

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:
NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
nwhipermit@noaa.gov
PHONE: (808) 725-5800 FAX: (808) 455-3093

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: Daniel Wagner

Affiliation: Ocean Exploration Trust (OET)

Permit Category: Research

Proposed Activity Dates: August 29 - September 25, 2023

Proposed Method of Entry (Vessel/Plane): Vessel (E/V *Nautilus*)

Proposed Locations: Deep waters (>200 meters) in expansion zone of the Papahānaumokuākea Marine National Monument towards the northwestern Monument boundary

Estimated number of individuals (including Applicant) to be covered under this permit:
50 (33 science and operations and 17 ship's crew)

Estimated number of days in the Monument: 29

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...

Our overall goal is to increase our scientific understanding of previously unexplored deep-sea habitats in the Monument, while also engaging the public in telepresence-based exploration. For this purpose we propose to conduct an expedition that will use the E/V *Nautilus* mapping and remotely operated vehicle (ROV) systems to survey deep-sea habitats (>200 meters) within the Monument, focusing on the Monument expansion zone towards the northwestern boundary. The expedition will be planned and executed in close collaboration with the resource management and scientific community, including staff of the Papahānaumokuākea Marine National Monument (PMNM). Video and information from the expedition will be live streamed to engage the public in telepresence-based exploration. Data and samples collected during the mission will be deposited in publicly-available repositories in order to provide a rich foundation to enable follow-on science, exploration, and management activities.

b.) To accomplish this activity we would

We aim to conduct a 29-day telepresence-enabled expedition aboard E/V *Nautilus* that will use the ship's mapping and remotely operated vehicle (ROV) systems to survey deep-sea habitats located primarily towards the northwestern expansion zone of the Monument between Lili'uokalani Ridge and the northwestern Monument boundary. This area includes numerous previously unexplored seamounts of biological and geological significance, as well as several underwater cultural heritage sites associated with the Battle of Midway.

Our ROV systems (rated to 4,000 and 6,000 meters) will be equipped with high-definition video and photo cameras, lights, parallel lasers for scale, CTD and oxygen sensors, scanning and multibeam sonars, Niskin bottles, push core tubes, manipulator arms, and a suction sampling system. During exploratory dives, ROVs will record high-resolution video, oceanographic, and seafloor mapping data, as well as collect limited biological, geological, and water samples. We request permission to collect a maximum of 15 rock samples, 5 sediment push cores, 15 biological samples, and 6 water samples per ROV dive to support studies on the biogeographic patterns of species distributions, carbonate chemistry, and the geological context of the region. Biological specimen collections will target possible new species, range expansions, or other samples with high potential to increase our scientific understanding of the biodiversity and biogeography of the region. Water samples will be collected via Niskin bottles mounted on the ROV for eDNA and carbonate chemistry analyses. A limited number of sediment samples may also be collected via pushcore or scoop for analysis of infauna and for geological archiving; rock samples will be collected by the ROV manipulators for studies on the geological age and context of the region. In particular, geological samples collected during this project will seek to identify whether specific seamounts are cretaceous or formed over the Hawaiian Hotspot.

In addition to ROV dives focused on the geology and biology, the project may also include limited deep-sea surveys on submerged archaeological sites associated with the Battle of Midway. Should such underwater cultural sites be explored via ROV, the team will adhere to OET's policies for documenting archaeological sites, which include (but are not limited to):

- Submerged cultural heritage sites will not be explored without explicit and communicated intent, and permission to do so from all relevant permitting agencies. This will include coordination with archaeologists from NOAA and the Naval History and Heritage Command who can participate in the expedition through telepresence.
- Coordinates of submerged cultural sites will not be broadcast over any of the channels that can be accessed by scientists ashore or the public.
- Under no circumstances will submerged cultural materials be touched or recovered.
- The ROVs will not be piloted directly over the site to avoid accidentally setting down on the site, getting the vehicle snagged on part of the site, and to avoid disturbance by down thrust.
- In the event human remains are sighted, all live video and audio feeds going to shore will be ceased. YouTube live streams will also be temporarily deactivated to prevent rewind capabilities and confirm that affected dives are not publicly published.
- Data from cultural heritage sites will be given to the Monument. Further distribution and use of the data will be subject to all constraints outlined by the permits required to conduct the work.

In addition to ROV dives, the expedition will include mapping operations using the hull-mounted acoustic sonars of E/V *Nautilus* (i.e., Kongsberg EM302 multibeam, Knudsen 3260 sub-bottom profiler, and Simrad EC150-3C acoustic Doppler current profiler and echosounder). Mapping operations will target previously unmapped areas of the Monument, particularly around seamounts and areas suspected to contain underwater cultural heritage sites associated with the Battle of Midway.

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

Due to its natural and cultural significance, the Northwestern Hawaiian Islands and surrounding waters have undergone a long history of science, conservation, and resource management. Despite historic efforts, a large portion of the Monument remains unexplored, particularly in the Monument expansion zone, hindering efforts to effectively manage its unique resources. The expedition will be planned and executed to fill knowledge gaps in support of science priorities of the Monument and its partner agencies. Expedition operations will be conducted in previously unsurveyed Monument areas, thus contributing directly to the priorities identified in the PMNM Management Plan, PMNM Natural Resources Science Plan, PMNM Maritime Heritage Research, Education and Management Plan, National Strategy for Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone (NOMEZ), Seabed 2030, and the UN Decade of Ocean Science for Sustainable Development. Expedition activities will also be designed to advance NOAA mission priorities, particularly in terms of understanding ocean changes, sharing that knowledge with others, and conserving marine ecosystems. Data and samples collected on this mission will be deposited in publicly-available repositories, therefore providing the essential precursor needed to enable follow-on science, exploration, and management activities.

In addition to the science objectives, this mission will have a large focus on education and outreach activities, thereby addressing the Monument's mission of bringing the place to the people. Building on ongoing collaborations, OET will continue to work closely with NOAA, US Fish and Wildlife Service, State of Hawai'i, Office of Hawaiian Affairs, and educators from the region to co-develop meaningful, culturally-relevant outreach and education experiences, particularly those targeting schools and communities throughout Hawai'i and across the Pacific Islands Region. This will include working closely with Native Hawaiian language practitioners to develop an expedition name reflecting Hawaiian relationships with mission themes, as well as incorporating Hawaiian cultural values and worldview into the implementation of the expedition.

Specific outreach products will include the development of media centered on the excitement of discovery and the science objectives of the expedition; website resources (blogs and photo albums) targeting the general public and K-12 learners; live ship-to-shore broadcasts with schools and communities worldwide hosted in 'Ōlelo Hawai'i and English; press opportunities; and promoting expedition content via OET's social media accounts (i.e., [Twitter](#), [Instagram](#), [Facebook](#), [YouTube](#), [LinkedIn](#), and [TikTok](#)). The expedition will also involve participants from [OET's Science & Engineering Internship Program](#) and [Science Communication Fellowship](#), which provide paid professional workforce training for students and educators. Finally, OET will work closely with PMNM to involve permit monitors and community cultural liaisons in outreach planning and onboard E/V *Nautilus*.

Other information or background:

The Ocean Exploration Trust is a non-profit organization established in 2007 with the aim of exploring the ocean, seeking out new discoveries while pushing the boundaries of technological innovation, education, and outreach. Expeditions center on scientific exploration of the seafloor, collaborating with the broader research community to identify priority regions and phenomena, and sharing results publicly via telepresence technology to inspire the next generation of ocean

explorers, scientists, and stewards. Since its establishment, OET's missions have been closely guided by the 2000 President Panel for Ocean Exploration, the US Ocean Exploration Program, as well as science priorities of NOAA and other government agencies.

To date, OET has led over 145 multi-disciplinary expeditions for a total of 1,748 days at sea aboard E/V *Nautilus* that explored deep-sea habitats throughout the Pacific, Caribbean, Atlantic Mediterranean, and Black Sea. These scientific expeditions included a total of 930 successful ROV dives that explored deep ocean habitats for close to 105,000 hours, as well as acquired high-resolution mapping data across over 870,000 square kilometers of seafloor. Results of these exploratory expeditions have been summarized in over 200 peer-reviewed scientific publications to date, covering a wide range of scientific disciplines, including deep-sea geology, biology, archaeology, chemistry, and the social sciences.

The 2023 expedition to the Monument will be funded by NOAA Ocean Exploration via the Ocean Exploration Cooperative Institute. This consortium of oceanographic institutions includes OET, University of Rhode Island, University of New Hampshire, Woods Hole Oceanographic Institution, and University of Southern Mississippi, which work together to advance the core priorities of NOAA Ocean Exploration. Specifically, the Ocean Exploration Cooperative Institute aims to explore unknown areas within the US exclusive economic zone, integrate emerging technologies into exploration operations, and expand opportunities for the next generation of ocean explorers.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Wagner, Daniel

Title: Chief Scientist

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

- Dr. Val Finlayson (University of Maryland)
- Dr. Michael Brennan (Search Inc.)

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

Ocean Exploration Trust

[REDACTED]

Phone: [REDACTED] (Daniel Wagner)

Fax: N/A

Email: [REDACTED]

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

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

- Ocean Exploration Trust
- University of Maryland (affiliation of onboard geology science lead, Dr. Val Finlayson)
- Search Inc. (affiliation of onboard archaeology science lead, Dr. Michael Brennan)
- NOAA Ocean Exploration and Ocean Exploration Cooperative Institute (expedition sponsor)

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):

No.	Name	Role on expedition	Affiliation
1	Daniel Wagner	Expedition Leader	Ocean Exploration Trust
2	Megan Cook	Expedition Co-Leader / Communication Lead	Ocean Exploration Trust
3	Michael Brennan	Archaeology Lead	Search Inc.
4	Val Finlayson	Geology Lead	University of Maryland
5-8	TBD	Supporting Scientists	TBD
9	Taylorann Smith	Science Manager	California State University Northridge
10	Kukui Lily Gavagan	Science Manager Support	University of Hawai'i at Hilo
11	TBD	Science Intern	TBD
12	Samantha Wishnak	Navigator	Ocean Exploration Trust
13	Meagan Putts	Navigator	University of Hawai'i at Mānoa
14	Sulaiman A'Sibani	Navigator	Ocean Exploration Trust
15	Renato Kane	Mapping Coordinator	Ocean Exploration Trust
16-21	TBD	ROV Pilots	Ocean Dynamics Inc/Ocean Exploration Trust
22-24	TBD	Video Engineers	Ocean Exploration Trust
25	TBD	Deck Chief	Ocean Exploration Trust
26	Tim Burbank	Data Engineer	Ocean Exploration Trust
27-29	TBD	Science Communication Fellows	TBD
31-32	TBD	Permit Monitor	PMNM (TBD)
33	Pavel Chubar	Captain	Marine Management
34-50	TBD	Crew	Marine Management

Section B: Project Information

5a. Project location(s):

Ocean Based

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

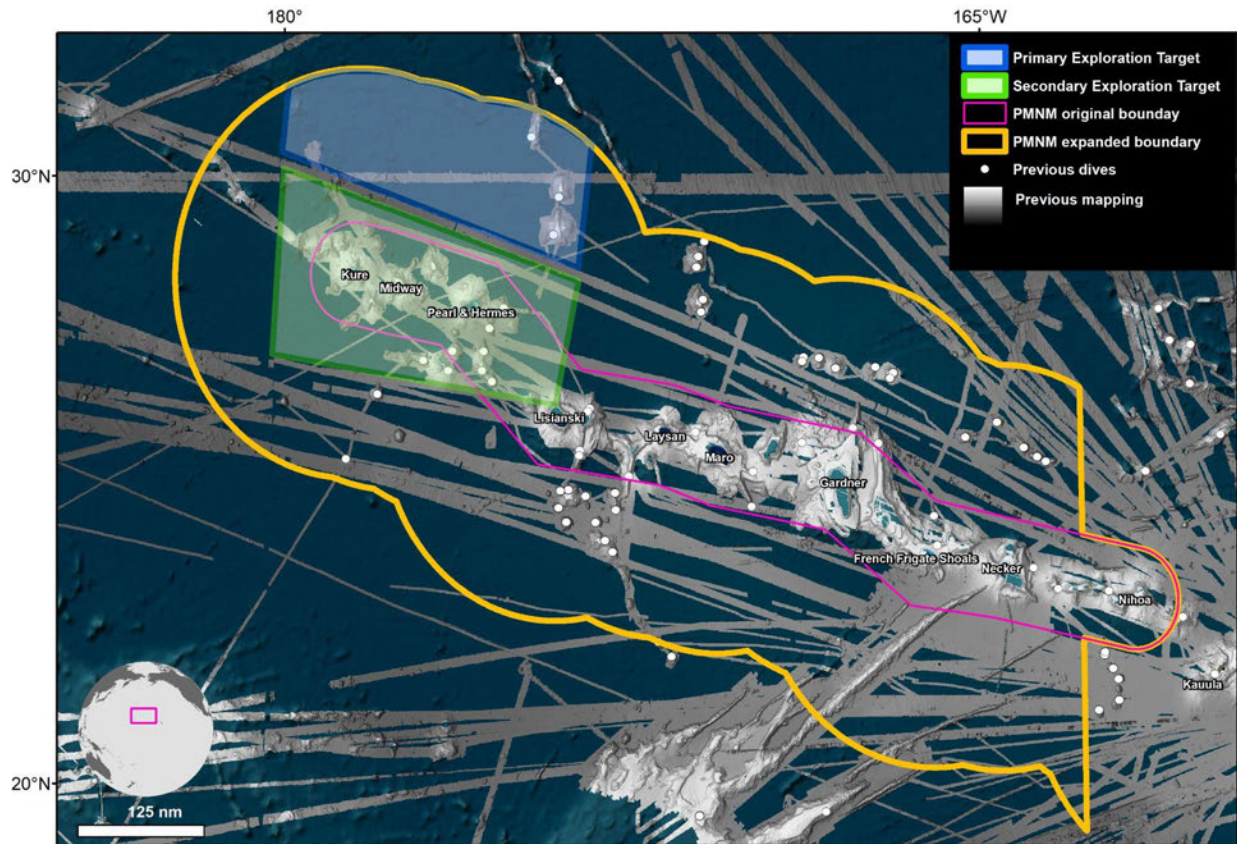
NOTE: Shallow water is defined by water less than 100 meters in depth.

Remaining ashore on any island or atoll (with the exception of Sand Island,at Midway Atoll 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:

The primary focus of the expedition will be to map and explore previously unsurveyed seafloor in the expansion zone of the Monument between Lili‘uokalani Ridge and the northwestern Monument boundary (see map below). However, should weather conditions be unfavorable in this area during the expedition, unexplored areas in deep-waters (>200 meters) located offshore Kure, Midway, Pearl & Hermes, Lisianski, and Laysan may also be explored as a secondary alternative. Should this be the case, all explorations will occur outside state waters far away from any emergent land features around Kure, Midway, Pearl & Hermes, Lisianski, and Laysan.



Map showing the location of the exploration targets for the 2023 expedition to PMNM aboard E/V Nautilus overlaid onto areas that have previously been mapped (gray areas) and explored via ROV (white dots). The primary focus (blue polygon) will be to explore deep seafloor located in the expansion zone of the Monument between Lili'uokalani Ridge and the northwestern Monument boundary. This area includes several previously unexplored seamounts of biological and geological significance, as well as several shipwrecks associated with the Battle of Midway. Note that a secondary exploration target (green polygon) will only be surveyed in case weather conditions prevent operations in the primary area. Should this be the case, operations will occur outside state waters and far away from emergent land features.

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:*

In 2016, PMNM was expanded to cover over 1,5 million square kilometers, making it the largest marine protected area in the world at the time, and to this day still the largest in the United States. While historic expeditions by the Hawai‘i Undersea Research Laboratory, R/V *Falkor*, NOAA Ship *Okeanos Explorer*, E/V *Nautilus* and other programs have increased our baseline knowledge of the deep-water resources of PMNM, large areas remain completely unexplored, particularly throughout the PMNM expansion zone. Further exploration in these areas are urgently needed to address management and science needs of the region, including a better understanding of the deep-water natural and cultural resources of PMNM, biogeographic patterns of species distributions, and the geological context of the region.

We propose a 29-day expedition that will start and end in Honolulu, and utilize the deep-water mapping and ROV survey capabilities of E/V *Nautilus*. The objectives of this expedition will be to:

- Acquire data to support management and science needs of PMNM and its partners, particularly in areas within the 2016 expanded Monument boundary
- Acquire high-resolution seafloor mapping data in areas with no or low-quality data, as well as to support ROV operations
- Map, survey, and sample the diversity and distribution of deep-sea benthic communities, particularly those found within deep-sea coral and sponge habitats, fish habitats, and other vulnerable marine habitats with high conservation value
- Map, survey, and sample geologic features to better understand the geological structure, age and volcanic history of formations within the region, particularly to determine which seamounts are cretaceous and which formed over the Hawaiian Hotspot
- Map and survey potential shipwreck sites associated with the Battle of Midway
- Engage a broad spectrum of the scientific community and public in telepresence-based exploration
- Provide a foundation of publicly-accessible data to spur further exploration, research, and management activities

Detailed science and exploration plans for each ROV survey will be prepared with input from the broader ocean exploration community. To this end, OET released a [call for community science input](#) in December 2023. Information received through this call will be used to refine ROV dive plans so that surveys address priority needs of the broader scientific community. This may include ROV dives to document submerged archaeological sites associated with the Battle of

Midway. Archaeological characterization will involve a comprehensive video survey of each wreck site, including zoomed-in views of objects for measurements. Comprehensive video surveys will allow for post-processing creation of 3-dimensional models that will provide further details to the on-site observations. All of this data will provide a characterization of the wreck sites' dimensions, physical structure, artifacts, and site formation processes in a quantitative means that can allow for comparison with other deep-water World War II wrecks. Surveyed wrecks will be compared to previously documented aircraft carrier wrecks, including USS Independence off San Francisco, USS Lexington in the Coral Sea, and USS Yorktown off Midway.

Throughout the planning and execution of the expedition, OET will work closely with PMNM, US Fish and Wildlife Service, NOAA's Pacific Island Regional Office, NOAA's Pacific Islands Fisheries Science Center, NOAA Ocean Exploration, Hawai'i Division of Aquatic Resources, Office of Hawaiian Affairs, Naval History and Heritage Command, and other partners to ensure that expedition activities address management and science priorities of the Monument. Data and samples collected during the expedition will be deposited in publicly-available repositories, and thereby provide a rich foundation to enable follow-on exploration, research and management activities. In addition to the science objectives, the expedition will include a large focus on education and outreach activities, particularly those targeting communities throughout Hawai'i designed to bring the place to the people.

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species beyond the protocols provided in PMNM Best Management Practices (<https://www.papahanaumokuakea.gov/permit/bestmanagement.html>)? Yes No

If so, please list the species you specifically intend to target.

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?

OET has a long and successful track record of conducting research in sensitive marine habitats, including six successful expeditions to PMNM since 2018. Protocols of our ROV and mapping operations are designed specifically to minimize potential impacts to fragile natural and cultural resources. Given the relatively short durations of our operations, we expect that these will have no significant effect on the cultural and natural resources or ecological integrity of the Monument.

All personnel of this expedition will adhere to the best management practices developed by NOAA Ocean Exploration, which are outlined in the [programmatic concurrence letter for all activities funded by the program](#). In brief, these practices include, but are not limited to:

- When ESA-listed marine species are sighted, the vessel shall take action as necessary to avoid violating the relevant separation distances
- Clean hull regularly to remove aquatic nuisance species
- We do not touch or disturb any historic sites that may be encountered. If historic sites are encountered, these will be documented and all information will be passed on to the Monument.
- ROVs will be operated in a manner to avoid seafloor disturbance; setting the ROV on the seafloor will be held to a minimum. For those situations when the ROV does make contact with the seafloor, we will first confirm that the area where the ROV is set down does not include fragile animals that can reasonably be avoided
- The ship and ROVs will use cameras and detection devices to avoid possible interactions with animals. This includes when operating all sonar sound sources.
- Biological sample collections will be limited to new species, new records, the dominant morphotype animal in a community, or other specimens with a high potential to lead to scientific discoveries. Whenever possible, sample collections will be made using the cutting implementation tool on the ROV, and only portions of organisms will be collected to avoid mortality
- Whenever possible, rock samples will be selected in a way to minimize disturbance to the surrounding environment and to minimize the incidental take of attached organisms
- Whenever possible, ROV dives will not deploy steel ballast. Our ROVs are designed to be able to conduct deep-water surveys without the use of steel ballast. Steel ballast will only be deployed in very limited cases where collected rock samples exceed 25 pounds. In such limited cases, steel ballast plates that weigh 20 pounds in air and measure 12x9x0.5 inches will be carefully jettisoned to minimize any disturbance or damage to sensitive areas.
- After each ROV use, the vehicles will be thoroughly sprayed with freshwater and allowed to air dry before the next dive. Though marine organisms should not survive this process, the ROV is thoroughly inspected prior to every dive and checked for the presence of biological organisms to prevent the spread of non-endemic species from one location to another.
- Instruments deployed to collect water samples and current data (except for expendable instruments) will not be allowed to contact the seafloor
- The use of detergents that may be washed from the ship or vehicles into the marine environment will be avoided
- Except in an emergency, the vessel will not anchor while at sea

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?

We are well aware of the extraordinary natural and cultural significance of the Monument. As a sacred place to many, we are committed to tread lightly and leave no footprint. We also realize that conducting research in PMNM is a great privilege, and are therefore committed to ensure that our expedition activities directly support PMNM science and management priorities. All of the information gathered through this project will be provided directly to PMNM resource managers before, during, and after the expedition.

Only limited and selective specimens will be collected, and these will target samples that have the potential to contribute to significant scientific discoveries. Given the minor and short-term durations of potential impact, we expect ROV operations will have no significant effect on cultural and natural resources or the ecological integrity of the Monument. We believe this proposed activity is consistent with the spirit of Proclamations 8031 and 9478, and specifically with Finding 1.b. Additionally, this project will facilitate the Monument's effort to bring the place to the people, rather than the people to the place through telepresence and other outreach efforts that will share information from the expedition with broad audiences in real-time. We have actively collaborated with PMNM staff to raise awareness about the cultural and natural significance of the Monument and will continue doing so throughout the planning and execution of this expedition. We will also continue working closely with the PMNM Cultural Working Group to identify ways to incorporate Hawaiian language, values, and worldview into expedition activities. Outreach will occur through live broadcasts on NautilusLive.org and in live interactions from the ship to classrooms, visitor's centers, and other public forums.

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 activities proposed here are specifically aimed at increasing our understanding of previously unexplored deep seafloor habitats within the Monument. As such, there is no alternative to conducting the activity inside the Monument. The seafloor mapping and ROV characterizations proposed by this project will provide essential baseline information on the location, extent and status of deep-water resources within the Monument.

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

The information gathered through this project will directly contribute to a better understanding of deep-water habitats, ecosystems, and cultural resources of the Monument, core objectives outlined in the PMNM Management Plan. Videos, photos, maps, and environmental data collected through this project will all be given to PMNM to enable better management of the Monument's unique resources. Based on similar missions we previously conducted in PMNM

and other sensitive marine areas, we do not anticipate any significant impacts to the cultural, natural, or historic resources of the Monument. No shore access is required and if project gear touches the seafloor, it will be minimal and for a short duration. In our opinion, the end value of this activity far outweighs any potential impacts, thus meeting the criteria noted under Finding 1.d. in Proclamation 8031.

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

This 29-day expedition will start and end in Honolulu. Given that transits towards the northwestern extent of our exploration target are 5 days each, we expect to have ~19 days on site. Weather permitting, we hope to map and characterize a portion of ~10 seamounts.

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

OET has a long and successful track record of conducting scientific exploration of the deep sea. Since its establishment in 2007, OET has led over 145 multi-disciplinary expeditions for a total of 1,748 days at sea aboard E/V *Nautilus* that included over 930 successful ROV dives and mapped over 870,000 square kilometers of seafloor. Many of these explorations were conducted in sensitive marine habitats, such as those harbored within PMNM. In the last three years alone, we conducted 20 expeditions that explored and characterized ten existing or proposed National Marine Sanctuaries, including six expeditions to the Papahānaumokuākea Marine National Monument (and Proposed National Marine Sanctuary), as well as many others that explored the Hawaiian Islands Humpback Whale National Marine Sanctuary, National Marine Sanctuary of American Samoa, Olympic Coast National Marine Sanctuary, Greater Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary, Monterey Bay National Marine Sanctuary, Channel Islands National Marine Sanctuary, Thunder Bay National Marine Sanctuary, and Proposed Chumash Heritage National Marine Sanctuary.

We work with a highly-trained team on all of our expeditions, and involve management partners in the planning and execution of our missions. Among those involved with planning the 2023 expedition to PMNM are:

- Dr. Christopher Kelley (University of Hawaii and Hawaii Undersea Research Laboratory - retired) led numerous deep-sea expeditions to PMNM
- Dr. Randall Kosaki (NOAA ONMS), PMNM Research Coordinator has also led numerous expeditions to PMNM
- Dr. Michael Brennan (Search Inc.) has close to 20 years of experience leading surveys of submerged archaeological sites, as well as in other fragile deep-sea environments
- Dr. Val Finlayson (University of Maryland) was the geology lead during the 2022 ROV expedition to PMNM aboard E/V *Nautilus*
- Joshua Chernov (OET) has decades of experience safely maintaining and operating ROVs, many of which have been in areas of cultural and natural significance.
- Dr. Daniel Wagner (OET) led numerous expeditions to PMNM and other remote ocean conservation areas.

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.

The expedition is fully funded by NOAA Ocean Exploration via the Ocean Exploration Cooperative Institute. The ship and operators are fully insured.

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.

Multibeam mapping is the best technique for creating high-resolution seafloor maps at depths greater than 50 meters. The E/V *Nautilus* multibeam system is capable of producing high-resolution maps at depths ranging between 200-7,000 meters. The sub-bottom profiler will simultaneously gather data to help geologists interpret the geology found up to 80 meters below the seafloor surface. ROVs are the best method to collect high-resolution video and environmental data, as well as collect samples in a targeted manner that minimizes impacts to the marine environment.

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

E/V *Nautilus* is equipped with VMS equipment and has previously used it within PMNM.

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

To the best of our knowledge, there are no other factors that would make the issuance of a research permit inappropriate.

8. Procedures/Methods:

Seafloor mapping will be conducted in transit between ROV sites and to fill gaps in seafloor bathymetry prior to ROV dives. In general, we will conduct 12-24 hour dives and then about 6-12 hours of mapping between ROV dives. However, we will be staffed to operate 24/7 for both ROV and mapping operations, and will make the most productive use of the time to fill the large mapping and exploration gaps across the area of operations.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding.

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:

Rock, sediment, water, invertebrate, coral, sponge, worm, arthropod, echinoderm, mollusk, jelly, bryozoan, tunicate, shrimp, microbes

Scientific name:

N/A (we will primarily target organisms that have not yet been named)

& size of specimens:

We request permission to collect a maximum of 15 rock samples, 5 sediment push cores, 15 biological samples, and 6 water samples per ROV dive. Sample collections will be performed in a way that minimizes potential impacts on the environment. This will include:

- Whenever possible only small parts of organisms will be taken. A whole sample of a species will only be collected if it is potentially new to science and there are at least 5 individuals of the species in the area.
- Care will be taken to not displace or collect rare species with dead colony samples
- Specimens of any kind will not be taken in an area where populations are so low that collection will have a detrimental impact
- Geological samples will have minimal encrusting organisms attached
- Rock samples will typically be softball to grapefruit in size
- Water samples will consist of 5 L samples

Collection location:

Specimens will be collected during ROV dives, which will primarily be conducted on deep seamounts towards the northwestern boundary of the Monument (see map above).

X Whole Organism X Partial Organism

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

Following the expedition, biological and geological specimens will be shipped to repositories for curation, as well as to make these available to qualified researchers from around the world.

Geological samples will be archived in the Marine Geological Samples Lab at the University of Rhode Island's Graduate School of Oceanography, whereas biological samples will be archived at Harvard University's Museum of Comparative Zoology. eDNA samples will be shipped to the Molecular-Genetics Lab at the NOAA NWFSC for processing by Meredith Everett. Once eDNA samples are processed, genetic data will be made publicly available via the National Center for Biotechnology Information Sequence Read Archive (NCBI SRA).

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

• General site/location for collections:

Specimens will be collected during ROV dives, which will primarily be conducted on deep seamounts towards the northwestern boundary of the Monument (see map above).

- 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?
N/A
- Will organisms be released?
No

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

Specimens will be transported aboard E/V *Nautilus* to Honolulu, where lead scientists will take sub-samples for participating researchers. The remainder will be shipped to the repositories listed above from Honolulu for curation.

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

As shown in the map above there have been no deep submergence dives in the primary area of operations, except limited dives conducted by E/V *Nautilus* in 2022. E/V *Nautilus* will map areas complementary to mapping accomplished during previous expeditions (also see map above).

E/V *Nautilus* has an open data policy and OET will work with partners to ensure the data and samples are archived in publicly-available repositories following the expedition. Non-video digital data, including ROV navigation data, ship navigation data, seafloor mapping data, and environmental data from ship-based sensors (i.e., CTD, oxygen, air temperature, sea surface temperature) will be submitted to the [Rolling Deck to Repository \(R2R\)](#). Additionally, non-video digital data collected during ROV dives (i.e., dive reports, sample reports, photos, navigation data, and environmental data) will be submitted to the [Marine Geoscience Data System \(MGDS\)](#). In addition to making data publicly available, R2R and MGDS also provide a gateway through which data is cataloged in [NOAA's National Centers for Environmental Information \(NCEI\)](#).

As in recent E/V *Nautilus* expeditions, full ROV dive videos will be uploaded to the [Nautilus Live YouTube Channel](#). Furthermore, OET will continue its ongoing collaborations through the NOAA Ocean Exploration Cooperative Institute to develop a submittal pipeline into the NCEI video portal, which is expected to be ready by the time this project would occur. Consequently, all video and digital data collected by this project will be made publicly available via NCEI and other repositories.

Following the expedition, collected biological and geological specimens will be shipped to repositories for curation, as well as to make these available to qualified researchers from around the world. Geological samples will be archived in the [Marine Geological Samples Lab at the University of Rhode Island's Graduate School of Oceanography](#), whereas biological samples will be archived at [Harvard University's Museum of Comparative Zoology](#). These repositories have

the resources to archive samples and make them available to qualified researchers from around world.

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

- Kongsberg EM302 multibeam echosounder and sound velocity profiler
- Underway CTD
- Knudsen Chirp 3260 Sub-bottom profiler
- Simrad EC150-3C acoustic Doppler current profiler and echosounder
- *Hercules*, *Argus* and *Little Hercules* remotely operated vehicles (ROVs)
- Norbit multibeam echosounder (ROV-based) Sonardyne Ranger2

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

Most of the biological samples will be stored in ethanol in the wet lab aboard E/V *Nautilus*. A few specimens may also be preserved in 10% formalin for histological analysis. Small pieces of corals and sponges may also be placed in bleach for onboard microscopic examination of sclerites and spicules. Marine safety data sheets of these chemicals are attached to this permit application.

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

None.

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

As is standard practice on E/V *Nautilus* expeditions, collected data and samples will be submitted to publicly-available repositories within 60 days of the completion of the project. Non-video digital data, including ROV navigation data, ship navigation data, seafloor mapping data, and environmental data from ship-based sensors (i.e., CTD, oxygen, air temperature, sea surface temperature) will be submitted to the [Rolling Deck to Repository \(R2R\)](#). Additionally, non-video digital data collected during ROV dives (i.e., dive reports, sample reports, photos, navigation data, and environmental data) will be submitted to the [Marine Geoscience Data System \(MGDS\)](#). In addition to making data publicly available, R2R and MGDS also provide a gateway through which data is cataloged in [NOAA's National Centers for Environmental Information \(NCEI\)](#).

As in recent E/V *Nautilus* expeditions, full ROV dive videos will be uploaded to the [Nautilus Live YouTube Channel](#). Furthermore, OET will continue its ongoing collaborations through the NOAA Ocean Exploration Cooperative Institute to develop a submittal pipeline into the NCEI video portal, which is expected to be ready by the time this project would occur.

Following the expedition, collected biological and geological specimens will be shipped to repositories for permanent curation, as well as to make these available to qualified researchers from around the world. Geological samples will be archived in the [Marine Geological Samples Lab at the University of Rhode Island's Graduate School of Oceanography](#), whereas biological samples will be archived at [Harvard University's Museum of Comparative Zoology](#).

An expedition summary that highlights the main findings of the expedition and how to access expedition data will be published within two weeks of the end of the expedition on the NautilusLive.org website. A more detailed summary will be published in an annual supplement to the Oceanography Society magazine which is anticipated to be released in March 2024.

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

Sherwood AR, Cabrera FC, Kalaiwaa GV, Fumo JT, Spalding HL, Kosaki RK, Wagner D & Paiano MO (2022). A new species of *Gibsmithia* (Dumontiaceae, Rhodophyta) from mesophotic depths of the Papahānaumokuākea Marine National Monument, Hawai'i, USA. *Phycologia* 61(5): 558-569.

Molodtsova, Opresko DM & Wagner D (2022). Description of a new and widely distributed species of *Bathypathes* (Cnidaria: Anthozoa: Antipatharia: Schizopathidae) previously misidentified as *Bathypathes alternata* Brook, 1889. *PeerJ* 10: e12638.

Stefanoudis PV, Talma S, Fassbender N, Swanborn D, Ochieng CN, Mearns K, Komakoma JD, Otwoma LM, Mbijne NE, Osuka KE, Samoilys M, Shah N, Samaai T, Trotsuk E, Tuda A, Zivane F, Wagner D & Woodall LC (2022). Stakeholder-derived recommendations and actions to support deep reef conservation in the Western Indian Ocean. *Conservation Letters*: e12924.

Delgado JP, Brennan ML, Rapu Haoa SA, Rapu Leong JH, Gaymer CF, Carabias D, Stokes E & Wagner D (2022). The hidden landscape: maritime cultural heritage of the Salas y Gómez and Nazca ridges with implications for conservation on the high seas. *Marine Policy* 136: 104877.

Georgian SE, Morgan & Wagner D (2021). The modeled distribution of distribution of corals and sponges surrounding the Salas y Gómez and Nazca ridges with implications for high seas conservation. *PeerJ* 9: e11972.

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Gress E, Opresko DM, Brugler MR, Wagner D, Eeckhaut & Terrana L (2020). Widest geographic distribution of a shallow and mesophotic antipatharian coral (Anthozoa: Hexacorallia): *Antipathes grandis* Verrill, 1928 – confirmed by morphometric and molecular analyses. *Marine Biodiversity Records* 13: 12.

Opresko DM & Wagner D (2020). Three new species of black corals (Cnidaria: Anthozoa: Antipatharia) from deep-sea seamounts and ridges in the North Pacific. *Zootaxa* 4868: 543-559.

Wagner D, Friedlander AF, Pyle RL, Brooks CM, Gjerde KM, Wilhelm AM (2020). Coral reefs of the high seas: hidden biodiversity hotspots in need of protection. *Frontiers Marine Science* 7: 567428.

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Austin JA, Demopoulos A, Wagner D, Delgado J, Hume C, Perry R, Potter J, Mayer L, Millar D, Raineault N, Vecchione M, Fisher G, Martinez C, Rissolo D & Thomas B (2020). Report on the workshop to identify national ocean exploration priorities in the Pacific. Consortium of Ocean Leadership and NOAA Office of Ocean Exploration and Research. 68 pp.

Howell KL, Davies JS, Allcock L, Braga-Henriques A, Buhl-Mortensen P, Carreiro-Silva M, Dominguez-Carrio C, Durden JM, Foster NL, Game CA, Hitchin B, Horton T, Hosking B, Jones DOB, Mah C, Marchais CL, Menot L, Morato T, Pearman TRR, Piechaud N, Ross RE, Ruhl HA, Saeedi H, Stefanoudis PV, Taranto GH, Thompson MB, Taylor JR, Tyler P, Vad J, Victorero L, Vieira RP, Woodall LC, Xavier JR & Wagner D (2019). A framework for the development of a global standardised marine taxon reference image database (SMarTaR-ID) to support image-based analyses. *PLoS ONE* 14(12): e0218904.

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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 1/10/2022
Date

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

NOAA/Inouye Regional Center
NOS/ONMS/PMNM/Attn: Permit Coordinator
1845 Wasp Blvd, Building 176
Honolulu, HI 96818
FAX: (808) 455-3093

DID YOU INCLUDE THESE?

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