

**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:** Loren Scott Godwin

**Affiliation:** Papahānaumokuākea Marine National Monument

**Permit Category:** Research

**Proposed Activity Dates:** August 1-August 24

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

**Proposed Locations:** Lisianski Island, Pearl and Hermes Atoll, Kure Atoll and French Frigate Shoals,(w/ Nihoa, Mokumanamana, Gardner Pinnacles, Maro Reef, Laysan Island and Midway Atoll

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

14

**Estimated number of days in the Monument:** 24

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

a.) The proposed activity would...  
conduct ecological assessments employing standardized methods to improve understanding of the spatial and temporal processes influencing the health of coral reef ecosystems throughout the archipelago.

b.) To accomplish this activity we would ....  
use proven Rapid Ecological Assessment (REA) methodologies to survey representative sites for fish, coral, macro invertebrates and document benthic habitat types.

c.) This activity would help the Monument by ...  
providing the information gained from this monitoring activity to resource managers and various public stakeholders to improve decision-making for the long-term conservation and management of coral reef resources within the Papahānaumokuākea Marine National Monument.

**Other information or background:** In the past decade, increased awareness regarding the declining condition of US coral reefs has prompted various actions by governmental and non-governmental organizations. Presidential Executive Order 13089 created the US Coral Reef Task Force (USCRTF) in 1998 to coordinate federal and state/territorial activities. Subsequently, the Coral Reef Conservation Act of 2000 provided Congressional funding for activities to conserve these important ecosystems, including mapping, monitoring and assessment projects carried out through the support of NOAA's Coral Reef Conservation Program. Numerous collaborations forged among federal agencies and state, local, non-governmental, academic and private partners now support a variety of monitoring activities in Hawai'i.

As part of the Coral Reef Conservation Act mandates, efforts to create structured monitoring began in the Northwestern Hawaiian Islands (NWHI) through the initiation of the NOWRAMP (Northwestern Hawaiian Islands Reef Assessment and Monitoring, later shortened to RAMP) program. Led by the State of Hawaii, US Fish and Wildlife Service, NOAA and several research institutions, efforts to characterize and monitor coral reefs and establish baselines to compare and facilitate monitoring of temporal changes in the ecosystem began. Since 2000, NOAA has conducted annual monitoring cruises to the NWHI, with leadership alternating between PIFSC/CRED and NOS/PMNM.

## **Section A - Applicant Information**

### **1. Applicant**

Name (last, first, middle initial): Godwin, Loren, Scott

Title: Resource Protection Specialist

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

Loren Scott Godwin

**2. Mailing address (street/P.O. box, city, state, country, zip):** Papahānaumokuākea Marine National Monument, [REDACTED]

Phone: [REDACTED]

Fax: [REDACTED]

Email: [REDACTED]

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

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

National Oceanic and Atmospheric Administration/National Ocean Service/ Office of National Marine Sanctuaries/ 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):**

Cori Kane, Fish Research Diver  
Paula Ayotte, Fish Research Diver  
Senifa Annandale, Fish Research Diver  
Brian Hauk, Fish Research Diver  
Trisha Soares, Fish Research Diver  
TBD, Fish Research Diver  
Jason Helyer, Benthic Research Diver  
Holly Bolick, Benthic Research Diver  
Daniel Wagner, Benthic Research Diver

TBD, Coxswain

TBD, Coxswain

TBD, Data Manager

TBD, Dive Chamber Operator

**Section B: Project Information**

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

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

Rapid Ecological Assessment (REA) sampling for fishes and benthic flora and fauna will be conducted at 4 locations: French Frigate Shoals, Lisianski Island, Pearl and Hermes Atoll and Kure Atoll(w/ Nihoa, Mokumanamana, Gardner Pinnacles, Maro Reef, Laysan Island and Midway Atoll as alternates). At each location, a stratified random survey design will be employed to sample coral reef habitat. The stratification scheme comprises the combination of three reef zones—fore reef, back reef, and lagoon—and three depth ranges—0 to 6 m, 6 to 18 m, and 18 to 33 m. A sampling ‘site’ denotes an area of 100 m by 100 m containing coral reef habitat. The target number of sampling sites for each location is estimated as follows:

At each location, sampling sites will be allocated proportionally among reef zone-depth strata according to the amount of coral reef habitat within each stratum. Specific site locations to be sampled within each stratum will be randomly selected from the complete list of stratum sample sites compiled using a Geographical Information System (GIS). A secondary list of alternative sampling sites will also be randomly generated for each stratum. In some situations, a randomly selected site may be determined upon arrival by the field team to be unsuitable for sampling, e.g., non-reef habitat, unsafe sea conditions, etc. In the case of unsuitable habitat, adjacent sampling sites (approximately 100 m in each direction from the original point) will be searched to the extent possible and substituted for the original site if suitable coral reef habitat is located. Sites determined to be unsuitable for REA sampling will be substituted with an alternative site from the secondary sample list.

**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:***

These efforts contribute to continuing research providing scientific information needed to support ecosystem approaches to the management of coral reef systems of the Monument. The use of consistent interdisciplinary methods across this vast region allows for an opportunity to perform comparative biogeographic and ecological analyses of diverse ecological, environmental, and oceanographic gradients. Patterns of variability of fish biomass, coral disease, diversity, and other reef metrics are paramount to assessing habitats in a coral ecosystem such as Papahānaumokuākea Marine National Monument (The Monument).

**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?

Surveys will be conducted in a manner that brings the divers in very limited direct contact with the natural resources. Fishes, invertebrates, and corals that can be indentified visually will not be collected. In rare instances, there will be algae and invertebrates that cannot be readily identified. Many species of algae and invertebrates require microscopic or histological examination to confirm identification, so very limited numbers of voucher specimens will be collected and preserved as necessary to make positive identifications. Additionally, if coral disease is documented a small sample of the infected colony would be collected and preserved to ascertain pathology.

These surveys will not occur in the vicinity of any known Native Hawaiian or western archaeological sites within the Monument, and thus are unlikely to impact any such resources. If possible archaeological sites are seen, Global Positioning System (GPS) coordinates for the sites as well as a general description will be taken and provided to Monument staff.

Because of the close relationship between Native Hawaiians and the ocean, the marine life of the NWHI also constitute a living cultural resource whose well-being is integral to the perpetuation of cultural values and practices. Many, if not most, of the species surveyed by the methods outlined in this application are of great cultural significance to Native Hawaiians, in spiritual, religious, nutritional, utilitarian, and other ways. A program such as the RAMP time series, whose goal is to characterize and monitor the Monument's living marine resources, will directly inform traditional managers and Native Hawaiian practitioners of the distribution and abundance of these resources within the Monument.

Finally, all scientists participating in this cruise will receive a Native Hawaiian cultural briefing before departure. In addition, the primary permittee, chief scientist, and other appropriate personnel will consult with the Office of Hawaiian Affairs (OHA) and the Monument's Native Hawaiian program coordinator on proper conduct while in the NWHI, on cultural sensitivities associated with the proposed activities and locations.

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? The proposed activities are consistent with the terms of the Proclamation in that they will "further understanding of Monument resources and qualities," and will "assist in the conservation and management of the Monument." They are also consistent with the Findings regarding the issuance of permits by the Trustees. Management regulations pertaining to the Monument, such as regulations for the mitigation of disease and alien species transport, are strictly adhered to when conducting operations within the Monument. The proposed activities will provide critical data that will greatly enhance the Monument managers' ability to characterize and understand the coral reef ecosystems within the Monument. The scientific methods to be used on this cruise are designed to have minimal, if any, negative effects on the environment. There are no anticipated indirect, secondary or cumulative effects of the proposed methods.

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.

The RAMP effort is conducted throughout the archipelago of Hawai'i, which provides for the opportunity of comparison between the populated and geologically younger southeastern islands and the NWHI. The variances generated within a data set are potentially unique to each site due to the abundance and distribution of the organisms present there. Similar tests conducted in the southeastern islands of the Hawai'i archipelago or elsewhere would be of questionable applicability because of fundamental differences in the assemblage structures of marine organisms when compared to the NWHI. Thus, the efficacy of the revised data collection protocols for monitoring in the NWHI cannot be tested anywhere but the NWHI.

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

Annual monitoring surveys are necessary to establish baseline abundances of coral reef organisms, to begin to understand the range of natural spatial and temporal variability that characterizes the ecosystems of the NWHI, and to establish a baseline against which changes due to the effects of large scale, long-term natural and anthropogenic impacts can be compared. These baselines will also be useful in documenting the impacts of episodic or localized natural and anthropogenic perturbations of the environment, such as storm damage, invasive species and vessel groundings. There are to be no adverse impacts on the Monument cultural, natural and historic resources, qualities and ecological integrity from the proposed activities.

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

The time allotted for this research is the minimum amount of time needed within Monument waters to complete the required work. Due to the considerable size of the Monument and the transit time between locations, we are only able to survey a subset of islands that represent the

broadest characterization of habitat types. The schedule of activities will maximize the operational days allotted aboard the NOAA research vessel Hi'ialakai.

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

The Monument staff and their partners involved in conducting the yearly coral reef monitoring have proven themselves capable of collecting monitoring data with no adverse impacts to the natural resources of the Monument. RAMP cruises have been successfully conducted on an annual basis in the NWHI since 2000 in conjunction with NOAA Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division, the State of Hawaii, and other partners. Team members are experienced divers and highly trained personnel who will be under the guidance of the Chief Scientist (CV attached).

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. There is an allocation of 21 days at sea aboard Hi'ialakai from NOAA's Office of Marine and Aviation Operations, and the RAMP effort is a line item in the budget of the Monument.

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.

Standardized survey procedures are employed during operations, and are the minimum effort needed to obtain the data. The procedures are designed with the intention of monitoring and assessing the coral reef ecosystem with as little impact as possible to the Monument resources. Through various cruises and reports the methods used have shown to have little impact on the habitat being observed.

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

Under a separate permit, the Hi'ialakai is outfitted with a mobile transceiver unit that is approved by the NOAA Office of Law Enforcement.

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

We are not aware of any other factors that would make the issuance of a permit for the activity inappropriate.

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

In order to properly manage the coral reefs and related waters of the Monument, RAMP cruises utilize several disciplines to monitor the various biota and environments. The primary research components are listed below with accompanying descriptions.

### Benthic Field Survey Methodology

At each survey site, two to three 25 m transect transects are the focal point for the benthic surveys.

#### Coral and Coral Disease:

Within each of the two transects above, five, 2.5-meter segments are surveyed (beginning at points: 0, 5, 10, 15, and 20 meters), whereby in each segment, all coral colonies whose center falls within 0.5 meters of either side of the transect line are identified to the species level and two planar size metrics collected (i.e., maximum diameter and maximum diameter perpendicular to the maximum diameter). The extent of colony mortality, both recent and old, is also estimated for each colony; special attention is paid to identifying as best as possible the extent of the former live colony. In addition, cases of disease or compromised health are recoded and additional information collected, including type of affliction (bleaching, skeletal growth anomaly, white syndrome, subacute tissue loss, band diseases, necroses, pigmentation responses, algal and fungal infections, as well as other diseases of unknown etiology, and predation), severity of the affliction (mild, moderate, marked, severe, acute), as well as photographic documentation and sometimes tissue samples. Coral tissue samples 1 centimeter in length are collected, catalogued and fixed in buffered zinc-formalin solution for further histopathological analyses.

#### Line Point Intercept (LPI):

A single diver swims over the lines and assess the benthic elements falling at fixed 20 cm intervals along each transect line. Each such element is tallied and recorded under the following scheme: live coral, recent dead coral, carbonate pavement, coral rubble, sand, rock, turf-algae, macro-algae, invertebrate, and other. Live benthic elements including coral, algae, and invertebrates were identified to the lowest taxonomic level possible. This data is used to provide the basis for quantitative estimates of live coral cover, as well as percent cover of the diverse benthic and substrate components. Species inventories and percent cover will be generated from data collected at each site. After the LPI is complete, the benthic research diver will conduct a qualitative assessment of algal and invertebrate species present within 5-m on either side of the transect line to document additional algal/invertebrate species not recorded during the LPI assessment. If during this phase, a species is encountered that is unidentifiable or potentially a new record there will be a voucher specimen collected.

#### Fish Survey Methodology:

Non-invasive underwater surveys are used to enumerate the diverse components of diurnally active shallow-water reef fish assemblages. Surveys are replicated at sites within and/or among the various habitat types present around each island or bank. Fish are identified to lowest possible taxa and their size estimated. Resulting data therefore provide information on size structure and provides the basis for estimation of biomass densities by taxa.

From 2000-2008 the primary survey method was a transect-based method. In 2009 methodology was shifted to a Stationary Point Count method. In 2009 both transects and SPC methods were

conducted to create conversion metrics to allow for comparison/conversion between methodologies. Both methods are described below for inclusion within this permit submission.

**Belt transects:** A pair of scuba diver-observers conduct parallel swims along three 25 m long transect lines, recording size-class specific (TL) counts of all fishes encountered, to species-level where possible, within visually estimated but defined belt widths: 4 m wide for fishes > 20 cm TL (100 m<sup>2</sup> area) on the initial swim-out, and 2 m wide for fishes <20 cm TL (50 m<sup>2</sup> area) on the subsequent swim back. Reef ledges and holes are visually searched. Stations are completed on all sides of the island/atoll, weather and sea conditions permitting.

**Stationary Point Counts (nSPC):** Stationary point counts are the main method now to survey reef fish assemblages. At each site, replicate nSPC surveys are conducted by a pair of divers, surveying adjacent visually-estimated cylinders of 7.5 m radius, centered on the divers. Each nSPC diver records the number, size (TL, to nearest cm), and species of all fishes present or passing through the cylinder in the course of the survey. nSPC surveys consists of 2 components: (i) a 5 minute species listing component – the aim of which is to build a list of species present pr passing through the cylinder; and (ii) an enumeration component, in which each diver records the number and sizes of fishes of those listed species in a series of instantaneous visual sweeps of their cylinder. Where time allows, 2 pairs of nSPC cylinders are surveyed per site per dive. nSPC Survey sites are randomly located with specified habitat strata encompassing all 0-30m hard bottom areas at each surveyed reef -with specific position generated prior to each cruise based on the random-stratified survey design.

**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:

Macro-Algae Voucher Specimens-Assorted green, red, and brown algae species  
Invertebrate Voucher Specimens.

Scientific name:

Macro-Algae-See Attachment A  
Invertebrates-See Attachment B

# & size of specimens:

Macro-Algae Voucher Specimens- Specimen size equivalent to 24 ounce sample bag

Invertebrate Voucher Specimens - A 5centimeterX5centimeter piece for encrusting forms (e.g. sponges,hydroids, bryozoans, tunicates) or 1centimeter in length for branching forms. For mobile species (e.g. sea stars, crabs, worms) the collection of a whole specimen is required for accurate taxonomic identification. All specimens will be collected as per the voucher specimen guidelines required by the Monument.

Collection location:

French Frigate Shoals, Lisianski Island, Pearl and Hermes Reef, and Kure Atoll (Nihoa, Mokumanamana, Gardner Pinnacles, Maro Reef, Laysan Island, Midway Atoll as alternates, see page 2)

Whole Organism  Partial Organism

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

Macro-Algae and invertebrate specimens will be deposited at the Bishop Museum, Honolulu, Hawaii

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

• General site/location for collections:

While in the field, all specimens will be kept in a preserved state in the wetlab aboard the NOAA research vessel Hi'ialakai: Algal specimens will be frozen and invertebrate collections will either be frozen or preserved in 95% Ethanol.

• 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?  
No

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

All specimens will be kept aboard the NOAA research vessel Hi'ialakai and transported back to Honolulu.

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

All specimens will be deposited at Bishop Museum and can be accessed by local researchers from the University of Hawaii, NOAA, US Fish and Wildlife Service and the State of Hawaii.

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

Specimens will be collected by the use of hand tools such as scrapers, chisels or snips.

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

95% Ethanol, buffered formalin

**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:**

A cruise report will be completed upon return to Honolulu. Monitoring data will be archived on servers located at the Monument offices and the NOAA PIFSC, Coral Reef Ecosystem Division

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

DeFelice, R.C., D. Minton, and L.S. Godwin. 2002. Records of shallow-water marine invertebrates from French Frigate Shoals, Northwestern Hawaiian Islands, with a note on nonindigenous species. Report to the U.S. Fish and Wildlife Service. Bishop Museum Technical Report No. 23. Contribution No. 2002-01 to the Hawaii Biological Survey

Godwin, L. S. 2002. Rapid ecological assessment of the marine invertebrate fauna of American Samoa and the U.S. Phoenix and Line Islands. Report submitted to the NOAA-NMFS Coral Reef Ecosystem Investigation. 17pp

Godwin, L.S. & N. L. Evenhuis. Marine Molluscs. In: Evenhuis & Eldredge (eds). Natural History of Nihoa and Necker Islands pp. 147-155. Bishop Museum Press 2004. 220 pp.

Godwin L.S. & L. G. Eldredge. Marine Invertebrates. In: Evenhuis & Eldredge (eds). Natural History of Nihoa and Necker Islands pp. 156-177. Bishop Museum Press 2004. 220 pp.

Godwin, S. 2005. Preliminary species inventory for marine invertebrates associated with the coral reef communities of the Northwestern Hawaiian Islands. Report submitted to the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

Friedlander, A.M., G. Aeby, R. Brainard, A. Clark, E. DeMartini, S. Godwin, J. Kenyon, R. Kosaki, J. Maragos, and P. Vroom. 2005. The State of Coral Reef Ecosystems in the Northwestern Hawaiian Islands. pp. 270-311. In J. Waddell (ed.), The State of Coral Reef Ecosystems of the United States and the Pacific Freely Associated States: 2005. NOAA Technical Memorandum NOS NCCOS 11. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team, Silver Spring, MD. 522pp.

Castro, P & L.S. Godwin. 2006. First record of coral crabs of the family Tetraliidae (Crustacea: Brachyura) from the Hawaiian Islands. Bishop Museum Occasional Papers. 88:53-55

Godwin, L.S. & H. Bolick. 2006. Inventory of intertidal and shallow sub-tidal marine invertebrates at Kalaupapa National Historic Park. Contribution No. 2006-003 to the Hawaii Biological Survey. 58 pp.

Kenyon J, S. Godwin, A. Montgomery, and R. Brainard 2007. Rare sighting of *Acropora cytherea* in the main Hawaiian Islands. *Coral Reefs* 26: 309

Maragos, J., J. Miller, J. Gove, E. Demartini, A. Friedlander, S. Godwin, C. Musburger, M. Timmers, R. Tsuda, P. Vroom, E. Flint, E. Lundblad, J. Weiss, P. Ayotte, E. Sala, S. Sandin, S. McTee, T. Wass, R. Brainard, D. Obura, S. Ferguson, and B. Mundy. 2007. U.S. atolls and low reef islands in the Line and Phoenix Islands, Central Pacific Ocean. Report to the U.S. Coral Reef Taskforce.

Martin J.W., S. Godwin, R. Moffit. 2008. Additions to the decapod crustacean fauna of the Hawaiian Islands, I. A review of the crab genus *Sakaila* Manning & Holthuis, 1981 (Decapoda, Brachyura, Calappoidea) with a description of a new species from French Frigate Shoals, Northwestern Hawaiian Islands. *Zootaxa* (In Press)

Godwin, L.S. and I. Baums. 2008. The hermit crab *Calcinus isabellae*, Poupin, 1997 (Crustacea: Decapoda: Anomura: Diogenidae), a new record for the Hawaiian Archipelago, including a review of the genus *Calcinus* Dana, 1851 in Hawai'i. Bishop Museum Occasional Papers 100: 52-54

Knapp, I.S., L.S. Godwin, J.E. Smith, G.J. Williams, and J.J. Bell. 2011. Records of non-indigenous marine species at Palmyra Atoll in the U.S. Line Islands. *Marine Biodiversity Records* 4:1-7. doi:10.1017/S1755267211000078

Baums, I.B., S. Godwin, E. Franklin, R. Toonen and D. Carlon. 2011. Population expansions occurred during periods of Pleistocene sea level rise in four species of coral associated hermit crabs (Anomura: Diogenidae). *Molecular Ecology*

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.

---

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 A. Potential Algal Genera Requiring Voucher Collections**

<b>Common Name</b>	<b>Scientific Name</b>		<b>Common Name</b>	<b>Scientific Name</b>
Algae	Caulerpa		Algae	Dasya
Algae	Caulerpella		Algae	Heterosiphonia
Algae	Codium		Algae	Hypoglossum
Algae	Halimeda		Algae	Martensia
Algae	Bryopsis		Algae	Schizoseris
Algae	Derbesia		Algae	Vanvoorstia
Algae	Pseudobryopsis		Algae	Amansia
Algae	Avrainvillea		Algae	Chondria
Algae	Chlorodesmis		Algae	Chondrophyucus
Algae	Rhipidosiphon		Algae	Herposiphonia
Algae	Rhipilia		Algae	Laurencia
Algae	Tydemanina		Algae	Lophosiphonia
Algae	Udotea		Algae	Neosiphonia
Algae	Palmophyllum		Algae	Polysiphonia
Algae	Phyllocladon		Algae	Spriocladia
Algae	Cheatomorpha		Algae	Womersleyella
Algae	Cladophora		Algae	Amansia
Algae	Dictyosphaeria		Algae	Tolypiocladia
Algae	Microdictyon		Branched coralline algae	non-geniculate
Algae	Valonia		Crustose coralline algae	
Algae	Acetabularia		Algae	Amphiroa
Algae	Bornetella		Algae	Hydrolithon
Algae	Neomeris		Algae	Jania
Algae	Boodlea		Algae	Mastophora
Algae	Siphonocladus		Algae	Erythrotrichia
Algae	Ventricaria		Algae	Gelidium
Algae	Entocladia		Algae	Pterocladia
Algae	Ulvella		Algae	Acrosymphyton
Algae	Ulothrix		Algae	Caulacanthus
Algae	Uronema		Algae	Gibsmithia
Algae	Ulva		Algae	Carpopeltis
Algae	Chnoospora		Algae	Halymenia
Algae	Dictyota		Algae	Hypnea
Algae	Distromium		Algae	Kallymenia
Algae	Lobophora		Algae	Predaea
Algae	Padina		Algae	Peyssonnelia
Algae	Styopodium		Algae	Ahnfeltiopsis
Algae	Asteronema		Algae	Plocamium
Algae	Feladmanna		Algae	Portieria

Algae	Hincksia		Algae	Platoma
Algae	Sargassum		Algae	Gracilaria
Algae	Turbinaria		Algae	Actinotrichia
Algae	Hydroclathrus		Algae	Galaxaura
Algae	Sphacelaria		Algae	Ganonema
Algae	Sporochnus		Algae	Scinaia
Algae	Bangia		Algae	Tricleocarpa
Algae	Porphyra		Algae	Liagora
Algae	Asparagopsis		Algae	Trichogloea
Algae	Aglaothamnion		Algae	Trichogloeopsis
Algae	Anotrichium		Algae	Yamadaella
Algae	Antithamnion		Algae	Stylonema
Algae	Centroceras		Algae	Gelidiopsis
Algae	Ceramium		Algae	Gloiocladia
Algae	Corallophila		Algae	Lomentaria
Algae	Crouania		Algae	Botryocladia
Algae	Griffithsia		Algae	Chrysiomenia
Algae	Haloplegma		Algae	Coelarthrum
Algae	Lejolisea		Algae	Coelothrix
Algae	Ptilothamnion		Algae	Halichrysis
Algae	Spryridea		Blue green algae	cyanobacteria
Algae	Wrangelia		Turf algae	

## Attachment B. Potential Marine Invertebrate Requiring Voucher Collections

<b>PHYLUM PORIFERA</b>	
<b>Class Calcarea</b>	
<b>Family Heteropiidae</b>	
	Heteropia glomerosa Bowerbank, 1873
<b>Class Demospongiae</b>	
<b>Order Hadromerida</b>	
<b>Family Suberitidae</b>	
	Suberites zeteki de Laubenfels, 1936
<b>Family Chalinidae</b>	
	Sigmadocia cf. caerulea Hechtel, 1965
<b>Family Niphatidae</b>	
	Gelloides fibrosa Wilson, 1925
<b>Order Poecilosclerida</b>	
<b>Family Mycalidae</b>	
	Mycale grandis Thiele, 1903
<b>Family Raspailidae</b>	
	Echinodictyum asperum Ridely and Dendy, 1886
<b>Family Dysideidae</b>	
	Dysidea sp.
<b>PHYLUM CNIDARIA</b>	
<b>Class Hydrozoa</b>	
<b>Family Halocordylidae</b>	
	Pennaria disticha
<b>Family Bougainvilliidae</b>	
	Bouganvillia ramosa van Beneden, 1844
<b>Family Sertulariidae</b>	
	Dynamena crisioides Lamouroux, 1824
<b>Class Anthozoa</b>	
<b>Family Diadumenidae</b>	
	Diadumene leucolena Verrill, 1866
	Diadumene lineata (Verrill, 1869)
<b>Subclass Octocorallia</b>	
	Carijoa riisei Duchassaing & Michelotti, 1860
<b>PHYLUM ANNELIDA</b>	
<b>Family Sabellidae</b>	
	Sabellastarte spectabilis Grube, 1878
	Branchiomma nigromaculata Baird, 1865
<b>Family Serpulidae</b>	

	Hyroides elegans Haswell, 1883
	Hyroides dirampha Morch, 1863
	Hyroides crucigerus Morch 1863
	Pomatoleios kraussii Baird, 1865
	Pomatoceros cf. minutus Rioja, 1941
	Salmacina tribranchiata Moore, 1923
	Serpula vermicularis Linnaeus, 1767
	Serpula cf. watsoni Willey, 1905
<b>Family Spirorbidae</b>	
	Eulaeospira orientalis Pillai, 1960
	Simplicaria pseudomilitaris Thiriot-Quievreux, 1965
	Janua pagenstecheri Quatrefages, 1865
	Neodexiospira preacuta Vine, 1972
	Neodexiospira foraminosa Moore and Bush, 1904
	Pileolaria militaris Claparede, 1868
	Circeus cf. americana Saint-Joseph, 1894
<b>PHYLUM MOLLUSCA</b>	
<b>Family Vermetidae</b>	
	Vermetus alii Hadfield & Kay, 1972
<b>Class Gastropoda</b>	
	Hipponix australis Lamarck, 1819
	Crucibulum spinosum (Sowerby, 1824)
	Hiponix sp.
<b>Class Bivalvia</b>	
	Chama macerophylla Gmelin, 1791
	Chama fibula Reeve, 1846
<b>PHYLUM ARTHROPODA</b>	
<b>Class Cirrepeida</b>	
<b>Order Thoracica</b>	
<b>Family Balanidae</b>	
	Balanus amphitrite Darwin, 1854
	Balanus eburneus Gould, 1841
	Balanus trigonus Darwin, 1854
	Megabalanus californicus Pilsbry, 1916
	Megabalanus tanagrae Pilsbry, 1928
	Megabalanus peninsularis Pilsbry, 1916

<b>Family Chthamalidae</b>	
	Chthamalus proteus
<b>PHYLUM ARTHROPODA</b>	
<b>Order Amphipoda</b>	
<b>Family Caprellidae</b>	
	Caprella acutifrons
<b>Family Gammaridae</b>	
	Erichthonius brasiliensis Dana, 1853
	Jassa falcata Sexton & Reid, 1951
<b>Class Decapoda</b>	
<b>Order Brachyura</b>	
<b>Family Grapsidae</b>	
	Pachygrapsus fakaravensis Rahtbun, 1907
	Metopograpsus oceanicus (Jacquinot, 1852)
	Nanosesarma minutum (De Man, 1887)
<b>Family Xanthidae</b>	
	Glabropilumnus seminudus (Miers, 1884)
<b>Class Stomatopoda</b>	
	Gonodactylaceusus 3utates Lanchester, 1903
<b>PHYLUM PYCNOGONIDA</b>	
	Anoplodactylus sp.
<b>PHYLUM ECHINODERMATA</b>	
<b>Class Ophiuroidea</b>	
	Ophiactis savignyi Muller and Troschel, 1842
<b>Class Holothuroidea</b>	
	Holothuria n. sp
<b>PHYLUM BRYOZOA</b>	
<b>Class Gymnolaemata</b>	
<b>Family Bugulidae</b>	
	Bugula neritina Linnaeus, 1758
	Bugula robusta MacGillivray, 1869
	Holoporella pilaefera Canu & Bassler, 1929
<b>Family Chorizoporidae</b>	
	Rhamphostomella argentea Hincks, 1881
<b>Family Scrupocellariidae</b>	
	Scrupocellaria cf. sinuosa Canu & Bassler, 1927
<b>Family Hippopodiniidae</b>	
	Hippopodina feegeensis Busk, 1884
<b>Family Schizoporellidae</b>	

	Schizoporella errata Waters, 1878
<b>Family Vesiculariidae</b>	
	Amathia distans Busk, 1886
<b>Family Watersiporidae</b>	
	Watersipora edmondsoni Soule & Soule, 1968
<b>SUBPHYLUM UROCHORDATA</b>	
<b>Class Ascidiacea</b>	
<b>Suborder Aplousobranchia</b>	
<b>Family Didemnidae</b>	
	Diplosoma listerianum Milne-Edwards, 1841
<b>Suborder Phlebobranchia</b>	
<b>Family Ascidiidae</b>	
	Phallusia nigra Savigny, 1816
	Ascidia syndneiensis
<b>Suborder Stolidobranchia</b>	
<b>Family Styelidae</b>	
	Botrylloides simodensis Saito and Watanabe, 1981
	Symplegma brakenhielmi Michaelsen, 1904
	Polyandrocarpa sagamiensis Tokioka, 1953
	Eusynstyela hartmeyeri Michaelson, 1904
	Styela plicata Lesueur, 1823
	Styela clava Herdman, 1882
<b>Family Pyuridae</b>	
	Microcosmus exasperatus Heller, 1878
	Herdmania momus Savigny, 1816