Project Title: **Ground truth the presence and abundance of coral habitat on the eastern Bering Sea slope both inside and outside canyon areas**

Associated NMFS Science Center/Regional Office: Alaska Fisheries Science Center, Alaska Regional Office

Principal Investigators: C. N. Rooper[1], M. F. Sigler[1], G.R. Hoff[1]

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Industry Partner: Marine Conservation Alliance, J. Gauvin (President), M. Burden (Executive Director)

Background and Justification

The eastern Bering Sea (EBS) slope and outer shelf is a region of enhanced primary and secondary productivity (the "Bering Sea Greenbelt") and attracts large numbers of fish, seabirds and marine mammals. Productivity is enhanced because of physical processes at the shelf break including intensive tidal mixing and transverse circulation and eddies in the Bering Slope Current which bring nutrients into the photic zone[1]. About 40% of U.S. commercial fisheries catch originates from the eastern Bering Sea; some of these fisheries concentrate on the slope and outer shelf. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) mandates NOAA to conduct scientific research to identify habitats essential for managed species and minimize the effects of fishing on essential fish habitat to the extent practicable. The MSFCMA also provides discretionary authority to fishery management councils protect deep-sea corals. Two of the largest submarine canyons in the world (Zhemchug Canyon and Pribilof Canyon) incise the EBS shelf break[2] and are dominant geological features on the shelf break (Fig. 1).

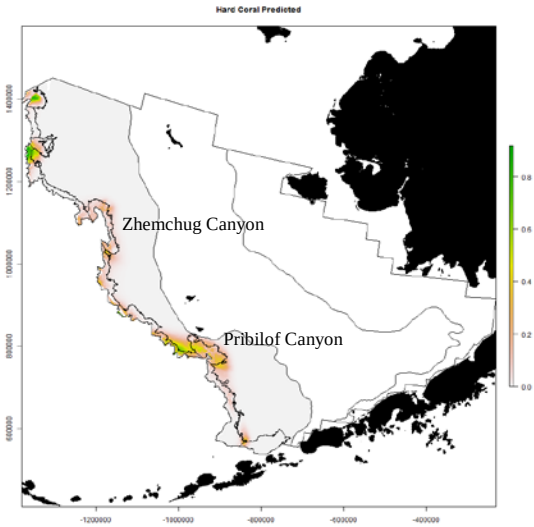

Figure 1. Map of the southeastern Bering Sea shelf and slope. The depth contours are 50, 100, 200 and 1,000 m. The colors represent the probability that coral is present by 1 x 1 km grid cell for the eastern Bering Sea shelf and outer slope based on generalized additive modeling. The color scale ranges from 0.0 probability (white) to 0.8 (green). The x-axis label is easting and the y-axis label is northing and the unit is meters (Alaska Albers Equal Area Conic projection with center latitude = 50° N and center longitude = 154° W).

In June 2013, the North Pacific Fishery Management Council (NPFMC) passed a motion requesting that field research be completed in 2014 to identify areas of relatively high coral abundance on the EBS slope and outer shelf (particularly in Pribilof and Zhemchug canyons) and to ground truth an existing coral presence/absence model[3] for the region using *in situ* camera operations (or similar activities).

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[1] Springer, A.M., McRoy, C.P., Flint, M.V., 1996. The Bering Sea Green Belt: shelf-edge processes and ecosystem production. Fish. Oceanogr. 5: 205–223.

[2] Karl, H.A., Carlson, P.R., Gardner, J.V., 1996. Aleutian Basin of the Bering Sea: Styles of sedimentation and canyon development. In Gardner JF, Field ME, Twichell DC. Geology of the United States seafloor: the view from GLORIA. Press Syndicate of the University of Chicago, Chicago IL.

Normarck, W.R., Carlson, P.R., 2003. Giant submarine canyons: Is size any clue to their importance in the rock record? Geol. Soc. Am. Special Paper 370.

[3] Sigler, M.F., Rooper, C.N., Hoff, G.R., Stone, R.P., McConnaughey, R.A., Wilderbuer, T.K. In review. Are Bering Sea canyons unique habitats within the eastern Bering Sea? Fish. Res.

The existing coral model was developed based on existing data from bottom trawl surveys of the EBS slope and outer shelf and was presented to the NPFMC in June 2013 as part of an analysis undertaken to test whether Pribilof and Zhemchug canyons are unique features on the EBS slope. The predictor variables were variables collected during the bottom trawl survey (e.g., water temperature) and gross bathymetric features (e.g., seafloor gradient). The predicted variables were the presence or absence of deep-sea hard corals (from the families Primnoidae, Stylasteridae, Paragorgidae, Plexauridae and Isidelladae). A generalized additive model (GAM)[4] was used to construct the relationships between predictor variables and predicted variables. The model output was on a 1 km^2 grid and made predictions of the probability of coral presence at each grid cell of the EBS slope and outer shelf (Fig. 1).

We propose a 30-day charter aboard a commercial fishing vessel to survey this area using a stereo drop camera system. The images collected during the survey will be used to estimate abundance and size of coral in the region and to ground truth model predictions. This information will improve our understanding of Bering Sea coral presence, density, and their attributes and in turn will help to inform types of management measures considered by the NPFMC for fisheries (e.g., gear modifications and area closures) which interact with these corals, should such management be necessary.

We also will collaborate with the Marine Conservation Alliance to conduct informal workshops with Bering Sea fishermen to gather their knowledge of specific locations where hard-bottom areas are found. The information from fishermen will be evaluated beside results of the visual survey and will complement the proposed fieldwork and model validation.

The primary objectives of the proposed 2014 research are:

- Gather information from fishermen on locations of hard-bottom areas
- Determine the presence/absence and density for major coral taxa at approximately 300 transects on the EBS slope using a stereo drop camera
- Measure the size and height of a subsample of the major coral taxa at each site
- Compare the presence or absence of coral at each site, information from fishermen and the probability of presence predicted by the existing coral model
- Apply the new information from fieldwork and fishermen in the coral model, produce revised predictions of coral locations and abundance and present this information to the NPFMC

The secondary objectives are to determine the presence/absence and abundance of major sponge taxa at the sampled transects, to measure the fine-scale association of fish and crab with coral and sponge and to record evidence of fishing gear impacts.

Methodology

Approximately 300 transects will be sampled along the eastern Bering slope and outer shelf from Bering Canyon to Navarin Canyon (Fig. 1). This sample size was chosen based on a simulation of the effect of sample size on the performance of the coral presence/absence model as measured by the AUC-value, a test statistic used for evaluating GAM performance[5]. An AUC-value of 0.78 was achieved for sample size of 300, about 85% of the value achieved for sample sizes of 1,000-2,000. AUC values of > 0.70 are considered acceptable and AUC values > 0.80

[4] Hastie, T., Tibshirani, R., 1990. Generalized additive models. Chapman & Hall/CRC. Boca Raton FL.
[5] Hosmer, D.W., Lemeshow, S., 2005. Multiple logistic regression. Applied Logistic Regression, Second Edition, John Wiley & Sons, Hoboken NJ.

are considered excellent[5]; therefore a sample size of approximately 300 stereo camera drops should result in a model with acceptable to excellent predictive power.

Transects will be placed randomly and their density will be proportional to the predicted probability of presence from the existing coral model (Fig. 1), so that areas with higher predicted probability of presence will be sampled more frequently. Each transect location will be sampled with a stereo drop camera[6]. A computer simultaneously triggers two cameras and four strobe lights mounted within an aluminum frame, so that paired images are recorded every second. The image feed from a single camera is sent by coaxial cable to a monitor at the surface. In addition, an Aanderaa Instruments Seaguard attached to the aluminum frame will record depth, temperature, salinity, pH, oxygen and turbidity every 7 seconds. The vessel will either drift with the current, or if no current is present, maintain ~ 1 knot of headway on the camera in a randomly chosen direction for a 15 minute duration drift/tow. A scientist will view images and control the winch to maintain the camera system off bottom (~1 m). A transect typically is 500-m long and 2.5 m wide for an area swept of 1,250 m^2. GPS-based position and seafloor backscatter from the vessel's Simrad ES60 38kHz echosounder will be continuously recorded during the cruise.

A post-cruise image analysis will determine substrate types, species abundance and composition and size. Substrate type will be determined using a standard methodology that has been applied on the west coast and Alaska[7]. Primary (>50% coverage of the seafloor bottom) and possibly secondary substratum (20-49% coverage) are recorded using seven substratum types: mud, sand, pebble (diameter <6.5 cm), cobble (6.5 < diameter < 25.5 cm), boulder (diameter >25.5 cm), exposed low relief bedrock, and exposed high relief bedrock and rock ridges. In addition, evidence of fishing gear impacts, including trawl furrows, lost gear and broken coral or sponge will be recorded.

Each stereo image pair will be examined to identify and count the species of coral present. Many corals will not be identifiable to species when viewed underwater; these corals will be pooled into family groups (Primnoidae, Stylasteridae, Paragorgidae, Plexauridae and Isidelladae). We also will identify and count sponges (class Hexactinellida) which typically are found in the same habitats as these coral taxa; we will complete the same data collection, analysis and modeling for this sponge taxa as for the coral taxa. A random selection of 20 individuals from each taxa and transect will be measured for height and width. While not measurable from visual surveys, rigidity of each taxa from previous collections of in-hand samples (e.g., trawl surveys) will be presented to the NPFMC when they consider approaches to managing impacts to these taxa. The observation area of the camera will be measured from a random selection of 30 paired images from each transect and the average value used to compute taxa densities for each transect. These 30 images also will be used to measure the fine-scale association of fish and crab with corals and sponges; the distance from fish (and crab) to the nearest coral (or sponge) will be measured.

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[6] Williams, K., Rooper, C.N., Towler, R. 2010. Use of stereo camera systems for assessment of rockfish abundance in untrawlable areas and for recording pollock behavior during midwater trawls. Fish. Bull. 108: 352-362.

[7] Rooper, C.N., Boldt, J.L., Zimmermann, M. 2007. An assessment of juvenile Pacific Ocean perch (*Sebastes alutus*) habitat use in a deepwater nursery. Estuar. Coast. Shelf Sci. 75:371-380.
Stein, D.L., Tissot, B.N., Hixon, M.A., Barss, W., 1992. Fish-habitat associations on a deep reef at the edge of the Oregon continental shelf. Fish. Bull. 90: 540-551.
Yoklavich, M.M., Greene, H.G., Cailliet, G.M., Sullivan, D.E., Lea, R.N., Love, M.S., 2000. Habitat associations of deep-water rockfishes in a submarine canyon: an example of a natural refuge. Fish. Bull. 98: 625-641.

The analysis will pool the data into family taxonomic groupings. Presence/absence and abundance (numeric density) data will be directly compared to the predictions of the existing coral model based on bottom trawl data using the AUC-value and the correlations between observations and predictions. We also will complete this comparison for the existing sponge model. Additional refinement of the models will be carried out if necessary and will incorporate the habitat measurements (e.g., oxygen) collected during the fieldwork. Final models of presence/absence and abundance, as well as diversity (number of families on each transect) and size (by taxa), will be used to calculate predictions for 100 by 100 m square blocks (a finer grid than the existing model) in the EBS and will be presented to Alaska Region fisheries managers and the North Pacific Fishery Management Council. The presentations are the first part of the outreach strategy for this project.

Prior to the fieldwork, workshops will be conducted with Bering Sea fishermen to gather their knowledge of specific locations where hard-bottom areas are found. The workshops are the second part of the outreach strategy for this project. MCA will take the lead in developing a standardized framework, questions, and process for the workshops and will coordinate with the fishing associations operating on the Bering Sea slope. Similar workshops previously have been conducted for the Gulf of Alaska and Aleutian Islands and were organized by member organizations of MCA, who also will organize these workshops. Fishermen attending the workshops will be informed from the outset that the next step will be to conduct video surveys in the areas of relatively high coral abundance (based on the existing coral model) and see how well their information represents what is seen from the fieldwork. In these workshops, fishermen will be asked to identify general areas of hard bottom and then to fill in fine-scale features such as banks and isolated rocks using their knowledge, charts and vessel plotter records. Workshops likely will be held separately for different gear types and fisheries because of differences in where each fishes. This information will be processed as geo-referenced overlays, compared to the results from the fieldwork and used as additional habitat information to revise these models.

The timeline and deliverables are:

1. Conduct workshops (December 2013 - January 2014)
2. Complete cruise aboard chartered fishing vessel (sometime during May to August 2014)
3. Complete image analysis (April 2015)
4. Complete ground truth comparisons and model revisions (May 2015)
5. Present report on comparison of model predicted presence, abundance, and diversity to observations and revised predictive model parameters to Alaska Region managers and NPFMC (June 2015)
6. Present maps of the predicted presence, abundance, size and diversity of coral and sponge to overlay with fishing activity in these regions to Alaska Region managers and the NPFMC (June 2015)

Linkage to MSRA Section 318 Priority Area(s)

This study is linked to MSRA Section 318 priority area 4 (conduct project … relevant to conservation of habitat) and MSRA Section 408 (conduct research, including cooperative research … on deep sea corals) because this research focuses on deep sea coral habitat and this study has been requested by the NPFMC in managing conservation of habitat that support eastern Bering Sea fisheries. Nearly 40% of U.S. commercial fisheries landings originate from the eastern Bering Sea.

National applicability/implementation that cuts across multiple regions

The field and modeling approaches of this study are applicable across multiple regions. Coral presence/absence models currently exist for all 6 NMFS Regions. However there has been little or no systematic validation for most of these efforts. For example, a habitat suitability model for *Lophelia* spp. banks has been developed and could be used to guide HAPC designations in the Southeast Region if sufficient ground truth data were available. The research proposed here will provide a methodology for improving existing models and ground truthing these models in other regions. Additionally, incorporating an evaluation of the utility of information available from fishery participants for predicting coral abundance has never been done formally before (to the best of our knowledge) and holds promise for increasing the knowledge base for coral abundance in a cost-effective manner.

Detailed Budget

Description	Coop. Res. Natl.	Coop. Res. Reg.	EFH	DSCRTP
Overtime			$16,463	
Benefits			$1,317	
Travel			$7,000	
Transportation			$3,400	
Rents (charter)	$200,000	$100,000		
Contracts			$110,240	
Supplies				$3,749
Equipment				$40,800
Total	$200,000	$100,000	$138,420	$44,549

Funding will be requested from three sources: Cooperative Research, Essential Fish Habitat (EFH) and Deep Sea Coral Research and Technology Program (DSCRTP). Field work will involve travel ($7,000), 30 vessel charter days including fuel ($300,000), overtime ($16,463) and transport of equipment and supplies from Seattle to Dutch Harbor and return. Thirty vessel charter days are necessary to reach the target sample size of 300 transects, based on previous experience. The request for Cooperative Research funds will be shared between the National ($200,000) and Regional ($100,000) sources because National requests are capped at $200,000. We also request contract funds to cover 12 months of contractor time to analyze the images ($110,240), based on current contract prices and anticipated processing time. We anticipate that 300 transects of 15-min duration will be collected during the project and processing time usually is 5-7 hours per transect. Funds for equipment ($40,800) will cover a winch to deploy and retrieve the underwater camera. The camera and associated winch cable were purchased with FY 2013 AFSC funds ($25,820). We also request funds for connectors for the winch and monitor, underwater ethernet connections for the camera sled, shipping cases, and routine equipment replacement costs based on costs from previous years ($3,749). MCA and its partners will provide an in-kind contribution of approximately $22,400 to develop and test a survey tool and facilitate workshops to gather baseline data ($6,900), compile that data into a format suitable for analysis ($5,000), and prepare a report describing the process, the methodology, findings, and interpretation of the information ($10,500).

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M.S. University of Alaska, Fairbanks, Fisheries and Aquatic Sciences, 1996
B.S. Oregon State University, Biology, 1991

Employment

2002-present	Research Fishery Biologist- Alaska Fisheries Science Center, RACE Division, Seattle Washington, USA.
1999-2002	Research Assistant- School of Aquatic and Fisheries Sciences, University of Washington, Seattle Washington USA
1999-2000	Teaching Assistant- School of Aquatic and Fisheries Sciences, University of Washington, Seattle Washington USA
1997-1998	Biological Science Technician- U.S. Forest Service, Juneau Forestry Sciences Laboratory, Juneau, Alaska, USA.
1997	Fishery Biologist- U.S. Geological Service, Columbia River Research Lab, Cook Washington, USA.
1996-1997	Biological Science Technician- U.S. Forest Service, Juneau Forestry Sciences Laboratory, Juneau, Alaska, USA
1994-1996	Research Assistant- Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska, Fairbanks, Alaska, USA.
1992-1994	Experimental Biology Aide- Oregon Department of Fish and Wildlife, Clackamas, LaGrande and Astoria, Oregon, USA

Five relevant publications

Rooper, C.N., M.H. Martin, J.L. Butler, D.T. Jones, & M. Zimmermann. In press. Estimating species and size composition of rockfish in acoustic surveys of untrawlable areas using a remote operated vehicle, bottom trawl, and stereo video camera. Fishery Bulletin.

Rooper, C.N., G. R. Hoff & A. De Robertis. 2010. Assessing habitat utilization and rockfish (Sebastes sp.) biomass in an isolated rocky ridge using acoustics and stereo image analysis. Can. J. Fish. Aquat. Sci. 67:1658-1670.

Williams, K., C.N. Rooper, & R. Towler. 2010. Use of stereo camera systems for assessment of rockfish abundance in untrawlable areas and for recording pollock behavior during midwater trawls. Fish Bull 108:352-362

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Five other publications

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Rooper, C.N. & M.H. Martin, 2009. Predicting presence and abundance of demersal fish: a model application to shortspine thornyhead (Sebastolobus alascanus). Mar Ecol Prog Ser 379:253-266

Boldt, J. L. & C. N. Rooper. 2009. An examination of links between feeding conditions and energetic content of juvenile Pacific ocean perch in the Aleutian Islands. Fishery Bulletin 107:278-285.

Rooper, C.N. 2008. An ecological analysis of rockfish (Sebastes spp.) assemblages in the north Pacific along broad-scale environmental gradients. Fishery Bulletin 181:1-11.

Memberships and Awards

Member: American Society of Limnology and Oceanography, 2000
American Fisheries Society, North Pacific International Chapter, 1998
Pearl Jam 10 Club, 2009
Sigma Xi, 2004

Best Student Paper, Pacific Estuarine Research Society Annual Meeting, 2000
Greater Seattle Hockey League, 2003-2004 Division 6-7 All-Star
Greater Seattle Hockey League, 2006-2007 Division 5 All-Star
Cobb Fellowship, University of Washington, 1998
Graduation with High Honors, Oregon State University, 1991

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EDUCATION

B.S. with honors, 1979, Cornell University
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PROFESSIONAL EXPERIENCE

Summary. 1983-present, Alaska Fisheries Science Center (Marine Biologist, 2005-present; Mathematical Statistician, 1994-2005; Fishery Research Biologist, 1983-1993).

- Program Leader, Habitat and Ecological Processes Research Program, Alaska Fisheries Science Center (AFSC) (2005-present). Lead Principal Investigator, North Pacific Research Board, Bering Sea Integrated Ecosystem Research Program. Lead Investigator, Arctic Ecosystem integrated survey. Member, NOAA Ocean Acidification Working Group. Leader, AFSC Essential Fish Habitat research. Leader, AFSC Loss of Sea Ice research. Leader, AFSC Ocean Acidification research.
- Principal investigator for Steller sea lion prey and predation studies for 5 years. Southeast Alaska Steller sea lion prey study. Pacific sleeper shark predation of juvenile Steller sea lion study.
- Principally responsible for Alaska sablefish assessment, population modeling, and quota recommendation for 10 years. Project leader of the Alaska Sablefish Longline Survey for 14 years.
- Served on stock assessment review panels for New England (chair), Washington-Oregon-California (chair), Alaska State, and Alaska Federal (co-chair) fisheries. Analyst for a National Research Council review of NMFS assessment methods. Advised University of Azores (Portugal) and New Zealand scientists on survey methods and population models.
- Affiliate Professor, University of Alaska Fairbanks, Juneau Center, School of Fisheries and Ocean Sciences (1997-present). Taught Fish Population Dynamics class and sections of Advanced Population Dynamics class. Member of graduate student committees.
- Extensive field experience with over 800 days at sea and over 30 research cruises as chief scientist.

RECENT PUBLICATIONS

Sigler MF, Rooper CN, Hoff GR, Stone RP, McConnaughey RA, Wilderbuer TK. In review. Are Bering Sea canyons unique habitats within the eastern Bering Sea? Fish. Res.

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Curriculum Vitae

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RESEARCH & WORK EXPERIENCE

Research Fisheries Biologist:
Alaska Fisheries Science Center (NMFS) Seattle, Washington (October 1996-present)
My research includes life history studies, deep-sea ecosystems, taxonomic issues and biodiversity in relationship to long term trends in fisheries independent and fisheries data. My current work focuses on the dynamics of skate nurseries in Alaskan waters with a focus on the unique habitat that may dictate nursery site selection along the upper continental slope.

I am a member of the eastern Bering Sea groundfish program and organize, implement and analyze trawl survey data. In addition I have been the lead scientist for the Eastern Bering Sea Upper Continental Slope Survey since 2002. The biennial survey collects groundfish and invertebrate biological data on a biennial basis for fisheries management stock assessments.

PUBLICATIONS

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ALASKA
Bering Sea Crabbers

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Captain John C. Clary (NOAA retired)
Logistics Officer
NOAA Fisheries Service
Alaska Fisheries Science Center
Seattle, WA 98115

September 24, 2013

RE: NMFS Cooperative Research Proposal entitled "Ground truth the presence and abundance of coral habitat on the eastern Bering Sea slope both inside and outside canyon areas" (Principal Investigators: C. Rooper, M. Sigler, and G. Hoff)

The Alaska Bering Sea Crabbers (ABSC) is a 501c(5) non-profit seafood industry trade association representing approximately 70% of the crab harvesters in the Bering Sea. As long-time participants in the king and tanner crab fisheries, our members have a significant stake in the long-term health of the Bering Sea ecosystem and are actively concerned with future access to the important crab resources upon which they depend. As such, we would like to take this opportunity to express our support for the above-referenced research proposal.

It is the continuing mission of ABSC to be vigilant stewards of our crab resources and the environment. To this end, ABSC fully believes that fishery management decisions should be based on the best available science. In its June 2012 motion, the North Pacific Fishery Management Council signaled its desire and intent to base its fishery management decisions regarding coral habitat in the eastern Bering Sea on quality scientific data and sufficient information. Recognizing that robust data on coral abundance and distribution was limited, the Council requested field research be conducted as a way of improving and validating the minimal data currently available. Scientists with the Alaska Fisheries Science Center have developed a research proposal that will make significant strides towards filling in the gaps of knowledge, which encompasses a variety of data gathering mechanisms including visual underwater surveys and workshops with fishermen. Ultimately, this dedicated work will help to produce revised predictions of coral locations and abundance as well as to measure the fine-scale associations of both crab and fish with coral and sponge habitats and to record any potential evidence of fishing gear impacts. This will allow for the full and thorough consideration of all available fishery management options in the future.

The North Pacific Council showed excellent forethought and responsibility by requesting in situ data collection and model validation before making any sort of fishery management decision(s) with the potential to have serious economic consequences for the North Pacific fishing fleet. ABSC emphasizes the importance of prioritizing funding for the above-referenced research proposal. All stakeholders, including members of industry as direct participants and members of the North Pacific Council as the decision-makers, will benefit from the collection of the scientific data that will result from this research proposal. For all of these reasons, we urge the approval of the necessary funding requested as quickly as possible.

Thank you for your time and consideration.

Ruth Christiansen

Ruth Christiansen, Science Advisor and Regulatory Analyst
Alaska Bering Sea Crabbers

ARCTIC STORM MANAGEMENT GROUP, LLC
2727 Alaskan Way, Pier 69
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John C. Clary
CAPT, NOAA (ret'd)
Logistics Officer
NOAA Fisheries Service
Alaska Fisheries Science Center
Seattle, WA

Re: Support NMFS Cooperative Research Proposal entitled "Ground truth the presence and abundance of coral habitat on the eastern Bering Sea slope both inside and outside canyon areas."

Dear Mr. Clary,

Arctic Storm Management Group is a long time participant in the Bering Sea fisheries. The company operates two catcher-processors and two catcher vessels that participate in the pollock, yellow-fin sole and cod fisheries. Arctic Storm has a long history advocating for use of sound science to manage our nation's fisheries. We support the NMFS Cooperative Research Proposal that seeks to ground- truth the presence and abundance of coral habitat in Bering Sea canyon areas.

In June the North Pacific Fishery Management Council requested that NMFS pursue field research that would gather empirical data regarding corals in the Bering Sea. The research proposed by Rooper, Sigler, and Hoff is critical for taking the next step in the North Pacific Council's consideration of Bering Sea coral management efforts. This research will prove invaluable as it ground-truths the result of a model developed by AFSC staff which predicted coral presence and absence in the Bering Sea. This research will also close other existing information gaps that are necessary before discussing potential management measures. These additional information gaps which this research will seek to address include: identifying coral characteristics in these areas, their density, and the presence of fishing effects. In addition, the industry has proposed to compliment this work through a fishermen's knowledge project that will work to identify hard bottom areas in the Bering Sea –a habitat attribute that is necessary for coral presence.

We urge NOAA to fully fund the requested amount. This will ensure that policy decisions are robust and backed by rigorous scientific information.

Sincerely,

Donna Parker
Director of Government Relations

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AT-SEA PROCESSORS ASSOCIATION
Partners for Healthy Fisheries
www.atsea.org

October 29, 2013

John C. Clary
CAPT, NOAA (ret'd)
Logistics Officer
NOAA Fisheries Service
Alaska Fisheries Science Center
Seattle, WA

Re: Support for NMFS Cooperative Research Proposal "Ground truth the presence and abundance of coral habitat on the eastern Bering Sea slope both inside and outside canyon areas."

Dear Capt. Clary,

The At-sea Processors Association (APA) is a trade association representing six companies that own and operate 16 U.S.-flag catcher/processor vessels that participate principally in the Alaska pollock fishery and west coast Pacific whiting fishery. By weight, these abundant, well managed groundfish fisheries account for more than one-third of all fish harvested in the U.S. each year. As partners in these robust fisheries, APA works with fishery managers, scientists, environmentalists and other industry members to ensure the continued health and sustainability of our marine resources.

We support the NMFS Cooperative Research Proposal that seeks to verify the presence and abundance of coral habitat in Bering Sea canyon areas through gathering empirical data on corals in the Bering Sea.

The research proposed by Rooper, Sigler, and Hoff is critical for taking the next step in the North Pacific Fisheries Management Council's consideration of Bering Sea coral management efforts—work that was requested of the NMFS by the NPFMC in June, 2013.

The research is very important for verifying the results of a model developed by AFSC staff, which predicted coral presence and absence in the Bering Sea based primarily on data from bottom trawl surveys. This research will provide empirical data critical to discussion on potential fisheries management measures, such as identifying coral characteristics in these areas, their density, and the presence of fishing effects.

We encourage NOAA to fully fund the requested amount, as this research is vital to ensuring that policy decisions pertaining to the Bering Sea canyons are robust and based on sound science.

Sincerely,

Stephanie D. Madsen

Stephanie Madsen
Executive Director

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September 25, 2013

John C. Clary
CAPT, NOAA (ret'd)
Logistics Officer
NOAA Fisheries Service
Alaska Fisheries Science Center
Seattle, WA

Re: NMFS Cooperative Research Proposal entitled "Ground truth the presence and abundance of coral habitat on the eastern Bering Sea slope both inside and outside canyon areas" (Principal Investigators: C. Rooper, M. Sigler, G. Hoff)

Dear Captain Clary,

The members of Groundfish Forum are long-time participants in the Bering Sea flatfish, cod, and rockfish trawl fisheries with 16 catcher processor vessels ranging in length from 125 to 276 feet. With our large stake in the future of Bering Sea resources and our dependence on future access to them, we would like to take this opportunity to express our support for the above-referenced proposal to do visual surveys on the Bering Sea slope.

Our intererst in the project is motivated primarily by our belief that fishery management should be based on good science and sufficient information to make truly scientifically-based management decisions. As you may know, several organizations are currently advocating for consideration of fishery management measures (including closures to fishing) to protect deep sea corals in Bering Sea canyons. At the same time, the available data to evaluate the need for and type of management measures is, from our perspective, unquestionably inadequate and this project would go a long way to addressing that need.

According to NOAA scientists involved in research on deep sea corals in the Bering Sea, the proportion of the Bering Sea slope where visual surveys have occurred in the past is a micro-fraction of one percent of the overall area. Additionally, the sampling approaches used for these past visual surveys were unfortunately non-random. For this reason, any attempt to expand from those limited existing visual surveys is not viable even if one were willing to ignore the sample size. While NOAA has provided a more robust data source with its extensive series of trawl and line surveys and its scientists have developed a predictive model for deep–sea corals using these data, NOAA understands that its model outputs are unfortunately limited to presence/absence predictions and are unvalidated at this point. In addition to the need for model output validation, we understand that consideration of fishery mangement will require data on density/height of corals by species to assess vulnerability and allow full consideration of all management options such as gear modification.

Key information on deep sea corals will be obtained from the above-referenced proposal and given the acute importance of data for the future of our Bering Sea fisheries, we cannot over-emphasize the importance prioritizing it for funding. All stakeholders will benefit from the collection the scientifically sound data that will result from the proposed visual surveys of the Bering Sea slope. The resulting consideration of management measures for the slope will also be greatly improved as a result of this work.

For all of these resasons we urge you to approve the funding requested in the proposal in as timely a manner as possible so that the fieldwork slated for 2014 can occur as planned.

Thank you for considering our thoughts on this matter.

Sincerely,

Lori Swanson
Executive Director