Papahānaumokuākea Marine National Monument

RESEARCH Permit Application

NOTE: ***This Permit Application (and associated Instructions) is to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).***

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.

- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.

- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

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

SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.

Papahānaumokuākea Marine National Monument
Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: David Hyrenbach
Affiliation: Oikonos–Ecosystem Knowledge & Hawaii Pacific University

Permit Category: Research
Proposed Activity Dates: 01 January 2024 – 31 December 2024 (Year 1 of a 3-year project)
Proposed Method of Entry (Vessel/Plane): Vessel (separately permitted by USFWS)
Proposed Locations: Kamole (Laysan Island) and Hōlanikū (Kure Atoll)

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

11 personnel and 11 TBD slots

Estimated number of days in the Monument: Overall, we are asking for 28 days in the Monument in 2024, with 14 days spent at each of the 2 proposed locations. The timing and number of visits to the field sites will depend on availability of ship transport, USFWS schedules, and weather. In future years, we will submit permit applications for an additional 42 days in 2025 and 28 days in 2026.

At Kamole: Weather permitting, a two-person team from Oikonos will visit this site once in 2024 (with additional visits planned in 2025 and 2026 that will be included in future permit applications). The bulk of the research will be conducted over 2 weeks during the early albatross chick provisioning period (late January – May). Our team deployments will span 12 - 14 days: transiting from Honolulu (3-4 days), working in the field (6 days), and returning to Honolulu (3-4 days). In 2025 and 2026, we plan to request permits for similar amounts of time in each of those years. Additionally, we plan on asking ask that USFWS and NOAA monk seal teams deployed at these locations retrieve tags opportunistically during any additional separately permitted visits in 2025 and 2026. No new tags will be deployed in 2026.

At Hōlanikū: All activities at this site will rely on State of Hawai‘i Division of Forestry & Wildlife (DOFAW) personnel, already deployed/separately permitted for access in the field from October 2023 to May 2024. In 2024, the team will deploy 20 Geolocation (GLS) tags over 2 weeks, during the late egg incubation and early albatross chick provisioning period (January – May). Our future plans (to be included in future permit applications) is to have the Hōlanikū team spend 2 weeks in January – May 2025 deploying the other 20 GLS tags and 2 weeks opportunistically retrieving the 2024-deployed tags (for a total of 4 weeks). We also plan to have the Hōlanikū team spend an

additional 2 weeks in January – May 2026 opportunistically retrieving tags during their normal fieldwork. No new tags will be deployed in 2026.

Overall time on field sites in Year 1 (2024): 14 days (Kamole) and 14 days (Hōlanikū)

In future years, we plan on requesting permits for the following time:
Year 2 (2025): 14 days (Kamole) and 28 days (Hōlanikū)
Year (2026): 14 days (Kamole) and 14 days (Hōlanikū)

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

The proposed research on black-footed albatross (BFAL) will: (1) characterize the at-sea distribution of birds breeding on Kamole and Hōlanikū over two breeding seasons (2024, 2025) and two non-breeding seasons (2024, 2025); (2) obtain feather samples to determine the sex of the tagged birds using molecular techniques; (3) integrate sex-specific data on seasonal movements by birds from these two colonies with existing tracking datasets for this species; and (4) synthesize their at-sea distribution and overlap with U.S. and foreign fisheries across the North Pacific to develop an integrated bycatch risk assessment for the species.

b.) To accomplish this activity we would ….

Over 3 years, we would deploy a total of 20 satellite-linked platform terminal transmitters (PTTs) and up to 90 archival Geolocation (GLS) tags to track the movements of up to 110 breeding BFAL (see Table 1). This permit application covers Year 1 (2024), but we have included all years here for clarity about the scope of the project.

<u>At Kamole:</u> BFAL have not been tracked from this site previously. Thus, we will deploy 20 PTTs and 40 GLS tags at this site. If we obtain additional funding, we would deploy an additional 10 GLS tags. Our goal is to deploy half of the currently funded tags (10 PTT and 20 GLS) in 2024. Weather and field conditions may alter this plan. The other half would be deployed in 2025 (under a separate permit application).

Under future permit applications, we plan to retrieve the archival GLS tags during field visits in 2025 and 2026. To facilitate the recapture of the birds equipped with archival GLS tags, BFAL nesting sites will be recorded with GPS and will be marked using colored rocks, to aid in recapture in the following year. The PTTs, which will be attached to 4 -6 dorsal feathers using Tesa tape, will fall off when the adhesive wears off (~2 months after deployment) or when the birds molt (July – September). We will also mark nests with colored rocks for the birds with PTTs in the case that USFWS can check on the fate of chicks.

<u>At Hōlanikū:</u> Between February and May in both 2012 and 2013, David Hyrenbach and Michelle Hester deployed GPS tags on a total of 18 BFAL breeding on Hōlanikū. These data are published in Hyrenbach et al. 2017 and Orben et al. 2021. Since we already have fine-scale spatial data from the breeding season for this colony, we will not deploy PTTs tags at this site. Instead we will focus on GLS tags at this site, with a maximum of 40 GLS to be deployed. Our goal is to deploy half the tags (20 GLS) in 2024. Under a separate permit application, we would like to deploy the remaining 20

GLS tags in 2025. We may alter the number deployed in 2024 if logistics or weather are uncooperative, but the maximum number of GLS tags deployed at Hōlanikū in 2024 will be 20.

We will retrieve the archival GLS tags during field visits in 2025 and 2026 (under separate permit applications). To facilitate the recapture of the birds equipped with archival GLS tags, BFAL nesting sites will be recorded with GPS and will be marked using colored rocks or recognizable pieces of marine debris (discarded buoys, etc.).

Table 1. Number of BFAL tags to be deployed and received by site, year, and tag type. Each tagged bird would have up to 4 breast feathers sampled for genetically sex the tracked individuals. Years not included in this permit application (2025 and 2026) are highlighted with gray shading, for clarity.

Satellite Tags: Laysan Island (Kamole), Hawaiian Islands National Wildlife Refuge

Black-footed	Birds Tracked	No. of Feathers	Notes
2024	10	40	
2025	10	40	
2026	0	0	
Total	20	80	

Geolocator (GLS) Tags: Laysan Island (Kamole), Hawaiian Islands National Wildlife Refuge

Black-footed	Birds Tracked	No. of Feathers	Notes
2024	20	80	deploy tags
2025	30	120	deploy and retrieve 2024 tags and deploy 2025 tags
2026	0	0	retrieve remaining tags
Total	50	200	

Geolocator (GLS) Tags: Kure Atoll (Hōlanikū), Hawaiian Islands National Wildlife Refuge

Black-footed	Birds Tracked	No. of Feathers	Notes
2024	20	80	deploy tags
2025	20	80	deploy and retrieve 2024 tags and deploy 2025 tags
2026	0	0	retrieve remaining tags
Total	40	160	

Grand Totals across all years, sites, and tag types

Black-footed	Birds Tracked	No. of Feathers	Notes
2024	50	200	deploy tags
2025	60	240	deploy and retrieve 2024 tags and deploy 2025 tags
2026	0	0	retrieve remaining tags
Total	110	440	

c.) This activity would help the Monument by …

This research will provide the Monument with useful information on the year-around distribution of male and female BFAL. BFAL have not been tracked at Kamole, and have only been tracked during the breeding season at Hōlanikū. As part of our project, we will integrate this information with similar existing data for birds from other breeding sites (Midway, Tern Island) in collaboration with Scott Shaffer and colleagues to enhance the integrated management and monitoring of this species. In a recent workshop, resource managers from NOAA fisheries, the Western Pacific Regional Fishery Management Council (WPRFMC), and the USFWS expressed their interest in these tracking data and bycatch analyses, with the goal to update the last population assessment for BFAL (Arata et al., 2009, Hyrenbach et al. 2021).

In the short-term, our team will quantify BFAL overlap with domestic and foreign fisheries, using datasets of longline and trawl fishing effort / catch from NOAA fisheries, regional fishery management organizations (RFMOs), and Global Fishing Watch (globalfishingwatch.org). Our project will assess albatross vulnerability to incidental fishing mortality and will identify the temporal and spatial hotspots of albatross-fisheries interactions. Ultimately, knowing when and where albatross interact with fisheries will help managers to identify threats and to develop recommendations for enhanced bycatch monitoring and mitigation across the North Pacific.

In the long-term, the integrated analysis of multi-colony BFAL tracking with updated fishing effort / bycatch data will inform the population assessment for this species, and will help answer questions about albatross ecology and conservation, within a broader ecosystem-based management framework. Our ultimate goal is to inform a new integrated population model (IPM) for this species, capable of evaluating the impacts from fisheries bycatch, climate (e.g., sea-level rise and flooding at breeding colonies), and introduced vegetation at colonies (Hyrenbach et al. 2021).

Hyrenbach KD, Ishizaki A, Polovina J, Ellgen S [editors]. 2021. The factors influencing albatross interactions in the Hawaii longline fishery: towards identifying drivers and quantifying impacts. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-122, 163 p. doi:10.25923/nb95-gs31TM-PIFSC-122

Arata JA, Sievert PR, Naughton MB. 2009. Status assessment of Laysan and black-footed albatrosses, North Pacific Ocean, 1923–2005. Reston (VA): U.S. Geological Survey Scientific Investigations Report 2009-5131, 80 p. https://pubs.usgs.gov/sir/2009/5131/pdf/sir20095131.pdf.

Other information or background:

Background and Overview: Summary of recommendations from the workshop: Hyrenbach KD, Ishizaki A, Polovina J, Ellgen S [editors]. 2021. The factors influencing albatross interactions in the Hawaii longline fishery: towards identifying drivers and quantifying impacts. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-122, 163 p. doi:10.25923/nb95-gs31TM-PIFSC-122

The Hawaii deep-set longline fishery (DSLL) operates north and south of the Hawaii Archipelago, with the shallow-setting swordfish fishery operating predominantly to the north and east of the fishing grounds. The tuna-targeting DSLL fishery accounts for 96% of the fishing effort. The

number of hooks has been increasing since 2010, with 64 million hooks set in 2021 (McCracken and Cooper, 2022). The Hawaii longline fishery is managed under the WPRFMC Pelagic Fisheries Ecosystem Plan (FEP), which specifies the measures to reduce interactions with protected species, including seabirds (Dalzell et al., 2021). Seabird interactions are monitored through the NMFS Pacific Islands Regional Office (PIRO) Observer Program, with the DSLL fishery monitored at a minimum of 20% coverage annually. The numbers of observed albatross interactions are summarized and published annually as part of PIRO Seabird Annual Reports and the Pelagic FEP SAFE Report (Ishizaki & Ellgen, 2021).

In the last decade (2004–2014), observer records have documented an increasing trend in albatross interactions (Ishizaki & Ellgen, 2021). A recent analysis conducted by Gilman and colleagues (2016) using data from October 2004 to May 2014, revealed that BFAL interaction rates have significantly increased over time, especially during years of higher annual mean Multivariate El Niño Index (MEI) values, suggesting that oceanographic changes have contributed to that trend. This analysis also showed a significant increasing trend in the number of albatrosses attending fishing vessels which may have contributed to the increasing catch rates. The higher interaction rates observed during the 2015–2016 El Niño event (Ishizaki & Ellgen, 2021) further underscore the potential links between ocean conditions and albatross-longline interactions.

Published tracking data of BFAL breeding at three sites in the NHWI (French Frigate Shoals, Midway Island, and Kure Atoll) suggest that BFAL at-sea distribution and movement patterns vary according to the phase of the breeding season. Longer foraging trips take place during the incubation and the chick-rearing periods, and shorter trips occur during the chick-guarding (or brooding) period. Furthermore, tagging studies in the NWHI suggest population-level differences in distribution among BFAL colonies; birds from French Frigate Shoals show the greatest spatial overlap with areas used by the DSLL fishery (Shaffer et al., 2021). Nevertheless, substantial knowledge gaps remain concerning sex differences in distribution during the breeding and post-breeding periods, the distributions of juveniles, and the movements of BFAL from unstudied breeding sites (e.g., year around from Laysan Island, post-breeding from Kure).

Workshop attendees highlighted the need to develop a rigorous integrated population model (IPM) model, able to address total population size, including non-breeders and juveniles, based on adult counts at multiple breeding colonies over time (e.g., years of contrasting oceanographic conditions). While this model would allow the assessment of the fishery impacts (e.g., effects of fishery takes on the population) in a broader ecological context, it would require filling in three substantial data gaps:

- BFAL distribution and fishery interaction data for different age-classes (breeders, juveniles, fledging chicks) from all breeding colonies during multiple years of contrasting oceanographic conditions (e.g., ENSO, PDO);
- Fishing effort distributions and BFAL bycatch data for the Hawaii DSLL and SSLL fisheries and other North Pacific longline fisheries;
- Characterize the degree of sex-specific, and individual variability in BFAL association and reliance on fisheries.

Our project addresses these knowledge gaps by studying the year around distribution of male / female breeding BFAL from Laysan Island and Kure Atoll, during two years (2024 and 2025). We will then add the distribution data to that of our collaborators and analyze the overlap and susceptibility of individuals to bycatch in different national and international fleets. These data will

then be made available to USFWS and their contractors who are currently creating an IPM for the species.

Data Sharing: Once our project has been completed, we will make all the tracking and associated meta-data from each tagged bird available to other researchers in the U.S. and internationally, for future use in research and management applications.

Domestically, we will deposit our PTT tracking data into the Animal Telemetry Network (ioos.noaa.gov/project/atn), a U.S. multi-agency initiative established under the auspices of the Integrated Ocean Observing System (IOOS), to provide unity, stability, and continuity to the national infrastructure that facilitates the collection, management, and availability of marine animal telemetry data. Data are viewable to the public in near real time via an online portal (portal.atn.ioos.us).

Internationally, we will deposit the GLS and PTT data in the Global Seabird Tracking Database, hosted by BirdLife International in the UK (www.seabirdtracking.org). We have already deposited our previous albatross tracking data in this database, which have been used in numerous reports, outreach activities, governmental assessments, and scientific publications.

Outreach: Since 2000, our research in the Monument has led to the publication of 7 peer-reviewed papers and a chapter in a technical report published by NOAA. Our team has also given 20 presentations at conferences, university seminars, local special interest groups, and government sponsored meetings. We have also provided data or analyzed products (e.g., maps or figures) to NOAA – fisheries and USFWS staff for outreach and reports. Moreover, this research has supported 4 MS and 2 undergraduate students.

For this project we will make all our research available online, with links to our educational program, Winged Ambassadors, which uses life histories of albatross to teach elementary and high school students about marine conservation. We are also enthusiastic about participating in any outreach efforts the Monument would like to promote, including outreach to members of the Native community.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Hyrenbach, K. David

Title: Research Associate, Oikonos-Ecosystem Knowledge
& Professor of Oceanography, Hawaii Pacific University (HPU)

1a. Intended field Principal Investigator (See instructions for more information):
Jessie Beck, Program Manager, Oikonos-Ecosystem Knowledge

[redacted]

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

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

4. Additional persons to be covered by permit. List all personnel roles and names (if known at time of application) here (e.g. John Doe, Research Diver; Jane Doe, Field Technician):

At any given time, only 2 - 4 Oikonos researchers will access Kamole to conduct the research. We have also requested that 5 TBD USFWS personnel be included in this permit to act as biological monitors for the Kamole work. The DOFAW field team on Hōlanikū will conduct the research during their regular field season. Once we have determined who will be going in the field, we will notify the Monument before departure from Honolulu. As part of this collaborative project, we will work closely with the refuge biologists and USFWS staff on planning, logistics, and data sharing.

To accommodate contingencies, project personnel include 11 people and 11 TBD slots (including USFWS personnel and contingency slots for Oikonos and DOFAW).

David Hyrenbach, PI, Hawaii Pacific University and Oikonos-Ecosystem Knowledge
Jessie Beck, Field Lead, Oikonos-Ecosystem Knowledge
Abram Fleishman, Field Ecologist, Oikonos-Ecosystem Knowledge
Michelle Hester, Executive Director and Ecologist, Oikonos-Ecosystem Knowledge
Alyssa Piauwasdy, Field Ecologist, Oikonos-Ecosystem Knowledge
TBD-person 1, Field Ecologist or volunteer, Oikonos-Ecosystem Knowledge
TBD-person 2, Field Ecologist or volunteer, Oikonos-Ecosystem Knowledge
TBD-person 3, Field Ecologist or volunteer, Oikonos-Ecosystem Knowledge

Michelle Smith, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
Tiana Bolosan, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
Sarah Donahue, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
Alyssa Mincer, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
Cynthia Vanderlip, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
Brianna Bishop, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist
TBD-person 1, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist or volunteer
TBD-person 2, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist or volunteer
TBD-person 3, State of Hawai‘i Division of Forestry & Wildlife (DOFAW), Ecologist or volunteer

TBD-person 1, U.S. Fish and Wildlife Service personnel or volunteer
TBD-person 2, U.S. Fish and Wildlife Service personnel or volunteer
TBD-person 3, U.S. Fish and Wildlife Service personnel or volunteer
TBD-person 4, U.S. Fish and Wildlife Service personnel or volunteer
TBD-person 5, U.S. Fish and Wildlife Service personnel or volunteer

Section B: Project Information

5a. Project location(s):

		Ocean Based	
☐ Nihoa Island	☐ Land-based	☐ Shallow water	☐ Deep water
☐ Necker Island (Mokumanamana)	☐ Land-based	☐ Shallow water	☐ Deep water
☐ French Frigate Shoals	☐ Land-based	☐ Shallow water	☐ Deep water
☐ Gardner Pinnacles	☐ Land-based	☐ Shallow water	☐ Deep water
☐ Maro Reef			
☒ Laysan Island	☒ Land-based	☐ Shallow water	☐ Deep water
☐ Lisianski Island, Neva Shoal	☐ Land-based	☐ Shallow water	☐ Deep water
☐ Pearl and Hermes Atoll	☐ Land-based	☐ Shallow water	☐ Deep water
☐ Midway Atoll	☐ Land-based	☐ Shallow water	☐ Deep water
☒ Kure Atoll	☒ Land-based	☐ Shallow water	☐ Deep water
☐ Monument Expansion Area			
☐ 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:
Designated breeding colonies at Kamole and Hōlanikū.

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 main purpose of our research effort is to provide the Monument, USFWS, and U.S. fishery managers (NOAA fisheries and Western Pacific Fishery Management Council) with a comprehensive picture of BFAL interactions with fisheries. The secondary purpose is to improve the population assessment of the species, by better understanding the links between their at-sea distribution and the threat of fisheries bycatch, within the context of oceanographic variability and changing climate.

Quantifying BFAL mortality in domestic and foreign longline fisheries throughout the North Pacific has been a research priority for resource managers in the US and abroad, and for RFMOs for decades (Cousins & Cooper 2000, Arata et al. 2009, Gilman et al. 2016, Hyrenbach et al. 2021). To address the goal of better understanding bycatch risks to BFAL, this research will fill data gaps and integrate updated fishery and demographic data towards the creation of an Integrated Population Model (IPM).

To advance BFAL conservation, our project will address two complementary knowledge gaps: (1) incomplete data on the year-around albatross distribution at sea from several colonies, and (2) outdated data on the magnitude and distribution of fishing effort within the albatross range, especially from certain fleets (e.g., China) and regions of special interest (e.g., Western Pacific). The direct outcomes of this project include, knowledge of albatross movements from important and data-poor colonies (Laysan Island, Kure Atoll) and during periods of the breeding cycle not previously studied, new partnerships with foreign fishing agencies, and a synthesis of these data to inform a future full IPM.

Albatross Tracking: To date, BFAL have only been tracked from 3 of the 8 Northwestern Hawaiian Islands colonies (Midway, Tern Island, Kure Atoll), and from Torishima (Mukojima Island Group, Japan). No tracking data exist for Laysan Island, the second largest breeding site, hosting over 21,000 pairs (~35% of global population). This is a site of particular interest due to

its geographic location, between Tern Island and Midway Atoll, which may lead to distinct at-sea distribution (Shaffer et al. 2021). The existing tracking data suggest that Tern Island birds commute to the West Coast and enter the US and Canadian Economic Exclusive Zones (EEZs) (Guy et al. 2013), while Kure birds commute to the NW Pacific and the Japanese EEZ. (www.pelagicos.net/research_bfal_tracking.htm). New genetic information indicates that bycatch from the Hawaii DSLL fishery is made up mostly of French Frigate Shoals albatross, with some bycatch of Kure birds in Alaska groundfish fisheries. Understanding the foraging distributions and fishery overlap of Laysan Island birds may provide insights into their lower survival and higher skipping breeding rates (Kendall et al. 2021). In addition to colony-based patterns, we will analyze sex-specific differences in distribution and fishery overlap. To accomplish this, we will sample a few breast feathers from each tagged bird and use genetic methods to sex the individual. We also will use archived feather samples to sex the birds previously tracked from Midway and Tern Island using genetic methods (in collaboration with Dr. Scott Shaffer). By including these sex-specific tracks into our dataset, we will amplify the value of these existing data.

Fisheries Vulnerability: Because BFAL overlap with multiple fisheries operating in national EEZs and the high-seas, bycatch assessments involve integrating diverse multinational datasets of disparate quality and resolution. These assessments are inhibited by the lack of fleet-specific fishing effort and bycatch rates. For instance, previous assessments estimated overall incidental mortality using bycatch rates for observed US fisheries and fishing effort distributions for foreign fleets (Lewison & Crowder 2003, Arata et al. 2009). The dynamic nature of fishing also renders older assessments obsolete, as fishing effort and distributions shift over time. For instance, Arata et al. (2009) generated BFAL bycatch estimates from driftnet fisheries using data dating back to the 1970s, and these fisheries were discontinued after a 1990 U.N. ban. Moreover, Arata et al.'s pelagic and demersal longline bycatch estimates were based on observations spanning 1998-2004. Similarly due to the lack of updated data, the 2017 BFAL workshop used the estimates from Arata et al. (2009) for non-Hawaii fisheries in the updated model scenarios, by extending them into the future (2005 - 2016).

The National Fish and Wildlife Foundation (NFWF) has invested substantial funding on long-term conservation of BFAL, a species at risk from multiple anthropogenic impacts, including mortality via fisheries bycatch, nesting habitat loss via sea-level rise, and impacts from marine pollution (ACAP 2012, BirdLife International 2020). Despite the dynamic and complex nature of North Pacific fisheries, quantifying the magnitude of fisheries bycatch and its population-level impacts is perhaps the most tractable of the known anthropogenic threats on BFAL populations. An updated species assessment will not only inform Monument management and BFAL conservation priorities in the U.S., but it will also provide a stimulus for advancing international collaboration on bycatch estimation and mitigation across the North Pacific.

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

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

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?

We will enter the Papahānaumokuākea Marine National Monument knowing that these islands are a resource to be protected and respected for their natural beauty, cultural and historical significance, and importance as a sensitive ecosystem. As a result, we will conduct our activities with full awareness of these facts and carefully scrutinize our protocols to ensure proper safeguards for the animals, flora, and cultural and historical artifacts and sites.

We will avoid unnecessary entry into sites that are covered by our research permits to minimize trampling and habitat destruction, and we will only enter sites not associated with our research permits if given permission by Refuge staff. Nothing is collected unless it is associated with our research activities and is covered by our permits. Furthermore, our field team will be accompanied by USFWS or DOFAW personnel who have previously visited and worked at Kamole and Hōlanikū, and, if it would be helpful, we would be happy to support any USFWS field projects as directed by USFWS staff.

With regard to our research on seabirds within the Monument, we will carefully evaluate each bird prior to deployment, to ensure that nervous or poorly conditioned birds are not studied. We will also take every precaution to minimize our impact on surrounding nests and birds. Nest markers (either colored rocks or debris) will be temporary only, and will be removed after 2026. Each bird is handled as minimally as possible and with awareness of the increased stress associated with being handled by humans. Despite the unavoidable amount of handling stress, in our experience, handled individuals recover quickly when returned to their nest. Our previous experience on Kure Atoll indicates that when released after being equipped or recaptured, BFAL albatross return to their nest to attend their chick.

Though other seabirds like auks appear to be susceptible to adverse effects from the attachment of tags, researchers have deployed tracking devices on other albatrosses for decades, with no significant adverse effects due to their large body masses and surface-foraging habits (Phillips et al. 2003). In our case, the weight of our tags (2.5 g for a GLS and 45.0 g for a PTT) amount to 0.1% - 1.8% of a BFAL's body mass, below the recommended maximum of 3%, recommended for seabird applications (Gaunt et al. 1997). While we will not be able to test for handling and tag-attachment effects, these tags have been deployed on BFAL for years, and there is no

evidence of detrimental impacts. According to our colleague, Dr. Scott Shaffer, since 2002 nest abandonment from his research activities has been less than 1% using similar tagging methods as ours. Given these exceptional tag recovery rates, we have no reason to believe that tagging has caused mortality or morbidity to the study birds.

To ease capture and avoid disturbance, birds will be captured by hand for tag deployments. If birds are skittish during tag retrievals, we may also use a large hand-held hoop net. Once caught, individuals are carefully moved away from their nest to minimize disturbance to other birds and placed on the ground. After a bird is removed from its nest, the nest will be marked with a colored rock (Kamole), or recognizable marine debris or empty jugs from the field camp (Hōlanikū). The chick will be covered with a breathable piece of cloth to provide shading, while the adult is off the nest. Based on our previous experience, banding / tagging and tag retrieval require 5 – 10 minutes. If adults begin to show signs of overheating during handling, we will wipe their foot webbing with ethyl alcohol wipes, to promote evaporation and cooling. If the bird continues to show signs of overheating, we will release the bird early. Tagging will only take place if it is not raining, to avoid compromising the waterproofing of adults and the thermo-regulation of chicks.

Hyrenbach, Beck and our team have previous experience capturing albatross by hand and with hoop nets, and are familiar with tag attachment / retrieval techniques. We will continually evaluate handling time to refine field methods to make this process as streamlined as possible to reduce stress to the birds

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?

Our research has provided new insights into the marine distributions and far-ranging movements of Hawaiian albatrosses, highlighting their use of different National Marine Sanctuaries and national territorial waters across the North Pacific. These findings underscore the ecological links and threats albatrosses face in the ocean environment (see publications and ongoing projects provided below).

Given that albatross forage across the Pacific and face many threats across many different regions of the North Pacific, our data provide a broader understanding for the oceanographic drivers of their populations and the potential anthropogenic impacts on their survival and population trends (e.g., Hyrenbach et al. 2021). For instance, our tracking data have provided critical information for determining overlap with management jurisdictions (Hyrenbach et al. 2006, Hyrenbach 2008) and fisheries (Hyrenbach & Dotson 2003, Guy et al. 2013). We build upon this previous research to develop a comprehensive and updated picture of BFAL vulnerability to fisheries bycatch, which will improve BFAL conservation decision-making for USFWS, NOAA, and other government agencies. Our research and the broader understanding of albatross distribution and movements were deemed essential to monitor and model the BFAL population trends (see NOAA workshop report, Hyrenbach et al. 2021).

Moreover, our datasets provide a unique opportunity for education and outreach. In the past, we have highlighted the tracking research we have conducted at Tern Island and Kure Atoll on the

NOAA-sponsored "Winged Ambassadors" program and classroom activities (Marrero et al. 2012, www.downloadwingedambassadors.org). Through our presentations and social media postings, we will also increase the visibility of the National Wildlife Refuge system and promote greater awareness of the conservation and protection of natural resources within the Monument.

Our project's fundamental goals of improving our knowledge and global conservation of BFAL also support the preservation of a culturally important species in Hawaiian culture and folklore. In Hawaiian worldviews, native plants and animals, such as BFAL or Kaupu, have inherent value as ancestors. Our project would increase the 'ike, or knowledge, of the species and of the ecologies of Kamole and Hōlanikū. Our work would also support the kānāwai of these places and species, or the rules and laws that direct the behavior and uses for places and resources with the goal of minimizing abuse of those resources. We are keenly aware of the cultural and historical significance of the Northwestern Hawaiian Islands and respect the resources to minimize our impact on these islands. Hyrenbach and Beck also have first-hand experience working at other sensitive sites in Hawaii, and are keenly aware of the cultural aspects involved in international and cross-cultural management and conservation of migratory species (e.g., Nevins et al. 2009).

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.

BFAL are important top predators in the North Pacific Ocean ecosystem, and according to the Monument Management Plan, greater than 98 percent of the world's population breeds in the Monument. Thus, the Monument provides a unique location from which researchers can study these highly pelagic species while they are "island-bound" during the breeding season. In particular, Kamole and Hōlanikū are high priority sites, due to the lack of knowledge of the at-sea distributions and fishery-overlap of albatross breeding at those sites (Hyrenbach et al. 2021). While no BFAL have been tracked from Laysan Island, three previous studies have been completed at Hōlanikū: (i) Young et al. (2009) tracked Laysan albatross (*Phoebastria immutabilis*; mōlī) year-around with GLS tags, (ii) Hyrenbach et al. (2017) tracked BFAL with PTTs during the chick-rearing period (May – July), and (iii) Hester and Vanderlip tracked BFAL with GPS tags during the chick-brooding period (Feb – May) (Orben et al. 2021). The current study will provide a year-round perspective of BFAL distributions that will complement the previous tracking studies at Kure Atoll.

Other studies have captured albatrosses at sea and have attached satellite transmitters during the post-breeding period, but these studies often lack any of the demographic information that we deem significant. Additionally, at sea captures of these species can be more stressful for birds than capturing them from their nest sites. Tagging breeding birds at colonies allows researchers to examine the distributions of birds of known breeding status and from specific breeding sites, thus providing key ancillary information to characterize: (1) breeding performance, 2) population demographics, 3) population comparisons of banded individuals, and 4) standardized comparisons of birds of known breeding status, sex, and colony origin. All of these aspects add greatly to our ecological interpretation and understanding of albatross distributions and ecosystem dynamics.

A unique facet of our tracking effort has been the ability to compare albatross distributions and movements across consecutive years to determine whether inter-annual variation in oceanographic conditions affects seabird behavior (Kappes 2009, Kappes et al. 2010 & 2015). These analyses are critical for understanding how albatrosses adapt to perturbations in their environment, and how changes in oceanography affect albatross foraging strategies, and ultimately their reproductive output in a given year (Thorne et al. 2015 & 2016). These analyses will allow us to make informed predictions about what large-scale environmental changes, such as El Niño Southern Oscillation events, or possibly global climate change may have on albatross populations in the future (e.g., Hazen et al. 2013).

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

As mentioned above, the adverse impact of our research upon individual seabirds is minimal and is limited to a cost of increased stress individuals during the tag deployment and retrieval (5-10 minutes each). Based on the relative mass of the tags (< 2% of albatross body mass) and the results of previous tracking studies on this species, we do not expect that the instruments themselves will impact the birds' ability to forage effectively. We do not anticipate any other adverse impacts on other Monument cultural, natural and historic resources, qualities, or ecological integrities.

The positive impacts of our research, in terms of potential conservation measures and management strategies for the species are, however, monumental. Our project follows a workshop organized by U.S. fisheries management agencies (NOAA-fisheries and WPFRMC) to assess the fishery bycatch vulnerability and impacts on this species. Thus, the results from our study will be combined with existing data to develop a basin-wide and multi-colony assessment that will inform longline fisheries management and will help interpret and model the BFAL population trajectory.

As noted previously, our research incorporates aspects of outreach to educate the public about scientific research and marine conservation. We also take great care to minimize our foot print on the island by using the minimum number of personnel at field sites and in the minimum amount of time we feel is required to conduct our research in a safe and efficient manner. We always try to balance using the fewest number of animals possible while still obtaining ecologically meaningful and statistically strong results. Overall, the knowledge we obtain about seabirds from our research will help ensure their long-term protection as a resource to be cherished and respected in a cultural sense. As top marine predators, seabirds also serve as sentinels of ocean health and marine pollution (Hyrenbach et al. 2017, Savoca et al. 2022). Our research promotes greater understanding of this concept at a minimal cost to the Monument's resources

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

To understand how albatrosses interact with fishing vessels, it is critical to study their movements throughout the year (including the incubating, brooding, rearing, and post-breeding phases). Their foraging behavior changes dramatically throughout their life cycle, as they adjust their effort to match the energetic demands of self-feeding and chick-provisioning, and as they respond to seasonal changes in oceanographic conditions and fishery distributions. These behavioral changes lead to seasonal distributional changes (Hyrenbach et al. 2002, Kappes et al. 2015), which influence their use of Monument waters and their overlap with fishing vessels (Hyrenbach et al. 2006, Hyrenbach 2008, Wren et al. 2019).

To match our field work with the life-cycle of BFAL, we will deploy the tags at the end of egg incubation and the start of the brooding phase (January – March), when adults are still attending their nests and go on short (1 – 7 day) foraging trips. This timing will ensure we have access to a large number of adult birds, and that – in the event of an adult not returning to the nest after tagging – that there are no impacts on the young chicks. We will also coordinate with USFWS to plan the timing and number of entries into the Monument, by cost-sharing the cost of the

transport vessel and by collaborating with DOFAW personnel (Hōlanikū) and USFWS personnel (Kamole). At Kamole, where tagging (in years 1 and 2) will require a 6-day window between January through April, we can adjust our field work based on USFWS planned activities and priorities, and are happy to aid in their research activities. In years 2 and 3, we will also retrieve GLS tags during these 6-day visits. We will also ask USFWS and NOAA personnel to opportunistically retrieve tags retrievals during planned trips to the island in spring / summer (May – August). At Hōlanikū, where DOFAW personnel will deploy and retrieve the tags, we will have even more flexibility to integrate our work amidst other monitoring and research activities.

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

Dr. Hyrenbach has over 20 years of experience studying the foraging ecology of albatrosses around the world and has previously visited Tern Island (2009) and worked in other Hawaiian seabird colonies (Lehua, Kaena Point). Moreover, he has served in several management and conservation groups focusing on albatrosses and other endangered marine resources in the Hawaiian Islands: (1) chair of the North Pacific Albatross Working Group (2004-2006); (2) member of the Western Pacific Regional Fishery Management Council Protected Species Committee; and (3) member of the Hawaiian Monk Seal Recovery Team (2014-2019). Therefore, he is familiar with the cultural and biological significance of the Monument.

Dr. Hyrenbach has also maintained a research and tracking program on albatrosses since he was in graduate school (1998) and is very familiar with the logistics involved in managing an Argos CLS program, programming / deploying tags, and downloading / analyzing the data. Dr. Hyrenbach is also acutely aware of the ecological impact this work may have on the Monument's natural and cultural resources, and he and his students take great care to minimize deleterious effects on the fauna, flora, and historical sites of the islands. As a way to mitigate the impacts on the resources of the Northwest Hawaiian Islands, Dr. Hyrenbach, his students, and colleagues will continuously evaluate and modify their protocols to accommodate new regulations, restrictions, and to minimize any deleterious effects that our research may cause. We will also modify our protocols to accommodate changes in equipment (e.g., improved attachment techniques) or methods that improve results and reduce impacts.

Beck has been leading seabird fieldwork in remote and challenging terrain since 2010, including deploying tags on seabirds on Lehua, Oahu, and in California (Año Nuevo Island) and Chile (Isla Mocha). Beck has tagged ~150 birds, banded several hundreds, and is extremely familiar with seabird handling techniques and minimizing stress to birds. She is currently a program manager for Oikonos-Ecosystem Knowledge, where she leads their Fisheries and Año Nuevo Island programs. As part of her Oikonos research, Beck also runs the Seabird Bycatch Necropsy Program in collaboration with NOAA. As part of this research, which recently won the 2023 Presidential Award for the Stewardship of Migratory Birds, Beck documents the impacts of fisheries bycatch on BFAL caught in federally-managed fisheries and has contributed to multiple publications, management reports, and workshops for the species. Beck is also a PhD Candidate at the University of California Santa Cruz, with a focus on seabird conservation and fisheries bycatch. The research described in this proposal is unrelated to Beck’s graduate work.

All the team members have field experience working with Hawaiian seabirds and many of them are working for DOFAW in Hōlanikū. In particular, Cynthia Vanderlip provides a wealth of knowledge and experience in the field, which will make this project a success.

Finally, we will ensure that research results from this work will be published in a timely manner while giving proper acknowledgement to the Monument and Refuge Complex system. Our team has an established track-record, which has resulted in several publications on albatross tracking (Hyrenbach et al. 2016, 2017, Orben 2021, Shaffer et al. 2021), and research on plastic ingestion by seabirds from the Monument (Rapp et al. 2017, Youngren et al. 2018, Savoca et al. 2022).

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.

Our team (Project PIs – Beck and Hyrenbach) was recently awarded 36 months ($405K) of funding from the National Fish and Wildlife Foundation's Seabird Fund to support the costs of conducting this research. For field logistics, we have $60K set aside each year for 3 years of vessel costs ($20k per year), in addition to salary and equipment costs. We also have an additional $10K to support DOFAW logistics on Hōlanikū, and $10K to support USFWS or NOAA crews to opportunistically retrieve GLS tags. Beyond the funding from NFWF, we have in excess of $411K in matching funds to support this project and related projects. Our team has also been invited to submit a proposal to the Paul M Angell foundation, to augment this project’s deliverables.

Given our prior experience working in albatross tracking, our partnerships with management agencies (USFWS, DOFAW, NOAA) and other seabird tracking researchers (Shaffer, Orben), and our continuous refinement of research protocols and methods, we believe we can minimize the need for mitigating measures within the Monument.

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

Although we modify and adapt our methods when needed, we plan to use the same general methods from our previous albatross tracking studies at Kure Atoll (Hyrenbach et al. 2017) and Tern Island (Hyrenbach et al. 2002), which have proven highly successful. Moreover, we have consulted with other seabird researchers currently working in the Monument (Shaffer, Orben) to ensure our methods are consistent with theirs and our datasets can be merged for an integrated analysis.

As previously noted, our methods provide us with an extensive amount of data, at a minimal cost to individual birds and Monument resources. We also design our studies to provide meaningful and statistically robust results using the lowest number of individuals. We will remove from the colonies all field equipment and materials not in use at the end of the field season. While this work does not necessitate IACUCs for either Dr. Hyrenbach or Beck, all methods and protocols used in this research activity have been approved by the Institutional Animal Care and Use Committees at HPU and partner institutions in previous projects.

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

Transportation of the field team will be part of a planned visit by USFWS and DOFAW. Thus, we will not use our own vessel, but will rely on a vessel selected by USFWS.

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

We believe that our researchers have the knowledge, experience, and sensitivity to be respectful stewards of the natural resources within the Monument by virtue of: (1) our involvement in research within the Monument since 1998 (through a collaboration with Dr. David Anderson, from Wake Forest University); (2) our previous field experience in Tern Island and Hōlanikū, in addition to decades of seabird research experience in the U.S. and internationally; (3) our partnerships with USFWS and DOFAW; and (4) our collaboration with other seabird researchers already tracking albatrosses in the Monument (Shaffer and Orben).

Furthermore, our research activities and purported outcomes are consistent with and mutually beneficial for the Monument to manage and maintain viable seabird populations. We have previously complied with all permit requirements and submitted detailed reports on our activities. We have also provided images and unpublished data from our research to NOAA (Alaska) and USFWS (Hawaii and California) and are happy to continue to do so upon request.

8. Procedures/Methods:

PTT tags will be attached using established methods employed previously for this species by our team and other researchers (Shaffer, Orben), since the 1990s. PTTs will be carefully attached to feathers on the dorsal region between the scapulas using Tesa tape (a durable cloth tape). The total mass a bird will carry is up to 50 g or about ~1.5% of bird body mass. Birds are weighed upon capture to ensure that this criterion is met.

GLS tags will be affixed to a band on the leg, based on established methods from others (Shaffer, Orben, Young). There is current conflicting advice from DOFAW and USGS about whether the GLS should be attached to a federal metal band or a plastic darvic band. Based on our experience, especially from Cynthia Vanderlip who conducted a similar GLS study on Laysan Albatross, we believe that attaching the GLS to a metal band is safe to the birds' legs, simpler and faster to attach, and reduces the chance of marine debris entanglement. However, if we are unable to get approval from DOFAW for this method, we will affix the GLS units to plastic darvic bands, following Shaffer. To avoid rubbing of the leg (which is sometimes an issue for this large species), we plan on having 2 sizes of darvic and metal bands available (7B and 8). On either the metal or darvic bands, GLS tags will be zip-tied to the band and placed around the bird's tarsus. The zip tie will be tightened with a zip tie gun to ensure that the closure tab does not rotate to touch the birds' legs. Total weight of the GLS unit will be 3g or <.001% of the birds' body weight.

In 2024, 50 adults will be equipped with tags (Table 1): (1) 10 birds from Kamole with Argos satellite-linked PTT tags that transmit data and will remain attached for 3-8 months, until the attachment fails or the feather are molted in summer (July – September); (2) 20 birds from Kamole archival GLS tags; and (3) 20 birds from Hōlanikū with archival GLS tags.

Our long term plan is to tag up to 110 adults in 2024-2026 (separate permits will be needed for 2025 and 2026): (1) 20 birds from Kamole with Argos satellite linked PTTs tags; (2) 40 birds from Hōlanikū with archival GLS tags; and (3) 40 birds from Kamole with archival GLS tags, with an additional 10 possible GLS tags pending funding. Because these archival tags must be retrieved to download the data, they continue recording data for up to 5 years, until the birds are recaptured back at the colony (January – May). Even if birds skip one breeding season, they can be recaptured in subsequent years.

Given that our equipment and methods will be replicated from previous field efforts (Hyrenbach et al. 2002, 2017, Shaffer et al. 2021), we do not anticipate any logistical changes to our tracking protocols.

To ensure that our PTT tags fall within the recommended weight ratio (<3% of body weight), we request to weigh birds with a spring balance when we deploy the tags. We would also like to take culmen length, bill depth and tarsus measurements for all tagged birds. We also request to sample up to 4 body contour feathers to determine the sex of the birds using molecular techniques. These feathers would be available to future researchers interested in molecular or genetic studies.

At Hōlanikū, we request that approved researchers follow the fate of chicks from tagged individuals throughout the breeding season to ascertain fledging success. No handling will be required. At Kamole, we ask that any separately-permitted visiting USFWS or NOAA teams opportunistically check the fate of chicks from tagged individuals as possible.

After tagging / recapture, birds will be released next to their nest and will be visually observed for several minutes at a distance to ensure that no complications have arisen. Feather samples will be stored in ziplock bags and kept at room temperature in a dry place in the field, and then frozen for long-term storage until analyses are conducted back in the lab.

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

N.A.

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:
Black-footed Albatross (Kaupu, BFAL)

Scientific name:
Phoebastria nigripes

& size of specimens:
Up to 4 contour feathers taken from up to 110 specimens

Collection location:
Within the albatross breeding colonies, near a nest.

☐ Whole Organism ☒ Partial Organism

9b. What will be done with the specimens after the project has ended?
Feathers will be used to determine the sex of the specimens using molecular methods.
Feathers will be grounded up and analyzed for stable isotopes.

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

• General site/location for collections:
In the breeding colonies, near the nest of the captured birds.

• Is it an open or closed system? ☐ Open ☐ Closed N.A.

• Is there an outfall? ☐ Yes ☐ No N.A.

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

• Will organisms be released?
Yes, the birds will be released near their nest after handling to deploy or remove tags.

10. If applicable, how will the collected samples or specimens be transported out of the Monument?
Feathers will be sealed in ziplock bags.
All samples will be transported off-island via boat.

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

There is no duplication of this work, because birds from these colonies have not been tracked using these tags in the past. These will be the first black-footed albatross tracking data from Kamole. While we have previously used PTTs on birds from Hōlanikū, this previous study focused on the chick-brooding (Feb – March) and rearing (March – July) phases. These will be the first deployments of archival GLS tags on BFAL from Hōlanikū. We are collaborating with other seabird researchers (Shaffer, Orben) and integrating our data with previously collected datasets, available via the BirdLife International Seabird Tracking Project.

Once we have completed our work, all feather samples will be available for other researchers to use in any pollutant / isotopic studies. Moreover, all the tracking data (from PTT and GLS tags) will be shared with international repositories of tracking data (BirdLife International, Animal Telemetry Network) to ensure they are widely available to other researchers and resource managers.

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

No special gear is required to collect feather samples.
Feathers are plucked from the birds' breasts by hand.
All waste will be transported off the island and disposed of appropriately.
All tracking data will be analyzed following previously used methods described above (e.g., Hyrenbach et al. 2002, Shaffer et al. 2021).

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

No hazardous materials will be brought to the field sites or generated during this research.

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

No fixed installations or instrumentation will be set in the Monument.

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

We envision that this research will lead to at least two publications: a synthesis of albatross distributions and an assessment of albatross fisheries vulnerability. Data analysis will commence as soon as possible in order to continually refine analytical approaches, but publications specific to the NFWF albatross-fisheries project will likely be written in late 2026. The final report for that project is expected to be completed in December 2026. Furthermore, we anticipate that additional collaborative papers will stem from this work

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

NOTE: team members are highlighted with bold font, students are highlighted with italics.

Orben, R.A., Adams, J., **Hester. M.**, Shaffer, S.A., Suryan, R.M., Deguchi, T., Ozaki, K., Sato, K., Young, L. C., Clatterbuck, C., Conners, M.G., Kroodsma, D.A., Torres, L.G. 2021. Across borders: External factors and prior behaviour influence North Pacific albatross associations with fishing vessels. Journal of Applied Ecology 58:1272–1283.

Hyrenbach, K.D., Ishizaki, A., Polovina, J., Ellgen, S. [editors]. 2021. The factors influencing albatross interactions in the Hawaii longline fishery: towards identifying drivers and quantifying impacts. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-122, 163 p. doi:10.25923/nb95-gs31TM-PIFSC-122

Nevins, H.M., **Beck**, **J.**, Michael, P.E., **Hester, M.**, Peschon, J., Donnelly-Greenan, E., Fitzgerald, S. 2018. Demographics of Laysan *Phoebastria immutabilis* and Black-footed *P. nigripes* Albatross caught as bycatch in Alaskan groundfish and Hawaiian longline fisheries. Marine Ornithology 46: 187-199.

Hyrenbach, K.D., Hester, M.M., Adams, J., *Titmus, A.J.*, Michael, P., *Wahl, T. Chang, C.-W.*, Marie, A., **Vanderlip, C**. 2017. Plastic ingestion by Black-footed Albatross (*Phoebastria nigripes*) from Kure Atoll, Hawai'i: Linking diet remains and parental distributions at sea. Marine Ornithology, 45: 225–236.

Michael, P.E., Jahncke, J., **Hyrenbach K.D.** 2016. Placing Local Aggregations in a Larger-scale Context: Hierarchical Modeling of Black-footed Albatross Dispersion. PLoS ONE 11(4): e0153783 doi:10.1371/journal.pone.0153783

Michael, P.E., Jahncke, J., **Hyrenbach, K.D.**, 2013. Relative influence of static and dynamic features on black-footed albatross habitat use in central California Sanctuaries. Fisheries Oceanography, 23(1): 18-31.

Guy, T.J., Jennings, S.L., Suryan, R.M., Melvin, E.F., Bellman, M.A., Ballance, L.T., Blackie, B.A., Croll, D.A., Deguchi, T, Geernaert, T.O., Henry, R.W., Hester, M., **Hyrenbach, K.D**., Jahncke, J., Kappes, M.A., Ozaki, K., Roletto, J., Sato, F., Sydeman, W.J., Zamon, J.E. 2013. Overlap of North Pacific albatrosses with the U.S. west coast groundfish and shrimp fisheries. Fisheries Research, 147: 222-234.

Marrero, M., **Hester, M.**, **Hyrenbach, D.**, *Michael, P.*, Adams, J., **Vanderlip, C.**, Keiper, C., Stock, J., Collins, A., Alvarez. T. 2012. Winged Ambassadors: Ocean Literacy Through the Eyes of Albatross. Current Journal of Marine Education, 28(2): 26-30.

Hyrenbach, K.D. 2008. Applying Spatially-explicit Measures for Albatross Conservation, Pp. 118-120. In: De Roi, T., Jones, M., Fitter, J. (Eds). Albatross: their world, their ways. Firefly Books, Buffalo, NY.

Suryan, R.M., Sato, F., Balogh, G., **Hyrenbach, K.D.**, Sievert, P., Ozaki, K. 2006. Foraging destinations and marine habitat use of short-tailed albatrosses: a multi-scale approach using first-passage time analysis. Deep-Sea Research II, 53 (3-4): 370-386.

Hyrenbach, K.D., Keiper, C., Allen, S.G., Anderson, D.J., Ainley, D.G. 2006. Use of national marine sanctuaries by far-ranging predators: commuting flights to the California Current System by breeding Hawaiian albatrosses. Fisheries Oceanography, 15 (2): 95-103.

Keiper, C.A., Hester, M.M., and **Hyrenbach, K.D.** 2005. Wonderous Ocean Wanderers in Our Own Front Yard. Hydrosphere, 17: 1, 10-11. www.farallones.org/docs/albatross.pdf

Shaffer, S. Costa, D., Suryan, R., **Hyrenbach, D.** 2004. Regional Summaries: North Pacific (section 4.1). In: BirdLife International. Global Procellariiform Tracking Workshop Report. Cambridge, BirdLife International. pp. 47-49.

Hyrenbach, D., Costa, D., Croxall, J., Cuthbert, R., Gales, R., Huin, N., Nel, D., Nicholls, D., Phillips, R., Pinaud, D., Quintana, F., Robertson, C., Robertson, G., Shaffer, S., Silk, J., Stahl, J.-C., Suryan, R., Terauds, A., Weimerskirch, H. 2004. Results: Establishment, maintenance and use of GIS tracking database (section 5.3). In: BirdLife International. Global Procellariiform Tracking Workshop Report. Cambridge, BirdLife International. pp. 64-66.

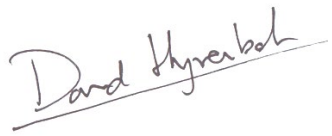
Croxall, J., Costa, D., Cuthbert, R., Gales, R., Huin, N., **Hyrenbach, D.**, Nel, D., Nicholls, D., Phillips, R., Pinaud, D., Quintana, F., Robertson, C., Robertson, G., Shaffer, S., Silk, J., Stahl, J.-C., Suryan, R., Terauds, A., Weimerskirch, H. 2004. Conclusions and future work (chapter 6). In: BirdLife International. Global Procellariiform Tracking Workshop Report. Cambridge, BirdLife International. pp. 69-72.

Hyrenbach, K.D., Dotson, R.C. 2003. Assessing the susceptibility of female Black-footed Albatross (*Phoebastria nigripes*) to longline fisheries during their post-breeding dispersal: an integrated approach. Biological Conservation, 112: 391-404.

Hyrenbach, K.D., Fernández, P, Anderson, D.J. 2002. Oceanographic habitats of two sympatric North Pacific albatrosses during the breeding season. Marine Ecology Progress Series, 233: 283-301.

Hyrenbach, K.D., Dotson, R.C. 2001. Post-breeding movements of a male Black-footed Albatross *Phoebastria nigripes.* Marine Ornithology, 29: 23-26.

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.



October 15, 2023

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 Hazards