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 - Research
OMB Control # 0648-0548
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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: Dr. Barbara Block

Permit Category: Research
Proposed Activity Dates: January 1- May 31, 2020, 2021 and 2022
Proposed Method of Entry (Vessel/Plane): Vessel, MY WILD HOOKER
Proposed Locations: Deepwater habitat, Nihoa to Gardner Pinnacles, outside State waters (3 miles), within the original Monument boundaries and in the Monument expansion area.

Estimated number of individuals (including Applicant) to be covered under this permit: 10

Estimated number of days in the Monument: 45 days per calendar year

Description of proposed activities: (complete these sentences):
  a.) The proposed activity seeks to answer the following questions: How do billfishes and tunas utilize the MPA? What residency time do these animals have in the MPA waters? What environmental conditions and oceanographic preferences are they utilizing in the MPA? What areas outside the MPA provide critical habitat in state and international waters?

To answer these questions we propose to undertake electronic and conventional tagging of yellowfin tunas (yellowfin and bigeye) and billfishes (blue marlin, black marlin, sailfish, and spearfish) caught by trolling, on hook and line in order to track the movements of these important pelagic species within and perhaps outside the Monument. While trolling for these species we would also tag and release any bycatch species such as blue, mako, thresher and other shark species encountered in the region and captured on hook and line. Satellite and archival tags provide detailed knowledge of location and tuna and billfish diving behaviors collected simultaneously with oceanographic data. Together these data provide in situ knowledge on how animals use these habitats.
b.) To accomplish this activity we would use trolled lures to attract fish to the boat. Fish will be captured on J or circle hooks, and released post tagging using standard recreational fishing techniques (hook removal post tagging).

c.) This trip with the team being proposed promises to provide unique opportunities to tag pelagic fish and track their travels in and out of the NWHI and a large Marine Protected Area.

Other information or background:

The project represents a collaboration of an accomplished recreational fishing team with the Block Lab of Stanford University. Dr. Block has been tagging in the North Pacific for 25 years and has put over 3000 tags (TOPP, IGMR, HIBT) inclusive of pop up satellite and archival tags on Pacific bluefin, yellowfin, big-eye, albacore tunas, lamnid sharks such as white, salmon and mako sharks, thresher, blue sharks, swordfish, and blue and black marlin, sailfish and spearfish. She is the scientific lead on the TAG a Giant project to tag tunas, and the IGFA efforts to enable citizen science tagging of billfish which is similar to this project (fishers wanting to help tag in the MPA). In this unique MPA to date, there is little data except some tracks from white sharks that were tagged in California and use areas in the PMNM. Given the team will be offered the platform of an excellent ship to conduct sportfishing it is most likely that blue marlin and yellowfin tunas will be the most likely catches that will be tagged. To discern the role of the large MPA for protecting pelagic species in US waters we propose to provide the vessel with up to 25 tags a year prepared for deployment on any species they catch and release.

We will meet our objectives by tagging from an accomplished sportfisher involving a team working together wherein tag and release protocols will be as followed. Fish will be caught via trolling using heavy 130 pound test fishing tackle and heavy test leaders. Upon reeling in the fish to the stern of the boat, satellite tags will be placed into the fish using established techniques with Wildlife Computer or Microwave Telemetry tags. Satellite tags will be tethered with a custom 4-layer attachment tether and custom titanium dart. Whenever possible, scientists experienced with tagging will be onboard and will train the owner, Captain and mates in tagging. Genetic samples will be taken with a biopsy tube on the tagging stick-stored in ethanol and then sent back to the lab for further analyses. For billfish and tunas all efforts to release the fish without hooks will be made. Hook removal tools will be utilized when the fish is alongside the vessel for tagging. If the hook cannot be removed quickly and safely, the leader will be cut as close to the hook as possible before the fish is released. In addition, any bycatch of sharks hooked during these efforts will be released with electronic archival or conventional tags, depending on the species and availability of tag-types at the time of encounter.

When near the boat, fish will be carefully handled, and tag placement will be 12 cm into the animal. The titanium dart will be rinsed with an alcohol pad, or with betadine and
inserted with a titanium applicator tip on a specially-designed tagging pole fitted to the custom tag dart. Attachments with these techniques have been proven. Upon release billfish and tunas will be irrigated and revived to help insure survivorship. Sharks are more durable and will be released readily using methods that ensure the animal’s survival.

Pop-up satellite archival tags (PSATs) track movements of large migratory marine animals. A PSAT is an archival tag (or data logger) that is equipped with a means to transmit the collected data via the Argos satellite system. The major advantage is that it does not have to be physically retrieved like an archival tag for the data to be available making it a viable, fishery independent tool for animal behavior and migration studies. Location, depth, temperature, oxygen levels, and body movement data are used to answer questions about migratory patterns, seasonal feeding movements, daily habits, and survival after catch and release, for examples.

A satellite tag is generally constructed of several components: a data-logging microprocessor, a nose cone with a metallic release section, a float, and an antenna. The release sections include a corrosive pin that is actively corroded with electrolysis on a preset date or after a specified period of time. Some limitations of using satellite tags are their depth limitations (2000m), their costs ($3000–$4000+), their vulnerability to loss by environmental issues (biofouling), or premature release through ingestion by a predator. The Block lab has had high success to date with both tunas and billfish and will put all data into a public database via the Animal telemetry network (IOOS) cite and our own TOPP website (www.topp.org).

This activity will benefit the Monument by determining how highly migratory species utilize the PNMN. The Block lab has extensively tagged off Kona with over 75 tracks of blue and black marlin and spearfish recorded. Tracks up to 243 days have been recorded over a decade of tagging in Hawaii. This citizen science effort in coordination with the International Game Fish Association (IGFA) has yielded over 18,000 days of data to date. The data is held in a public repository where it can be download by scientists, anglers and the general public. See also: https://igfa.org/the-great-marlin-race/

While pop-up satellite tags do release from the fish they are implanted in, based on years of previous experience in the Main Hawaiian Islands, we expect that all of these tags will be “discharged” outside the monument, because they will be attached to the billfish for 180 days or more, during which time we fully expect that the fish will have swum well outside the Monument boundaries. Should any of the pop-up tags release within the Monument it is possible to track their location from the location signal they emit, and recover the tag.

All other tags will remain with the fish until it is recaptured and they will not be “discharged” within the Monument.
Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Dr. Barbara A. Block

Title: Principal Investigator

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

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

Fax: none

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

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

Stanford University

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):
Dr. Barbara Block, Principal Investigator
Dr. Taylor Chapple, Assistant Professor
Dr. George Shillinger, Research Scientist
Mr. Robert Schallert, Research Scientist, Tagging specialist
Dr. Samantha Andrzejaczek, Research Scientist, Tagging specialist
Theodore Reimer, Field Technician
Allen Stuart, Vessel Owner
Captain Shane O’Brien, Vessel Captain
Rick Gaffney, Consultant
## Section B: Project Information

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

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
<th>Ocean Based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nihoa Island</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Necker Island (Mokumanamana)</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>French Frigate Shoals</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Gardner Pinnacles</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Maro Reef</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Laysan Island</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Lisianski Island, Neva Shoal</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Pearl and Hermes Atoll</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Midway Atoll</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Kure Atoll</td>
<td>Land-based</td>
<td>Shallow water, Deep water</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:
Trolling for billfish and yellowfin tuna will take place from Nawiliwili Harbor on Kauai, into the original Monument boundaries and the expanded Monument boundaries, and back out, as weather and sea conditions permit. The focus of the effort will be in the offshore, deep-water areas, primarily north of Necker, Nihoa, French Frigate Shoals and Gardner Pinnacles, and in the area of known sea mounts in the specified research area.

### 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
6. Purpose/Need/Scope

State purpose of proposed activities:

The questions we wish to answer are as follows:

How do billfish and tunas utilize the MPA? What residency time do these animals have in the MPA? What environmental conditions and oceanographic preferences are they utilizing on the MPA? What areas outside the MPA provide critical habitat?

Satellite and archival tags provide detailed knowledge of location and tuna and billfish diving behaviors collected simultaneously with oceanographic data. Together these data provide in situ knowledge on how animals use these habitats.

We proposed to undertake the first dedicated tag and release effort in the Monument focused on electronic tagging of a variety of highly mobile pelagic fish and sharks. The proposed activity will afford Monument Managers with new data regarding a number of species important to the ecosystem of the PMNM including in particular major billfish species and yellowfin tuna.

*Considering the purpose of the proposed activities, do you intend to film / photograph federally protected species?  Yes ☐ NO: X

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

Pacific blue marlin (Makaira nigricans), Black marlin (Makaira indica), Yellowfin tuna (Thunnus albacares).

For a list of terrestrial species protected under the Endangered Species Act visit: [http://www.fws.gov/endangered/](http://www.fws.gov/endangered/)

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?

Tagging and release of these species on heavy fishing gear (130 pound tackle) has been perfected to the point that it has proven low mortality, which will minimize impacts on the natural resources and ecological integrity of the Monument. Investigators
recognize that from a Native Hawaiian perspective all natural resources are cultural resources and should therefore be honored and respected. It is further understood that the bills of the various billfish species were utilized by Native Hawaiians as implements, tools, and by Koa (warriors) as essential parts of some weapons of war (Lua) and therefore the billfish species have great cultural importance.

We expect this work will teach us a great deal about how highly mobile predators, important to both early Hawaiians and the fishermen of today use the Monument, which way the fish go if they leave the Monument, and if they return to the PMNM if they do leave.

b. How will the activity be conducted in a manner compatible with the management direction of this proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument cultural, natural and historic resources, qualities, and ecological integrity, any indirect, secondary, or cumulative effects of the activity, and the duration of such effects?

We believe that the proposed tagging activities will support the management direction of the proclamation by adding substantial new data regarding how these important pelagic species utilize the waters of the monument to feed, breed and perhaps live out their lives. We do not believe that the proposed activities will diminish the Monument, and would argue that learning a lot more about the lives of a variety of the Monument’s pelagic species will enhance the ecological integrity of the PMNM, provide a baseline regarding these important natural resources, and do so with no impact on the area’s historic resources and little to no impact on the cultural resources of this uniquely important protected area.

How will the answers to our research questions help the Co-Trustees manage the resources of the Monument?

Tunas and billfish are highly mobile fish but utilize large MPA habitats as foraging and spawning areas. These fish are sought after by industrial commercial fisheries where ever they swim. The data of fish habitat utilization can be combined with ship AIS data to better understand how MPA’s like PMNM create refuge areas for these animals.

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.

No. Outside the Monument boundaries there is a virtual wall of foreign longline vessels, targeting several of the species that are the focus of our research which substantially limits the value of any data gathered in those heavily fished waters (including those of the Main Hawaiian Islands), and likely decreases the availability of the target species, thus increasing the effort required to acquire the data and lessening its overall value. Tagging within the Monument boundaries will provide data on populations of pelagic fish in waters not subject to harvest and may provide unique data on several species, especially yellowfin tuna that may be benefitting from the layered protections of the PMNM, and are likely to be proven to be part of a resident population.
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, new information on how pelagic species use the waters of the monument and where they travel if and when they leave the MPA will be invaluable to Monument Managers, particularly as domestic commercial fishing interests continue to pursue justification and seek authorization to harvest within the boundaries. This is a low impact endeavor with a large potential for returning valuable data regarding the ecological integrity of the PMNM, which can then be utilized to justify continued protections currently, and to expand the scope of marine research from the benthic zone to the pelagic.

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

Forty-five days/year in the Monument is the shortest possible duration required to assure tagging success. We only require being present for tagging, the electronic tags will record detailed behavior of the animals after we leave.

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

See Dr. Block's c.v. (attached) The Principal Investigator, Dr. Barbara Block is an internationally recognized expert on pelagic species and tagging. The Block lab has a team that has processed electronic tag data for over 25 years. We have many of the original tracks on marlin and tuna in the Hawaiian Islands and data will be available via the Great Marlin Race website for public download.

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.

See attached letter regarding vessel owner Allen Stuart who will be funding this research activity. Required vessel insurance documents are also available and special insurance provisions can also be applied to that coverage. Dr. Block holds an endowed chair at Stanford University and has been actively tagging pelagic fish for decades with funding from a wide variety of funding sources, grants, NGO’s and other sources including from sport fishermen/citizen scientists seeking to add to the knowledge base on the pelagic species important to them. See Dr. Block’s c.v. (attached)

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.

We cannot manage what we do not understand. Electronic tags are the best way to learn presence and residency time of fish within the region. This information can improve conservation management plans for species, define MPAs with greater precision, and allow managers to engage with stakeholders with greater confidence. Understanding the role the Monument plays in the lives of these fish species may
strengthen ties between Hawaiians and their resident animals, inspiring the next generation to be even greater guardians of their native lands and seas.

The proposed methodology is the least impactful and most results oriented of any means for determining behavior of the target species within the Monument. All techniques to be utilized will be accomplished based on 25 years of perfecting these methods of pelagic fish tagging. We are highly qualified after tagging with over 3000 fish tagged globally, and over 300 in central Pacific 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 will be prior to undertaking this investigation.

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate. No other factors that we can conceive of would make the issuance of this permit inappropriate.

8. Procedures/Methods:
Tagging from an accomplished sport fishing vessel involving a practiced team working together wherein tag and release will be undertaken as follows: Fish will be caught by trolling on heavy 130 lb test fishing tackle which minimizes the time required to bring the fish to the boat prior to tagging and release. Upon reeling in the fish to the stern of the vessel, a satellite tag dart will be inserted into the dorsal hump of the fish using established techniques as outlined herein, and Wildlife Computer or Microwave Telemetry tags. Satellite tags will be attached with a custom 4 layer tether and custom titanium dart. Whenever possible, scientists and/or research technicians experienced with tagging will be onboard and they will also train the Captain and crew of the vessel in tagging techniques in the Main Hawaiian Islands prior to any voyage into the Monument. Genetic samples will be taken with a biopsy tube on the tagging stick—then stored in ethanol and sent back to the lab for further analyses and documentation.

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:
Scientific name:
Blue marlin, Makaira nigricans
Black marlin, Makaira indica
shortbill spearfish, Tetrapturus angustirostris
Yellowfin tuna, Thunnus albacares
Bigeye tuna, Thunnus obesus
Mako Shark *Isurus oxyrinus*
Common Thresher shark *Alopias vulpinus*
Big eye Thresher *Alopias*
Blue shark, Prionace Glaucus

# & size of specimens:
Up to 10 Blue marlin and 10 tunas of each species will be tagged, up to 5 sailfish, 5 spearfish, and 5 sharks, per year.

Collection location:
Deepwater habitat from Nihoa to Gardiner Pinnacles

Whole Organism  X  Partial Organism

9b. What will be done with the specimens after the project has ended?
All will be released with electronic or conventional tags. Data collected from the tags will be publicly accessible.

9c. Will the organisms be kept alive after collection?  □ Yes  □ No
N/A all will be released

• General site/location for collections:
  Deepwater habitat from Nihoa to Gardiner Pinnacles

• 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

10. If applicable, how will the collected samples or specimens be transported out of the Monument?
When tagging, if possible, genetic samples (biopsies such as fin clips) will be collected, and these fin clips will be isolated and stored upon the vessel until the vessel has left the monument, and then taken to the lab for further analyses.

11. Describe collaborative activities to share samples, reduce duplicative sampling, or duplicative research:
We will make the data available thru both the gtopp.org and ATN websites. The latter is a national website Dr. Block helped create for biologging data.

12a. List all specialized gear and materials to be used in this activity:
130 lb. class trolling tackle. Aluminum tag poles. Only pop up satellite tags and archival tags will be deployed on fish. Fish will potentially leave the monument with these instruments.

Pop-up satellite archival tags (PSATs) track movements of large, migratory marine animals. A PSAT is an archival tag (or data logger) that is equipped with a means to transmit the collected data via the Argos satellite system. The major advantage is that it does not have to be physically retrieved like an archival tag for the data to be available making it a viable, fishery independent tool for animal behavior and migration studies. Location, depth, temperature, oxygen levels, and body movement data are used to answer questions about migratory patterns, seasonal feeding movements, daily habits, and survival after catch and release, for examples.

A satellite tag is generally constructed of several components: a data-logging section, a release section, a float, and an antenna. The release sections include an energetically popped off release section or a corrosive pin that is actively corroded on a preset date or after a specified period of time. Some limitations of using satellite tags are their depth limitations (2000m), their costs ($499–$4000+), their vulnerability to loss by environmental issues (biofouling), or premature release through ingestion by a predator.

12b. List all Hazardous Materials you propose to take to and use within the Monument:
Diesel fuel, and motor oil on board the vessel.

13. Describe any fixed installations and instrumentation proposed to be set in the Monument:
None

14. Provide a time line for sample analysis, data analysis, write-up and publication of information:
Tags will be set for 8, 10 and 12-month deployments. When all the tags have popped up the data will be written up for publications. Dr. Block has 220 publications and has a long-proven track record for writing up research results. Target date for publication is 12 months after the last of the tags have popped up and downloaded their data.

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

Publications of Relevance


Wiens, L., Banh, S., Sotiri, E., Jastroch, M., Block, B. A., Brand, M. D., and J. R. Treberg


Wilson, S., Jonsen, I., Schallert, R. Tracking the fidelity of Atlantic bluefin tuna released in Canadian waters to the Gulf of Mexico spawning grounds. *Canadian J. of Fisheries and Aquatic Sciences*. 2015. 72: 1700-1717.


Gleiss, A.C., Block, B.A., Campagna, C., Grundy, Hays, G, Jorgensen, S., Liebsch, N.,


Shillinger, G., Palacios,D., Bograd, S. Swithenbank, A., Gaspar, P., Wallace, B.


Stokesbury, M., Cosgrove, R., Boustany, A. Browne, D., Teo, S.L.H., O’Dor, R. and B.A. Block. Preliminary results on the movement of Atlantic bluefin tuna from the eastern Atlantic Ocean to the western Atlantic Ocean as determined with pop-up satellite archival tags. 2007. *Hydrobiologia*: 582:91-97


Biology 148:159-165.


Boustany, A., M., Marcinek, D. J., Keen, J., Dewar, H., And B. A. Block. Movements and
temperature preferences of Atlantic bluefin tuna (*Thunnus thynnus*) off North Carolina:
Nielsen (eds.), Electronic Tagging and Tracking in Marine Fisheries, 65-88. 2001 Kluwer

Block, B.A., Dewar, H., Blackwell, S.B., Williams, T., Prince, E. Boustany, A.M., Farwell, C.,
Bluefin Tuna. J.R. Sibert and J. L. Nielsen (eds.), Electronic Tagging and Tracking in

movements and depth distribution of large adult yellowfin tuna (*Thunnus albacares*) near
the Hawaiian Islands, recorded using ultrasonic telemetry: implications for the

populations of the swordfish, *Xiphias gladius*, as inferred through analysis of mitochondrial

movements and depth distribution of large adult yellowfin tuna (*Thunnus albacares*) near
the Hawaiian Islands, recorded using ultrasonic telemetry: implications for the

Development of an acoustic telemetry tag for monitoring electromyograms in free-
swimming fish. *Journal of Experimental Biology* 202, 2693-2699

technology for tracking the movements of Atlantic bluefin tuna. *Proceedings of the National
Academy* 95: 9384-9389.

Block, B. A., Dewar, H., Williams, T., Prince, E. and C. Farwell. 1998. The use of archival,

movements and depth distribution of large adult yellowfin tuna (*Thunnus albacares*) near
the Hawaiian Islands, recorded using ultrasonic telemetry: implications for the

Block, B. A., Keen, J., Brill, R.W., Castillo, B., Dewar, H., Freund, E., Marcinek, D. and C.


**Book Chapters**


**CURRICULUM VITAE**

**BARBARA A. BLOCK**

**ADDRESS**

**EDUCATION:**
- 1980 B.A., University of Vermont. Zoology
- 1986 Ph.D., Duke University. Zoology

**PROFESSIONAL POSITIONS:**
- 1986-1988 Muscular Dystrophy Association Postdoctoral Fellow. Department of Biology and Department of Anatomy, University of Pennsylvania
- 1989-1993 Assistant Professor, Department of Organismal Biology, University of Chicago.
- 1994-1996 Assistant Professor, Department of Biological Sciences, Stanford University
- 1997-2003 Associate Professor, Department of Biological Sciences, Stanford University
- 1999-Present Charles & Elizabeth Prothro Professor of Marine Science, Stanford University
2004- Present  Professor, Department of Biological Sciences, Stanford University

AWARDS
1989  National Science Foundation Presidential Young Investigator Award
1993  Bartholomew Award, Society for Integrative & Comparative Biology
1995  Bowditch Award, American Physiological Society
1995  Presidents Medal, Society for Experimental Biology
1995  Terman Fellow, Stanford University
1996  MacArthur Foundation Fellow
1997  Pew Marine Conservation Fellow
2001  Ocean Conservation Award, Aquarium of the Pacific
2002  International Gamefish Association Conservation Award
2005  Ricketts Award, Monterey Bay
2006  Fellow of the California Academy of Sciences
2008  Walter B. Cannon Award, American Physiological Society
2011  International Gamefish Association Gil Keech Conservation Award
2012  Environmental Stewardship Award, South Carolina Aquarium
2012  Rolex Award for Enterprise
2015  Fellow of the American Physiological Society
2016  Benchley Award for Ocean Science
2018  University of Vermont, Distinguished Alumni Award, Biology
Tracks of billfish tagged in the MHI by year
With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as “confidential” prior to posting the application.

Signature       Date

8/27/2019

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

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

DID YOU INCLUDE THESE?

X Applicant CV/Resume/Biography
X Intended field Principal Investigator CV/Resume/Biography
X Electronic and Hard Copy of Application with Signature

☐ Statement of information you wish to be kept confidential (NONE)
☐ Material Safety Data Sheets for Hazardous Materials (N/A)