

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic
Resources
Honolulu, Hawai'i 96813

March 10, 2023

Board of Land
and Natural Resources
Honolulu, Hawai'i

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National
Monument Native Hawaiian Practices Permit to Pelika Andrade, Nā Maka Onaona
(Formerly Nā Maka o Papahānaumokuākea) and the University of Hawai'i at Mānoa, for
Access to State Waters to use Traditional Ecological Knowledge to Conduct Intertidal
Surveys and Monitoring to Advise and Direct Management Strategies for Intertidal
Fisheries Activities

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahānaumokuākea Marine National Monument Native Hawaiian practices permit to Pelika Andrade, Nā Maka Onaona (Formerly Nā Maka o Papahānaumokuākea) and the University of Hawai'i at Mānoa, pursuant to §187 A-6, Hawai'i Revised Statutes (HRS), Chapter 13-60.5, Hawai'i Administrative Rules (HAR), and all other applicable laws and regulations.

The Native Hawaiian practices permit, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument, including the Northwestern Hawaiian Island (NWHI) State Marine Refuge and the waters (0-3 nautical miles) surrounding the following sites:

- Nihoa

The activities covered under this permit would be authorized to occur between April 2023 and March 2024.

INTENDED ACTIVITIES

The applicant, Pelika Andrade of Nā Maka Onaona (Formerly Nā Maka o Papahānaumokuākea) and the University of Hawai'i at Mānoa, is proposing to support sustainable fisheries and aina momona through continuing intertidal surveys and monitoring to advise and direct management strategies which support intertidal fishery productivity, specifically 'ōpihi. The researcher will be accessing the monument via a USFWS expedition of which the primary goal is to conduct terrestrial surveying and controlling of terrestrial

invasive species and terrestrial native species monitoring; therefore the researcher will be conducting the intertidal research opportunistically, when resources and time become available during the trip.

Land-Based Activities

Terrestrial activities conducted will consist of surveying and controlling terrestrial invasive species and terrestrial native species monitoring. The terrestrial invasive species control would focus primarily on *Cenchrus echinatus* and the terrestrial native species monitoring would involve the use of remote cameras and recording phenology and abundance of seabirds, shorebirds, invertebrates, and native plants. These land-based activities will be under USFWS direction and authorized under the Co-Trustee permit (PMNM 2023-001).

Intertidal Activities

The intertidal activities would be part of ongoing monitoring from across the archipelago that is used to advise and direct management strategies which support intertidal fishery productivity, specifically 'ōpihi. This research is a natural continuation of previous intertidal ecosystem studies, surveys and monitoring (with a variation on previous research questions), that have been conducted by the co-researcher working on the project, Kim Kanoe'ulalani Morishige, and many other researchers affiliated with similar expeditions in the past eleven (11) years.

Huli'ia

The applicant and permitted personnel will utilize traditional observational practices through the Huli'ia process while additionally recording atmospheric, land, and ocean observations. substrate type, limu presence/density, crustose/turf/macro algae proportions, other species ratios, clumping of 'ōpihi and hā'uke'uke, presence of natural predators, other intertidal species, and other intertidal information. Additional sampling of gonads for 'ōpihi (*Cellana exarata*, *C. sandwicensis*) and hā'uke'uke (*Colobocentrotus atratus*) will be done to determine fecundity-at-size. Shells will also be saved for analysis of growth rates.

Subsistence/Sustenance Fishing

The applicant is also requesting to consume intertidal resources, collect limu for consumption, and to subsist and sustenance fish by trolling using handlines and/or other hook and trolling equipment to further support the cultural practice and relationship between participants and Papahānaumokuākea. Vessel operations will be authorized under the Co-Trustee permit (PMNM 2023-001).

These studies will add onto the eleven (11) years of data on intertidal species, re-establishing Native Hawaiian ancestral consciousness and awareness about the health and condition of marine resources. Note: 'Ōpihi are the only species that are collected for biological sampling; the other species are for consumption only. However, when harvesting the other species the researcher and assistants, take note of reproductive states and other observations, which are included in Huli'ia. For this year, there were only two (2) species that were increased in terms of sample size, Aama and Pipipi, whose numbers have been observed to be abundant and are species that each team member does eat (historically). In addition the project decreased their Leho request. Collections list for individual species below:

Collections List

of individuals & size of specimens:

1. 'A'ama (Thin-shelled rock crab, *Grapsus tenuicrustatus*):
 - a. Up to 30 per island/location per access
 - b. 3 inches or larger
2. Makaloa (Spotted drupe, *Drupa ricina*)
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
3. Pipipi (Black Nerite, *Nerita picea*)
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
4. Pūpū 'Awa (Open Drupe, *Thais aperta* (formally *Purpura aperta*))
 - a. Up to 30 per island/location, per access
 - b. ½ inch or larger
5. Hā'uke'uke (Helmet urchin, *Colobocentrotus atratus*)
 - a. Up to 30 per island/location per access
 - b. 2 inches or larger
6. Makaiauli (Black-Foot 'Opihi, *Cellana exarata*)
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
7. 'Ālinalina (Yellow-Foot 'Opihi, *Cellana sandwicensis*)
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
8. He'e Maui / He'e Pali (Day Octopus / Cliff Octopus, *Octopus cyanea/Octopus oliveri*)
 - a. Up to 2 individuals per island/location per access
 - b. 1 lb or heavier, per State regulations
9. Leho Ahi (Humpback Cowry, *Cypraea mauritiana*)
 - a. Up to 6 per island/location per access
 - b. 2 inches or larger
10. Pūpū – (Intermediate Drupe, *Thais intermedia*)
 - a. Up to 24 per island/location per access
 - b. 1 inch or larger
11. Limu Kohu
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
12. Pālahalaha
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
13. Līpe'epe'e
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
14. Ahi, mahimahi, ono, nenu, aku
 - a. Up to 10 individuals across the five species listed

Notes on Fishing: Researcher and assistants will fish in transit for pelagic fish or near-to-shore for nearshore fish (Nenu). The researcher and assistants usually pull lines as they get closer to land because of birds hunting and as a preventative measure in case they encounter other species foraging close to the islands. Nenu is the only fish the project will harvest close to land using either spear or hand techniques. Target sizes when fishing: When utilizing line fishing for

pelagic fish is difficult to target size but if an individual is too large or too small, it will be released if chances of survival are good. Nenu are caught with more selection capability so a medium size is usually the desired target size.

To safeguard Monument resources, the applicant will harvest from various places along the shoreline to be mindful of harvest pressure in one location. The applicant has also attended and completed the 2019 Resource Monitor Training and has ample experience at the locations proposed over multiple trips. Applicant would additionally abide by the following PMNM Best Management Practices (BMPs) while conducting the aforementioned activities within the PMNM: Best Management Practices for Boat Operations and Diving Activities (BMP #004); General Storage and Transport Protocols for Collected Samples (BMP #006); Marine Wildlife Viewing Guidelines (BMP #010); and Disease and Introduced Species Prevention Protocol for Permitted Activities in the Marine Environment (BMP #011), in addition to any other BMPs that apply.

The applicant's proposed activities directly support the Marine Conservation Science (MCS) Monument Management Plan Action Plan activities:

MCS-1.1: Continue to characterize types and spatial distributions of shallow-water marine habitats to inform protection and management efforts.

MCS-1.2: Continue monitoring of shallow-water coral reef ecosystems to protect ecological integrity.

NHCH 2.3: Facilitate cultural field research and cultural education opportunities annually;

NHCH 2.6: Continue to facilitate Native Hawaiian cultural access.

The activities described above may require the following regulated activities to occur in State waters:

- ☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
- ☒ Anchoring a vessel
- ☒ 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

The central purpose of the expedition is to expand and advance traditional Native Hawaiian knowledge in the field of marine conservation and management and continue to bridge the gap between cultural and western research methodologies. The primary objectives of the cultural

expedition are to:

- (1) collect environmental data related to traditional Native Hawaiian marine management;
- (2) expand the application of traditional Hawaiian environmental monitoring tools and methodologies;
- (3) increase the knowledge base pertaining to intertidal ecosystems, including ‘opihi /hā‘uke‘uke / limu abundance, health, and reproductive cycles; and
- (4) re-establishing and strengthening cultural ties through feeding and being fed by the environment (genealogy).

Project Background

Land-Based Activities

Participants will support and continue efforts by the U.S. Fish and Wildlife Service (USFWS) of native species monitoring and invasive species control on the island in accordance with USFWS protocols (authorized under the Co-Trustee permit (PMNM 2023-001)).

Intertidal Activities

The intertidal project is led by two experts: Pelika Andrade and Kim Kanoe‘ulalani Morishige. ONMS and permittees will provide survey and report data to USFWS as stipulated in the general conditions of this permit. Previous permitted intertidal monitoring efforts suggest the take activity is beneficial for the resource. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Bird, Na Maka Onaona, and the Intertidal Monitoring Partnership have noted changes over time. For example, the high density of recruits recorded in June 2010, did not all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m²), whereas in 2011, there were less 1.5-yearold ‘opihi (50 per m²) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html).

Similarly, researchers and participants have noted differences in population distribution, for example, in 2012, ‘opihi at Mokumanamana and Nihoa were recorded in the tens of thousands compared to the 3,000 found at La Perouse Pinnacles at FFS (http://www.papahanaumokuakea.gov/research/intertidal_cruise2013_return.html). No ‘opihi samples were or will be collected at La Perouse Pinnacles due to the low population size.

The proposed activity will support sustainable fisheries and aina momona through continuing intertidal surveys and monitoring across the archipelago to advise and direct management strategies to support the intertidal fishery focusing on Opihi/Limpet productivity. Over the past decade of collaborative intertidal monitoring, the locally led research team has identified significant shortcomings to the current research being conducted on Hawai‘i’s unique wave-dominated, rocky intertidal shoreline. For instance, prior data collection methods failed to measure environment – a key component to intertidal ecology and sustainable fisheries management. From recent findings, the researchers/team draw new hypotheses and a new survey method (PACC) that focus on the effects of seasonal changes in habitat on patterns of reproductive cycles, recruitment

and productivity of rocky intertidal communities. The work generated would be used to develop a sustainable fishery model for evaluating species productivity on any intertidal coastline in Hawai'i. As a model system for intertidal mollusc fisheries, the objectives are to assess the stock status for three species of limpet (*Cellana* spp.) in the Hawaiian Islands by: (1) describing and delineating their environment and habitat, (2) improving the understanding of the biology and ecology of *Cellana* spp., and (3) proposing sustainable harvest practices and management measures using an indicator-based approach.

Sustainable ecosystems and 'āina that are thriving and productive are fundamental in Native Hawaiian values and systems. Looking beyond the obvious Native Hawaiian practice of harvesting and gathering, there was a system in place that supported productive lands, oceans, and communities generationally. The proposed activities are supporting the Native Hawaiian practice of 'āina momona.

Since 2009, Na Maka Onaona has been a major partner in Hawaii's Intertidal Monitoring Partnership conducting research in PMNM. Over the past eleven years, the team has been conducting intertidal monitoring along Hawaii's wave-exposed shorelines to address community concerns on sustainable harvest of 'opihi (*Cellana* spp). Working with numerous schools and community organizations, the researchers/team have learned valuable lessons about both the productivity of the shorelines, and how this productivity aligns within the larger goals of thriving communities (Morishige et al. 2018). Through integrating institutional research, traditional knowledge systems, end-user (i.e. fisher) engagement, and outreach/education, the team has developed a unique research approach - made possible through the contributions of these multiple perspectives, considerations, and relationships. This journey provides the researchers/team the capacity to understand a space through the multiple lenses within a community and create a platform that is inclusive of various knowledge systems to address the needs of Hawaiian people, the environment, and a thriving relationship between the two entities. Building on recent research, the understanding of place changes by season and across multiple landscapes. The researchers/team have developed a modified survey to look at the role of different habitat types, and the influence of environment on the carrying capacity of the intertidal fishery. Based on a shared goal of a productive and sustainable fishery, the latest series of questions have led the researchers/team to identify management strategies that can maximize replenishment in these rocky intertidal ecosystems. The researchers/team believe the sharing of this journey is valuable and will encourage a more inclusive conversation to evolve management and conservation to truly support 'āina momona, abundant and productive communities of people and place.

The outputs of this project will be the identification of optimal habitat for a productive intertidal fishery, effective management strategies/tools, and support for stakeholder decision-making based on the sustainable opihi population density for respective shorelines-types. If the researchers/team can understand a shoreline's stable habitat (habitat size and population densities at its minimum normally during the seasonal dieback), the researchers/team can understand that shoreline's stable carrying capacity of 'opihi. This research in PMNM is part of an on-going initiative to survey multiple locations in the Main Hawaiian Islands to inform management techniques to sustainably harvest and rest populations that compliments cyclical productivity. Locations across the Hawaiian

Archipelago have been selected due to existing, long-term partnerships and/or areas of interest expressed by Native Hawaiian community members. The research team will train and work with local and Native Hawaiian communities to build local research capacity by surveying their intertidal ecosystems.

These activities will additionally strengthen cultural and spiritual connections to the Northwestern Hawaiian Islands and foster the expansion and perpetuation of Native Hawaiian ecological knowledge and research methodologies. This knowledge may be critical as it is observed by local Hawaii residents that ‘opihi and hā‘uke‘uke stocks are generally diminishing in size and number in the main Hawaiian Islands, therefore more data in this area may help to curb the decline. The continuation of ‘opihi data collection, and comprehensive intertidal surveys (including fishes, algae, and invertebrates) using Native Hawaiian ecological knowledge and methodologies coupled with western science will help to contribute to the overall health of Papahānaumokuākea.

Procedures/Methods:

Land-Based Activities

The procedure and methods for the land-based invasive species control and native species monitoring are conducted in accordance with USFWS protocols and authorized under the Co-Trustee permit (PMNM 2023-001).

Intertidal Activities

The cultural research team would make visual assessments of intertidal areas where ‘opihi and ha‘uke‘uke are located. The research team would record substrate type, limu type/density, crustose/turf/macro algae proportions, other species proportions/ratio, clumping of ‘opihi, hā‘uke‘uke, and other intertidal species, presence of natural predators, freshwater input, etc. The team would take wet/dry notes and use digital cameras to record observations (will remain within the BMO distance for any filming or photography of protected species). At the end of visiting each island, Na Maka Onaona will facilitate a Huli ‘ia discussion for the group to share observations. One person will be designated and write all the observations made by the group on one data sheet to facilitate the analysis process while observations are still fresh and can be clarified. To complete these activities, the crew would require access to nearshore areas (below the splash zone) that contain ‘opihi habitat (e.g. intertidal zone at Mokumanamana). Every participant will adhere to all Monument requirements while undertaking this project. Note: Opihi are the only organisms collected for biological reasons but when harvesting the others, the researchers and assistants do take note of reproductive states and other observations, which are included in Huli‘ia.

The researcher believes the following amounts per visit within the timeframe of this permit are appropriate: no more than four (4) individuals of each invert species, including ha‘uke‘uke and opihi, per person, two he‘e, and a total of one “mini snack-sized zip lock bag” approximately 100 grams of limu is appropriate to harvest per island. Harvesting will supplement meals and may consist of ‘opihi, hā‘uke‘uke, limu, ‘a‘ama, pipipi, makaloa, he‘e, and leho. ‘Opihi will be gathered by hand using an ‘opihi knife, and the researcher and assistants will be mindful to harvest

individuals that are larger than the legal-size limit of 1 ¼ inch as well as to leave larger ‘opihi alone as they are believed to be more fecund. The researcher and assistants will also harvest from various places along the shoreline to be mindful of harvest pressure on one rock. ‘Opihi are also able to reach reproductive maturity at approximately 7 months after settling onto the rocks (Kay & Magruder 1977), thus the researcher is confident that there will be larval recruitment the following year. When harvesting limu, proper practice of cutting/ pinching off the branches off and leaving the holdfast will be utilized to ensure continual growth after it is harvested. All other invertebrates will be gathered by hand. All inverts will be consumed raw, except leho and pipipi, which will be boiled then consumed. Limu will be “cured” and prepared to supplement meals. He‘e will be harvested by using a metal rod to attract the he‘e out of its house and then be gathered by hand. The researcher and assistants will not harvest he‘e that is under one pound, in accordance to the State of Hawai‘i fishing regulations. The he‘e will either be prepared by either drying or boiling before consumption. Near-shore spear fishing or catch by hand methods for reef fish. Hook, handline, and trolling methods will be used to sustainance fish while in State and Federal waters. Refer to attached table for list of species.

PACC Surveys

The researchers/team will conduct PACC surveys to examine ‘opihi densities by size classes and maximum sizes within each vertically stratified zone (black zone (basalt rock) and pink zone (crustose coralline algae zone)). The black zone is located on the upper extent of the shoreline defined as the Emergent Tidal Zone where black rock is exposed to the air depending on the tide and the pink zone is located lower on the shoreline in the Wave Zone (Bird et al. 2013). Rugosity measurements will be recorded for the black zone and pink zone to identify differences in ‘opihi carrying capacity by distinct habitat zones within the intertidal ecosystem. Tight measurements will also quantify the growth and shrinkage of the broader shoreline within each survey site to provide a practical measure of seasonal habitat threshold. PACC surveys will provide a total rugosity measurement for black and pink zones within the mixed (overlap of black and pink zones) rugosity zones. In order to increase the precision of ‘opihi habitat availability, PACC will also record differences in ‘opihi habitat and non-habitat to develop more precise estimates of ‘opihi densities.

PACC surveys aim to better understand how natural fluctuations occur even on remote shorelines with low human impact. This research will shed light on seasonal growth and die back of populations in relation to their habitat size and local physical environment. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Chris Bird and intertidal monitoring crews have noted changes over time. For example, there was a high density of recruits recorded in June 2010, however, they did not all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m²), whereas in 2011, there were less 1.5-year-old ‘opihi (50 per m²) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html). Although one year might seem like there are many recruited ‘opihi, the habitat and environmental conditions can limit their survival and influence successful recruitment into adult populations. This highlights the importance of considering the maximum and minimum thresholds of population densities by size

to identify stable carrying capacities.

PACC implements a mix of standardized and novel methodologies across boulder, bench, and sloped rocky substratum to: 1) examine the effect of swell exposure (Low, Medium, High) on habitat size; 2) develop a practical, routine method for determining opihi growth rates and age *in situ*; and 3) measure species fecundity and reproductive output in relation to major environmental drivers such as temperature. This project evaluates how environment, growth and age structure, and reproductive output affects total shellfish production on temporal and spatial scales; and re-establishes productive ecosystems as a fundamental strategy of traditional Hawaiian resource management.

‘Opihi Gonad Collection

The researchers/team will collect ‘opihī if populations are not too small, to dissect gonads and use histological methods that can provide fecundity estimates and reproductive state by sizes that have not been used for ‘opihī in PMNM in prior years. To determine fecundity-at-size, the researchers/team will examine ‘opihī ovaries histologically for all size groups except size class A (0-1 cm SL). A total of n=80 specimens will be collected from Nihoa using an opihi knife. These specimens will be measured by caliper for shell length, shell width, and shell height, and weighted by scale for total weight, soft-body weight, and gonad weight.

Gonad tissue will be fixed in 10% v/v Neutral Buffered Formalin and rinsed with 70% v/v ethanol prior to haematoxylin and eosin staining (H&E) at the University of Hawaii’s Histology and Imaging Core Facility (Honolulu, Hawaii). Using a microscope and imageJ, oocytes will be measured for diameter, and enumerated to determine fecundity. Extra shells from collections will be saved where a subset of them will be analyzed to measure sub-annual growth rates. Following the methods of Mau et al. (2019), each shell will be cross-sectioned from anterior to posterior direction using a low speed saw (Isomet 1000, Buehler) equipped with a 0.5 mm diamond coated blade. Parallel cuts will be made at the apex or maximal growth-axis to obtain two replicate 1.3 mm thick-sections per specimen. The replicate thick section will be mounted in its entirety on a large glass slide using quick-drying epoxy (EPO-TEK 301, Epoxy Technology Inc, Billerica, MA), grinded with F1000 grit SiC powder secondary, and polished with 3 and 1µm Al₂O₃ powder on a lapping wheel. The polished, thick-sections will be stained with Mutvei’s solution to expose major lines, micro lines, and micro increments by light microscopy (Schöne et al. 2005). Shell thick-sections will be placed in a petri dish and submerged in Mutvei’s solution for 45 minutes held constant at 37-40°C with 14 constant stirring. These stained thick-sections will be imaged using a Nikon Eclipse E600 Polarizing light microscope at 100x magnification. Daily growth will be measured along two axes using the standard measuring tool in ImageJ. To measure daily growth (as shell length) along the horizontal axis, the researchers/team will record x-coordinates for each point where a micro increment band intersects the outermost layer, and subtract x-coordinates of sequential points to calculate horizontal distance or growth. Back-calculated shell length measurements will be used to model age-at-length data.

Huli‘ia

The researchers/team will also be engaging in Huli ‘ia, an observational process documenting

seasonal changes and shifts across entire landscapes, *ma uka* (ocean) to *ma kai* (ocean) identifying dominant correlating cycles to support and guide the management and best practices that support a productive and thriving community, ‘āina momona. It is an observational process documenting natural changes over time, identifies dominant cycles within certain species or occurrences (*flowering, fruiting, presence/absence of flora/fauna, cloud formations, spawning, or recruiting of fish species*, etc.) and assists in identifying correlations between species and/or occurrences as indicators of the other. When one thing happens (a flower blooms in mass), it indicates that another occurrence (a fish is spawning in mass) is happening (Sterling et al. 2017, Morishige et al. 2018). It allows natural cycles to support and guide management practices allowing the flexibility needed to ensure the best times to rest areas or species and/or to harvest areas or species. Huli ‘ia stems from traditional management systems driven by an intimate understanding of the natural environment and the ability for communities to adjust and adapt their activities to support these systems of nature. Through this documentation process, Huli ‘ia supports the development of best practices enabling communities to adjust and adapt their activities to assist in malama ‘āina.

- Lani (atmospheric) observations include looking at cloud formations, noting wind direction/strength and what times it changes, visibility of the horizon, bird activity, other weather related observations such as rain or rainbows, the rising and setting of the moon and sun, the moon phase, and stars.
- Honua (land) observations include looking at any plants that are flowering, seeding or fruiting, new growth, animals reproducing, precipitation and soil moisture, bird arrival and departure and any other animal behaviors. Land observations from the main Hawaiian Islands during the expedition may also be useful to help remember activities in the NWHI during that time. For example, the researchers/team notice hala fruiting here on the main islands and can relate that in the Northwestern Hawaiian Islands, this is the season when juvenile iwa are still in the nest.
- Kai (ocean) observations include noting the tide (high/low and time), waves and currents, identifying and looking at the behavior of invertebrates, limu (algae) and fish in the intertidal environments, noting any spawning or aggregation of species, and noting any juveniles and newly recruited species. (see observation datasheet)

To ensure responsible and ethical practices, the researchers/team will refrain from collecting ‘opihi and hā‘uke‘uke if populations appear too small to sustain collections. Consumption of intertidal resources including invertebrates, limu will further support cultural practice and relationship between participants and the islands.

Cultural Protocol

The intertidal monitoring / ‘opihi team consists of Native Hawaiian practitioners / cultural researchers on this voyage who are experienced in proper protocol and will help to ensure the entire group enters Papahānaumokuākea with proper intent and that all resources are treated with respect and care.

Native Hawaiian protocols, including oli and mele, will be conducted to reestablish an awareness between people and place. It will also serve to reconnect the Northwestern Hawaiian Islands into

the Hawaiian consciousness and worldview. This ceremony/protocol is very important because it establishes a sense of respect and reverence for the environment and all things it encompasses. It also supports a cultural interaction between people (younger siblings) and the islands & resources (older siblings) and prepares participants for that interaction. These protocol and ceremony are necessary to tap into an elevated state of awareness which will support cultural research and participants' openness to "see" properly.

Cultural harvesting protocols for intertidal invertebrates and limu will be conducted with adequate safeguards by not taking more than what is needed to allow participants to practice their culture but without compromising the ecological integrity and natural resources. Appropriate oli/mele will be conducted prior to arrival and departure on each island to introduce ourselves and our pono intentions as well as to thank each island for their contributions.

Consumption of intertidal resources including invertebrates, limu will further support cultural practice and relationship between participants and their islands. Consumption feeds physical, spiritual, and cultural health rooting us in our ancestral ties and customary practices. Consumption allows the participants to be nurtured and nourished by place and genealogy. The islands and the resources thriving here are older siblings and customary relationships are based on the reciprocal practice of being fed and cared for by their older siblings while the participants care for and "feed" them in return. The participants presence, activities, oli, observations, surveys, etc., feed and care for place further supporting the physical, spiritual, and cultural health of the islands and participants. Consumption also allows the participants to interact with place and understanding the network involved to produce a meal, which feeds a community. The research team will work together to apply this integrated monitoring approach. The research team will be comprised of cultural researchers / practitioners, scientists, and managers. To ensure the success of these field studies, the team will conduct appropriate protocol and offer ho'okupu (cultural offerings) to maintain the spiritual integrity of the sites that are visited.

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service and Pacific Islands National Wildlife Refuge Complex Office (USFWS), and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since February, 2022, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

MMB Agency Reviewer Questions and Applicant Responses:

- 1. Is the data being collected comparable to previous intertidal surveys conducted by Chris Bird and other researchers in PMNM? If there is a legitimate difference (due to some advancement in scientific methodology or taxonomic discoveries) then this**

should be discussed.

Response: Yes, we have built on Chris Bird's methods and hybridized after 8 years of understanding the shorelines across the entire archipelago. We currently have been implementing the hybridized surveys (PACC) since 2018. We are still looking at population sizes, still within the size classes Dr. Bird had originally created, still recognizing the zones (pink and black), etc. You can find a complete write up on the reasoning behind hybridizing the methodology and the current methods in this publication: <https://escholarship.org/uc/item/08b9x8t9> We will also be doing a special presentation to the Native Hawaiian Cultural working Group on our lessons learned leading into PACC and the new management plan we developed for the intertidal/Opihi fishery that we are working with communities and DAR to implement. I would be happy to present our work to any others as well.

- 2. In question 7f the following is stated “We will use hook/handline and trolling methods for the sustenance fishing while in federal waters” but then in question 8 the following is stated as also occurring “near-shore spear fishing or catch by hand methods for reef fish”. Please confirm the full extent of what types of fishing practices are being requested. Would all authorized individuals listed be conducted spearfishing?**

Response: My understanding is that while the vessel is underway outside of the 2 miles from shore (federal waters) and if the opportunity arises to troll to supplement our meal, we will do so. When we are in closer waters, we need to be very specific in fish species (ciguatera being a concern) targeting nenu, if the opportunity arises, using spear fishing as our method as we take ONLY what we intend to take. There have been instances in the past where I have caught nenu by hand in shallow waters or in tidepools. No, not all authorized individuals listed will be conducting spearfishing; only those with skill and experience IF we decide to. On all past spearfishing permits, we have only been able to spearfish once. Safety is a huge concern and consideration. I included it in this permit in the happen-stance that the opportunity arose and our entire team is comfortable. All considerations and safety measures are taken before doing.

- 3. Do the numbers listed in question 9a include specimens that would be collected for consumption? In the applicant it is requested that the up to four (4) individuals of each invert species, including ha'uke'uke and opihi, could be consumed per person, as well as two he'e, and a total of one “mini snack-sized zip lock bag” approximately 100 grams of limu per person.**
- a. For example, if 15 people are authorized under this permit and it is requested that each person could consume up to 4 ha'uke'uke that would be a total of 60 ha'uke'uke collected per island. The request in 9a is only for 30.**

Response: Most people do not eat the entirety of what is listed on the permit. We will be harvesting/consuming the lesser. Example: If all 12 of 15 don't eat ha'uke'uke... the other 3 will still only eat 4 each taking only 12... and not take the 30 total requested. If all 15 do eat ha'uke'uke, then we all eat 2 each. Also, if population appear large enough.

- 4. The applicant mentions that they will refrain from collecting if populations appear**

“too small”. What constitutes “too small” of a population?

Response: Based on experience, 15 consecutive years studying and researching the intertidal zone across almost every shoreline from Hawaii Island to Lalo (French frigate shoals), I understand what I should expect to see and what I shouldn't expect to see, based on seasons, exposure, side of the island, substrate type, shadow, etc., (see publication through link above). At all times, there is an assessment of population size which differs by species. Opihi, Pipipi, Aama, etc. are usually found across the shoreline so we don't have to walk long stretches of the shoreline to see their distribution and population size... but other species like Leho or Pupu Awa are usually more scattered and sporadic. Those species behave differently and their distribution is not as commonly spread out as opihi, so if we come across individuals or small groupings regularly and throughout most of the tidepools and shorelines, we may take an individual from a small grouping... never 2 from that grouping while selectively harvesting individuals as we travel the shoreline. If we don't see that consistency, it's not a food we need to consume at this time. Note, I adjusted numbers per species based on my past experience on Nihoa with Lehu = 6, Pupu Awa = 24, etc. Again based on experience, if there is any way our harvest/consumption will off-set the stability of the intertidal fishery, we will not harvest.

5. Which of the listed individuals on the permit request would be filling this role? “The intertidal monitoring / ‘opihi team consists of Native Hawaiian practitioners / cultural researchers on this voyage who are experienced in proper protocol and will help to ensure the entire group enters Papahānaumokuākea with proper intent and that all resources are treated with respect and care.”

Response: Pelika Andrade (permittee) will be filling the role. I have been actively engaged in the care of Papahānaumokuākea since 2008. I was one of the co-founders of the Intertidal partnership (with Randy Kosaki, Hoku Johnson, Moani Pai, and Chris Bird) in 2010 supporting (and participating in) the yearly summer accesses from 2011-2017. I have trained thousands of Hawaii school groups, community members, and residents across the Archipelago in intertidal monitoring. I am also a part of the Cultural Working Group serving as Chair from 2010-2014 then again from 2021 to present (within our newly organized leadership team Hui Manamana). I have also been a part of the RAC, native Hawaiian representative since 2012 (I believe)... am a cultural monitor and have done cultural briefings for various accesses to Papahānaumokuākea.

6. Are gonads and shells brought back to the MHI for analysis? If so are the brought back in a natural state or preserved/fixed/frozen?

a. (Reference from application):

i. Section: Description of proposed activities: b.) To accomplish this activity we would ...

1. (pg. 6) We will collect ‘opihi to dissect gonads and use histological methods that can provide fecundity estimates and reproductive state by sizes that have not been used for ‘opihi in PMNM in prior years. To determine fecundity-at-size, we will examine ‘opihi ovaries histologically for all size groups except size class A (0-1 cm SL). A total of n=80 specimens will be collected from Nihoa using an opihi knife. These specimens will be measured by caliper for shell length,

shell width, and shell height, and weighted by scale for total weight, soft-body weight, and gonad weight.

Response: We usually process opihi in the monument doing all the measurements (length, width, height) and weights (entire animal with shell, without shell, gonad) and gender, but that was historically when we were on the Searcher with space and an entire crew dedicated to opihi. This specific access we will not be on the Searcher and not have an entire crew dedicated to opihi so I may have some help dissecting some but most likely not all. In both cases, the entire specimen (dissected and/or not dissected) are brought back to the MHI for further analysis and accurate data collection.

7. Is the collection of opihi the only biological samples for the intertidal surveys or will biological samples be collected for ha'uke'uke and limu too - or will only observational data collection occur for these organisms?

b. (Reference from application):

i. Section: 6. Purpose/Need/Scope State purpose of proposed activities (pg. 10):

1. The primary objectives of the permit activities are to:

a. (3) increase the knowledge base pertaining to intertidal ecosystems, including 'opihī /hā'uke'uke / limu abundance, health, and reproductive cycles;

ii. Procedures/Methods (pg. 17):

1. The cultural research team would make visual assessments of intertidal areas where 'opihī and ha'uke'uke are located. The research team would record substrate type, limu type/density, crustose/turf/macro algae proportions, other species proportions/ratio, clumping of 'opihī, hā'uke'uke, and other intertidal species, presence of natural predators, freshwater input, etc.

Response: Opihi are the only species for biological sampling. The others are for consumption only.

8. The following questions are in reference to pages 19 and 20 of the application where it lists the number and size of specimens collected:

c. For the species collection list above - are the only organisms being collected for the biological survey the opihi or are gonad or other types of analysis occurring with other species?

Response: Opihi are the only organisms collected for biological reasons BUT when harvesting the others, we do take note of reproductive states and other observations, which are included in Huli'ia.

d. For the species collection list above – can the applicant provide the reasoning for

increase in samples this year?

Response: There were only 2 species that were increased, Aama and Pipipi, whose numbers are plentiful and are species that each team member does eat (historically). We also decreased our Leho request.

- e. For the species collection list above - are 10 individuals collected per species of fish (Ahi, Mahimahi, Ono, Nenu, Aku) – i.e. up to 50 individuals total would be collected or is it 10 individuals across the 5 species – i.e. 10 total individuals will be collected across the 5 species?

Response: Up to 10 individuals across the 5 species.

- f. For the species collection list above - where does fishing for Ahi, Mahimahi, Ono, Nenu, Aku occur – is it during transit? Does it occur in both nearshore and pelagic waters?

Response: All but Nenu will be in pelagic and during transit. We usually pull lines in as we get closer to land because of birds hunting and the instance we may come across other species foraging close to the islands. Nenu is the only fish we harvest close to land and it isn't with line but either by spear or hand techniques.

- g. For the species collection list above - are there any guidelines while fishing – (i.e. is there a targeted or minimum/maximum size fish that is aimed for per species – do certain sizes get released if too small or too large)? Is the entire fish usually consumed?

Response: Line fishing is hard in targeting size but if one is too large or too small, it will be released if chances of survival are good. Nenu are caught with more selection capability so medium size is usually the desired target size.

- h. Does the expedition know how many people will be on the boat and how many days the expedition will be in the monument?

Response: Boat time usually (pending weather conditions) are 1.5-2 days to Nihoa and 2+ days returning. Pending weather conditions and arrival times (too close to sunset we delay landing to the following day) days on land will differ. We depart on April 1 and return April 11 with 12 days for this access. If weather conditions are good we should be on land 7-8 days.

COMMENTS / RECOMMENDATIONS:

- 9. Request that the following condition to be included in the permit, (if this is not already stated in the permit conditions or BMPs): Permittee will implement collection/sampling design that removes a sustainable proportion from the local population of target organisms and make efforts to distribute collection activities across shoreline/reef flat/benthic areas, so as not to consolidate the impacts of**

collection in one location (if applicable/if collecting samples).

Response: Absolutely.

10. Would the applicant be open to working with OHA to give to a presentation to the Cultural Working Group with any findings from there research? The CWG would like to hear about the health status of the ‘ōpihi population and if there are any noted changes since the latest storms have blown through Hawai‘i.

Response: We are already on the CWG quarterly meeting agenda scheduled for March 22, 2023

Note from applicant:

Please note that this permit is being submitted for activities (especially the PACC) ONLY IF there is time since the primary reason for this trip is to do invasive species mitigation work under the co-managers permit with FWS. It is extremely hard and expensive to visit Papahānaumokuākea so any opportunity to fill in data gaps and continue consistency in our research we do not let pass us by.

Additional reviews and permit history:

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g. MMPA, ESA, EA) Yes ☒ No ☐

If so, please list or explain:

Other Consultations: (ESA/MMPA Section 7; NHPA Section 106, etc.)

- On February 09, 2023, NMFS concurred that all proposed permit activities would be covered under PMNM’s programmatic ESA Section 7 informal consultation. NMFS-prescribed conditions will be reflected in the PMNM permit, prior to issuance.
- On February 09, 2023, NMFS concurred with the ONMS determined that—given the scope of the proposed action and the implementation of proposed BMPs and special terms and conditions for permit PMNM-2023-004—the proposed project will adversely affect EFH, but effects will be no more than minimal. The ONMS BMPs and special terms and conditions (included in Appendix below) are suitable to ensure that adverse effects to EFH will be no more than minimal. Therefore, NMFS did not provide additional conservation recommendations for this project, thus satisfying the requirements of Section 305(b)(D)(2) of the Magnuson-Stevens Act.

The Department has made an exemption determination for this permit in accordance chapter 343, HRS, and Chapter 11-200.1, HAR. See Attachment (“DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS, AND CHAPTER 11-200.1 HAR, FOR

PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT NATIVE HAWAIIAN PRACTICES PERMIT TO PELIKA ANDRADE, NĀ MAKA ONAONA (FORMERLY NĀ MAKA O PAPAHĀNAUMOKUĀKEA) AND THE UNIVERSITY OF HAWAI‘I AT MĀNOA, FOR ACCESS TO STATE WATERS TO USE TRADITIONAL ECOLOGICAL KNOWLEDGE TO CONDUCT INTERTIDAL SURVEYS AND MONITORING TO ADVISE AND DIRECT MANAGEMENT STRATEGIES FOR INTERTIDAL FISHERIES ACTIVITIES UNDER PERMIT PMNM-2023-004”)

Has Applicant been granted a permit from the State in the past? Yes ☒ No ☐

If so, please summarize past permits:

Have there been any a) violations: Yes ☐ No ☒
b) Late/incomplete post-activity reports: Yes ☐ No ☒

Are there any other relevant concerns from previous permits? Yes ☐ No ☒

Monument permits have been issued to applicant Pelika Andrade (PMNM-2021-009) and the co-researcher working on the project, Kim Kanoe‘ulalani Morishige, for similar activities in 2011 and 2012 (PMNM-2011-040, PMNM-2012-052, PMNM-2014-020, PMNM-2015-017, PMNM-2015-017 AI and PMNM-2017-024 respectively).

Similar activities, including cultural monitoring activities on land and intertidal areas, have been previously permitted in the Monument for different applicants (PMNM-2007- 024 Kanahele, PMNM-2008-041 Kikiloi-Graves, PMNM-2009-021 Kikiloi-Graves, PMNM-2009-023 Kanahele, PMNM-2009-047 Kawelo, PMNM-2011-036 Kanahele, PMNM-2011-039 Kikiloi-Graves, PMNM-2011-040 Tom, PMNM-2012-038 Anthony, PMNM-2012-052 Springer, PMNM-2013-026 Anthony, and pending applications PMNM-2015-014 Kikiloi and PMNM-2015-022 Kanahele. Personnel that would be participating in these activities have participated in past approved permitted activities previously listed.

STAFF OPINION:

DAR staff is of the opinion that Applicant has properly demonstrated valid justifications for his application and should be allowed to enter the NWHI State waters and to conduct the activities therein as specified in the application with certain special instructions and conditions, which are in addition to the Papahānaumokuākea Marine National Monument Research Permit General Conditions. All suggested special conditions have been vetted through the legal counsel of the Co-Trustee agencies (see Recommendation section).

MONUMENT MANAGEMENT BOARD OPINION:

The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by NOAA, USFWS, ONMS, DAR, DOFAW and OHA staff.

RECOMMENDATION:

Based on the attached proposed declaration of exemption prepared by the department after consultation with and advice of those having jurisdiction and expertise for the proposed permit actions:

1. That the Board declare that the actions which are anticipated to be undertaken under this permit will have little or no significant effect on the environment and is therefore exempt from the preparation of an environmental assessment.
2. Upon the finding and adoption of the department's analysis by the Board, that the Board delegate and authorize the Chairperson to sign the declaration of exemption for purposes of recordkeeping requirements of chapter 343, HRS, and chapter 11-200, HAR.
3. That the Board authorize and approve a Native Hawaiian Practices Permit to Pelika Andrade, Nā Maka Onaona (Formerly Nā Maka o Papahānaumokuākea) and University of Hawai'i at Mānoa, with the following special conditions:
 - a. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocol attached to this permit.
 - b. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
 - c. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State Marine Refuge.
 - d. No fishing is allowed in State Waters except as authorized under state law for subsistence, traditional, and customary practices by Native Hawaiians.
 - e. If there is any Hawaiian monk seal or any other protected species in the area when performing any permitted activity shall cease until the animal(s) depart the area, except as permitted for specific management of that species.
 - f. The permittee will implement a collection/sampling design that removes a sustainable proportion from the local population of target organisms and makes efforts to distribute collection activities across shoreline/reef flat/benthic areas, so as not to consolidate the impacts of collection in one location (if applicable/if collecting samples).
 - g. To avoid physical damage to corals during transit to any of the listed locations, a spotter should be placed in the bow of the dingy to watch for exposed or near surface coral heads.

- h. For all activities requiring landing on uninhabited islands an authorized staff escort trained for each particular inhabited island will be included on the landing team.
- i. Measures should be implemented to prevent detergents and other cleaners from being washed overboard.
- j. The permittee is required to follow all applicable Federal, State, and County laws with respect to the COVID-19 emergency response that apply at the time of departure and return. In issuance of this permit, the State of Hawaii is not otherwise monitoring or regulating permittee's compliance with COVID-19 laws and is not responsible for the health and safety of crew members, researchers or other occupants of the vessel associated with this permit.

Respectfully submitted,



Brian J. Neilson, Administrator
Division of Aquatic Resources

APPROVED FOR SUBMITTAL



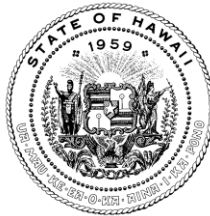
Dawn N. S. Chang, Chairperson
Board of Land and Natural Resources

Attachments:

- 1) Declaration of Exemption ("DE") from the Preparation of an Environmental Assessment under the Authority of Chapter 343, HRS & Chapter 11-200.1 HAR
- 2) PMNM Application
- 3) PMNM Compliance Information Sheet ("CIS Form")

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR |
KA HOPE KIA'ĀINA



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

March 10, 2023

TO: Division of Aquatic Resources File

THROUGH: Dawn N. S. Chang, Chairperson

FROM: Brian J. Neilson, Administrator
Division of Aquatic Resources

A handwritten signature in black ink, appearing to read "BJN", is written over the name "Brian J. Neilson".

SUBJECT:

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200.1 HAR, FOR A PAPAĤANAUMOKUĀKEA MARINE NATIONAL MONUMENT NATIVE HAWAIIAN PRACTICES PERMIT TO PELIKA ANDRADE, NĀ MAKA ONAONA (FORMERLY NĀ MAKA O PAPAĤANAUMOKUĀKEA) AND THE UNIVERSITY OF HAWAI'I AT MĀNOA, FOR ACCESS TO STATE WATERS TO USE TRADITIONAL ECOLOGICAL KNOWLEDGE TO CONDUCT INTERTIDAL SURVEYS AND MONITORING TO ADVISE AND DIRECT MANAGEMENT STRATEGIES FOR INTERTIDAL FISHERIES ACTIVITIES UNDER PERMIT PMNM-2023-004.

The following permitted activities are found to be exempted from preparation of an environmental assessment under the authority of Chapter 343, HRS and Chapter 11-200.1, HAR:

Project Title: Papahānaumokuākea Marine National Monument Native Hawaiian Practices Permit to Pelika Andrade, Nā Maka Onaona (Formerly Nā Maka o Papahānaumokuākea) and the University of Hawai'i at Mānoa, for Access to State Waters to use Traditional Ecological Knowledge to Conduct Intertidal Surveys and Monitoring to Advise and Direct Management Strategies for Intertidal Fisheries Activities.

Permit Number: PMNM-2023-004

Project Description: The applicant, Pelika Andrade of Nā Maka Onaona (Formerly Nā Maka o Papahānaumokuākea) and the University of Hawai'i at Mānoa, is proposing to support sustainable fisheries and aina momona through continuing intertidal surveys and monitoring to advise and direct management strategies which support intertidal fishery productivity, specifically 'ōpihi. The researcher will be accessing the monument via a USFWS expedition of which the primary goal is to conduct terrestrial surveying and controlling of terrestrial invasive species and terrestrial native species

monitoring; therefore the researcher will be conducting the intertidal research opportunistically, when resources and time become available during the trip.

Land-Based Activities

Terrestrial activities conducted will consist of surveying and controlling terrestrial invasive species and terrestrial native species monitoring. The terrestrial invasive species control would focus primarily on *Cenchrus echinatus* and the terrestrial native species monitoring would involve the use of remote cameras and recording phenology and abundance of seabirds, shorebirds, invertebrates, and native plants. These land-based activities will be under USFWS direction and authorized under the Co-Trustee permit (PMNM 2023-001).

Intertidal Activities

The intertidal activities would be part of ongoing monitoring from across the archipelago that is used to advise and direct management strategies which support intertidal fishery productivity, specifically ‘ōpihi. This research is a natural continuation of previous intertidal ecosystem studies, surveys and monitoring (with a variation on previous research questions), that have been conducted by the co-researcher working on the project, Kim Kanoë‘ulalani Morishige, and many other researchers affiliated with similar expeditions in the past eleven (11) years.

Huli‘ia

The applicant and permitted personnel will utilize traditional observational practices through the Huli‘ia process while additionally recording atmospheric, land, and ocean observations. substrate type, limu presence/density, crustose/turf/macro algae proportions, other species ratios, clumping of ‘opihi and hā‘uke‘uke, presence of natural predators, other intertidal species, and other intertidal information. Additional sampling of gonads for ‘opihi (*Cellana exarata*, *C. sandwicensis*) and hā‘uke‘uke (*Colobocentrotus atratus*) will be done to determine fecundity-at-size. Shells will also be saved for analysis of growth rates.

Subsistence/Sustenance Fishing

The applicant is also requesting to consume intertidal resources, collect limu for consumption, and to subsist and sustenance fish by trolling using handlines and/or other hook and trolling equipment to further support the cultural practice and relationship between participants and Papahānaumokuākea. Vessel operations will be authorized under the Co-Trustee permit (PMNM 2023-001).

These studies will add onto the eleven (11) years of data on intertidal species, re-establishing Native Hawaiian ancestral consciousness and awareness about the health and condition of marine resources. Note: Opihi are the only species that are collected for biological sampling; the other species are for consumption only. However, when harvesting the other species the researcher and assistants, take note of reproductive states and other observations, which are included in Huli‘ia. For this year, there were only two (2) species that were increased in terms of sample size, Aama and Pipipi, whose numbers have been observed to be abundant and are species that each team member does eat (historically). In addition the project decreased their Leho request. Collections list for individual species below:

Collections List

of individuals & size of specimens:

1. ‘A‘ama (Thin-shelled rock crab, *Grapsus tenuicrustatus*):

- a. Up to 30 per island/location per access
 - b. 3 inches or larger
2. Makaloa (Spotted drupe, *Drupa ricina*)
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
3. Pipipi (Black Nerite, *Nerita picea*)
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
4. Pūpū ‘Awa (Open Drupe, *Thais aperta* (formally *Purpura aperta*))
 - a. Up to 30 per island/location, per access
 - b. ½ inch or larger
5. Hā‘uke‘uke (Helmet urchin, *Colobocentrotus atratus*)
 - a. Up to 30 per island/location per access
 - b. 2 inches or larger
6. Makaiauli (Black-Foot ‘Opihi, *Cellana exarata*)
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
7. ‘Ālinalina (Yellow-Foot ‘Opihi, *Cellana sandwicensis*)
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
8. He‘e Maui / He‘e Pali (Day Octopus / Cliff Octopus, *Octopus cyanea/Octopus oliveri*)
 - a. Up to 2 individuals per island/location per access
 - b. 1 lb or heavier, per State regulations
9. Leho Ahi (Humpback Cowry, *Cypraea mauritiana*)
 - a. Up to 6 per island/location per access
 - b. 2 inches or larger
10. Pūpū – (Intermediate Drupe, *Thais intermedia*)
 - a. Up to 24 per island/location per access
 - b. 1 inch or larger
11. Limu Kohu
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
12. Pālahalaha
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
13. Līpe‘epe‘e
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
14. Ahi, mahimahi, ono, nenu, aku
 - a. Up to 10 individuals across the five species listed

Notes on Fishing: Researcher and assistants will fish in transit for pelagic fish or near-to-shore for nearshore fish (Nenu). The researcher and assistants usually pull lines as they get closer to land because of birds hunting and as a preventative measure in case they encounter other species foraging close to the islands. Nenu is the only fish the project will harvest close to land using either spear or hand techniques. Target sizes when fishing: When utilizing line fishing for pelagic fish is difficult to target size but if an individual is too large or too small, it will be released if chances of survival are good. Nenu are caught with more selection capability so a medium size is usually the desired target size.

To safeguard Monument resources, the applicant will harvest from various places along the shoreline to be mindful of harvest pressure in one location. The applicant has also attended and completed the 2019 Resource Monitor Training and has ample experience at the locations proposed over multiple trips. Applicant would additionally abide by the following PMNM Best Management Practices (BMPs) while conducting the aforementioned activities within the PMNM: Best Management Practices for Boat Operations and Diving Activities (BMP #004); General Storage and Transport Protocols for Collected Samples (BMP #006); Marine Wildlife Viewing Guidelines (BMP #010); and Disease and Introduced Species Prevention Protocol for Permitted Activities in the Marine Environment (BMP #011), in addition to any other BMPs that apply.

The applicant's proposed activities directly support the Marine Conservation Science (MCS) Monument Management Plan Action Plan activities:

MCS-1.1: Continue to characterize types and spatial distributions of shallow-water marine habitats to inform protection and management efforts.

MCS-1.2: Continue monitoring of shallow-water coral reef ecosystems to protect ecological integrity.

NHCH 2.3: Facilitate cultural field research and cultural education opportunities annually;

NHCH 2.6: Continue to facilitate Native Hawaiian cultural access.

The activities described above may require the following regulated activities to occur in State waters:

- ☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
- ☒ Anchoring a vessel
- ☒ 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

The central purpose of the expedition is to expand and advance traditional Native Hawaiian knowledge in the field of marine conservation and management and continue to bridge the gap between cultural and western research methodologies. The primary objectives of the cultural expedition are to:

- (1) collect environmental data related to traditional Native Hawaiian marine management;
- (2) expand the application of traditional Hawaiian environmental monitoring tools and methodologies;

(3) increase the knowledge base pertaining to intertidal ecosystems, including ‘opihi /hā‘uke‘uke / limu abundance, health, and reproductive cycles; and

(4) re-establishing and strengthening cultural ties through feeding and being fed by the environment (genealogy).

Project Background

Land-Based Activities

Participants will support and continue efforts by the U.S. Fish and Wildlife Service (USFWS) of native species monitoring and invasive species control on the island in accordance with USFWS protocols (authorized under the Co-Trustee permit (PMNM 2023-001)).

Intertidal Activities

The intertidal project is led by two experts: Pelika Andrade and Kim Kanoë‘ulalani Morishige. ONMS and permittees will provide survey and report data to USFWS as stipulated in the general conditions of this permit. Previous permitted intertidal monitoring efforts suggest the take activity is beneficial for the resource. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Bird, Na Maka Onaona, and the Intertidal Monitoring Partnership have noted changes over time. For example, the high density of recruits recorded in June 2010, did not all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m²), whereas in 2011, there were less 1.5-yearold ‘opihi (50 per m²) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html).

Similarly, researchers and participants have noted differences in population distribution, for example, in 2012, ‘opihi at Mokumanamana and Nihoa were recorded in the tens of thousands compared to the 3,000 found at La Perouse Pinnacles at FFS (http://www.papahanaumokuakea.gov/research/intertidal_cruise2013_return.html). No ‘opihi samples were or will be collected at La Perouse Pinnacles due to the low population size.

The proposed activity will support sustainable fisheries and aina momona through continuing intertidal surveys and monitoring across the archipelago to advise and direct management strategies to support the intertidal fishery focusing on Opihi/Limpet productivity. Over the past decade of collaborative intertidal monitoring, the locally led research team has identified significant shortcomings to the current research being conducted on Hawai‘i’s unique wave-dominated, rocky intertidal shoreline. For instance, prior data collection methods failed to measure environment – a key component to intertidal ecology and sustainable fisheries management. From recent findings, the researchers/team draw new hypotheses and a new survey method (PACC) that focus on the effects of seasonal changes in habitat on patterns of reproductive cycles, recruitment and productivity of rocky intertidal communities. The work generated would be used to develop a sustainable fishery model for evaluating species productivity on any intertidal coastline in Hawai‘i. As a model system for intertidal mollusc fisheries, the objectives are to assess the stock status for three species of limpet (*Cellana* spp.) in the Hawaiian Islands by: (1) describing and delineating their environment and habitat, (2) improving the understanding of the biology and ecology of *Cellana* spp., and (3) proposing sustainable harvest practices and management measures using an indicator-based approach. Sustainable ecosystems and ‘āina that are thriving and productive are fundamental in Native Hawaiian values and systems. Looking beyond the obvious Native Hawaiian practice of harvesting and gathering,

there was a system in place that supported productive lands, oceans, and communities generationally. The proposed activities are supporting the Native Hawaiian practice of ‘āina momona.

Since 2009, Na Maka Onaona has been a major partner in Hawaii’s Intertidal Monitoring Partnership conducting research in PMNM. Over the past eleven years, the team has been conducting intertidal monitoring along Hawaii’s wave-exposed shorelines to address community concerns on sustainable harvest of ‘opihi (*Cellana* spp). Working with numerous schools and community organizations, the researchers/team have learned valuable lessons about both the productivity of the shorelines, and how this productivity aligns within the larger goals of thriving communities (Morishige et al. 2018). Through integrating institutional research, traditional knowledge systems, end-user (i.e. fisher) engagement, and outreach/education, the team has developed a unique research approach - made possible through the contributions of these multiple perspectives, considerations, and relationships. This journey provides the researchers/team the capacity to understand a space through the multiple lenses within a community and create a platform that is inclusive of various knowledge systems to address the needs of Hawaiian people, the environment, and a thriving relationship between the two entities. Building on recent research, the understanding of place changes by season and across multiple landscapes. The researchers/team have developed a modified survey to look at the role of different habitat types, and the influence of environment on the carrying capacity of the intertidal fishery. Based on a shared goal of a productive and sustainable fishery, the latest series of questions have led the researchers/team to identify management strategies that can maximize replenishment in these rocky intertidal ecosystems. The researchers/team believe the sharing of this journey is valuable and will encourage a more inclusive conversation to evolve management and conservation to truly support ‘āina momona, abundant and productive communities of people and place.

The outputs of this project will be the identification of optimal habitat for a productive intertidal fishery, effective management strategies/tools, and support for stakeholder decision-making based on the sustainable opihi population density for respective shorelines-types. If the researchers/team can understand a shoreline’s stable habitat (habitat size and population densities at its minimum normally during the seasonal dieback), the researchers/team can understand that shoreline’s stable carrying capacity of ‘opihi. This research in PMNM is part of an on-going initiative to survey multiple locations in the Main Hawaiian Islands to inform management techniques to sustainably harvest and rest populations that compliments cyclical productivity. Locations across the Hawaiian Archipelago have been selected due to existing, long-term partnerships and/or areas of interest expressed by Native Hawaiian community members. The research team will train and work with local and Native Hawaiian communities to build local research capacity by surveying their intertidal ecosystems.

These activities will additionally strengthen cultural and spiritual connections to the Northwestern Hawaiian Islands and foster the expansion and perpetuation of Native Hawaiian ecological knowledge and research methodologies. This knowledge may be critical as it is observed by local Hawaii residents that ‘opihi and hā‘uke‘uke stocks are generally diminishing in size and number in the main Hawaiian Islands, therefore more data in this area may help to curb the decline. The continuation of ‘opihi data collection, and comprehensive intertidal surveys (including fishes, algae, and invertebrates) using Native Hawaiian ecological knowledge and methodologies coupled with western science will help to contribute to the overall health of Papahānaumokuākea.

Procedures/Methods:

Land-Based Activities

The procedure and methods for the land-based invasive species control and native species monitoring are conducted in accordance with USFWS protocols and authorized under the Co-Trustee permit (PMNM 2023-001).

Intertidal Activities

The cultural research team would make visual assessments of intertidal areas where ‘opihi and ha‘uke‘uke are located. The research team would record substrate type, limu type/density, crustose/turf/macro algae proportions, other species proportions/ratio, clumping of ‘opihi, hā‘uke‘uke, and other intertidal species, presence of natural predators, freshwater input, etc. The team would take wet/dry notes and use digital cameras to record observations (will remain within the BMO distance for any filming or photography of protected species). At the end of visiting each island, Na Maka Onaona will facilitate a Huli ‘ia discussion for the group to share observations. One person will be designated and write all the observations made by the group on one data sheet to facilitate the analysis process while observations are still fresh and can be clarified. To complete these activities, the crew would require access to nearshore areas (below the splash zone) that contain ‘opihi habitat (e.g. intertidal zone at Mokumanamana). Every participant will adhere to all Monument requirements while undertaking this project. Note: Opihi are the only organisms collected for biological reasons but when harvesting the others, the researcher and assistants do take note of reproductive states and other observations, which are included in Huli‘ia.

The researcher believes the following amounts per visit within the timeframe of this permit are appropriate: no more than four (4) individuals of each invert species, including ha‘uke‘uke and opihi, per person, two he‘e, and a total of one “mini snack-sized zip lock bag” approximately 100 grams of limu is appropriate to harvest per island. Harvesting will supplement meals and may consist of ‘opihi, hā‘uke‘uke, limu, ‘a‘ama, pipipi, makaloha, he‘e, and leho. ‘Opihi will be gathered by hand using an ‘opihi knife, and the researcher and assistants will be mindful to harvest individuals that are larger than the legal-size limit of 1 ¼ inch as well as to leave larger ‘opihi alone as they are believed to be more fecund. The researcher and assistants will also harvest from various places along the shoreline to be mindful of harvest pressure on one rock. ‘Opihi are also able to reach reproductive maturity at approximately 7 months after settling onto the rocks (Kay & Magruder 1977), thus the researcher is confident that there will be larval recruitment the following year. When harvesting limu, proper practice of cutting/ pinching off the branches off and leaving the holdfast will be utilized to ensure continual growth after it is harvested. All other invertebrates will be gathered by hand. All inverts will be consumed raw, except leho and pipipi, which will be boiled then consumed. Limu will be “cured” and prepared to supplement meals. He‘e will be harvested by using a metal rod to attract the he‘e out of its house and then be gathered by hand. The researcher and assistants will not harvest he‘e that is under one pound, in accordance to the State of Hawai‘i fishing regulations. The he‘e will either be prepared by either drying or boiling before consumption. Near-shore spear fishing or catch by hand methods for reef fish. Hook, handline, and trolling methods will be used to sustainance fish while in State and Federal waters. Refer to attached table for list of species.

PACC Surveys

The researchers/team will conduct PACC surveys to examine ‘opihi densities by size classes and maximum sizes within each vertically stratified zone (black zone (basalt rock) and pink zone (crustose coralline algae zone)). The black zone is located on the upper extent of the shoreline defined as the Emergent Tidal Zone where black rock is exposed to the air depending on the tide and the pink zone is

located lower on the shoreline in the Wave Zone (Bird et al. 2013). Rugosity measurements will be recorded for the black zone and pink zone to identify differences in ‘opihi carrying capacity by distinct habitat zones within the intertidal ecosystem. Tight measurements will also quantify the growth and shrinkage of the broader shoreline within each survey site to provide a practical measure of seasonal habitat threshold. PACC surveys will provide a total rugosity measurement for black and pink zones within the mixed (overlap of black and pink zones) rugosity zones. In order to increase the precision of ‘opihi habitat availability, PACC will also record differences in ‘opihi habitat and non-habitat to develop more precise estimates of ‘opihi densities.

PACC surveys aim to better understand how natural fluctuations occur even on remote shorelines with low human impact. This research will shed light on seasonal growth and die back of populations in relation to their habitat size and local physical environment. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Chris Bird and intertidal monitoring crews have noted changes over time. For example, there was a high density of recruits recorded in June 2010, however, they did not all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m²), whereas in 2011, there were less 1.5-year-old ‘opihi (50 per m²) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html). Although one year might seem like there are many recruited ‘opihi, the habitat and environmental conditions can limit their survival and influence successful recruitment into adult populations. This highlights the importance of considering the maximum and minimum thresholds of population densities by size to identify stable carrying capacities.

PACC implements a mix of standardized and novel methodologies across boulder, bench, and sloped rocky substratum to: 1) examine the effect of swell exposure (Low, Medium, High) on habitat size; 2) develop a practical, routine method for determining opih growth rates and age *in situ*; and 3) measure species fecundity and reproductive output in relation to major environmental drivers such as temperature. This project evaluates how environment, growth and age structure, and reproductive output affects total shellfish production on temporal and spatial scales; and re-establishes productive ecosystems as a fundamental strategy of traditional Hawaiian resource management.

‘Opihi Gonad Collection

The researchers/team will collect ‘opihi if populations are not too small, to dissect gonads and use histological methods that can provide fecundity estimates and reproductive state by sizes that have not been used for ‘opihi in PMNM in prior years. To determine fecundity-at-size, the researchers/team will examine ‘opihi ovaries histologically for all size groups except size class A (0-1 cm SL). A total of n=80 specimens will be collected from Nihoa using an opih knife. These specimens will be measured by caliper for shell length, shell width, and shell height, and weighted by scale for total weight, soft-body weight, and gonad weight.

Gonad tissue will be fixed in 10% v/v Neutral Buffered Formalin and rinsed with 70% v/v ethanol prior to haematoxylin and eosin staining (H&E) at the University of Hawaii’s Histology and Imaging Core Facility (Honolulu, Hawaii). Using a microscope and imageJ, oocytes will be measured for diameter, and enumerated to determine fecundity. Extra shells from collections will be saved where a subset of them will be analyzed to measure sub-annual growth rates. Following the methods of Mau et al. (2019), each shell will be cross-sectioned from anterior to posterior direction using a low speed saw (Isomet 1000, Buehler) equipped with a 0.5 mm diamond coated blade. Parallel cuts will be made at the apex or maximal

growth-axis to obtain two replicate 1.3 mm thick-sections per specimen. The replicate thick section will be mounted in its entirety on a large glass slide using quick-drying epoxy (EPO-TEK 301, Epoxy Technology Inc, Billerica, MA), grinded with F1000 grit SiC powder secondarily, and polished with 3 and 1µm Al₂O₃ powder on a lapping wheel. The polished, thick-sections will be stained with Mutvei's solution to expose major lines, micro lines, and micro increments by light microscopy (Schöne et al. 2005). Shell thick-sections will be placed in a petri dish and submerged in Mutvei's solution for 45 minutes held constant at 37-40°C with 14 constant stirring. These stained thick-sections will be imaged using a Nikon Eclipse E600 Polarizing light microscope at 100x magnification. Daily growth will be measured along two axes using the standard measuring tool in ImageJ. To measure daily growth (as shell length) along the horizontal axis, the researchers/team will record x-coordinates for each point where a micro increment band intersects the outermost layer, and subtract x-coordinates of sequential points to calculate horizontal distance or growth. Back-calculated shell length measurements will be used to model age-at-length data.

Huli'ia

The researchers/team will also be engaging in Huli 'ia, an observational process documenting seasonal changes and shifts across entire landscapes, *ma uka* (ocean) to *ma kai* (ocean) identifying dominant correlating cycles to support and guide the management and best practices that support a productive and thriving community, 'āina momona. It is an observational process documenting natural changes over time, identifies dominant cycles within certain species or occurrences (*flowering, fruiting, presence/absence of flora/fauna, cloud formations, spawning, or recruiting of fish species*, etc.) and assists in identifying correlations between species and/or occurrences as indicators of the other. When one thing happens (a flower blooms in mass), it indicates that another occurrence (a fish is spawning in mass) is happening (Sterling et al. 2017, Morishige et al. 2018). It allows natural cycles to support and guide management practices allowing the flexibility needed to ensure the best times to rest areas or species and/or to harvest areas or species. Huli 'ia stems from traditional management systems driven by an intimate understanding of the natural environment and the ability for communities to adjust and adapt their activities to support these systems of nature. Through this documentation process, Huli 'ia supports the development of best practices enabling communities to adjust and adapt their activities to assist in malama 'āina.

- Lani (atmospheric) observations include looking at cloud formations, noting wind direction/strength and what times it changes, visibility of the horizon, bird activity, other weather related observations such as rain or rainbows, the rising and setting of the moon and sun, the moon phase, and stars.
- Honua (land) observations include looking at any plants that are flowering, seeding or fruiting, new growth, animals reproducing, precipitation and soil moisture, bird arrival and departure and any other animal behaviors. Land observations from the main Hawaiian Islands during the expedition may also be useful to help remember activities in the NWHI during that time. For example, the researchers/team notice hala fruiting here on the main islands and can relate that in the Northwestern Hawaiian Islands, this is the season when juvenile iwa are still in the nest.
- Kai (ocean) observations include noting the tide (high/low and time), waves and currents, identifying and looking at the behavior of invertebrates, limu (algae) and fish in the intertidal environments, noting any spawning or aggregation of species, and noting any juveniles and newly recruited species. (see observation datasheet)

To ensure responsible and ethical practices, the researchers/team will refrain from collecting ‘opihi and hā‘uke‘uke if populations appear too small to sustain collections. Consumption of intertidal resources including invertebrates, limu will further support cultural practice and relationship between participants and the islands.

Cultural Protocol

The intertidal monitoring / ‘opihi team consists of Native Hawaiian practitioners / cultural researchers on this voyage who are experienced in proper protocol and will help to ensure the entire group enters Papahānaumokuākea with proper intent and that all resources are treated with respect and care.

Native Hawaiian protocols, including oli and mele, will be conducted to reestablish an awareness between people and place. It will also serve to reconnect the Northwestern Hawaiian Islands into the Hawaiian consciousness and worldview. This ceremony/protocol is very important because it establishes a sense of respect and reverence for the environment and all things it encompasses. It also supports a cultural interaction between people (younger siblings) and the islands & resources (older siblings) and prepares participants for that interaction. These protocol and ceremony are necessary to tap into an elevated state of awareness which will support cultural research and participants’ openness to “see” properly.

Cultural harvesting protocols for intertidal invertebrates and limu will be conducted with adequate safeguards by not taking more than what is needed to allow participants to practice their culture but without compromising the ecological integrity and natural resources. Appropriate oli/mele will be conducted prior to arrival and departure on each island to introduce ourselves and our pono intentions as well as to thank each island for their contributions.

Consumption of intertidal resources including invertebrates, limu will further support cultural practice and relationship between participants and their islands. Consumption feeds physical, spiritual, and cultural health rooting us in our ancestral ties and customary practices. Consumption allows the participants to be nurtured and nourished by place and genealogy. The islands and the resources thriving here are older siblings and customary relationships are based on the reciprocal practice of being fed and cared for by their older siblings while the participants care for and “feed” them in return. The participants presence, activities, oli, observations, surveys, etc., feed and care for place further supporting the physical, spiritual, and cultural health of the islands and participants. Consumption also allows the participants to interact with place and understanding the network involved to produce a meal, which feeds a community. The research team will work together to apply this integrated monitoring approach. The research team will be comprised of cultural researchers / practitioners, scientists, and managers. To ensure the success of these field studies, the team will conduct appropriate protocol and offer ho’okupu (cultural offerings) to maintain the spiritual integrity of the sites that are visited.

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service and Pacific Islands National Wildlife Refuge Complex Office (USFWS), and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since February, 2022, giving the public an opportunity to

comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

MMB Agency Reviewer Questions and Applicant Responses:

- 1. Is the data being collected comparable to previous intertidal surveys conducted by Chris Bird and other researchers in PMNM? If there is a legitimate difference (due to some advancement in scientific methodology or taxonomic discoveries) then this should be discussed.**

Response: Yes, we have built on Chris Bird's methods and hybridized after 8 years of understanding the shorelines across the entire archipelago. We currently have been implementing the hybridized surveys (PACC) since 2018. We are still looking at population sizes, still within the size classes Dr. Bird had originally created, still recognizing the zones (pink and black), etc. You can find a complete write up on the reasoning behind hybridizing the methodology and the current methods in this publication: <https://escholarship.org/uc/item/08b9x8t9> We will also be doing a special presentation to the Native Hawaiian Cultural working Group on our lessons learned leading into PACC and the new management plan we developed for the intertidal/Opihi fishery that we are working with communities and DAR to implement. I would be happy to present our work to any others as well.

- 2. In question 7f the following is stated "We will use hook/handline and trolling methods for the sustenance fishing while in federal waters" but then in question 8 the following is stated as also occurring "near-shore spear fishing or catch by hand methods for reef fish". Please confirm the full extent of what types of fishing practices are being requested. Would all authorized individuals listed be conducted spearfishing?**

Response: My understanding is that while the vessel is underway outside of the 2 miles from shore (federal waters) and if the opportunity arises to troll to supplement our meal, we will do so. When we are in closer waters, we need to be very specific in fish species (ciguatera being a concern) targeting nenu, if the opportunity arises, using spear fishing as our method as we take ONLY what we intend to take. There have been instances in the past where I have caught nenu by hand in shallow waters or in tidepools. No, not all authorized individuals listed will be conducting spearfishing; only those with skill and experience IF we decide to. On all past spearfishing permits, we have only been able to spearfish once. Safety is a huge concern and consideration. I included it in this permit in the happen-stance that the opportunity arose and our entire team is comfortable. All considerations and safety measures are taken before doing.

- 3. Do the numbers listed in question 9a include specimens that would be collected for consumption? In the applicant it is requested that the up to four (4) individuals of each invert species, including ha'u'ke'u'ke and opihi, could be consumed per person, as well as two he'e, and a total of one "mini snack-sized zip lock bag" approximately 100 grams of limu per person.**
 - a. For example, if 15 people are authorized under this permit and it is requested that each person could consume up to 4 ha'u'ke'u'ke that would be a total of 60 ha'u'ke'u'ke collected per island. The request in 9a is only for 30.**

Response: Most people do not eat the entirety of what is listed on the permit. We will be harvesting/consuming the lesser. Example: If all 12 of 15 don't eat ha'u'ke'u'ke... the other 3 will still only eat 4 each taking only 12... and not take the 30 total requested. If all 15 do eat ha'u'ke'u'ke, then we all eat 2 each. Also, if population appear large enough.

4. The applicant mentions that they will refrain from collecting if populations appear “too small”. What constitutes “too small” of a population?

Response: Based on experience, 15 consecutive years studying and researching the intertidal zone across almost every shoreline from Hawaii Island to Lalo (French frigate shoals), I understand what I should expect to see and what I shouldn't expect to see, based on seasons, exposure, side of the island, substrate type, shadow, etc., (see publication through link above). At all times, there is an assessment of population size which differs by species. Opihi, Pipipi, Aama, etc. are usually found across the shoreline so we don't have to walk long stretches of the shoreline to see their distribution and population size... but other species like Leho or Pupu Awa are usually more scattered and sporadic. Those species behave differently and their distribution is not as commonly spread out as opihi, so if we come across individuals or small groupings regularly and throughout most of the tidepools and shorelines, we may take an individual from a small grouping... never 2 from that grouping while selectively harvesting individuals as we travel the shoreline. If we don't see that consistency, it's not a food we need to consume at this time. Note, I adjusted numbers per species based on my past experience on Nihoa with Lehu = 6, Pupu Awa = 24, etc. Again based on experience, if there is any way our harvest/consumption will off-set the stability of the intertidal fishery, we will not harvest.

5. Which of the listed individuals on the permit request would be filling this role? “The intertidal monitoring / ‘opihi team consists of Native Hawaiian practitioners / cultural researchers on this voyage who are experienced in proper protocol and will help to ensure the entire group enters Papahānaumokuākea with proper intent and that all resources are treated with respect and care.”

Response: Pelika Andrade (permittee) will be filling the role. I have been actively engaged in the care of Papahānaumokuākea since 2008. I was one of the co-founders of the Intertidal partnership (with Randy Kosaki, Hoku Johnson, Moani Pai, and Chris Bird) in 2010 supporting (and participating in) the yearly summer accesses from 2011-2017. I have trained thousands of Hawaii school groups, community members, and residents across the Archipelago in intertidal monitoring. I am also a part of the Cultural Working Group serving as Chair from 2010-2014 then again from 2021 to present (within our newly organized leadership team Hui Manamana). I have also been a part of the RAC, native Hawaiian representative since 2012 (I believe)... am a cultural monitor and have done cultural briefings for various accesses to Papahānaumokuākea.

6. Are gonads and shells brought back to the MHI for analysis? If so are the brought back in a natural state or preserved/fixed/frozen?

a. (Reference from application):

i. Section: Description of proposed activities: b.) To accomplish this activity we would ...

1. (pg. 6) We will collect ‘opihi to dissect gonads and use histological methods that can provide fecundity estimates and reproductive state by

sizes that have not been used for ‘opihi in PMNM in prior years. To determine fecundity-at-size, we will examine ‘opihi ovaries histologically for all size groups except size class A (0-1 cm SL). A total of n=80 specimens will be collected from Nihoa using an opihi knife. These specimens will be measured by caliper for shell length, shell width, and shell height, and weighted by scale for total weight, soft-body weight, and gonad weight.

Response: We usually process opihi in the monument doing all the measurements (length, width, height) and weights (entire animal with shell, without shell, gonad) and gender, but that was historically when we were on the Searcher with space and an entire crew dedicated to opihi. This specific access we will not be on the Searcher and not have an entire crew dedicated to opihi so I may have some help dissecting some but most likely not all. In both cases, the entire specimen (dissected and/or not dissected) are brought back to the MHI for further analysis and accurate data collection.

7. Is the collection of opihi the only biological samples for the intertidal surveys or will biological samples be collected for ha‘uke‘uke and limu too - or will only observational data collection occur for these organisms?

b. (Reference from application):

i. Section: 6. Purpose/Need/Scope State purpose of proposed activities (pg. 10):

1. The primary objectives of the permit activities are to:

a. (3) increase the knowledge base pertaining to intertidal ecosystems, including ‘opihi /hā‘uke‘uke / limu abundance, health, and reproductive cycles;

ii. Procedures/Methods (pg. 17):

1. The cultural research team would make visual assessments of intertidal areas where ‘opihi and ha‘uke‘uke are located. The research team would record substrate type, limu type/density, crustose/turf/macro algae proportions, other species proportions/ratio, clumping of ‘opihi, hā‘uke‘uke, and other intertidal species, presence of natural predators, freshwater input, etc.

Response: Opihi are the only species for biological sampling. The others are for consumption only.

8. The following questions are in reference to pages 19 and 20 of the application where it lists the number and size of specimens collected:

c. For the species collection list above - are the only organisms being collected for the biological survey the opihi or are gonad or other types of analysis occurring with other species?

Response: Opihi are the only organisms collected for biological reasons BUT when harvesting the others, we do take note of reproductive states and other observations, which are included in Huli‘ia.

- d. For the species collection list above – can the applicant provide the reasoning for increase in samples this year?

Response: There were only 2 species that were increased, Aama and Pipipi, whose numbers are plentiful and are species that each team member does eat (historically). We also decreased our Leho request.

- e. For the species collection list above - are 10 individuals collected per species of fish (Ahi, Mahimahi, Ono, Nenu, Aku) – i.e. up to 50 individuals total would be collected or is it 10 individuals across the 5 species – i.e. 10 total individuals will be collected across the 5 species?

Response: Up to 10 individuals across the 5 species.

- f. For the species collection list above - where does fishing for Ahi, Mahimahi, Ono, Nenu, Aku occur – is it during transit? Does it occur in both nearshore and pelagic waters?

Response: All but Nenu will be in pelagic and during transit. We usually pull lines in as we get closer to land because of birds hunting and the instance we may come across other species foraging close to the islands. Nenu is the only fish we harvest close to land and it isn't with line but either by spear or hand techniques.

- g. For the species collection list above - are there any guidelines while fishing – (i.e. is there a targeted or minimum/maximum size fish that is aimed for per species – do certain sizes get released if too small or too large)? Is the entire fish usually consumed?

Response: Line fishing is hard in targeting size but if one is too large or too small, it will be released if chances of survival are good. Nenu are caught with more selection capability so medium size is usually the desired target size.

- h. Does the expedition know how many people will be on the boat and how many days the expedition will be in the monument?

Response: Boat time usually (pending weather conditions) are 1.5-2 days to Nihoa and 2+ days returning. Pending weather conditions and arrival times (too close to sunset we delay landing to the following day) days on land will differ. We depart on April 1 and return April 11 with 12 days for this access. If weather conditions are good we should be on land 7-8 days.

COMMENTS / RECOMMENDATIONS:

- 9. Request that the following condition to be included in the permit, (if this is not already stated in the permit conditions or BMPs): Permittee will implement collection/sampling design that removes a sustainable proportion from the local population of target organisms and make efforts to distribute collection activities across shoreline/reef flat/benthic areas, so as not to consolidate the impacts of collection in one location (if applicable/if collecting samples).**

Response: Absolutely.

10. Would the applicant be open to working with OHA to give to a presentation to the Cultural Working Group with any findings from there research? The CWG would like to hear about the health status of the ‘ōpihi population and if there are any noted changes since the latest storms have blown through Hawai‘i.

Response: We are already on the CWG quarterly meeting agenda scheduled for March 22, 2023

Note from applicant:

Please note that this permit is being submitted for activities (especially the PACC) ONLY IF there is time since the primary reason for this trip is to do invasive species mitigation work under the co-managers permit with FWS. It is extremely hard and expensive to visit Papahānaumokuākea so any opportunity to fill in data gaps and continue consistency in our research we do not let pass us by.

Additional reviews and permit history:

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g. MMPA, ESA, EA) Yes ☒ No ☐

If so, please list or explain:

Other Consultations: (ESA/MMPA Section 7; NHPA Section 106, etc.)

- On February 09, 2023, NMFS concurred that all proposed permit activities would be covered under PMNM’s programmatic ESA Section 7 informal consultation. NMFS-prescribed conditions will be reflected in the PMNM permit, prior to issuance.
- On February 09, 2023, NMFS concurred with the ONMS determined that—given the scope of the proposed action and the implementation of proposed BMPs and special terms and conditions for permit PMNM-2023-004—the proposed project will adversely affect EFH, but effects will be no more than minimal. The ONMS BMPs and special terms and conditions (included in Appendix below) are suitable to ensure that adverse effects to EFH will be no more than minimal. Therefore, NMFS did not provide additional conservation recommendations for this project, thus satisfying the requirements of Section 305(b)(D)(2) of the Magnuson-Stevens Act.

Monument permits have been issued to applicant Pelika Andrade (PMNM-2021-009) and the co-researcher working on the project, Kim Kanoe‘ulalani Morishige, for similar activities in 2011 and 2012 (PMNM-2011-040, PMNM-2012-052, PMNM-2014-020, PMNM-2015-017, PMNM-2015-017 A1 and PMNM-2017-024 respectively).

Similar activities, including cultural monitoring activities on land and intertidal areas, have been previously permitted in the Monument for different applicants (PMNM-2007- 024 Kanahele, PMNM-2008-041 Kikiloi-Graves, PMNM-2009-021 Kikiloi-Graves, PMNM-2009-023 Kanahele, PMNM-2009-047 Kawelo, PMNM-2011-036 Kanahele, PMNM-2011-039 Kikiloi-Graves, PMNM-2011-040 Tom, PMNM-2012-038 Anthony, PMNM-2012-052 Springer, PMNM-2013-026 Anthony, and pending applications PMNM-2015-014 Kikiloi and PMNM-2015-022 Kanahele. Personnel that would be participating in these activities have participated in past approved permitted activities previously listed.

Exemption Determination: After reviewing §11-200.1-15, HAR, including the criteria used to determine significance under §11-200.1-13, HAR, DLNR has concluded that the activities under this permit would have minimal or no significant effect on the environment and that issuance of the permit is categorically exempt from the requirement to prepare an environmental assessment based on the following analysis:

1. All activities associated with this permit have been evaluated as a single action. Since this permit involves an activity that is precedent to a later planned activity, i.e., the same methodology used throughout the permit period, the categorical exemption determination here will treat all planned activities as a single action under §11-200.1-10, HAR.

2. The General Exemption Type #5 for Basic Data Collection, Research and Experimental Management with no Serious or Major Environmental Disturbance Appears to Apply. §11-200.1-16 (a) (1) and §11-200.1-16 (a) (2), HAR, exempts the class of actions that involve “basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource.” This exemption type has been interpreted to include the intertidal surveys and monitoring and the collection and analysis of opihi and reproductive biology, such as those being proposed.

The proposed activities here appear to fall squarely under the general exemption type identified under HAR §11-200.1-16 (a) (1) and as described under the revised 2020 DLNR Exemption List (Concurred on by the Environmental Council on November 10, 2020), under the general exemption type #5 (Part 1), item #15, which includes, the conducting of “game and non-game wildlife surveys, vegetation and rare plant surveys, aquatic life surveys, inventory studies, new transect lines, photographing, recording, sampling, collection, culture, and captive propagation.”

The General Exemption Type #8 for Continuing Administrative Activities Appears to Apply. §11-200.1-16 (a) (1), HAR, exempts the class of actions that involve “continuing administrative activities.” This exemption type have been interpreted to include educational activities consisting of a cultural curriculum, such as those being proposed.

The proposed activities here appear to fall squarely under the general exemption type identified under HAR §11-200.1-16 (a) (1) and as described under the revised 2020 DLNR Exemption List (Concurred on by the Environmental Council on November 10, 2020), under the general exemption type #8 (Part 1), item #5, which includes, “training, environmental interpretation, public safety efforts and other educational activities.”

As discussed below, no significant disturbance to any environmental resource is anticipated. Thus, so long as the below considerations are met, an exemption class should include the action now contemplated.

3. Cumulative Impacts of Actions in the Same Place and Impacts with Respect to the Potentially Particularly Sensitive Environment Will Not be Significant. Even where a categorical exemption appears to include a proposed action, the action cannot be declared exempt if “the cumulative impact of planned successive actions in the same place, over time, is significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment.” §11-200.1-15 (d), HAR. To gauge whether a significant impact or effect is probable, an exempting agency must consider every phase of a proposed action, any expected primary and secondary consequences, the long-term and short-term effects of the action, the overall and cumulative effect of the action, and the sum effects of an action on the quality of the environment. §11-200.1-13, HAR.

Monument permits have been previously issued to the co-researcher working on the project (most recently 2018 and 2021) in State Waters, and several permits have been issued to various researchers since 2011 for similar types of intertidal studies. There were no deleterious effects from the previous expeditions. With this in mind, significant cumulative impacts are not anticipated as a result of this activity, and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the Monument Proclamation in that the activities do not diminish, but rather enhance monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts, nor did it raise any cultural concerns, that would occur as a result of these activities.

Since no significant cumulative impacts or significant impacts with respect to any particularly sensitive aspect of the project area are anticipated, the categorical exemptions identified above should remain applicable.

4. Overall Impacts will Probably be Minimal and Insignificant. Any foreseeable impacts from the proposed activity will probably be minimal, and further mitigated by general and specific conditions attached to the permit. Specifically, all conservation and management activities covered by this permit will be carried out with strict safeguards for the natural, historic, and cultural resources of the Monument as required by Presidential Proclamation 8031, other applicable law and agency policies and standard operating procedures.

Conclusion. Upon consideration of the permit to be approved by the Board of Land and Natural Resources, the potential effects of the above listed project as provided by Chapter 343, HRS and Chapter 11-200.1 HAR, have been determined to be of probable minimal or no significant effect on the environment and exempt from the preparation of an environmental assessment.

Papahānaumokuākea Marine National Monument
Permit Application – Native Hawaiian Practices
OMB Control # 0648-0548
Page 1 of 23

Papahānaumokuākea Marine National Monument

NATIVE HAWAIIAN PRACTICES 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 – Native Hawaiian Practices
OMB Control # 0648-0548
Page 2 of 23

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: Pelika Andrade

Affiliation: Na Maka Onaona (formerly Na Maka o Papahānaumokuākea) & UH Mānoa

Nā Maka Onaona (NMO) is a non-profit 501(c)3 supporting Aina Momona: A thriving and productive Hawaii. NMO cultivates and supports Aina Momona through providing culturally grounded educational programs and partnerships that support the over all health of our communities; mentally, spiritually, emotionally, and physically. NMO has been developing programs focused on investing in our communities and the next generation to lay a foundation for change paving the way to redefining health, wellness, and productivity. Most issues we face today are rooted in the misbehavior of people and the values, or lack of, we collectively share today. NMO focuses on addressing people to shift our behaviors, our values and our relationships and including people in healing the natural world around us. NMO strongly believes that the health of our environment is reflected in our people and the health of our people are reflected in our environment and it is a journey we must all take together.

Permit Category: Native Hawaiian Practices

Proposed Activity Dates: TBD April 2023 – March 2024

Proposed Method of Entry (Vessel/Plane): Vessel – Iwa Kai

Proposed Locations: Nihoa

Estimated number of individuals (including Applicant) to be covered under this permit:
13-15 (7 project personnel + 6-8 vessel crew) total people will be covered to conduct activities under this permit, co-listed under the co-managers permit.

Estimated number of days in the Monument: 12

Description of proposed activities: (complete these sentences):

a.) The proposed activity will...

Support co-managers (permit PMNM-2023-001) to survey for and control invasive plants, primarily *Cenchrus echinatus*; retrieve data from and re-deploy remote cameras; and

record phenology and abundance of seabirds, shorebirds, invertebrates and native plants.

In support of these activities, we will also be engaging in Huli ‘ia, an observational process documenting seasonal changes and shifts across entire landscapes, *ma uka* (ocean) to *ma kai* (ocean) identifying dominant correlating cycles to support and guide our management and best practices that support a productive and thriving community, ‘aina momona. It is an observational process documenting natural changes over time, identifies dominant cycles within certain species or occurrences (*flowering, fruiting, presence/absence of flora/fauna, cloud formations, spawning, or recruiting of fish species, etc.*) and assists in identifying correlations between species and/or occurrences as indicators of the other. When one thing happens (a flower blooms in mass), it indicates that another occurrence (a fish is spawning in mass) is happening (Sterling et al. 2017, Morishige et al. 2018). It allows natural cycles to support and guide our management practices allowing the flexibility needed to ensure the best times to rest areas or species and/or to harvest areas or species. Huli ‘ia stems from traditional management systems driven by an intimate understanding of the natural environment and the ability for communities to adjust and adapt their activities to support these systems of nature. Through this documentation process, Huli ‘ia supports the development of best practices enabling communities to adjust and adapt their activities to assist in malama ‘aina.

- Lani (atmospheric) observations include looking at cloud formations, noting wind direction/strength and what times it changes, visibility of the horizon, bird activity, other weather related observations such as rain or rainbows, the rising and setting of the moon and sun, the moon phase, and stars.
- Honua (land) observations include looking at any plants that are flowering, seeding or fruiting, new growth, animals reproducing, precipitation and soil moisture, bird arrival and departure and any other animal behaviors. Land observations from the main Hawaiian Islands during the expedition may also be useful to help remember activities in the NWHI during that time. For example, we notice hala fruiting here on the main islands and can relate that in the Northwestern Hawaiian Islands, this is the season when juvenile iwa are still in the nest.
- Kai (ocean) observations include noting the tide (high/low and time), waves and currents, identifying and looking at the behavior of invertebrates, limu (algae) and fish in the intertidal environments, noting any spawning or aggregation of species, and noting any juveniles and newly recruited species. (see observation datasheet)

If time allows, we will support sustainable fisheries and aina momona through continuing intertidal surveys and monitoring across the archipelago to advise and direct management strategies to support the intertidal fishery focusing on Opihi/Limpet productivity. Over the past decade of collaborative intertidal monitoring, our locally led research team has identified significant shortcomings to the current research being conducted on Hawai‘i’s unique wave-dominated, rocky intertidal shoreline. For instance, prior data collection methods failed to measure environment – a key component to intertidal ecology and sustainable fisheries

management. From recent findings, we draw new hypotheses and a new survey method (PACC) that focus on the effects of seasonal changes in habitat on patterns of reproductive cycles, recruitment and productivity of rocky intertidal communities. The work generated would be used to develop a sustainable fishery model for evaluating species productivity on any intertidal coastline in Hawai'i. As a model system for intertidal mollusc fisheries, our objectives are to assess the stock status for three species of limpet (*Cellana* spp.) in the Hawaiian Islands by: (1) describing and delineating their environment and habitat, (2) improving the understanding of the biology and ecology of *Cellana* spp., and (3) proposing sustainable harvest practices and management measures using an indicator-based approach.

Sustainable ecosystems and aina that are thriving and productive are fundamental in Native Hawaiian values and systems. Looking beyond the obvious Native Hawaiian practice of harvesting and gathering, there was a system in place that supported productive lands, oceans, and communities generationally. Our proposed activities are supporting the Native Hawaiian practice of Aina Momona.

Since 2009, Na Maka Onaona has been a major partner in Hawaii's Intertidal Monitoring Partnership conducting research in PMNM. Over the past eleven years, our team has been conducting intertidal monitoring along Hawaii's wave-exposed shorelines to address community concerns on sustainable harvest of 'opihi (*Cellana* spp). Working with numerous schools and community organizations, we have learned valuable lessons about both the productivity of our shorelines, and how this productivity aligns within the larger goals of thriving communities (Morishige et al. 2018). Through integrating institutional research, traditional knowledge systems, end-user (i.e. fisher) engagement, and outreach/education, our team has developed a unique research approach - made possible through the contributions of these multiple perspectives, considerations, and relationships. This journey provides us the capacity to understand a space through the multiple lenses within a community and create a platform that is inclusive of various knowledge systems to address the needs of our people, our environment, and a thriving relationship between the two entities. Building on recent research, our understanding of place changes by season and across multiple landscapes. We have developed a modified survey to look at the role of different habitat types, and the influence of environment on the carrying capacity of our intertidal fishery. Based on a shared goal of a productive and sustainable fishery, our latest series of questions have led us to identify management strategies that can maximize replenishment in these rocky intertidal ecosystems. We believe the sharing of this journey is valuable, and will encourage a more inclusive conversation to evolve management and conservation to truly support 'aina momona, abundant and productive communities of people and place.

PACC surveys aim to better understand how natural fluctuations occur even on remote shorelines with low human impact. This research will shed light on seasonal growth and die back of populations in relation to their habitat size and local physical environment. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Chris Bird and intertidal monitoring crews have noted changes over time. For example, there was a high density of

recruits recorded in June 2010, however, they did not all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m²), whereas in 2011, there were less 1.5-year-old ‘opihi (50 per m²) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html). Although one year might seem like there are many recruited ‘opihi, the habitat and environmental conditions can limit their survival and influence successful recruitment into adult populations. This highlights the importance of considering the maximum and minimum thresholds of population densities by size to identify stable carrying capacities.

PACC implements a mix of standardized and novel methodologies across boulder, bench, and sloped rocky substratum to: 1) examine the effect of swell exposure (Low, Medium, High) on habitat size; 2) develop a practical, routine method for determining opihi growth rates and age in-situ; and 3) measure species fecundity and reproductive output in relation to major environmental drivers such as temperature. Our project evaluates how environment, growth and age structure, and reproductive output affects total shellfish production on temporal and spatial scales; and re-establishes productive ecosystems as a fundamental strategy of traditional Hawaiian resource management.

The outputs of this project will be the identification of optimal habitat for a productive intertidal fishery, effective management strategies/tools, and support for stakeholder decision-making based on the sustainable opihi population density for respective shorelines-types. If we can understand a shoreline’s stable habitat (habitat size and population densities at its minimum normally during the seasonal dieback), we can understand that shoreline’s stable carrying capacity of ‘opihi. This research in PMNM is part of an on-going initiative to survey multiple locations in the Main Hawaiian Islands to inform management techniques to sustainably harvest and rest populations that compliments cyclical productivity. Locations across the Hawaiian Archipelago have been selected due to existing, long-term partnerships and/or areas of interest expressed by Native Hawaiian community members. Our research team will train and work with local and Native Hawaiian communities to build local research capacity by surveying their intertidal ecosystems.

Consistent with proclamation 8031, these activities will strengthen cultural and spiritual connections to the Northwestern Hawaiian islands and foster the expansion and perpetuation of Native Hawaiian ecological knowledge and research methodologies. This knowledge may be critical as it is observed by local Hawaii residents that ‘opihi and hā‘uke‘uke stocks are generally diminishing in size and number in the main Hawaiian Islands, therefore more data in this area may help to curb the decline. The continuation of ‘opihi data collection, and comprehensive intertidal surveys (including fishes, algae and invertebrates) using Native Hawaiian ecological knowledge and methodologies coupled with western science will help to contribute to the overall health of Papahānaumokuākea.

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

conduct PACC surveys to examine ‘opihi densities by size classes and maximum sizes within each vertically stratified zone (black zone (basalt rock) and pink zone (crustose coralline algae zone)). The black zone is located on the upper extent of the shoreline defined as the Emergent Tidal Zone where black rock is exposed to the air depending on the tide and the pink zone is located lower on the shoreline in the Wave Zone (Bird et al. 2013). Rugosity measurements will be recorded for the black zone and pink zone to identify differences in ‘opihi carrying capacity by distinct habitat zones within the intertidal ecosystem. Tight measurements will also quantify the growth and shrinkage of the broader shoreline within each survey site to provide a practical measure of seasonal habitat threshold. PACC surveys will provide a total rugosity measurement for black and pink zones within the mixed (overlap of black and pink zones) rugosity zones. In order to increase the precision of ‘opihi habitat availability, PACC will also record differences in ‘opihi habitat and non-habitat to develop more precise estimates of ‘opihi densities.

We will collect ‘opihi to dissect gonads and use histological methods that can provide fecundity estimates and reproductive state by sizes that have not been used for ‘opihi in PMNM in prior years. To determine fecundity-at-size, we will examine ‘opihi ovaries histologically for all size groups except size class A (0-1 cm SL). A total of n=80 specimens will be collected from Nihoa using an ‘opihi knife. These specimens will be measured by caliper for shell length, shell width, and shell height, and weighted by scale for total weight, soft-body weight, and gonad weight.

To ensure responsible and ethical practices, we will refrain from collecting ‘opihi and hā‘uke‘uke if populations appear too small to sustain collections. Consumption of intertidal resources including invertebrates, limu will further support cultural practice and relationship between participants and our islands. Consumption feeds physical, spiritual, and cultural health rooting us in our ancestral ties and customary practices. Consumption allows us to be nurtured and nourished by place and genealogy. Our islands and the resources thriving here are older siblings and customary relationships are based on the reciprocal practice of being fed and cared for by our older siblings while we care for and “feed” them in return. Our presence, activities, oli, observations, surveys, etc feed and care for place further supporting the physical, spiritual and cultural health of our islands and ourselves. Consumption also allows us to interact with place and understanding the network involved to produce a meal, which feeds a community. The research team will work together to apply this integrated monitoring approach. The research team will be comprised of cultural researchers / practitioners, scientists, and managers. To ensure the success of these field studies, the team will conduct appropriate protocol and offer ho'okupu (cultural offerings) to maintain the spiritual integrity of the sites that are visited.

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

This activity will not only add to the current knowledge of the marine environment in the NWHI, it will help to gain a better understanding of the resources by looking at the resources through a Native Hawaiian cultural lens ensuring a holistic approach to interaction and care. It will also help the monument by continuing to re-establish Native Hawaiian ancestral consciousness and

awareness about the health and condition of the marine resources. This integrated monitoring research cruise is the only one of its kind that integrates Native Hawaiian worldview and knowledge systems with western scientific methods to better understand the status of intertidal marine resources. It helps the Monument strengthen its management of cultural resources and ensures the strong participation of Native Hawaiians in the region's long-term protection. By providing opportunities to conduct cultural research, (cultural) researchers will assist in the recovery of important Native Hawaiian marine management practices and support the use of Native Hawaiian traditional ecological knowledge. Additionally, the permitted cultural practitioners and researchers will be key to the development of an eventual cultural access and monitoring plan for the NWHI.

The scientific research methods will build on the valuable long-term monitoring data collected on previous intertidal research cruises.

Other information or background:

Additionally this project is also supported by the following activities in the Monument Management Plan, (NHCH-2.1, 2.2, 2.3, 2.5, 2.6, 3.4, 4.2, 5.3 and NHCI – 3.1 and 3.2) all of which call for the identification of Native Hawaiian research priorities and access opportunities.

NHCH-2.1: Continue to compile information and conduct new cultural historical research about the NWHI.

NHCH-2.2: Support Native Hawaiian cultural research needs.

NHCH-2.3: Facilitate cultural field research and cultural education opportunities annually.

NHCH-2.5: Incorporate cultural resources information into the Monument Information Management System.

NHCH-2.6: Continue to facilitate Native Hawaiian cultural access.

NHCH-3.4: Identify and integrate Native Hawaiian traditional knowledge and management concepts into Monument management.

NHCH-4.2: Develop and implement specific preservation and access plans, as appropriate, to protect cultural sites at Nihoa and Mokumanamana.

NHCH-5.3: Integrate Native Hawaiian values and cultural information into the Monument permittee education and outreach program.

NHCI-3.1: Engage the Native Hawaiian community to identify how traditional knowledge will be integrated into Monument activities.

NHCI-3.2: Use and integrate Native Hawaiian traditional knowledge in Monument management activities.

References

Bird, C.E., Franklin, E.C., Smith, C.M. and Toonen, R.J., 2013. Between tide and wave marks: a unifying model of physical zonation on littoral shores. *PeerJ*, 1, p.e154.

Kay, E.A. and Magruder, W., 1977. The biology of opihi. Department of Planning and Economic Development, Honolulu, p.46.

Mau, A.B., 2019. The Aquaculture and Biology of ‘Opihi ‘Alinalina (*Cellana sandwicensis*) (Doctoral dissertation, University of Hawai‘i at Mānoa).

Morishige, K., Andrade, P., Pascua, P., Steward, K., Cadiz, E., Kapono, L. and Chong, U., 2018. Nā Kilo ‘Āina: Visions of Biocultural Restoration through Indigenous Relationships between People and Place. Sustainability, 10(10), p.3368.

Sterling, E., Ticktin, T., Morgan, T.K.K., Cullman, G., Alvira, D., Andrade, P., Bergamini, N., Betley, E., Burrows, K., Caillon, S. and Claudet, J., 2017. Culturally grounded indicators of resilience in social-ecological systems. Environment and Society, 8(1), pp.63-95.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Andrade, Pelika

Title: Executive Director, Na Maka Onaona / Extension Agent, UH Sea Grant

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

Andrade, Pelika

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

SEE ORIGINAL APPLICATION FOR CONTACT INFO

SEE ORIGINAL APPLICATION FOR CONTACT INFO

Phone: SEE ORIGINAL APPLICATION FOR CONTACT INFO

Fax:

Email: SEE ORIGINAL APPLICATION FOR CONTACT INFO

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

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

Na Maka Onaona, University of Hawai'i Sea Grant, University of Hawaii Manoa, Hawaii

Institute of Marine Biology

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, Diver):

We expect that the final list of cruise personnel will be available in March 2023 and will be submitted via an updated PMNM Compliance Information Sheet at that time.

Tentative List for 2023 Cruise

Pelika Andrade, Ph.D. Student, UH Sea Grant Extension Agent, PMNM Cultural Resource Monitor, Na Maka Onaona,
 Natie Hawaiian Cultural Working Group, NHP Permittee

- 1- Pelika Andrade
- 2- Rachel Rounds
- 3- Daniel Link
- 4- Ilana Nimz
- 5- Leila Nagatani
- 6- Michael Tuerk
- 7- FWS staff or volunteer
- 6-8 Iwa Kai crew TBD

Section B: Project Information

5a. Project location(s):

Ocean Based

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

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:

Various key location on Nihoa for invasive species sweeps, transects, and removal activities. Intertidal areas of Nihoa.

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

- ☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving Monument resource
- ☐ Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
- ☒ Anchoring a vessel
- ☐ Deserting a vessel aground, at anchor, or adrift
- ☐ Discharging or depositing any material or matter into the Monument
- ☐ Touching coral, living or dead
- ☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- ☒ Attracting any living Monument resource
- ☒ Sustenance fishing (Federal waters only, outside of Special Preservation Areas, Ecological Reserves and Special Management Areas)
- ☒ Subsistence fishing (State waters only)
- ☒ Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

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

The central purpose of the expedition is to support co-management activities. The central purpose of this permit is to expand and advance traditional Native Hawaiian knowledge in the field of marine conservation and management and continue to bridge the gap between cultural and western research methodologies. The primary objectives of the permit activities are to:

- (1) collect environmental data related to traditional Native Hawaiian marine management;
- (2) expand the application of traditional Hawaiian environmental monitoring tools and methodologies;
- (3) increase the knowledge base pertaining to intertidal ecosystems, including ‘opihi / hā‘uke‘uke / limu abundance, health, and reproductive cycles; and
- (4) re-establishing and strengthening cultural ties through feeding and being fed by our environment (genealogy).

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species? 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/endangered/>

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?

All activities contained in this permit application were permitted over prior years and have demonstrated no impact on Monument cultural, natural and historic resources. All consultations (e.g. Section 106 National Historic Preservation Act) and compliance requirements would be completed prior to departure. The activities would adhere to all rules and regulations established by the Monument including adherence to all quarantine requirements, wildlife viewing guidelines, and entry/exit notification procedures where applicable.

The intertidal monitoring / ‘opihi team consists of Native Hawaiian practitioners / cultural researchers on this voyage who are experienced in proper protocol and will help to ensure the entire group enters Papahānaumokuākea with proper intent and that all resources are treated with respect and care. Native Hawaiian protocols, including oli and mele, will be conducted to re-establish an awareness between people and place. It will also serve to reconnect the Northwestern Hawaiian Islands into the Hawaiian consciousness and worldview. This ceremony/protocol is very important because it establishes a sense of respect and reverence for the environment and all things it encompasses. It also supports a cultural interaction between people (younger siblings) and the islands & resources (older siblings) and prepares participants for that interaction. These protocol and ceremony are necessary to tap into an elevated state of awareness which will support cultural research and participants’ openness to “see” properly.

The consumption of intertidal resource invertebrates, limu will be conducted with adequate safeguards by not taking more than what is needed to allow participants to practice their culture but without compromising the ecological integrity and natural resources. For example, when harvesting ‘opihi we will be mindful to harvest individuals that are larger than the legal-size limit of 1 ¼ inch as well as to leave larger ‘opihi alone as they are believed to be more fecund. We will also harvest from various places along the shoreline to be mindful of harvest pressure on one rock. ‘Opihi are also able to reach reproductive maturity at approximately 7 months after settling onto the rocks (Kay & Magruder 1977), thus we are confident that there will be larval recruitment the following year. When harvesting limu, proper practice of cutting the branches off and leaving the holdfast will be utilized to ensure continual growth after it is harvested. We believe that two traditionally harvested and prepared individuals of each invert species (see Quest #9) per person and a total of one “mini snack-sized zip lock bag” approximately 100 grams of limu (see Quest #9) is appropriate to harvest per island.

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?

Per 7a above, all activities obtained in this permit application were permitted over prior years and have previously demonstrated no impact on Monument cultural, natural and historic resources. All consultations (e.g. ESA Section 7) and compliance requirements would be completed prior to departure. All personnel named in this permit will be accompanied by an experienced researcher in conducting surveys in the intertidal zone and are aware of the risks associated with working in nearshore areas with high wave action. Activities proposed in this application would have no cumulative effect as the applicant is proposing short survey days and no negative effects have resulted from previous years’ surveys within the NWHI.

In addition, this activity is part of the following Monument Management Plan Action Plans:

- NHCH 2.3: Facilitate cultural field research and cultural education opportunities annually;
- NHCH 2.6: Continue to facilitate Native Hawaiian cultural access;
- NHCH-3.1: Assess Monument cultural resource capacity;
- NHCH-3.2: Increase knowledge base of Native Hawaiian values and cultural information through “in-reach” programs for research managers;
- NHCH-4.2: Develop and implement specific preservation and access plans, as appropriate, to protect cultural sites at Nihoa and Mokumanamana;
- NHCH-5.3: Integrate Native Hawaiian values and cultural information into the Monument permittee education and outreach program

In addition, NOAA Office of National Marine Sanctuaries (ONMS) as a managing agency on the Monument Management Board, does and would commit to monitoring the intertidal zones of Nihoa and Mokupapapa (French Frigate Shoals). From 2010-2018, ONMS funded 100% of the

annual intertidal research cruises to the same areas on Nihoa, Mokumanamana, and Mokupapapa (French Frigate Shoals - FFS) in which permitted sampling of various invertebrate species occurred the prior year. The project is led by two experts: Pelika Andrade and Kim Kanoē‘ulalani Morishige. ONMS and permittees will provide survey and report data to the U.S. Fish and Wildlife Service (USFWS) as stipulated in the general conditions of this permit.

Previous permitted intertidal monitoring efforts suggest the take activity is beneficial for the resource. In 2012, the intertidal data was collected for the fourth consecutive year and Dr. Bird, Na Maka Onaona, and the Intertidal Monitoring Partnership have noted changes over time. For example, the high density of recruits recorded in June 2010, didn’t all survive, suggesting that more ‘opihi settled on the shore than the habitat could sustain. In 2010, participants recorded numerous small one month old ‘opihi (300 per m2), whereas in 2011, there were less 1.5-year-old ‘opihi (50 per m2) (http://www.papahanaumokuakea.gov/news/opihi/opihi_chris_b.html). Similarly, researchers and participants have noted differences in population distribution, for example, in 2012, ‘opihi at Mokumanamana and Nihoa were recorded in the tens of thousands compared to the 3,000 found at La Perouse Pinnacles at FFS (http://www.papahanaumokuakea.gov/research/intertidal_cruise2013_return.html). No ‘opihi samples were or will be collected at La Perouse Pinnacles due to the low population size.

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

There is no practicable alternative to conducting the activity within the Monument. There is no other place within the Hawaiian Archipelago that can serve as a baseline of abundance for local community-based marine managers due to its remote locale and legal protection status. Because the Northwestern Hawaiian Islands are remotely managed, this area serves as an optimal measure for determining how environment and habitat availability influence ‘opihi populations with minimal human impact. These activities will directly contribute to the PACC surveys being conducted in the Main Hawaiian Islands to develop indicators of productivity that incorporate environmental factors and critical aspects of ‘opihi life history, both essential components for sustainable fisheries management.

The consumption of intertidal inverts and limu can be conducted outside of Papahānaumokuākea, however there is no alternative to consuming an important cultural resource at a place like Papahānaumokuākea because it allows one to connect to a place on a spiritual level which cannot be done by consuming it elsewhere. This is the reason kanaka maoli can connect to the place they live, because they have a deep and intimate connection to their land, their oceans and to their resources. We cannot whole-heartedly connect to Papahanaumokuakea without practicing our culture like we do in other parts of Hawai‘i, this is an extension of our daily lives and make up who we are. The intent is to mālama Papahānaumokuākea by re-connecting ourselves to the place, being present, observe & listen to what she tells us and to allow her to spiritually and physically mālama us by consuming

resources found there and by giving us ‘ike and showing us hō‘ailona and experiences found nowhere else on this planet.

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 end value of the activity outweighs any adverse impacts by safeguarding against the loss of opportunity to expand Native Hawaiian knowledge and re-connect kanaka maoli culturally, physically, and spiritually to Papahānaumokuākea. There is a great need to recover traditional Native Hawaiian marine ecosystem management practices, and as such, the Monument provides an unparalleled venue to accomplish this.

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

The duration of the activity will be fit into any open opportunities to access the shoreline within the primary activity of the co-managers permit. All other activities listed in this permit will be in support of the primary activity of the co-managers permit.

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

The applicant, Pelika Andrade, is qualified to conduct and complete the activities within this application. **Pelika Andrade** is the executive director and co-founder of Na Maka Onaona supporting productive communities across Hawaii. Andrade is a co-developer of Huli‘ia, Na Maka Onaona’s seasonal tracking tool/program which has been used during previous intertidal cruises, in Kure Atoll field crew activities, as well as Midway FWS activities. Andrade has also spent the past 14 years working within Papahānaumokuākea conducting research, supporting management activities, supporting outreach and education initiatives and serving on both the PMNM Reserve Advisory Council and the Cultural working group. She was one of the co-founders of the formal intertidal cruise in 2010 supporting the collaboration from 2011 till it’s final year in 2017. Andrade is also a Hawai‘i Sea Grant Extension Agent at the University of Hawaii Manoa and a native Hawaiian born and raised on the island of Kaua‘i. She has a long history working with coastal communities throughout the archipelago as a community member, sailor, voyager, cultural practitioner and researcher. For the past 14 years, she has been developing alternate approaches to monitoring Hawai‘i’s shoreline and supporting implementation of a management strategy that supports healthy, balanced communities in Hawai‘i. Previous to her work as a Sea Grant Extension Agent, Andrade served as the program coordinator for the Keaholoa STEM Scholars Program at the University of Hawai‘i at Hilo and a lecturer co-instructing the Kuula: Integrative Marine Resource Management course established in partnership with PMNM NOAA and UHHilo Marine Science and Uluakea program.

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 vessel and transport are funded in full by USFWS. The field and research activities on Nihoa are led and supported by USFWS. All other activities, including the data workup for all the information collected through this access, will be supported by the University of Hawaii at Manoa and Na Maka Onaona.

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

The methods and procedures employed are widely accepted by Native Hawaiian marine practitioners and research scientists for collecting quantitative and qualitative data in intertidal ecosystems. The proposed methodology would not require specialized equipment and would also take into full account the fragility of the Monument's resources. We will conduct responsible and ethical practices by refraining from collecting and harvesting invertebrates or algae if the population numbers appear too low. We will use hook/handline and trolling methods for the sustenance fishing while in federal waters.

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

It is highly likely that this activity would be carried out on a vessel outfitted with a mobile transceiver unit approved by OLE and therefore complies with the requirements of Presidential Proclamation 8031.

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

All permits required for access and conducting cultural observations of the marine environment will be obtained. Also, several members from the Native Hawaiian cultural working group have been consulted regarding the activities to be permitted under this application. Similar to all previous Intertidal Cruise's (2011-2017), a presentation will be provided to the working group when time is available.

ADDITIONAL FINDINGS FOR PROPOSED NATIVE HAWAIIAN PRACTICES

k. Explain how the activity is non-commercial and will not involve the sale of any organism or material collected.

The activity is non-commercial. The end-value of the activity is informational and is intended to provide local and governmental managers the information critical to the conservation of these cultural resources.

l. Explain how the purpose and intent of the activity is appropriate and deemed necessary by traditional standards in the Native Hawaiian culture (pono), and demonstrate an understanding of, and background in, the traditional practice and its associated values and protocols.

The purpose and intent of the proposed activity is appropriate and pono by traditional standards in the Native Hawaiian culture in that the expedition is centered on enhancing traditional marine resource management skills through careful observation.

m. Explain how the activity benefits the resources of the Northwestern Hawaiian Islands and the Native Hawaiian community.

The data collected from these field studies will better enable these cultural researchers / practitioners to understand the biological, spiritual and cultural connections between the NWHI and the Main Hawaiian Islands. In doing so, researchers will be better equipped to manage their areas in the main Hawaiian Islands from which the Northwestern Hawaiian Islands will ultimately benefit.

In the Main Hawaiian Islands, Na Maka Onaona has built strong partnerships with numerous organizations building the capacity of community groups, families, and agencies to track seasonal cycles and trends across entire landscapes. Na Maka Onaona has also built strong relationships with UH Manoa, NOAA PMNM, OHA, USFWS, Hawaii Institute of Marine Biology, Hawaii DAR, Hui Maka'ainana o Makana, Kalaemano Interpretive Center, and various other community partners focusing on intertidal research and opihi fishery management. Our team of research leads, student interns, and community volunteers will conduct monthly intertidal surveys and quarterly sample collections, while the UH Sea Grant College Program and UH graduate students will analyze the data and conduct outreach to disseminate the findings to community stakeholders. Drawing upon over a decade of experience in building local community capacity for conducting research and outreach in Hawai'i's rocky intertidal, our team will develop products that will inform local community decision-making on the development of effective adaptive management strategies and tools that support a productive intertidal 'opihī fishery that ensures a stable food resource for future generations of local residents and Hawaiians.

n. Explain how the activity supports or advances the perpetuation of traditional knowledge and ancestral connections of Native Hawaiians to the Northwestern Hawaiian Islands.

The group of cultural researcher / practitioners leading activities of this permit possess intricate knowledge of traditional Native Hawaiian phenology and marine management practices in the near shore fishery area within their own ahupua'a. Of equal importance, knowledge gained will be utilized to inform local marine management and conservation education within their home communities. Each practitioner will reflect upon traditional concepts like 'āina momona (bountiful lands), ho'omalū (regulated activities) and kapu (prohibited activities) which are

fundamental in traditional Native Hawaiian marine management.

o. Will all Monument resources harvested in the Monument be consumed in the Monument? If not, explain why not.

Yes, under this permit, all of the resources harvested for cultural purposes will be consumed in the monument.

8. Procedures/Methods:

The cultural research team would make visual assessments of intertidal areas where ‘opihi and ha‘uke‘uke are located. The research team would record substrate type, limu type/density, crustose/turf/macro algae proportions, other species proportions/ratio, clumping of ‘opihi, hā‘uke‘uke, and other intertidal species, presence of natural predators, freshwater input, etc. The team would take wet/dry notes and use digital cameras to record observations (will remain within the BMO distance for any filming or photography of protected species). At the end of visiting each island, Na Maka Onaona will facilitate a Huli ‘ia discussion for the group to share observations. One person will be designated and write all the observations made by the group on one data sheet to facilitate the analysis process while observations are still fresh and can be clarified. To complete these activities, our crew would require access to nearshore areas (below the splash zone) that contain ‘opihi habitat (e.g. intertidal zone at Mokumanamana). Every participant will adhere to all Monument requirements while undertaking this project.

Cultural harvesting protocols for intertidal invertebrates and limu will be conducted with adequate safeguards by not taking more than what is needed to allow participants to practice their culture but without compromising the ecological integrity and natural resources. Appropriate oli/mele will be conducted prior to arrival and departure on each island to introduce ourselves and our pono intentions as well as to thank each island for their contributions. We believe the following amounts per visit within the timeframe of this permit are appropriate: no more than four (4) individuals of each invert species, including ha‘uke‘uke and opihi, per person, (see Quest #9), two he‘e, and a total of one “mini snack-sized zip lock bag” approximately 100 grams of limu (see Quest #9) is appropriate to harvest per island. Harvesting will supplement meals and may consist of ‘opihi, hā‘uke‘uke, limu, ‘a‘ama, pipipi, makaloa, he‘e, and leho. ‘Opihi will be gathered by hand using an ‘opihi knife, and we will be mindful to harvest individuals that are larger than the legal-size limit of 1 ¼ inch as well as to leave larger ‘opihi alone as they are believed to be more fecund. We will also harvest from various places along the shoreline to be mindful of harvest pressure on one rock. ‘Opihi are also able to reach reproductive maturity at approximately 7 months after settling onto the rocks (Kay & Magruder 1977), thus we are confident that there will be larval recruitment the following year. When harvesting limu, proper practice of cutting/ pinching off the branches off and leaving the holdfast will be utilized to ensure continual growth after it is harvested. All other invertebrates will be gathered by hand. All inverts will be consumed raw, except leho and pipipi, which will be boiled then consumed. Limu will be “cured” and prepared to supplement meals. He‘e will be harvested

by using a metal rod to attract the he‘e out of its house and then be gathered by hand. We will not harvest he‘e that is under one pound, in accordance to the State of Hawai‘i fishing regulations. The he‘e will either be prepared by either drying or boiling before consumption. Near-shore spear fishing or catch by hand methods for reef fish. Hook, handline, and trolling methods will be used to sustainance fish while in State and Federal waters. Refer to attached table for list of species.

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:

1. Thin-Shelled Rock Crab
2. Spotted Drupe
3. Black Nerite
4. Open Drupe
5. Helmet Urchin
6. Black-Foot ‘Opihi
7. Yellow-Foot ‘Opihi
8. Day Octopus / Cliff Octopus
9. Humpback Cowry
10. Intermediate Drupe
11. None, Bonnemaisoniaceae Family
12. Sea lettuce, Ulvaceae Family
13. Order Ceramiales, Rhodomelaceae Family
14. Yellowfin tuna
15. Dolphinfin
16. Wahoo
17. Hawaiiin Chub
18. Skipjack tuna

Scientific name:

1. Grapsus tenuicrustatus
2. Drupa ricina
3. Nerita picea
4. Thais aperta (formally Purpura aperta)
5. Colobocentrotus atratus
6. Cellana exarata
7. Cellana sandwicensis

8. *Octopus cyanea* / *Octopus oliveri*
9. *Cypraea mauritiana*
10. *Thais intermedia*
11. *Asparagopsis taxiformis*
12. *Ulva lactuca*
13. *Palisada parvipapillata*
14. *Thunnus albacares*
15. *Coryphaena hippurus*
16. *Acanthocybium solandri*
17. *Kyphosus hawaiiensis*
18. *Katsuwonos pelamis*

Hawaiian name:

1. 'A'ama
2. Makaloa
3. Pipipi
4. Pūpū 'Awa
5. Hā'uke'uke
6. Makaiauli
7. 'Ālinalina
8. He'e Maui / He'e Pali
9. Leho ahi
10. Pūpū
11. Limu Kohu
12. Pālahalaha
13. Līpe'epe'e
14. Ahi
15. Mahimahi
16. Ono
17. Nenu
18. Aku

& size of specimens:

1. 'A'ama:
 - a. Up to 30 per island/location per access
 - b. 3 inches or larger
2. Makaloa
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
3. Pipipi

- a. Up to 30 per island/location per access
 - b. ½ inch or larger
4. Pūpū ‘Awa
 - a. Up to 30 per island/location per access
 - b. ½ inch or larger
5. Hā‘uke‘uke
 - a. Up to 30 per island/location per access
 - b. 2 inches or larger
6. Makaiauli
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
7. ‘Ālinalina
 - a. Up to 40 per island/location per access
 - b. 1 ¼ inch or larger
8. He‘e Maui / He‘e Pali
 - a. Up to 2 individuals per island/location per access
 - b. 1 lb or heavier
9. Leho Ahi
 - a. Up to 6 per island/location per access
 - b. 2 inches or larger
10. Pūpū - Thais
 - a. Up to 24 per island/location per access
 - b. 1 inch or larger
11. Limu Kohu
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
12. Pālahalaha
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
13. Līpe‘epe‘e
 - a. Up to 1 small “snack size” ziploc full (approx. 100g) per access
14. Ahi, Mahimahi, Ono, Nenu, Aku
 - a. Up to 10 individuals of the species listed while in transit.

Collection location:

Nihoa, Mokumanamana, Mokupāpapa

☒ Whole Organism ☐ Partial Organism

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

All specimens will be consumed while in PMNM.

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

- General site/location for collections:

NA

- Is it an open or closed system? ☐ Open ☐ Closed

NA

- Is there an outfall? ☐ Yes ☐ No

NA

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

NA

- Will organisms be released?

NA/NO

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

N/A

11. Describe any fixed or semi-permanent structures or installations, or cultural offerings you plan to leave in the Monument:

Offerings of pa'akai (salt) and wai (water) may remain in the Monument.

12. List all specialized gear and materials to be used in the proposed activities:

Snorkeling gear, transect line, data sheets, 'opihi knives, handline, hook & trolling equipment.

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

NONE

14. Describe collaborative activities to share samples, cultural research and/or knowledge gained in the Monument:

This permit application has been submitted in conjunction with the permit application submitted

the co-manager permit.

In addition, cultural researchers will present preliminary findings to community partner organizations, agency partners, and marine resource managers under this permit. Na Maka Onaona will continue to inform and update the public (e.g. at NWHI Coral Reef Ecosystem Reserve Advisory Council meetings) and the Native Hawaiian Cultural Working Group on all findings.

15a. Will you produce any publications, educational materials or other deliverables?

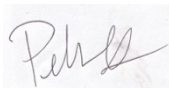
☒ Yes ☐ No

15b. Provide a timeline for write-up and publication of information or production of materials:

Education and Outreach curriculum material will be produced from this project and incorporated into material used for local schools in the Main Hawaiian Islands. One such example are the various Huli ‘ia posters produced by Na Maka Onaona and partners (NOAA PMNM, USFWS, OHA) and Huli ‘a data collected by communities across the archipelago.

16. If applicable, list all Applicant’s 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.



1/20/23

Signature

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?

- ☒ 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

Papahānaumokuākea Marine National Monument Compliance Information Sheet

1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant):

Pelika Andrade, Daniel Link, Rachel Rounds, Tessa Broholm, Leila Nagatani, Michael Tuerk, Ilana Nimzand and 4 TBD vessel crew.

2. Specific Site Location(s): (Attach copies of specific collection locations):

Nihoa

3. Other permits (list and attach documentation of all other related Federal or State permits):

ESA consultation completed 2/9/23. EFH consultation completed on 2/9/23.

3a. For each of the permits listed, identify any permit violations or any permit that was suspended, amended, modified or revoked for cause. Explain the circumstances surrounding the violation or permit suspension, amendment, modification or revocation.

n/a

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information):

The vessel and transport are funded in full by USFWS. The field and research activities on Nihoa are led and supported by USFWS. All other activities, including the data workup for all the information collected through this access, will be supported by the University of Hawaii at Manoa and Na Maka Onaona.

5. Time frame:

Activity start: 4/01/2023

Activity completion: 4/11/2023

Dates actively inside the Monument: TBD

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application:

Limiting factor is uncertainty of landing and intertidal access, pending ocean conditions and other access related responsibilities. Samples will also need to be processed (length, weight, gonad weight, etc) so samples will be gathered when processing is possible within the timeframe of other activities. Projected sampling will be towards the end of stay on Nihoa to accommodate the initial work planned for the trip and processing being completed on ship while underway on our return.

Personnel schedule in the Monument:

Pelika Andrade, Daniel Link, Rachel Rounds, Tessa Broholm, Leila Nagatani, Michael Tuerk, Ilana Nimzand and 4 TBD vessel crew.

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument: see attachment

7. Check the appropriate box to indicate how personnel will enter the Monument:

- ☒ Vessel
☐ Aircraft

Provide Vessel and Aircraft information: Searcher

Please note that responses to Questions 8-10 can be found on the CIS submittal for PMNM-2023-001 in which the IWA KAI is permitted to access the Monument under (or under USFWS records for the expedition).

8. The certifications/inspections (below) must be completed prior to departure for vessels (and associated tenders) entering the Monument. Fill in scheduled date (attach documentation):

- ☐ Rodent free, Date:
- ☐ Tender vessel, Date:
- ☐ Ballast water, Date:
- ☐ Gear/equipment, Date:
- ☐ Hull inspection, Date:

9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):

Vessel name:

Vessel owner:

Captain's name:

IMO#:

Vessel ID#:

Flag:

Vessel type:

Call sign:

Embarkation port:

Last port vessel will have been at prior to this embarkation:

Length:

Gross tonnage:

Total ballast water capacity volume (m3):

Total number of ballast water tanks on ship:

Total fuel capacity:

Total number of fuel tanks on ship:

Marine Sanitation Device:

Type:

Explain in detail how you will comply with the regulations regarding discharge in the Monument. Describe in detail. If applicable, attach schematics of the vessel's discharge and treatment systems:

Other fuel/hazardous materials to be carried on board and amounts:

Provide proof of a National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement-approved Vessel Monitoring System (VMS). Provide the name and contact information of the contractor responsible for installing the VMS system. Also describe VMS unit name and type:

VMS Email:

Inmarsat ID#:

* Individuals MUST ENSURE that a type-approved VMS unit is installed and that its automatic position reports are being properly received by the NOAA OLE system prior to the issuance of a permit. To make sure your VMS is properly configured for the NOAA OLE system, please contact NOAA OLE at (808) 725-6110 or (808) 725-6100.

* PERMITS WILL NOT BE ISSUED TO INDIVIDUALS ENTERING THE MONUMENT VIA VESSEL UNTIL NOAA OLE HAS CONTACTED THE MONUMENT PERMIT COORDINATOR WITH A 'POSITIVE CHECK' READING.

10. Tender information:

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors:

Additional Information for Land Based Operations

11. Proposed movement of personnel, gear, materials, and, if applicable, samples:

12. Room and board requirements on island:

13. Work space needs:

DID YOU INCLUDE THESE?

- ☐ Map(s) or GPS point(s) of Project Location(s), if applicable
- ☐ Funding Proposal(s)
- ☐ Funding and Award Documentation, if already received
- ☐ Documentation of Insurance, if already received
- ☐ Documentation of Inspections
- ☐ Documentation of all required Federal and State Permits or applications for permits