

**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:** Jacob Marcus Asher

**Affiliation:** NOAA PIFSC Coral Reef Ecosystem Division

**Permit Category:** Research

**Proposed Activity Dates:** August/September/October 2013

**Proposed Method of Entry (Vessel/Plane):** R/V Searcher

**Proposed Locations:** Nihoa Island, Necker Island (Mokumanamana), French Frigate Shoals

**Estimated number of individuals (including Applicant) to be covered under this permit:** 3

**Estimated number of days in the Monument:** 12

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

a.) The proposed activity would...

collect shallow water (0-30m) and deeper water (30-100m) videographic surveys of coral reef fishes using baited remote underwater stereo-video systems (stereo-BRUVs).

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

use a stratified random sampling approach (two levels: depth and habitat) to deploy multiple stereo-BRUVs units. Data generated would include relative abundance, biomass, and size of priority species using the BRUV.

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

providing diver-independent and deep-water survey data on abundance and size distribution of reef fishes species including apex predators. Such information will complement the visual survey data gathered from SCUBA-accessible depths (0-30m) and provide a means to test for impacts of diver presence on estimated apex predator densities in the PMNM. Similar surveys (already

conducted and additional ones planned) in the Main Hawaiian Islands will allow for meaningful comparative analysis of PMNM and NWHI apex predator densities.

**Other information or background:**

An ESA Section 7 consultation has not yet been completed for this proposed project.

## **Section A - Applicant Information**

### **1. Applicant**

Name (last, first, middle initial):

1.) Asher, Jacob M. and 2.) Williams, Ivor D.

Title:

1.) Marine Ecosystem Research Supervisor and PhD Candidate at the University of Western Australia 2.) Reef Fish Researcher & Fish Team Lead

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

Jacob Asher

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

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

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

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

NOAA PIFSC CRED

### **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):**

Kaitlin Baird, Field Technician; Emily Crigler, Field Technician

**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 checked="" type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> Necker Island (Mokumanamana) | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input checked="" type="checkbox"/> Deep water |
| <input checked="" type="checkbox"/> French Frigate Shoals        | <input type="checkbox"/> Land-based | <input checked="" type="checkbox"/> Shallow water | <input checked="" 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 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 type="checkbox"/> Other                                   |                                     |   |  |

**Ocean Based**

Remaining ashore on any island or atoll (with the exception of Midway & Kure Atolls and Field Camp staff on other islands/atolls) between sunset and sunrise.

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

Location Description:

Stereo-BRUVS deployments will follow a two-level stratified random sampling design (depth/habitat):

- 1.) Open-circuit diver depths: Shallow (0 – 6m), moderate (6 – 18m), deep (18 – 30m);
- 2.) Mesophotic reefs: Shallow (30 – 53m), moderate (53 – 76m), deep (76 – 100m);
- 3.) Habitat strata: Aggregated reef, pavement, spur and groove.

**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:***

Over the last decade or more there have been abundant studies showing remarkable differences in abundance and size-distributions of targeted between the PMNM and populated islands in the MHI. The great bulk of that data has come from visual survey programs, including the PMNM's own monitoring surveys, as well as the NWHI & MHI RAMP surveys conducted by NOAA CRED and partners. That data has had great scientific and other value and plays a role in demonstrating the vital importance of preserving and managing remote reef areas such as are located within the PMNM.

Strengths of those visual survey programs include that data is gathered across large areas using consistent methodology, survey design, and personnel, and that randomized sampling across <30m hard bottom means that data are credibly representative of a large portion of coral reef habitat. However, as with any survey method, there are potential weaknesses to visual survey data gathered by divers on SCUBA, particularly: (i) possible differences in fish behavior among areas, e.g. avoidance of divers in locations where fishing occurs or attraction where fishing is prohibited, which could bias abundance and mortality estimates; and (ii) safety considerations, which preclude large-scale SCUBA-based visual survey operations beyond ~30m water depth. As some reef fish species can be abundant in deeper habitats, the depth limitation for standard SCUBA surveys means CRED RAMP data are potentially not representative of species' status across their entire depth distributions.

We propose to utilize baited remote underwater stereo-video (stereo-BRUVs) surveys to generate diver-independent data from 0-100m habitats. Stereo-BRUVs can generate extremely accurate size distributions, which allow us to apply length-based models that we are currently implementing to determine status of Hawaii priority species. The project will assess all target species (i.e. preferred targets in the MHI) and apex predators encountered, however because of their wide depth-range, and relative scarcity in shallow habitats around populated areas, it is expected that the project will be particularly valuable for 3 Hawaii Fisheries Local Action Strategy priority species: the blue trevally (*Caranx melampygus*), the green jobfish (*Aprion virescens*), and the whitespot goatfish (*Parupeneus porphyreus*) and for several apex predator species (sharks and large jacks). Because results from this project will greatly increase the value and defensibility of data on targeted species and particularly roving predators from other visual survey programs in the Pacific, the project will contribute to management activities in other jurisdictions as well.

A recently published study based on NOAA PIFSC CRED RAMP data estimated that reef sharks abundance around populated areas is depleted by 93-97% of original baseline levels. That work has attracted considerable attention from US management agencies, science communities, and public/news media outlets. Continued stereo-BRUVs assessments of sharks and jacks in the Hawaiian Archipelago would be timely and particularly valuable for those taxa, generating robust estimates of apex predator relative abundances and potentially of differences between the remote NWHI and the MHI. It will provide information on an ecologically critical group of

fishes that are generally believed to exhibit among the clearest impacts of protection in large marine reserves such as the PMNM.

In summary, the information obtained will a.) assess populations of apex predators (primarily sharks/jacks) against predator populations captured in diver independent stereo-BRUVS video in the Main Hawaiian Islands (primary goal) b.) assess shallow water and mesophotic coral reef fish communities in the NWHI.

The intent of the permit is for research purposes. Ultimately, the information collected could be used by Conservation and Management agencies (as with many marine research outcomes) in the future.

\*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species? Yes  No

For a list of terrestrial species protected under the Endangered Species Act visit:  
<http://www.fws.gov/angered/>

For a list of marine species protected under the Endangered Species Act visit:  
<http://www.nmfs.noaa.gov/pr/species/esa/>

For information about species protected under the Marine Mammal Protection Act visit:  
<http://www.nmfs.noaa.gov/pr/laws/mmpa/>

**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 stereo-BRUVS team members will conduct reef fish surveys with care and anticipate no greater than minimal adverse impacts to the natural resources of the Monument. The team members will not step foot on any of the terrestrial habitats in the Monument. The research does not propose collecting or extracting any materials from the Monument (observational/ videographic research only). The research does not propose permanently discharging any materials in the Monument. The scientific objectives are to observe apex predators and reef fish within their natural habitat with minimal disturbance and to only come in contact with resources in limited occurrences to further comprehensive understanding and research in the Monument. In addition, team members will attend a Hawaiian Cultural Briefing before entering the Monument waters. This education instills the awareness of the natural, cultural and historical values the Monument holds. Informative cultural literature provided by the Office of Hawaiian Affairs

(OHA) and the Monument for personnel seeking further knowledge or who may not be able to attend the briefings will also be reviewed.

All management regulations pertaining to the Monument are strictly adhered to when conducting operations within the Monument (such as disease mitigation regulations) and in Special Preservation Areas. All activities proposed provide critical data that will greatly enhance the Monument managers' ability to characterize and understand the ecosystems and apex predator/reef fish populations within the Monument. As stated, all scientific methods to be used on this cruise are designed to avoid and minimize negative effects on the environment. The uniformed goals of conservation and management are of utmost importance to the intended research and no work outside of permitted activities shall be considered.

Stereo-BRUVs are simple in construction, composed of an open, lightweight galvanized (60 - 70 lb.) steel frame, Sony CX-7 or CX-12 cameras and stereo-camera housings mounted onto a base bar, and PVC bait arm with a wire mesh basket which holds approximately 1 kg. bait. Historically, these systems were deployed from the fantail of the Oscar Elton Sette, or from small motorized vessels (PIFSC Safeboats).

Stereo-BRUVs deployments are done with a high degree of sensitivity in minimizing impacts to benthic coral reef ecosystem communities. Steps to ensure effective deployments include: 1.) evolving evaluations (GAR assessments) of sea states (winds, tides, currents, wave heights) 2.) clear and easily identifiable surface floats to mark location of units 3.) assessment of bottom bathymetry based on fathometer readings and potential for hang-ups 4.) controlled lowering of stereo-BRUVs from support vessels (i.e. wrapping surface lines around rail cleats, and limiting descent speed to avoid "free fall").

Recoveries are planned using the same steps listed above (e.g. evolving surface condition GAR and surface line positioning assessments), along with the retrieval of slack line prior to initiating winch-powered recovery. Coxswains and deck crew get as close to being above BRUVs stations as possible, initiating high speed powered retrieval once line tension/unit weight is noted to avoid unit drags or hang-ups along the bottom.

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?

Data from the program will improve understanding of the status of key reef fish species in the PMNM and information from this project along and in combination with comparable data from the MHI will provide greatly improved assessments of relative status of targeted and keystone reef species in the PMNM and MHI. Such data is fed into management decision making in the MHI and beyond, e.g. through NOAA CRED's partnerships with Hawaii DAR, NOAA PIRO, and with the Western Pacific Regional Fisheries Management Council. Project results are therefore expected to further highlight the conservation and management importance of the

PMNM as well as providing information which secondarily supports reef fish management in the MHI.

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 critical need to conduct this work in the PMNM is that the primary goal is to determine status (number and size distribution) of reef fish species that are generally believed to be depleted around human population centers. Surveys within the PMNM therefore provide the only means of assessing intact populations of those species within the Hawaiian archipelago, and hence the only means to provide a reference point against which populations in the MHI can be compared.

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

Stereo-BRUVs deployments in the NWHI would provide natural resource managers with greatly improved information on reef fish populations that are independent of potential bias caused by presence of divers and which are truly representative of populations spanning depth ranges down to 100m. Those deeper (>30m deep) habitats remain relatively underexplored. Outputs from this project will therefore greatly improve information on status of key reef fish species in the PMNM, and will allow for meaningful assessment of the extent to which the main current data source on reef fish status (visual surveys by divers on SCUBA in <30m) are representative of broader status of reef fish assemblages within the monument. We believe those positive effects will greatly outweigh the minimal adverse effects - deployments are relatively short, the BRUV units are recovered in their entirety, and divers do not need to even enter the water during these survey operations.

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

Stereo-BRUVs deployment soak times are set at one hour per station. This is a standard soak time broadly used for this technology, including for exsiting surveys in the MHI which we wish to compare PMNM data with. The value of the resulting data is therefore very dependent on maintaining that methodological consistency.

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

Stereo-BRUVs methodology is a well established tool for reef fish surveys - and is currently used in numerous research programs around the Pacific.

The permit applicant and NOAA CRED have extensive previous experience conducting surveys using BRUV. For example, the applicant led operations including 385 deployments and recoveries during a March - April 2012 research cruise to American Samoa/Tutuila, which was a

joint effort between NOAA PIFSC CRED and the PIFSC Fisheries Biology and Stock Assessment Branch (FBSAB). That operation also involved participation of staff from the University of Western Australia, which has led the push to expand use of BRUV for coral reef fish surveys in recent years. In a similar arrangement, the applicant also conducted BRUV surveys of 191 sites in the MHI during cruises in September 2012, and previously assisted with BRUV operations in the Mariana Archipelago in 2010.

Our division - the NOAA PIFSC CRED - has over a decade of experience of running survey programs in the PMNM and elsewhere, and the permit applicant has previously taken part in 3 extended survey operations in the PMNM. We value our partnership with the PMNM and take seriously the responsibilities that come with the privilege of being able to conduct work in the PMNM.

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.

Applicant is a member of staff of the NOAA PIFSC CRED. In addition to core division resources, work on BRUV surveys in the Hawaiian Archipelago is supported by a grant from the NOAA Coral Reef Conservation Program (Project 381 "Improving status and mortality assessments of Hawaii priority reef fish species and apex predators using remote video-surveys").

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.

Stereo-BRUVs are low-cost, low-weight, effective, technologically simple, and easy to deploy and retrieve, being able to sample reef fish populations over multiple depth and habitat strata. Limited soak times and well-developed and workable deployment/retrieval methods are designed to minimize impacts to reef fish and associated benthic habitats.

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

Yes (work to be completed on the R/V Searcher)

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 such factors.

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

As described above, deployments will follow the model used for stereo-BRUV survey operations completed in Tutuila, American Samoa from March – April 2012 and in Oahu, Lanai, Molokai, and Maui in the Main Hawaiian Islands in September 2012 as part of an existing NOAA fisheries methods-calibration program.

Stereo-BRUVs, as designed by UWA and AIMS, are termed ‘remote’ because the systems are deployed on the seafloor independent from an operator or observer. Each system uses two “off-the-shelf” HD SONY CX-7 or CX-12 NTSC video cameras mounted 0.7 m apart on a base bar that is inwardly converged at 8 degrees to gain an optimized field of view, with a maximum visibility range of 10 m. Each stereo-BRUVs is typically baited with 1 kg of pilchards (*Sardinops sagax*) or close analog (*Cololabis saira*; Japanese Sanma), which is placed in a plastic-coated wire basket and suspended on a bait arm 1.2 m in front of the unit.

Several of the camera frames (four out of eight) are of a lighter design, and have the option of adding ballast (5 – 7.5 kg.) in areas of high currents/surge/waves directly to the frame (pins). Ballast would be added on a case-by-case deployment basis, depending on site, bathymetry, and sea-state (wave/current conditions/depth strata). Ballast will remain attached to the individual stereo-BRUVS frame pins during deployment/survey/recovery operations, will not make intentional contact with benthic substrate, and will not be intentionally released.

Each remote underwater video station weighs ~ 35kg, and is deployed by a surface vessel at preselected GPS locations with a polypropylene rope and surface floats attached, with the descent controlled by taking tension on the deployment line (wrapping it around a deck cleat to avoid instrumentation "free fall"). BRUV units are retrieved by grappling surface floats and hauling lines with high speed electric winch or pot-hauler. Existing GIS maps and stratified random sampling designs are used to allocate video station sites along pre-defined depth/habitat strata as follows:

- 1.) Depth strata: Shallow (0 – 6m), moderate (6 – 18m), deep (18 – 30m) diver depths;
- 2.) Additional stratified random sites allocated to deeper, mesophotic reefs outside of standard, open-circuit dive depths: Shallow (30 – 53m), moderate (53 – 76m), deep (76 – 100m);
- 3.) Habitat strata: Aggregated reef, pavement, spur and groove.

Stereo-BRUVS temporarily rest directly on benthic substrate. The footprint of the stereo-BRUVS is approximately 0.05 square meters (a 12 mm diameter galvanized steel pipe in a rectangular shape 1.26 meters long by 0.86 meters wide). While steps to mitigate impacts are highlighted in the previous paragraph (i.e., controlled descent and recovery steps), there is the possibility that corals, algae, or rocks could be broken when the stereo-BRUVS frame comes in contact with the substrate (i.e., injuring, disturbing, or damaging any living or nonliving Monument resource). Given the very small footprint of the stereo-BRUVS and the short duration of the proposed research, these impacts would be limited to the immediate area but would vary depending upon:

- The weight of individual camera stations over live coral/algal cover;
- Shifting of camera stations along the bottom due to currents and/or surface wave action;
- Dragging of camera stations during recovery.

A sampling grid resolution of 500 m-square cells was chosen to reduce the likelihood of fish moving between sample sites within the sampling period (based on the estimated swimming

speeds of common reef fish species and the distances they typically travel over a sampling period) to maintain independence among samples.

Use of multiple BRUV systems allows for efficient sampling, with a small boat able to complete an average of ~15-20 combined camera station deployments and retrievals per day.

Video footage is stored on flash memory cards, which are downloaded and backed-up for later concatenation, conversion, and analysis. Commercially available SeaGIS software packages are used to analyze stereo BRUVs and measure fish sizes (EventMeasure) ([www.seagis.com](http://www.seagis.com)). The software package CalMeasure, designed by SeaGIS, is used to calculate and standardize the field of view and provide accurate measures of fish length from the stereo-images. Stereo-camera calibrations are a vital component for this mission, with two series completed (pre-cruise/post-cruise). These calibration values between camera stereo-systems are integral in obtaining length data for all species examined in stereo BRUVs video.

**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:  
Not applicable

Scientific name:

# & size of specimens:

Collection location:

Whole Organism  Partial Organism

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

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

• General site/location for collections:

- 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?
  
- Will organisms be released?

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

Video sampling only

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

Underwater stereo-camera surveys to assess coral reef fish populations in the US and US Pacific Territories remain limited and BRUV or other remote stereo-video units have not been used previously to survey coral reef fishes in the PMNM. And, as noted above, there have been few surveys at all to date of reef fish populations beyond 30m deep. The proposed surveys which would be conducted for this project will therefore gather new information that is not currently available from other sources or in other forms.

As with all data gathered by NOAA CRED, data are made available to the scientific and management community and to the public at large. NOAA CRED is currently developing a web-based interface to make all CRED-gathered data available by direct download. While that site is in development, as needed thereafter, CRED data is available by request from CRED information services team and from other CRED scientists.

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

- 1.) Stereo-BRUVs frames, base bars, camera synchronizing diodes, underwater housings, PVC bait arms, plastic-coated wire baskets
- 2.) Sony CX-7 and/or CX-12 video cameras
- 3.) Bait (*Cololabis saira*)
- 4.) Portable winch, davit arm

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

Prolong Calcium Sulfonate Grease (for portable winch maintenance, if needed)

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

All stereo-BRUVs deployments are temporary, with deployment times of one hour. Following the completion of deployments, units are completely recovered using a high-speed winch. Photograph and schematic diagram of a single stereo-BRUVs unit are attached.

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

Time line from raw videographic data collection to generating publishable material is estimated at 24 months.

**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.

---

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