previous trips to the NWHI, and are familiar with the Native Hawaiian cultural significance of the place (that natural resources are also cultural resources), and how to honor the islands, reefs, and animals that inhabit it. This research is designed to quantify the damage being done to the coral resources of the NWHI by derelict fishing nets. By measuring this impact, and publishing the results, it is our hope that the issue of marine debris, and its lasting damaging effects, will receive more attention and possibly funding in the future. In this way the research will protect and enhance coral reefs and this important cultural resource.

b. How will the activity be conducted in a manner compatible with the management direction of this proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument cultural, natural and historic resources, qualities, and ecological integrity, any indirect, secondary, or cumulative effects of the activity, and the duration of such effects? Papahānaumokuākea Marine National Monument has the highest level of protection that a marine environment can receive, yet the reefs are still vulnerable to anthropogenic impacts originating outside the Monument boundaries and beyond the control of local managers. These threats include global climate change and marine debris. Entanglement of charismatic megafauna such as threatened green sea turtles and endangered Hawaiian monk seals are conspicuous manifestations of the marine debris problem, and the benefits of net removal for this reason alone has been justified in the Monument in recent years. Very little is known about the impacts of these nets to benthic NWHI reef communities, and the few studies conducted on reefs elsewhere indicate that impacts to sessile marine invertebrates include damage and death. Entanglement with monofilament fishing line has been shown to cause significant coral mortality. Ship groundings have a similar damaging affect on the reefs as marine debris in that they break and kill coral, and create new space for recruitment. These effects have been shown to create long lasting changes to the reefs they impact. In addition to the benefit that removing the nets will bring to the atoll, the understanding that the project will bring will help us make informed decisions in the future as to when to remove or leave a net, and what to look for in changes to the environment in locations where nets have been or will be removed.

c. Is there a practicable alternative to conducting the activity within the Monument? If not, explain why your activities must be conducted in the Monument.

Initially the project was set up in the NWHI for several reasons. First, it provides the only location where enough nets are on reefs to achieve a significant sample size. Furthermore, a study elsewhere, even in the Main Hawaiian Islands, will have different results due to the unique reef habitats that occur in the NWHI. Atoll lagoons are different enough in their functioning that different results would probably be found at fringing or barrier reef. We need to know the impacts nets have in the NWHI, to apply the results to future NWHI decisions. This resurvey cannot be conducted anywhere else, as the sites are located at Midway Atoll.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?

The results will aid managers in understanding the extent of the damage that these nets have on the reef as well as the potential consequences of both removal and leaving the nets on the reef. At the end of the project, as well as having collected this important data, we will also have removed dangerous entanglement hazards from the reef. Given the usefulness of the results, the removal of the nets, and the minimal damage that will occur due to the project, the value of the project outweighs the negligible impacts.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.

The time allocated for the survey will be enough to ensure that the project can be completed, and will factor in a few days for possible bad weather, but will not extend beyond this. We have experience conducting these surveys and know that in good weather it should take about 4 days.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.

The applicant has served as a member of the NOAA CRED marine debris removal team for four years, with approximately 10 months field time spent surveying for nets and removing them. I have been involved with the training of the new debris field teams after my initial year, and am qualified to train researchers in net removal techniques. I have extensive field time in the NWHI, including a month at Midway Atoll, living on the island, and conducting marine debris removal. I have experience with benthic habitat surveys and can conduct and train researchers to conduct the surveys. I have extensive field time driving small boats and snorkeling and diving. I understand how to avoid potential impacts, and mitigate them when they do occur. I have lead four previous surveys, which have been completed without negative impacts.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. Initially the project was funded by the NOAA Marine Debris Program, and the grant covered the first year of surveys. This resurvey will be funded by the NOAA Papahānaumokuākea Marine National Monument office.

h. Explain how your methods and procedures are appropriate to achieve the proposed activity's goals in relation to their impacts to Monument cultural, natural and historic resources, qualities, and ecological integrity.

The divers will use previously proven methods for locating and surveying the nets on the reef. Nets that pose an entanglement hazard will be removed from the reef. No more sites will be used than is necessary to address the question posed. All measures will be taken to respect and protect the natural and cultural resources by using the most conservative removal methods and by remaining mindful of the unique qualities of the NWHI. Monk seals and turtles will always be respected, and if they are in an area we wish to work, we will avoid the area until they have left.

i. Has your vessel been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?

n/a

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.

The activities proposed in this application have all been reviewed and accepted in previously granted permits. The net removal techniques will be the same one used for years by CRED, and the photoquadrat method is one used by the CRED and the Monument during the Rapid Ecological Assessment and Monitoring surveys. These tried and tested methods will now be applied by experienced researchers to answer an important question that addresses future management decisions regarding marine debris in the Monument.

## **8. Procedures/Methods:**

To address the question about the type and extent of the effects of nets, either left or removed, on the coral community, we have designed a study which compares the percent cover of coral species at different types of sites. The site categories are; a) nets left on the reef, b) nets removed from the reef and c) a control, without having any net on the reef. These sites have been marked permanently, surveyed, photo documented, and resurveyed over a one year time period. For this resurvey we will relocate the study sites using recorded GPS waypoints. Once found a researcher will re-photograph the site using a photoquadrat. Photos of previous surveys will be referenced to ensure that the same area is photographed. Analysis of the photos will be done using random point counts to determine the percent cover of algae, coral, coral cement and other substrata. We feel that although important initial findings have come from the first year of work, that this resurvey will help us to better quantify long term effects of marine debris on reefs.

**NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding, as a customized application will be needed. For more information, contact the Monument office on the first page of this application.**

**9a. Collection of specimens - collecting activities (would apply to any activity): organisms or objects (List of species, if applicable, attach additional sheets if necessary):**

Common name:

n/a

Scientific name:

n/a

# & size of specimens:

n/a

Collection location:

n/a

Whole Organism  Partial Organism

**9b. What will be done with the specimens after the project has ended?**

n/a

**9c. Will the organisms be kept alive after collection?**  Yes  No

n/a

• General site/location for collections:

n/a

- Is it an open or closed system?  Open  Closed

n/a

- Is there an outfall?  Yes  No

n/a

- Will these organisms be housed with other organisms? If so, what are the other organisms?

n/a

- Will organisms be released?

n/a

**10. If applicable, how will the collected samples or specimens be transported out of the Monument?**

n/a

**11. Describe collaborative activities to share samples, reduce duplicative sampling, or duplicative research:**

n/a

**12a. List all specialized gear and materials to be used in this activity:**

Small boat

Knives

Photoquadrat

**12b. List all Hazardous Materials you propose to take to and use within the Monument:**

n/a

**13. Describe any fixed installations and instrumentation proposed to be set in the Monument:**

Stakes have already been installed. It is possible that we may have to replace stakes that have been damaged.

**14. Provide a time line for sample analysis, data analysis, write-up and publication of information:**

Analysis of the photos will begin directly after the survey and will be completed by the end of September 2011. Further data analysis, statistical analysis write up will be completed by the end of 2011.

**15. List all Applicants' publications directly related to the proposed project:**

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as “confidential” prior to posting the application.

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Signature

Date

**SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE BELOW:**

Papahānaumokuākea Marine National Monument Permit Coordinator  
6600 Kalaniana'ole Hwy. # 300  
Honolulu, HI 96825  
FAX: (808) 397-2662

**DID YOU INCLUDE THESE?**

- Applicant CV/Resume/Biography
- Intended field Principal Investigator CV/Resume/Biography
- Electronic and Hard Copy of Application with Signature
- Statement of information you wish to be kept confidential
- Material Safety Data Sheets for Hazardous Materials