

**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](mailto: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:** David Clague

**Affiliation:** Monterey Bay Aquarium Research Institute

**Permit Category:** Research

**Proposed Activity Dates:** October-November 2010

**Proposed Method of Entry (Vessel/Plane):** R/V Ka'imikai-o-Kanaloa

**Proposed Locations:** Gardner Pinnacles region for ROV dives and the region including and east of Gardner Pinnacles for bathymetric surveying.

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

6

**Estimated number of days in the Monument:** 14

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

a.) The proposed activity would...  
determine the vertical history of Gardner Pinnacles and the impact of past climate change on the development and drowning of submerged reef terraces.

b.) To accomplish this activity we would ....  
use the multibeam on the KOK to map the submerged platform around Gardner Pinnacles down to the original island shoreline at 1500-2000 m depth and use the Pisces submersibles to observe and collect samples from these drowned coral terraces. Additional surveys would be done on seamounts east of Gardner Pinnacles to determine the distribution of any drowned reef sequences on these seamounts, banks, and island flanks.

c.) This activity would help the Monument by ...  
establishing the history of drowned terraces that comprise much of the shallow to moderate depth (65 to 2000 m deep) habitat within the monument.

**Other information or background:** The work will also establish the age of Gardner Pinnacles and help define models for formation of the Hawaiian-Emperor volcanic chain over the past 80 million years. Gardner is an important location along the chain as it is the volcano whose laboratory age differs the largest amount from the age interpolated from adjacent volcanoes. It is also one of only a few Hawaiian volcanoes to be surrounded by a series of drowned reefs that likely formed and drowned during glacial/interglacial cycles about 10-15 million years ago, during a time when little is known of climate variation.

## **Section A - Applicant Information**

### **1. Applicant**

Name (last, first, middle initial): Clague, David A.

Title: Senior Scientist

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

David Clague

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

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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

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

Monterey Bay Aquarium Research Institute

#### **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):**

Dr. Jody Webster, Senior Lecturer at University of Sydney, Australia, [REDACTED]

[REDACTED] submersible observer

Dr. Donald Potts, Professor at University of California at Santa Cruz, [REDACTED]  
[REDACTED] submersible observer

Dr. Willem Renema, Researcher, Nationaal Natuurhistorisch Museum Naturalis, Leiden,  
Netherlands, [REDACTED] submersible observer, sample curator

Dr. Juan Calos Braga, Professor at University of Granada, Spain, [REDACTED]  
submersible observer

Jonathan Weiss, graduate student at University of Hawaii, [REDACTED]  
[REDACTED] submersible observer, multibeam mapper.

Note that all personnel will be either on the R/V KOK or inside the research submersible  
Pisces V or IV. No free diving is planned, nor any excursions onto land.

**Section B: Project Information**

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

<input checked="" type="checkbox"/> Nihoa Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input checked="" type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Necker Island (Mokumanamana)	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input checked="" type="checkbox"/> Deep water
<input checked="" type="checkbox"/> French Frigate Shoals	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input checked="" type="checkbox"/> Deep water
<input checked="" type="checkbox"/> Gardner Pinnacles	<input type="checkbox"/> Land-based	<input checked="" type="checkbox"/> Shallow water	<input checked="" 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 type="checkbox"/> Midway Atoll	<input type="checkbox"/> Land-based	<input 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 checked="" 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 deep water work outlined above consists of deep water multibeam mapping during transits for Nihoa, Necker, and French Frigate Shoals. For Gardner Pinnacles, operations will include both multibeam mapping in deep water and submersible dives. Shallow water is indicated only for one dive that we plan to end at a notch in the carbonate platform at about 65 m depth at a location some 50 km southsoutheast of the Pinnacles. We plan to survey using the ship during each night and to dive on the series of drowned reef terraces around Gardner Pinnacles that range in depth from 65 to nearly 2000 m. Multibeam bathymetric surveys would also be conducted on the flanks of volcanoes within the Monument during transits to and from Gardner Pinnacles via Middle Bank, Nihoa, Twin Banks, Necker Island, French Frigate Shoals, St. Rogatien, and Brooks Banks from Oahu.

**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:***

The multibeam mapping is needed to determine dive locations precisely and to determine if the series of drowned terraces already known to occur on the southeastern flank of Gardner Pinnacles are unique or also occur elsewhere along the chain. The submersible dives will primarily focus on visual observations and collection of rock samples. No other form of sampling will be undertaken except recovery of carbonate (including dead corals, which we therefore will touch) and lava rock samples using the manipulator on the submersible. The samples (10-20 per submersible dive for 6 dives) are required to be able to determine the ages and depth of formation of the samples and the terraces from which they are collected. Combining information on ages, depths of formation, and present depth of sampling will allow us to reconstruct the subsidence history of Gardner Pinnacles. Under 5b above, I consider removing rock samples using the manipulators on the research submersible to be altering submerged lands, so this box was checked, although it is redundant with the first regulated activity. The ship is never anchored during either submersible operations or bathymetric surveying, which is why the anchor box was not checked.

**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?

All activities will be using the HURL ship and research submersible and will consist of observations and sampling dead carbonate reef materials and lava samples at depths from 65 to 2000 m depth and bathymetric surveying from the ship. Bathymetric surveys are conducted from the ship putting only sound into the water. The use of the submersible manipulator to collect the 10-20 rock samples per dive will limit damage to the substrate and allow us to avoid any living resources. No cultural or historical resources are known to exist within the proposed work areas.

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? Studies such as that proposed enhance understanding of the distribution of natural resources within the Monument and the formation of those features. Removal of rock samples from depth should have no detrimental effects in the short or long term.

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.

There is no alternative. Only the islands and banks in the Hawaiian volcanic chain have the drowned coral reefs of the right ages to study climate variation during the 10-15 million year period.

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

Research activity will increase knowledge about the origins and distribution of habitats surrounding Gardner Pinnacles, no known adverse effects to weigh against the increase in knowledge.

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

The cruise will consist of 6 dives, a service day for the research submarine, and transit days to and from Gardner Pinnacles from Oahu. Any shorter cruise would not amortize the transit days efficiently.

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

I have been chief scientist on more than 60 research cruises during the past 40 years, more than half utilizing either research submersibles or remotely operated vehicles. Much of that work has been conducted around hydrothermal vent sites with their delicate ecosystems and geologic structures. Sampling has always been tuned to minimize adverse impacts. I foresee no negative impacts that would require a mitigation plan.

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. Each of the researchers listed is supported by their home institutions, who cover travel costs, salaries, and costs of conducting the research. There are no contingencies for mitigation of adverse effects of the research. All activities will be conducted either from on-board the HURL vessel or from within the research submersible, so liability rests with HURL.

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.

We have selected the least intrusive and least destructive method to acquire samples from the drowned terraces - careful selection by eye using the manipulator on the research submersible. The other method would involve significant risk to habitat and lifeforms as it would entail blind sampling using dredges.

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

HURL will provide this information for the ship.

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

None known.

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

Multibeam mapping is accomplished by collecting a swath of data as the ship is underway. This would be done on both transits to/from the area and to map as much of the submerged platform surrounding Gardner Pinnacles as time permits (about half).

The maps would provide the base maps for submersible dives.

**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:

rocks will be collected using the robotic arms or manipulators on the research submersible.

Scientific name:

carbonate rocks and lava rocks

# & size of specimens:

between 60 and 120 samples, each about 1 kg size.

Collection location:

All samples from submarine terraces surrounding Gardner Pinnacles

Whole Organism  Partial Organism

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

They will be archived at the Smithsonian Institution along with the rest of Clague extensive collection of other submarine samples from the Hawaiian Ridge and Emperor Seamounts. Sorena Sorenson, curator of the geology collections, is the contact person at the Smithsonian.

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

no organisms will be collected

• General site/location for collections:

All target sites for sample collection/dives are shown in Attachment 1.

• Is it an open or closed system?  Open  Closed

• Is there an outfall?  Yes  No

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

NA

- Will organisms be released?

No

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

samples will return to Honolulu by ship and then be shipped by airfreight to our laboratories.

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

Submarine samples have only been collected from a few locations on Gardner Pinnacles, prior to establishment of the Monument. None of the existing dredges recovered carbonate samples from the drowned reef terraces as they dredged deeper than these features. The research team I have assembled is a large collaborative team that brings together the expertise to fully analyze the samples in a coordinated way to avoid duplication of effort.

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

Pisces submersible

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

none

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

none

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

sample analysis should be completed in about 1 year, with data analysis, write-up and publication in the second year.

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

Please see attached vitae of the participants.

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

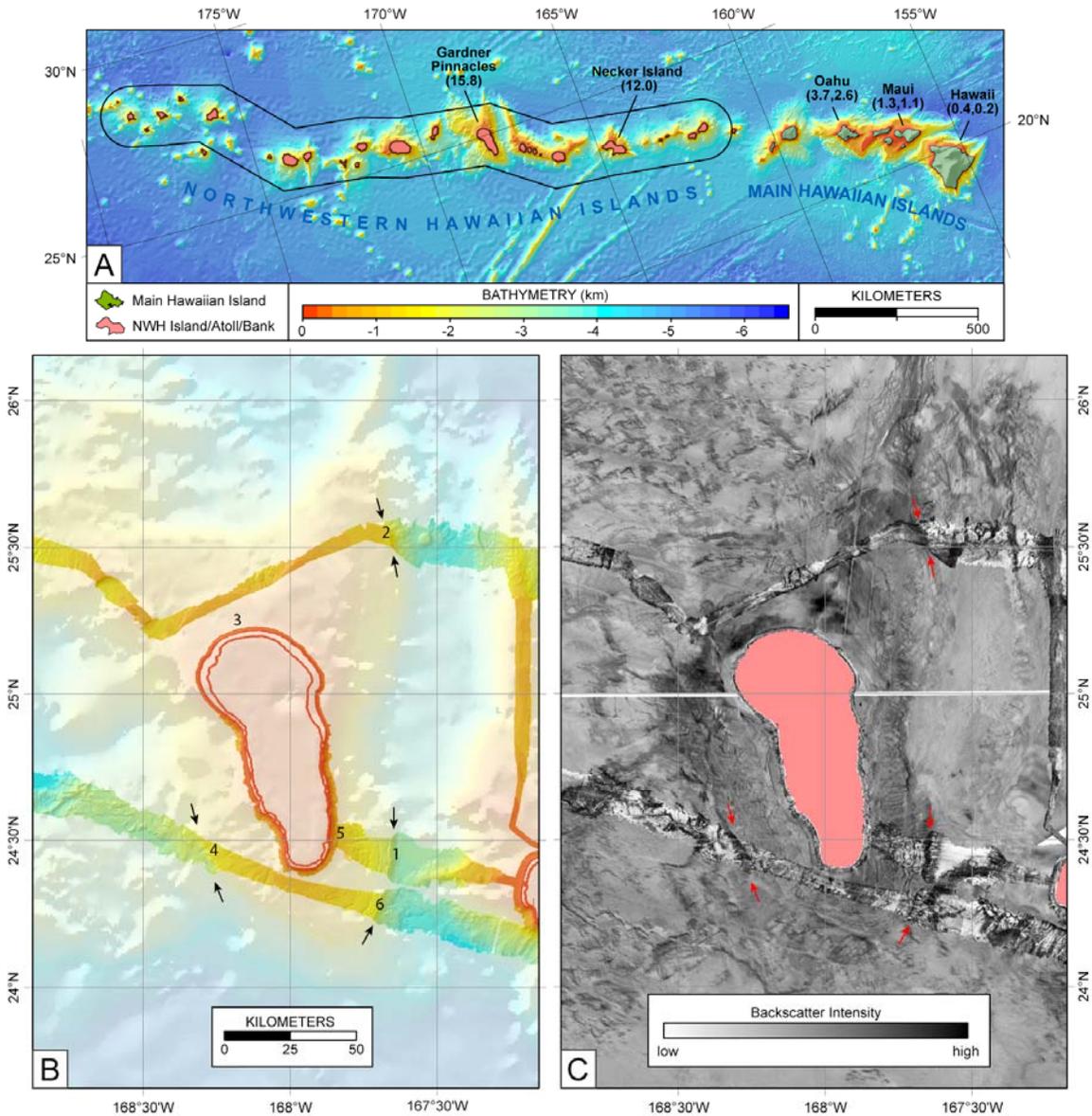
**SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE  
BELOW:**

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

Attachment 1. Clague – PMNM Research permit application, Dive Locations



**A.** Map showing the Hawaiian chain with the boundaries of the Papahānaumokuākea Marine National Monument and the locations of Gardner Pinnacles and Necker Island (with inferred ages in Myr in parentheses). Bathymetric surveys would be conducted between the eastern edge of the Monument and Gardner Pinnacles on transits between Honolulu and Gardner Pinnacles. These survey lines would be located to supplement existing bathymetric coverage.

**B.** Existing multibeam coverage of Gardner Pinnacles superposed on geoid-derived bathymetry. The arrows show the locations of the main break-in-slope. The stairstep reefs are located upslope from this feature. Proposed dive targets are numbered 1 to 6.

**C.** Same region as B. but showing multibeam backscatter data superposed on the GLORIA sidescan data collected by the US Geological Survey. The pink area is the shallow (<100 m depth) platform not imaged by the GLORIA survey.