

Papahānaumokuākea Marine National Monument
RESEARCH Permit Application

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

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:

Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
nwhipermit@noaa.gov
PHONE: (808) 397-2660 FAX: (808) 397-2662

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

Papahānaumokuākea Marine National Monument Permit Application Cover Sheet

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

Summary Information

Applicant Name: Dr. James V. Gardner

Affiliation: Center for Coastal & Ocean Mapping, University of New Hampshire

Permit Category: Research

Proposed Activity Dates: spring to early summer 2011 (cruise dates not yet set by NSF)

Proposed Method of Entry (Vessel/Plane): RV Kilo Moana

Proposed Locations: Necker Ridge intersection with Hawaiian Ridge within a polygon with coordinates of 23.582°N/164.966°W to 23.425°N/164.680°W to 23.134°N/164.882°W to 23.412°N/165.204°W to 23.582°N/164.966°W.

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

6

Estimated number of days in the Monument: 2

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...
include collecting multibeam echosounder bathymetry, CHIRP subbottom profiler and gravity data

b.) To accomplish this activity we would
be continuously underway at ~12 knts with no stations

c.) This activity would help the Monument by ...
provide the first detailed bathymetry of the intersection of Necker Ridge with the Hawaiian Ridge

Other information or background: The datasets are being collected for use in the development of potential claims the U.S. may submit to the United Nations Commission on the Law of the Sea (UNCLOS). UNCLOS requirements for an extended shelf claim (UN, 1983) are based on either of two formulae; a distance formula that allows an extension of the shelf to 60 nm beyond

the foot of the continental slope (generally defined as the point of maximum change in gradient at its base) and a sediment-thickness formula that allows the extension of the shelf to where the sediment thickness is 1% of the distance back to the foot of the slope. One of the objectives of the new mapping is thus to provide the data needed to define the location of the foot of the continental slope. However, the extended claim cannot extend beyond 100 nm from the 2500 m isobath, the location of which also is accurately mapped in these new surveys, or 350 nm from the officially defined shoreline, whichever is more advantageous to the coastal state. A claim for an extension of the U.S. juridical shelf under UNCLOS would likely be based on a combination of bathymetric data (the 2500-m isobath and the foot of the slope) and geophysical data (the thickness of sediment) (Hutchinson et al., 2005).

The U.S. Bathymetric Mapping Program

Even though as of this writing the U.S. Senate has not acceded to the UNCLOS treaty, the University of New Hampshire's Center For Coastal and Ocean Mapping-Joint Hydrographic Center has been directed by Congress, through funding to NOAA, to conduct multibeam bathymetric mapping of selected U.S. continental margins. Mayer et al. (2002) conducted a study of the U.S. marine data archives to determine where additional bathymetric surveys might be beneficial in developing a potential U.S. claim under UNCLOS Article 76. This study identified seven regions; areas in the Arctic Ocean, the Bering Sea and the Gulf of Mexico, the entire U.S. Atlantic margin, the Gulf of Alaska and areas surrounding the Mariana Islands, Kingman Reef and Palmyra Atoll, where the U.S. may have a potential for extended shelf claims. Necker Ridge, in the proximity to the Hawaiian Ridge was added to the list after the Mayer et al. report was published. The website http://ccom.unh.edu/law_of_the_sea.html has images, data and reports from areas mapped to date.

References

UN, 1983, United Nations Convention on the Law of the Sea, United Nations, New York, No. E.93.V.16.

Mayer, L.A., Jakobsson, M., and Armstrong, A., 2002, The compilation and analysis of data relevant to a U.S. claim under United Nations Law of the Sea Article 76: A Preliminary Report. <http://www.jhc.unh.edu/unclos/html/reports.htm>.

These data are being collected for the U.S. State Department for the U.S. Law of the Sea efforts. The data will be used to verify whether or not Necker Ridge is a natural prolongation to the Hawaiian Ridge.

The multibeam data will be processed at sea in real time and the cruise report and data will be publicly available on the website http://ccom.unh.edu/law_of_the_sea.html within a month of data collection.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Gardner, James V.

Title: Research Professor

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

Dr. James V. Gardner

2. Mailing address (street/P.O. box, city, state, country, zip): Center for Coastal & Ocean Mapping, Chase Ocean Engineering Lab, University of New Hampshire, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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

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

U.S. State Department, NOAA, University of New Hampshire

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. James V. Gardner, Chief Scientist, UNH, [REDACTED]

Dr. Brian Calder, co-Chief Scientist, UNH, [REDACTED]

Mr. David Armstrong, multibeam watchstander, [REDACTED]

[REDACTED]

Mr. Brian O'Donnell, multibeam watchstander, [REDACTED]
unnamed NOAA employee, multibeam watchstander
unnamed NOAA employee, multibeam watchstander

Section B: Project Information

5a. Project location(s):

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

Ocean Based

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

Location Description:

The deep-water intersection between Necker Ridge and Hawaiian Ridge

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 bathymetry is required by U.S. State Department Law of the Sea project to demonstrate a natural prolongation of the Hawaiian Ridge to Necker Ridge

7. Answer the Findings below by providing information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Monument:

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?

All work will be in water deeper than 1000 m and underway at ~12 knts.

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?

This work will not impact the cultural, natural and historic resources, qualities and ecological integrity, nor will there be any indirect, secondary or cumulative effects of this activity on the monument. It may add a small amount of high-resolution bathymetry on a small part of the western section of the monument. The data will be freely available to the monument if desired. Any work within the monument will be done at the outer western limit in a very small, deep-water area where Necker Ridge appears to be connected to the Hawaiian Ridge. The ship will not be operating in waters shallower than ~1000 m.

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, the connection between Necker Ridge and the Hawaiian Ridge must be mapped to establish whether Necker Ridge is a natural prolongation of the Hawaiian Ridge. The only way to establish the connection is by multibeam bathymetry mapping.

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

no impacts on the Monument

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

2 days are all that are required to collect the multibeam bathymetry in this restricted area

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

James V. Gardner

Date of Birth:

28 May, 1940, USA citizen

Education:

Ph.D., Marine Geology, Columbia University, 1973

MS, Marine Geology, Columbia University, 1969

BS, Geology, California State Univ. San Diego, 1965-1967

---, Geology, University of Kansas, 1958-1960

Fellow, Geological Society of America

Employment:

Research Professor, Center for Coastal and Ocean Mapping, University of New Hampshire, Durham, NH 03824 2003-present

Research Marine Geologist, Coastal & Marine Geology Team, U.S. Geological Survey, Menlo Park, CA 1975 to 2003 (retired, Emeritus Senior Geologist)

Marine Geologist, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA, 1973-1975

Research Marine Geologist, Marathon Oil Company, Denver Research Center, Denver, CO 1969-1971

Selected Research Experience

3/83-6/92 Program Chief for USGS GLORIA EEZ mapping program (EEZ SCAN)

1991-1992 Edgeworth David Visiting Scholar, University of Sydney, Sydney Australia

1996-2003 Chief of USGS Seafloor Mapping Project

1999-present Appointed Honorary Associate of School of Geosciences, University of Sydney, Australia

2000-2003 Adjunct Professor of Ocean Mapping, University of New Hampshire
2003-present Emeritus Senior Geologist, US Geological Survey, Menlo Park, CA
2003-present Research Professor, Center for Coastal and Ocean Mapping University of New Hampshire
2003-present Program Manager, U.S. Law of the Sea mapping
2001-2005 Appointed member of US Sea-Bottom Surveys Panel of United States/Japan Cooperative Program in Natural Resources.

Participated in more than 50 major oceanographic cruises since 1973, and Chief Scientist on 30 of them.

SELECTED RELEVANT PUBLICATIONS:

2003

Gardner, J.V., Hughes Clarke, J.E. Mayer, L.A., and Dartnell, P., 2003, Bathymetry and acoustic backscatter of the mid and outer continental shelf, head of De Soto Canyon, northeastern Gulf of Mexico – data, images, and GIS, U.S. Geological Survey Open-File Report OF03-007 (DVD).

Gardner, J.V., Dartnell, P., Mayer, L.A., and Hughes Clarke, J.E., 2003, Geomorphology, acoustic backscatter, and processes in Santa Monica Bay from multibeam mapping. *Marine Environmental Research*, v. 56, p. 15-46.

Schmahl, G., Hickerson, E., Weaver, D. and Gardner, J., 2003, High-resolution multibeam mapping and habitat characterization of topographic features in the northwest Gulf of Mexico (abs.). U.S. Hydro conference, Biloxi, MS.

Barnes, P., Fleisher, G., Gardner, J.V., and Lee, K., 2003, Bathymetry and selected perspective views of 6 reef and coastal areas in northern Lake Michigan. US Geological Survey Open-File Report 03-120 (<http://geopubs.wr.usgs.gov/open-file/of03-120>).

Lee, H.J., Kayen, R.E., Gardner, J.V., and Locat, J., 2003, Characteristics of several tsunamigenic submarine landslides, in Locat, J. and Mienert, J., (eds.), *Submarine mass movements and their consequences*, Kluwer Academic Publishers, Amsterdam, p. 357-366.

2004

Gardner, J.V., 2004, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the northeast U.S. Atlantic continental margin. Cruise Report, Univ. of New Hampshire CCOM Administrative report, 61p.

Bohannon, R.G. and Gardner, J.V., 2004, Submarine landslides of San Pedro Escarpment, southwest of Long Beach, California, *Marine Geology*, v. 203, p. 261-268.

Dartnell, P. and Gardner, J.V., 2004, Predicting seafloor facies from multibeam bathymetry and backscatter data, *Photogrammetric Engineering and Remote Sensing*, v. 70, p. 1081-1091.

Dartnell, P. and Gardner, J.V., 2004, Predicted seafloor facies of central Santa Monica Bay, California. US Geological Survey Open-File Report 2004-1081 (<http://pubs.usgs.gov/of/2004/1081>).

Dartnell, P., Gardner, J.V., Mayer, L.A., and Hughes Clarke, J.E., 2004, Los Angeles and San Diego margin high-resolution multibeam bathymetry and backscatter data. U.S. Geological Survey Open-File Report 2004-1221 (<http://pubs.usgs.gov/of/2004/1221>).

Dartnell, P., Barnes, P. Gardner, J.V., and Lee, K., 2004, Visualizing the geology of lake trout spawning sites: northern Lake Michigan. U.S. Geological Survey Geologic Investigations Series I-2800 (<http://pubs.usgs.gov/map/i2800/>).

Klaucke, I. Masson, D.G, Kenyon, N.H., and Gardner, J.V., 2004, Sedimentary processes of the lower Monterey Fan channel and channel-mouth lobe, *Marine Geology*, v. 206, p. 181-198.

2005

Gardner, J.V. and Beaudoin, J., 2005, High-resolution multibeam bathymetry and acoustic backscatter of outer shelf banks, northwestern Gulf of Mexico, *Gulf of Mexico Science*, v. 23, p. 5-29.

Gardner, J.V., Mayer, L.A., and Armstrong, A. 2005, New views of the U.S. Continental Margins, U.S. Hydro Conference Proceedings, CD-ROM

Gardner, J.V., Dartnell, P., Mayer, L.A., Hughes Clarke, J.E., Calder, B.R., and Duffy, G., 2005, Drowned barrier-island complexes and shelf-edge deltas on the northwest Florida outer continental shelf, *Geomorphology*, v. 64, p. 133-166.

Gardner, J.V., Mayer, L.A., and Armstrong, A., 2005, US Law of the Sea mapping. *Hydro International*, v. 9, p. 42-45.

Jakobsson, M., Gardner, J.V., Vogt, P., Mayer, L.A., Armstrong, A., Backman, J., Breman, R., Calder, B., Hall, J.K., and Kraft, B., 2005. Multibeam bathymetric and sediment profiler evidence for ice grounding on the Chukchi Borderland, Arctic Ocean. *Quaternary Research*, v. 63, p. 150-160.

Gardner, J.V. and Mayer, L.A., 2005, Benthic habitat mapping with advanced techniques and their applications (abs), in Barnes, P.W. and Thomas, J.P. (eds.) *Benthic habitats and the effects of fishing*, American Fisheries Society Symposium 41, American Fisheries Society, p. 139-140.

Barnes, P., Fleischer, G.W., Gardner, J.V., and Lee, K.M., 2005, Using laser technology to characterize substrate morphology and geology of lake trout spawning habitat in northern Lake Michigan. In Barnes, P.W. and Thomas, J.P. (eds.) *Benthic Habitats and the effects of fishing*. American Fisheries Society Symposium 41, Bethesda, Maryland, American Fisheries Society, p. 165-169.

Dartnell, P., G. Larson, R. Collier, M. Buktenica, and J Gardner. 2005. Multibeam Mapping of Crater Lake, Oregon and Application of Sonar Data to Model a Submerged Moss Community. American Association for the Advancement of Science, Ashland, OR.

Cartwright, D. and Gardner, J.V., 2005, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the northeast U.S. Atlantic continental margin: Legs 4 and 5. Cruise Report, Univ. of New Hampshire CCOM Administrative report, 30p.

2006

Gardner, J.V., Mayer, L., and Armstrong, A., 2006, Mapping supports potential submission to U.N. Law of the Sea. *Eos, Trans. American Geophysical Union*, v. 87, p. 157-160.

Dartnell, P., Barnard, P., Chin, J.L., Hanes, D., Kvittek, R.G., Iampietro, P.J., and Gardner, J.V., 2006. Under the Golden Gate Bridge – Views of the sea floor near the entrance to San Francisco Bay, California. U.S. Geological Survey Scientific Investigations Map 2917.

Pe'eri, S., Philpot, W.D., Guenther, G.C. and Gardner, J.V., 2006, Shoreline mapping using LIDAR red-channel waveforms (abs.), American Geophysical Union Fall Meeting, San Francisco.

2007

Gardner, J.V., Calder, B.R., Hughes Clarke, J.E., Mayer, L.A., Elston, G., and Rzhhanov, Y., 2007, Drowned shelf-edge delta complexes and barrier islands and related features along the outer continental shelf north of the head of De Soto Canyon, NE Gulf of Mexico, *Geomorphology*, v. 89, p. 370-390.

Gardner, J.V., Mayer, L.A., and Armstrong, A.A., 2007, High-resolution mapping in support of UNCLOS Article 76: Seeing the seafloor with new eyes. U.S. Hydro Conference, Norfolk, VA, 12p.

Gardner, J.V. and Johnson, J., 2007, New insights in Atlantic continental margin processes (abs.). Geological Society of America NE section meeting, Durham, NH.

Gardner, J.V., 2007, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the Florida Escarpment and Sigsbee Escarpment northern Gulf of Mexico continental margin. University of New Hampshire, CCOM-JHC Administrative Report 07-100, 40p.

Schwehr, K., Sullivan, B., and Gardner, J.V., 2007, Google Earth visualizations: Preview and delivery of hydrographic and other marine datasets. U.S. Hydro Conference, Norfolk, VA, 12p.

Gulick, S.P.S., Lowe, L.A., Pavlis, T., Mayer, L. and Gardner, J.V., 2007, New insight into the Transition Fault debate: Propagating strike-slip in response to stalled subduction in the Gulf of Alaska. *Geology*, v. 35, p. 763-766.

Sweeney, E. M., Gardner, J.V., Mayer, L. A., and Johnson, J.E., 2007, Interpretations of a low-backscatter anomaly found in 12-kHz data on the U.S. mid-Atlantic lower

continental slope (abs.). Geological Society of America NE section meeting, Durham, NH

Pe'eri, S., J. V. Gardner, L. Ward, R. Morrison, and J.Lillycrop, 2007a. The seafloor as key component for the success of lidar in bottom detection, abstract in JALBTCX 8th Annual Workshop, Seattle, WA, 23-24 May 2007.

Dartnell, P., Normark, W.R., Driscoll, N.W., Babcock, J.M., Gardner, J.V., Kvittek, R.G. And Iampietro, P.J., 2007, Multibeam bathymetry and selected perspective views offshore San Diego, California. U.S. Geological Survey Scientific Investigations Map 2959.

Gardner, J.V., 2007, U.S. Law of the Sea cruise to map the western insular margin and 2500-m isobath of Guam and the Northern Mariana Islands, Cruise Report, Univ. of New Hampshire CCOM Administrative report, 44p.

Gardner, J.V., Mayer, L.A., and Armstrong, A., Bathymetry mapping for U.S. UNCLOS Concerns: A Gold Mine for Marine Geology, Gardner, Mayer & Armstrong, American Geophysical Union Fall Meeting, San Francisco, Dec. 10-14 2007

2008

Gardner, J.V., Mayer, L.A., and Armstrong, A., From the Arctic to the tropics: The U.S. UNCLOS bathymetric mapping program. Canadian Hydrographic Conference, Victoria BC, Canada, 5-8 May, 2008

Pe'eri, S., Gardner, J.V., and Ward, L.G., 2008, Validating coastal flooding models using ALB-derived shorelines. Canadian Hydrographic Conference, Victoria BC, Canada, 5-8 May, 2008

Gardner, J.V., U.S. State Dept. ECS Pacific Workshop, UNH bathymetric mapping in the Guam and CNMI western insular slopes. April 22-23, 2008, Honolulu

Gardner, J.V., U.S. State Dept. ECS Pacific Workshop, Proposed UNH bathymetric mapping in Kingman Reef and Palmyra Atoll. April 22-23, 2008, Honolulu

Pe'eri, S., Gardner, J.V., Philpot, W.D., Guenther, G., and Morgan, L.V., in press, A review of shoreline algorithms using airborne lidar bathymetry (ALB). Applied Optics, 27p..

Calder, B.R. and Gardner, J.V., 2008, U.S. Law of the Sea cruise to map the foot of the slope of the Northeast U.S. Atlantic continental margin: Leg 6. University of New Hampshire, CCOM-JHC Administrative Report 08-101, 128p.

Fonseca, L., Gardner, J., Calder, B.R., Mayer, L.A., and Armstrong, A.A., 2008, US UNCLOS multibeam data: The processing of multibeam bathymetry and backscatter. Hydro International, Nov., p. 14-17.

Mayer, L.A., K Brumley, A Andronikov, D. N. Chayes, A. A. Armstrong, B Calder, J K Hall, W C Clyde, W A Bothner, J V Gardner, 2008, Resent Mapping and Sampling on the Chukchi Borderland and Alpha/Medelev Ridge, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract C11C-0516.

2009

Dartnell, P. and Gardner, J.V., 2009, Seafloor terrain analysis and geomorphology of the greater Los Angeles margin and San Pedro Basin, southern California, in Lee, H.J. and Normark, W.R., (eds.), Earth science in the urban ocean: The southern California continental borderland. Geological Society of America Special Paper 454, p. 9-28.

Mayer, L.A., Armstrong, A.A. and Gardner, J.V., 2009, Mapping in the Arctic Ocean in support of a potential extended continental shelf. U.S. Hydro Conference, Norfolk, VA, 13p.

Gardner, J.V. and Malik, M., 2009, US. Law of the Sea cruise to map the eastern Mendocino Ridge, eastern Pacific Ocean. Cruise Report. CCOMJHC Administrative Report 09-001, 35p.

Gardner, J.V., Malik, M., and Walker, S., 2009, Plume 1400 meters high discovered at the seafloor off the northern California margin. Eos, v. 90, No. 32., p. 275.

2010

Gardner, J.V., 2010, The West Mariana Ridge, western Pacific Ocean: geomorphology and processes from new multibeam data. Geological Society of America Bulletin. v. 122, p 1378-1388.

Boyd, R., Keene, J., Hubble, T. Gardner, J., Glenn, K., Ruming, K., and Exon, N., 2009, Southeast Australia: A Cenozoic continental margin dominated by mass transport, in

Mosher, D.C., Shipp, jR.C., Moscardelli, L., Chaytor, J.D., Baxter, C.D.P., Lee, H.J., and Urgeles, jR. (eds.) Submarine mass movements and their consequences, 4th International Symposium, Springer Dordrecht Heidelberg, New York, p. 491-502.

Mayer, L.A., Armstrong, A.A. and Gardner, J.V., 2010, Mapping in the Arctic Ocean in support of a potential extended continental shelf. Hydro International.

Doucet, M., Paton, M., Gardner, J., and Greinert, J., 2010, 4D multimodal visualization and analysis of seafloor vents and plumes. Canadian Hydrographic Conference Proceedings.

Pe'eri, S., Gardner, J.V., Armstrong, A.A., Yoos, C.J., Holmberg, P.S., and Greenaway, M.P., 2010, Hydrographic survey bottom sampling specifications: A remote sensing perspective. Canadian Hydrographic Conference 2010 Proceedings.

Pe'eri, S., Gardner, J.V., Ward, L.G., Morrison, R.J., and Lillycrop, J., in press, The seafloor: a key component for the lack of success of lidar in bottom detection. IEEE Transactions on Geoscience and Remote Sensing, v. p.

Mayer, L.A., Weber, T., Gardner, J., Malik, M. Beaudoin, J. and Doucet, M., 2010, More than the bottom: Multibeam sonars and water-column imaging. American Geophysical Union Fall Meeting, San Francisco, 2010.

Clarke, S., Boyd, R., Hubble, T. Airey, D., Keene, J., Exon, N. Gardner, J. and shipboard party, 2010, Sediment characteristics of submarine landslides on the upper east Australian continental margin-preliminary findings, American Geophysical Union Fall Meeting, San Francisco, 2010.

Hubble, T., Yu, P., Airey, D., Clarke, S., Boyd, R. Keene, J., Exon, N., Gardner, J. and shipboard party, Physical properties and age of mid-slope sediments dredged from the eastern Australian continental margin-implication for continental margin erosional processes, American Geophysical Union Fall Meeting, San Francisco, 2010.

2011

Rzhanov, Y., Pe'eri, S., Guilford, J. and Gardner, J., 2011, Seafloor characterization using airborne hyperspectral co-registration procedures independent from attitude and positioning sensors (abs.), Coastal Geotools 2011, March, 2011, Myrtle Beach, SC

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. funding is from the U.S. State Department, through NOAA to the Univ. of New Hampshire. The funding is presently in-hand at the Univ. of Hawaii.

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

Multibeam bathymetry mapping uses a 12-kHz sonar frequency and collects soundings over a swath of ~5 x water depth. The system to be used is the latest, state-of-the-art multibeam system, in use throughout the world for mapping the bathymetry of the deep ocean. The frequency has no impact on the monument's cultural, natural or historic resources, qualities and ecological integrity. The multibeam system to be used was chosen because almost all of the work outside the monument will be in water depths deeper than 2500 m, thus the requirement for a 12-kHz system.

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

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

8. Procedures/Methods:

The hull-mounted multibeam bathymetry mapping system will be run 24 hr/day at a ship speed of ~12 knts. The survey lines will be separated by the total achieved swath width minus about 1 km to achieve swath overlap. The survey lines within the monument will be run parallel to and on the western flank of the strike of the Hawaiian Ridge. At no time will be be in waters shallower than ~1000 m. No marine archeological activities are involved. There will be no XBT or CTD casts within the monument. The gravity meter is a passive system that simply measures the gravity field. The multibeam system requires no safeguards.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding, as a customized application will be needed. For more information, contact the Monument office on the first page of this application.

9a. Collection of specimens - collecting activities (would apply to any activity): organisms or objects (List of species, if applicable, attach additional sheets if necessary):

Common name:

n/a

Scientific name:

n/a

& size of specimens:

n/a

Collection location:

n/a

Whole Organism Partial Organism

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

n/a

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

n/a

• General site/location for collections:

n/a

• 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?

n/a

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

n/a

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

n/a.

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

Kongsberg EM122 multibeam echosounder

Knudsen Chirp 3460 subbottom profiler

gravity meter

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

none

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:

These data are being collected for the U.S. State Department for the U.S. Law of the Sea efforts. The multibeam data will be processed at sea in real time and the cruise report and data will be publicly available on the website

http://ccom.unh.edu/law_of_the_sea.html within a month of data collection.

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

James V. Gardner

Date of Birth:

28 May, 1940, USA citizen

Education:

Ph.D., Marine Geology, Columbia University, 1973

MS, Marine Geology, Columbia University, 1969

BS, Geology, California State Univ. San Diego, 1965-1967

---, Geology, University of Kansas, 1958-1960

Fellow, Geological Society of America

Employment:

Research Professor, Center for Coastal and Ocean Mapping, University of New Hampshire, Durham, NH 03824 2003-present

Research Marine Geologist, Coastal & Marine Geology Team, U.S. Geological Survey, Menlo Park, CA 1975 to 2003 (retired, Emeritus Senior Geologist)

Marine Geologist, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA, 1973-1975

Research Marine Geologist, Marathon Oil Company, Denver Research Center, Denver, CO 1969-1971

Selected Research Experience

3/83-6/92 Program Chief for USGS GLORIA EEZ mapping program (EEZ SCAN)

1991-1992 Edgeworth David Visiting Scholar, University of Sydney, Sydney Australia

1996-2003 Chief of USGS Seafloor Mapping Project

1999-present Appointed Honorary Associate of School of Geosciences, University of Sydney, Australia

2000-2003 Adjunct Professor of Ocean Mapping, University of New Hampshire

2003-present Emeritus Senior Geologist, US Geological Survey, Menlo Park, CA

2003-present Research Professor, Center for Coastal and Ocean Mapping University of New Hampshire

2003-present Program Manager, U.S. Law of the Sea mapping

2001-2005 Appointed member of US Sea-Bottom Surveys Panel of United States/Japan Cooperative Program in Natural Resources.

Participated in more than 50 major oceanographic cruises since 1973, and Chief Scientist on 30 of them.

SELECTED RELEVANT PUBLICATIONS:

2003

Gardner, J.V., Hughes Clarke, J.E. Mayer, L.A., and Dartnell, P., 2003, Bathymetry and acoustic backscatter of the mid and outer continental shelf, head of De Soto Canyon, northeastern Gulf of Mexico – data, images, and GIS, U.S. Geological Survey Open-File Report OF03-007 (DVD).

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Schmahl, G., Hickerson, E., Weaver, D. and Gardner, J., 2003, High-resolution multibeam mapping and habitat characterization of topographic features in the northwest Gulf of Mexico (abs.). U.S. Hydro conference, Biloxi, MS.

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2004

Gardner, J.V., 2004, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the northeast U.S. Atlantic continental margin. Cruise Report, Univ. of New Hampshire CCOM Administrative report, 61p.

Bohannon, R.G. and Gardner, J.V., 2004, Submarine landslides of San Pedro Escarpment, southwest of Long Beach, California, *Marine Geology*, v. 203, p. 261-268.

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Dartnell, P., Gardner, J.V., Mayer, L.A., and Hughes Clarke, J.E., 2004, Los Angeles and San Diego margin high-resolution multibeam bathymetry and backscatter data. U.S. Geological Survey Open-File Report 2004-1221 (<http://pubs.usgs.gov/of/2004/1221>).

Dartnell, P., Barnes, P. Gardner, J.V., and Lee, K., 2004, Visualizing the geology of lake trout spawning sites: northern Lake Michigan. U.S. Geological Survey Geologic Investigations Series I-2800 (<http://pubs.usgs.gov/map/i2800/>).

Klaucke, I. Masson, D.G, Kenyon, N.H., and Gardner, J.V., 2004, Sedimentary processes of the lower Monterey Fan channel and channel-mouth lobe, *Marine Geology*, v. 206, p. 181-198.

2005

Gardner, J.V. and Beaudoin, J., 2005, High-resolution multibeam bathymetry and acoustic backscatter of outer shelf banks, northwestern Gulf of Mexico, *Gulf of Mexico Science*, v. 23, p. 5-29.

Gardner, J.V., Mayer, L.A., and Armstrong, A. 2005, New views of the U.S. Continental Margins, U.S. Hydro Conference Proceedings, CD-ROM

Gardner, J.V., Dartnell, P., Mayer, L.A., Hughes Clarke, J.E., Calder, B.R., and Duffy, G., 2005, Drowned barrier-island complexes and shelf-edge deltas on the northwest Florida outer continental shelf, *Geomorphology*, v. 64, p. 133-166.

Gardner, J.V., Mayer, L.A., and Armstrong, A., 2005, US Law of the Sea mapping. *Hydro International*, v. 9, p. 42-45.

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Gardner, J.V. and Mayer, L.A., 2005, Benthic habitat mapping with advanced techniques and their applications (abs), in Barnes, P.W. and Thomas, J.P. (eds.) Benthic habitats and the effects of fishing, American Fisheries Society Symposium 41, American Fisheries Society, p. 139-140.

Barnes, P., Fleischer, G.W., Gardner, J.V., and Lee, K.M., 2005, Using laser technology to characterize substrate morphology and geology of lake trout spawning habitat in northern Lake Michigan. In Barnes, P.W. and Thomas, J.P. (eds.) Benthic Habitats and the effects of fishing. American Fisheries Society Symposium 41, Bethesda, Maryland, American Fisheries Society, p. 165-169.

Dartnell, P., G. Larson, R. Collier, M. Buktenica, and J Gardner. 2005. Multibeam Mapping of Crater Lake, Oregon and Application of Sonar Data to Model a Submerged Moss Community. American Association for the Advancement of Science, Ashland, OR.
Cartwright, D. and Gardner, J.V., 2005, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the northeast U.S. Atlantic continental margin: Legs 4 and 5. Cruise Report, Univ. of New Hampshire CCOM Administrative report, 30p.

2006

Gardner, J.V., Mayer, L., and Armstrong, A., 2006, Mapping supports potential submission to U.N. Law of the Sea. Eos, Trans. American Geophysical Union, v. 87, p. 157-160.

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2007

Gardner, J.V., Calder, B.R., Hughes Clarke, J.E., Mayer, L.A., Elston, G., and Rzhhanov, Y., 2007, Drowned shelf-edge delta complexes and barrier islands and related features

along the outer continental shelf north of the head of De Soto Canyon, NE Gulf of Mexico, *Geomorphology*, v. 89, p. 370-390.

Gardner, J.V., Mayer, L.A., and Armstrong, A.A., 2007, High-resolution mapping in support of UNCLOS Article 76: Seeing the seafloor with new eyes. U.S. Hydro Conference, Norfolk, VA, 12p.

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Gardner, J.V., 2007, U.S. Law of the Sea cruise to map the foot of the slope and 2500-m isobath of the Florida Escarpment and Sigsbee Escarpment northern Gulf of Mexico continental margin. University of New Hampshire, CCOM-JHC Administrative Report 07-100, 40p.

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2008

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the Chukchi Borderland and Alpha/Medelev Ridge, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract C11C-0516.

2009

Dartnell, P. and Gardner, J.V., 2009, Seafloor terrain analysis and geomorphology of the greater Los Angeles margin and San Pedro Basin, southern California, in Lee, H.J. and Normark, W.R., (eds.), *Earth science in the urban ocean: The southern California continental borderland*. Geological Society of America Special Paper 454, p. 9-28.

Mayer, L.A., Armstrong, A.A. and Gardner, J.V., 2009, Mapping in the Arctic Ocean in support of a potential extended continental shelf. U.S. Hydro Conference, Norfolk, VA, 13p.

Gardner, J.V. and Malik, M., 2009, US. Law of the Sea cruise to map the eastern Mendocino Ridge, eastern Pacific Ocean. Cruise Report. CCOMJHC Administrative Report 09-001, 35p.

Gardner, J.V., Malik, M., and Walker, S., 2009, Plume 1400 meters high discovered at the seafloor off the northern California margin. *Eos*, v. 90, No. 32., p. 275.

2010

Gardner, J.V., 2010, The West Mariana Ridge, western Pacific Ocean: geomorphology and processes from new multibeam data. *Geological Society of America Bulletin*. v. 122, p 1378-1388.

Boyd, R., Keene, J., Hubble, T. Gardner, J., Glenn, K., Ruming, K., and Exon, N., 2009, Southeast Australia: A Cenozoic continental margin dominated by mass transport, in Mosher, D.C., Shipp, jR.C., Moscardelli, L., Chaytor, J.D., Baxter, C.D.P., Lee, H.J., and Urgeles, jR. (eds.) *Submarine mass movements and their consequences*, 4th International Symposium, Springer Dordrecht Heidelberg, New York, p. 491-502.

Mayer, L.A., Armstrong, A.A. and Gardner, J.V., 2010, Mapping in the Arctic Ocean in support of a potential extended continental shelf. *Hydro International*.

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Pe'eri, S., Gardner, J.V., Ward, L.G., Morrison, R.J., and Lillycrop, J., in press, The seafloor: a key component for the lack of success of lidar in bottom detection. IEEE Transactions on Geoscience and Remote Sensing, v. p.

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Hubble, T., Yu, P., Airey, D., Clarke, S., Boyd, R. Keene, J., Exon, N., Gardner, J. and shipboard party, Physical properties and age of mid-slope sediments dredged from the eastern Australian continental margin-implication for continental margin erosional processes, American Geophysical Union Fall Meeting, San Francisco, 2010.

2011

Rzhanov, Y., Pe'eri, S., Guilford, J. and Gardner, J., 2011, Seafloor characterization using airborne hyperspectral co-registration procedures independent from attitude and positioning sensors (abs.), Coastal Geotools 2011, March, 2011, Myrtle Beach, SC

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as “confidential” prior to posting the application.

Signature

Date

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

Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
FAX: (808) 397-2662

DID YOU INCLUDE THESE?

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