

North Pacific Fishery Management Council: Request for Proposals for Habitat Areas of Particular Concern (HAPCs), 2010

Introduction

Habitat Areas of Particular Concern (HAPCs) are geographic sites that fall within the distribution of essential fish habitat¹ (EFH) for the Council's managed species, which may require additional protection from adverse effects. EFH is designated for the managed species identified in the Council's six Fishery Management Plans (BSAI and GOA groundfish, BSAI crab, Scallop, and Salmon, Arctic management area). The Council has a formalized process, identified in the FMPs, for selecting HAPCs. Under this process, the Council will periodically consider whether to set habitat priorities. This action initiates a Council call for proposals for candidate areas that meet the Council's specific priorities. The sites proposed under this process are then sent to the Council Plan Teams for scientific review, to determine whether they have ecological merit, and are also reviewed for socioeconomic and management and enforcement impacts. This combined information is presented to the SSC, the AP, and the Council, and the Council may choose to select various HAPC proposals for further analysis and implementation.

Steps in the HAPC process	Draft Timeline
Council sets HAPC priorities	April 2010
Prepare and issue call for proposals; proposal period open	April-August 31 (19 weeks)
Initial screening of proposals for adherence to priorities; Council selects proposals to go forward for review	October 2010
Socioeconomic and enforcement review of proposals by staff	October-November
Plan Teams joint meeting to review proposals for ecological merit	January 2011
Council decision on whether to formulate proposals into an amendment analysis	February 2011
Initial review of amendment analysis	April 2011
Final action on amendment analysis	June 2011

This current notice constitutes a Request for Proposals for candidate areas to be considered as HAPCs. Proposals must meet the criteria identified in the section below. All Federal, State, private and foreign organizations or members of the public are eligible to submit proposals. **Proposals are due August 31, 2010.**

Council habitat priorities and HAPC criteria

Proposals must meet the Council's identified priority for this proposal cycle:

- Skate nurseries

¹ Essential fish habitat is defined in the Magnuson-Stevens Act as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Additionally, the EFH guidelines [50 CFR 600.815(a)(8)] provide four considerations for identifying HAPCs:

1. The importance of the ecological function provided by the habitat.
2. The extent to which the habitat is sensitive to human-induced environmental degradation.
3. Whether, and to what extent, development activities are, or will be, stressing the habitat type.
4. The rarity of the habitat type.

The Council will consider specific sites occurring within EFH as HAPCs if they (a) meet the rarity criterion identified above, AND (b) meet at least one other of the HAPC considerations. Proposals will be reviewed against these four considerations using the Council's evaluation criteria, identified on page 3.

Proposal application procedures

All applicants should complete the application included in this package. If you need further information, please contact the Council office by phone at (907) 271-2809.

Proposals must be submitted to the Council office by mail or fax. Proposals will be accepted until **5 p.m. Alaska time on August 31, 2010**. Proposals must follow the guidelines and criteria specified in this document.

Proposal review process

Initial screening of proposals. Council staff will screen proposals to determine consistency with Council priorities, HAPC criteria, and general adequacy. Staff will present a preliminary report of the screening results to the Council. The Council will determine which of the proposals will be forwarded for the next review step: scientific, socioeconomic, and enforcement review.

Scientific review of proposals by Council Fishery Management Plan Teams. The Council will refer selected proposals to the Plan Teams, who will evaluate the proposals for ecological merit. Reviewers will rate the proposals using the evaluation criteria identified in this proposal package (page 3), recognizing that there will always be some level of scientific uncertainty in the design of proposed HAPCs and how they meet the criteria and stated goals and objectives. The review panels may highlight available science and information gaps that may have been overlooked or are not available to the submitter of the HAPC proposal.

Review of proposals for socioeconomic and management and enforcement considerations. Proposals will be reviewed by Council or agency economists for socioeconomic impact. The Magnuson-Stevens Act states that EFH measures are to minimize impacts on EFH "to the extent practicable," thus, socioeconomic considerations have to be balanced against expected ecological benefits at the earliest point in the development of measures. Management and enforcement will also provide input during the review to evaluate general management cost and enforceability of individual proposals.

Council decision on whether to proceed with proposed amendments. The Council will select which proposal or proposals will go forward for analysis for possible HAPC designation. The Council may modify the proposed HAPC sites and management measures.

Evaluation criteria for HAPC proposals

The Council has determined, through the HAPC identification process defined in the Council FMPs, that HAPCs in Alaska must be geographic sites that are rare, and must meet one of three other considerations: provide an important ecological function, be sensitive to human-induced degradation, or be stressed by development activities. In order to provide some guidance to proposers and reviewers about how proposals should be evaluated against these considerations, the following criteria have been adopted by the Council.

In order to be considered rare, proposals should meet the criteria identified in scores "2" or "3". For the other three factors, a score of "0" indicates that a proposal does not meet the particular consideration in question.

Score	HAPC considerations			
	Rarity	Ecological Importance	Sensitivity	Level of Disturbance (applicable to activities other than fishing)
	<i>The rarity of the habitat type.</i>	<i>The importance of the ecological function provided by the habitat</i>	<i>The extent to which the habitat is sensitive to human induced environmental degradation</i>	<i>Whether and to what extent development activities are or will be stressing the habitat type</i>
0		Habitat does not provide any ecological associations ² for managed species.	Habitat resilient (not sensitive).	Habitat not subject to developmental stress.
1		Habitat provides little structure ³ or refugia. Foraging and spawning areas do not exist.	Habitat somewhat sensitive and quickly recovers; 1- 5 years. Effects considered temporary.	Habitat is or will be exposed to minimal disturbance from development.
2	Habitat uncommon, less frequent, and occurs to some extent in one or two of the Alaska regions: Gulf of Alaska, Bering Sea, Aleutian Islands, and Arctic.	Habitat exhibits structure and provides refugia or substrates for spawning and foraging.	Habitat sensitive and recovery is within 10 years. Effects considered temporary, however may be more than minimal.	Habitat is or will be stressed by activities. Short term effects evident.
3	Habitat uncommon and occurs in discrete areas within only one Alaska region.	Complex habitat condition and substrate serve as refugia, concentrate prey, and/or are known to be important for spawning.	Habitat is highly sensitive and slow to recover; exceeds 10s of years. Effects will persist and more than minimal.	Habitat is or will be severely stressed or disturbed by development. Cumulative impacts require consideration from long term effects.

² Ecological associations are those associations where the habitat provides for reproductive traits (i.e. spawning and rearing aggregations) and foraging areas; areas necessary for survival of the species. Associations include habitat complexity (features, structures, etc.) and habitat associations (provide refugia, spawning substrates, concentrate prey, etc.). Ecological importance is not to be applied across all waters or substrates.

³ 'Structure' refers to three-dimensional structure.

Data Certainty Factor

The Data Certainty Factor (DCF) determines the level of information known to describe and assess the HAPC site. The DCF is used to determine if information is adequate prior to taking further action. Thus, a HAPC proposal with a high criteria score and a low DCF is to be highlighted (flagged) as a potential candidate for HAPC and for further consideration as a research priority. The DCFs are color coded according to their weight to provide a visual way of informing the criteria scores, i.e., proposal scores with a DCF of 3 are color-coded green, scores with a DCF of 2 are color-coded yellow, and scores with a DCF of 1 are color-coded red

Weight	Data Certainty
3	Site-specific habitat information is available.
2	Habitat information can be inferred or proxy conditions allow for information to be reliable.
1	Habitat information does not exist; neither by inference nor proxy.

HAPC Proposal Rank

The HAPC ranking formula provides a color-coded score (sum of criteria scores) to provide information on the proposal as it is considered by the Council in the HAPC process. A highly ranked HAPC proposal with a DCF of 3 (score color-coded green) has a high criteria score and information exists to assess the site.

HAPC Proposal Rank = Additive HAPC Criteria Score supplemented with Data Certainty Factor

Example evaluation of HAPC proposals:

HAPC Evaluation	Proposal A	Proposal B	Proposal C
Rarity	0	2	3
Ecological importance	2	1	3
Sensitivity	2	3	3
Stress / disturbance	0	0	2
Criteria Score Total (+)	4	6	11
Data Certainty Factor	3	3	1
HAPC Proposal Rank (=)	none*	6	11
Research Priority Flag			

* Proposals must meet the rarity consideration.

High scoring proposals with a low data certainty factor may warrant consideration as a research priority.

Resources available to the applicant

NMFS EFH website	Includes information on EFH regulations, EFH descriptions and identification, species profiles and habitat assessment reports, existing HAPC locations, EFH 5-year review for 2010, Final EFH EIS from 2005, links to scientific information: http://www.fakr.noaa.gov/habitat/efh.htm
North Pacific EFH and HAPC Viewer	Online EFH Mapper . Note upper left pick lists. Select North Pacific region; then select Show All HAPC or select a HAPC by area. Please note Baseline Layers Pick List (upper right side) for more features. Marine EFH delineations are also available on this site. http://sharpfin.nmfs.noaa.gov/website/EFH_Mapper/map.aspx
AFSC skate research	http://www.afsc.noaa.gov/species/Skates.php
Gear effects on habitat	General information on the effects of particular gear types on habitat, Chapter 3.4.3 of the 2005 EFH Final Environmental Impact Statement (FEIS), http://www.fakr.noaa.gov/habitat/seis/final/Volume_I/Chapter_3.pdf Summary of the specific effects of Alaska fisheries on habitat (1998-2002), Appendix B.2 of the 2005 EFH EIS, http://www.fakr.noaa.gov/habitat/seis/final/Volume_II/Appendix_B.pdf Update on effects of fishing evaluation, chapter 10 of the EFH 5-year review summary report, http://www.fakr.noaa.gov/habitat/efh/review/efh_5yr_review_sumrpt_draft.pdf
Survey data	Interactive map of information from the groundfish surveys, http://www.afsc.noaa.gov/RACE/groundfish/survey_data/default.htm
Observer data	Interactive map of data from the groundfish observer program, by species (1993-2008), http://www.afsc.noaa.gov/FMA/spatial_data.htm
Economic data	Economic SAFE report, http://www.afsc.noaa.gov/refm/docs/2009/economic.pdf Catch reports for groundfish fisheries, http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm Crab and Scallop fishery information, http://www.cf.adfg.state.ak.us/geninfo/shellfish/shelhome.php
NOAA charts	http://www.nauticalcharts.noaa.gov/mcd/OnLineViewer.html

HAPC PROPOSAL APPLICATION

All text in italics is for instruction only, and should be deleted in the final proposal.

1 Proposer information

Name:

Address:

Affiliation:

2 Proposal Summary

Title:

Summary: *Single, brief paragraph concisely describing the proposed action*

What habitat is the proposed area intended to protect?:

What FMP species is the proposed area intended to protect?:

3 Geographic delineation of the proposed HAPC

Include latitude and longitude reference points and delineation on an appropriately-scaled NOAA chart.

4 Responsiveness to HAPC considerations and Council priorities

Identify how the proposed HAPC addresses the four considerations set out in the EFH guidelines, and the Council's priority habitat type for the 2010 proposal process.

5 Purpose and objectives

Purpose and need:

Specific objectives for proposal:

Methods to measure progress toward those objectives:

6 Proposed management measures, if appropriate

Proposed management measures to meet objectives:

7 Effects

Expected benefits of the proposed HAPC to FMP species:

Identification of fisheries, sectors, stakeholders, and communities who would be affected by the establishment of the proposed HAPC:

8 Supporting information

Please provide the best available information and/or sources of information to support the objectives of the proposed HAPC and discussion of the expected effects of implementing the proposal, including socioeconomic costs if possible.



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

*National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668*

AGENDA D-3(d)(2)
OCTOBER 2010

August 30, 2010

Mr. Eric Olson, Chairman
North Pacific Fishery Management Council
605 W. 4th Avenue, Suite 306
Anchorage, Alaska 99501-2252

Dear Mr. Olson:

The National Marine Fisheries Service (NMFS) submits the enclosed Habitat Areas of Particular Concern (HAPC) proposal to identify and conserve skate nursery areas. In April the North Pacific Fishery Management Council initiated a call for HAPC proposals and identified a priority for skate nursery areas. Recently, the Council extended the proposal deadline from August 16, 2010, to August 31, 2010.

NMFS researchers have identified several skate nursery areas over the past few years, and in 2008 the Council discussed the possibility of designating such areas as HAPCs. Since these first discussions, the Alaska Fisheries Science Center (AFSC) has researched skate nursery areas further and identified six discrete areas. Research surveys and observed commercial catch occur across a diverse range of habitats where skate nurseries could potentially exist. However, AFSC research documents only these specific areas where high concentrations of egg cases repeatedly have been found. NMFS considers these skate nursery areas to be uncommon, ecologically significant to the species, and sensitive to fishing disturbance, thereby addressing the regulatory considerations for HAPCs as well as the current HAPC priority expressed by the Council. If future research identifies additional skate nursery areas, the Council could of course consider modifications to any HAPCs that are established during this cycle.

We look forward to working with the Council to evaluate this proposal and any others that you may receive.

Sincerely,

for Robert D. Meun
James W. Balsiger, Ph.D.
Administrator, Alaska Region

Enclosure



HAPC PROPOSAL APPLICATION

1 Proposer information

Name: NOAA Fisheries / Alaska Fisheries Science Center (Olav A. Ormseth and Gerald R. Hoff)
Address: 7600 Sand Point Way NE, F/AKC 2, Seattle, WA, 98115
Affiliation: U.S. Department Of Commerce / NOAA

2 Proposal Summary

Title

Eastern Bering Sea Skate Nursery Habitat Areas of Particular Concern

Summary

Skates (Rajidae) are elasmobranch fishes that reproduce by depositing a small number of large eggs, protected by proteinaceous egg cases, directly on the seafloor. Skate embryos develop inside these cases, a process which can take over three years. During the development period, egg cases provide crucial protection to the embryo and the fragile yolk mass. In the Bering Sea, skate species deposit their eggs in highly localized areas known as nursery sites (see Figure 1). Because skates are long-lived, slow to mature, and produce few offspring, it is essential to reduce or eliminate the potential for damage to these areas. We propose that six skate nursery sites in the Bering Sea/ Aleutian Islands management area be designated as Habitat Areas of Particular Concern (HAPC). The localized nature of these nursery sites makes them ideal for spatial management: they are very small areas, they are static, and have distinct boundaries. The sites have been carefully mapped by NMFS scientists at the Alaska Fisheries Science Center using bottom trawls and/or underwater cameras. We propose that the use of any fishing gear contacting the bottom be prohibited within each nursery site.

What habitat is the proposed area intended to protect?

Benthic habitat used by skates as nursery sites, where egg deposition and embryo development take place. Known nursery sites are small in area and occur at the head of undersea canyons. All sites identified to date are on sandy to muddy bottoms with flat topography.

What FMP species is the proposed area intended to protect?

The proposed areas will protect species in the BSAI skate (Rajidae) complex. The nursery sites identified in this proposal primarily contain eggs from three species: Alaska skate (*Bathyraja parmifera*), Aleutian skate (*Bathyraja aleutica*), and Bering skate (*Bathyraja interrupta*). However because some of the nursery sites contain eggs from additional skate species, this proposal may be said to seek protection for the skate complex as a whole.

3 Geographic delineation of the proposed HAPC

We are proposing six skate nursery HAPC sites in the eastern Bering Sea. These sites have been studied and mapped using research bottom trawls, with the exception of the "Pribilof" site which was mapped using an autonomous underwater vehicle (AUV) equipped with a high-resolution camera. Additional AUV mapping work has been performed at several of the other sites listed here, but those data were not used to delineate the boundaries of the proposed area. At each site, the spatial extent of bottom trawls containing greater than 1,000 egg cases/km² was established (Figure 2). The boundary lines were then snapped to the nearest minute of latitude or longitude away from the center of the nursery area. This snapping created a buffer region to account for the possibility of additional eggs in unsampled areas. Using whole minutes also allows for a simpler boundary line that will be easier to discern by vessels and policymakers.

Figure 3 shows the general locations of the six proposed HAPC sites in the eastern Bering Sea. Figures 4-8 are detailed maps showing the extent of each site. The spatial scale is identical in Figures 4-8 so the relative sizes of the proposed HAPC sites can be compared.

The table below contains information regarding each site, include the bounding latitude and longitude lines and the area contained within the proposed boundaries.

Site	Predominant species	Depth of max. egg density (m)	Maximum egg density (eggs/km ²)	Area of proposed HAPC (km ²)	Boundaries of proposed HAPC areas (°N latitude or °W longitude)			
					north	south	west	east
Bering 1	Alaska	145	800,406	63	54°53'	54°49'	165°46'	165°38'
Bering 2	Aleutian	380	62,992	60	54°38'	54°33'	165°45'	165°34'
Bristol	Bering	156	6,188	47	55°21'	55°17'	167°40'	167°34'
Pribilof	Alaska	205	16,473	4	56°11'	56°10'	168°28'	168°26'
Zhemchug	Alaska	217	610,064	11	56°57'	56°54'	173°23'	173°21'
Pervenets	Alaska, Bering, Aleutian	316	334,163	95	59°28'	59°22'	177°43'	177°34'

4 Responsiveness to HAPC considerations and Council priorities

This proposal directly addresses the Council’s priority habitat type for 2010. In addition, it addresses the EFH guidelines in the following manner:

<u>HAPC consideration</u>	<u>Skate Nursery HAPC proposal responsiveness</u>
Ecological significance	Skate nursery sites are distinct benthic habitat sites used for skate egg case deposition and embryo development. Nursery sites concentrate multiple cohorts of early life stages that are highly vulnerable, as well as reproductive adult skates. As a result, they are extremely important for the sustainability of skate populations and have great ecological significance.
Sensitivity to human-induced degradation	Skate egg cases and the embryos they contain are sensitive to being dislodged, damaged, destroyed, or captured by fishing gears. Fishing also increases the mortality risk to reproductive adults in nursery sites.
Stress from development	Development is unlikely to affect the nursery sites identified in this proposal.
Rarity	The current state of knowledge indicates that skate nursery sites are very rare. The HAPC areas proposed here constitute only 280 km ² total, compared to an estimated area of 495,218 km ² for the eastern Bering Sea.

5 Purpose and objectives

Purpose and need

The purpose of the proposed HAPC sites is to protect eggs and developing embryos of skate (Rajidae) species in the eastern Bering Sea. Skate eggs are deposited in small, highly localized areas known as nursery sites. Eggs and embryos are protected by proteinaceous egg cases. However the egg cases, eggs, and embryos are susceptible to damage or destruction from fishing gears that contact the bottom. In addition, fishing activity may be disruptive to reproductive adult skates depositing eggs in nursery sites. Because skates have relatively low productivity (low fecundity, long embryo development times, and delayed adult maturity), a need exists to protect skate nursery sites and limit the potential loss of skate early life stages.

Specific objectives for proposal

1. Establish HAPC sites to protect known skate nursery sites in the eastern Bering Sea.
2. More generally, conserve and protect skate nursery sites from disturbance.

Methods to measure progress toward those objectives

1. Skate HAPC areas identified and conservation measures adopted.
2. Skate egg case concentrations area to be monitored every 2-3 years using non-invasive research design (*in situ* observation vs. trawl net catch).
3. Council maintains skate egg concentration areas as a conservation priority with EFH and HAPC management.

6 Proposed management measures, if appropriate

Proposed management measures to meet objectives

1. Establish six skate nursery HAPC areas in the eastern Bering Sea.
2. Prohibit commercial fishing using bottom contact gear within each HAPC area.
3. Maintain skate conservation as a priority in Council and NMFS Research Plans.

7 Effects

Expected benefits of the proposed HAPC to FMP species

Skate populations (primarily Alaska, Bering, and Aleutian skates) in the eastern Bering Sea will benefit from the proposed action through reduced loss of early life stages and reduced disruption of reproductive activities of adult skates.

Identification of fisheries, sectors, stakeholders, and communities who would be affected by the establishment of the proposed HAPC

<u>Stakeholder</u>	<u>Potential affect</u>	<u>Discussion</u>
Groundfish fisheries	Slight negative effect	The proposed sites are very small and limitations on areas accessible to groundfish fisheries will be low.
Stakeholders	Substantial positive effects; slight negative effects	All stakeholders will benefit from increased sustainability of skate populations. Some stakeholders may experience slight negative effects due to a very small reduction in areas open to commercial fishing.
Communities	No effect	The sites are far offshore of any community. Traditional activities will not be affected, and negative impact on fisheries will be very slight and should not affect communities.

8 Supporting information

Supporting research

The information used to support this proposal comes primarily from a years-long research effort by Gerald R. Hoff, AFSC fishery biologist, to identify, map, and study skate nursery sites in the eastern Bering Sea. This work has been supported by NOAA EFH funds and by grants from the North Pacific Research Board. Summaries of the work can be found at: <http://www.afsc.noaa.gov/Quarterly/amj2005/divrptsRACE2.htm>.

Because skate nurseries are rare and small in area, identifying nursery areas has been a major challenge. Data regarding trawl catches of egg cases from research surveys and fishery observers were used to identify potential sites. Dedicated skate nursery research surveys using a bottom trawl and an adaptive sampling design were conducted to map the spatial extent of seven nursery sites and provide information regarding embryo size and viability, as well as egg case predation (Hoff 2010). In 2009, an AUV was used to map parts of 4 nurseries using a high-resolution camera (Hoff *et al* 2010). Nursery sites are small in area and highly localized, with abrupt transitions from areas of high egg case density to areas with little or no egg cases. They occur over a narrow depth range (from 150 to 375 meters) on generally flat sandy to muddy bottom, with little bottom structure or attached biota. Sites are associated with major undersea canyons and are generally located in the upper portion of canyon heads. Nursery sites are highly productive, with some sites possessing estimated egg densities of $>100,000$ eggs/km².

This work and earlier research (Hoff 2008) also identified the presence of multiple cohorts within nurseries and suggested that development time of Alaska skate embryos exceeded 3 years. This may be temperature dependent, a hypothesis supported by subsequent work where viable embryos are being raised at different temperatures in the laboratory (Hoff *et al* 2010). This long development time substantially increases the exposure of the delicate embryos to predation and disturbance.

Skates, and elasmobranchs in general, are considered low-productivity species. This results in part from delayed sexual maturity (e.g. 9 years for the Alaska skate; Matta and Gunderson 2007) and low fecundity (e.g. Ebert 2005). Thus skates are considered to be "equilibrium" life history strategists: they put a large amount of energy into a small number of offspring and rely on the high survival rate of offspring for maintaining the strength of populations. This may be compared to species such as Pacific cod that produce huge numbers of eggs, very few of which are likely to survive. This underscores the importance of skate early life survival and reducing the potential for damage to embryos in nursery sites.

The AUV surveys conducted in 2009 were also used to obtain estimates of egg production in the 4 known Alaska skate nursery sites, which were then compared to estimates of egg and juvenile abundance from AFSC research surveys and stock assessments (Hoff 2010b). This work indicated that the known nursery sites probably are not sufficient to sustain the population of Alaska skates and that there are likely to be nursery areas yet to be identified. While we feel that it is crucial to protect the known nursery sites, we hope to identify other sites in the future and propose similar HAPC protection for them.

Socioeconomic effects

While a thorough analysis of economic impacts of the proposed HAPC designation is beyond the scope of this proposal, we believe that impacts on groundfish fisheries will be minimal. The proposed areas are very small. In addition, skate nursery sites are unattractive from a commercial fishing perspective: personal communication with fishers suggests that trawling in areas with high egg case density results in unwanted high egg case catches that are very difficult to remove from trawl nets.

In contrast, all stakeholders will benefit from enhanced sustainability of skate populations. Skate nurseries are ideal candidates for spatial management because they are fixed locations that are highly localized and will receive immediate benefits from elimination of bottom-contact commercial fishing. Designating these areas as HAPC is also consistent with the Council's emphasis on an ecosystem-based approach to fisheries management.

Scientific Expertise

Gerald R. Hoff, AFSC, jerry.hoff@noaa.gov, 206-526-4580

Olav A. Ormseth, AFSC, olav.ormseth@noaa.gov, 206-526-4242

Literature cited and additional reference material

Ebert, D.A. 2005. Reproductive biology of skates, *Bathyraja* (Ishiyama), along the eastern Bering Sea continental slope. *J. Fish. Biol.* 66: 618-649.

Ebert, D.A., Smith, W.D., Haas, D.L., 1, Ainsley, S.M., Cailliet, G.M. 2007. Life history and population dynamics of Alaskan skates: providing essential biological information for effective management of bycatch and target species. North Pacific Research Board Final Report #510.

Hoff, G.R., 2007. Reproductive biology of the Alaska skate *Bathyraja parmifera*, with regard to nursery sites, embryo development and predation. Ph.D. Dissertation. University of Washington, School of Aquatic and Fishery Sciences. 161 p

Hoff, G.R., 2008. A nursery site of the Alaska skate (*Bathyraja parmifera*) in the eastern Bering Sea. *Fish. Bull.* 106:233-244

Hoff, G.R., 2010. Identification of skate nursery habitat in the eastern Bering Sea. *Mar. Ecol. Prog. Ser.* 403: 243-254.

Hoff, G.R., H. Singh, J.L. Guthridge, and O.A. Ormseth. 2010. Habitat mapping and production estimate of skate nursery sites in the eastern Bering Sea. North Pacific Research Board Final Report #808, 28 pages.

Love, M.S., Schroeder, D.M., Snook, L., York, A., and Cochrane, G., 2008. All their eggs in one basket: a rocky reef nursery for the longnose skate (*Raja rhina* Jordan & Gilbert, 1880) in the southern California Bight. *Fish. Bull.* 106:471-475.

Matta, M.E., Gunderson, D.R., 2007. Age, growth, maturity, and mortality of the Alaska skate, *Bathyraja parmifera*, in the eastern Bering Sea. *Environ. Biol. Fish.* 80:309-323.

Musick, J.A., Burgess, G., Cailliet, G., Camhi, M., and Fordham, S., 2000a. Management of sharks and their relatives (Elasmobranchii). *Fisheries* 25(3):9-13.

Ormseth, O.A., Matta, B., Hoff, G.R., 2009. Bering Sea and Aleutian Islands skates. In: Stock assessment and fishery evaluation report for the groundfish resources of the Bering Sea/Aleutian Islands regions. North Pac. Fish. Mgmt. Council, Anchorage, AK, pp 1087 -1178.

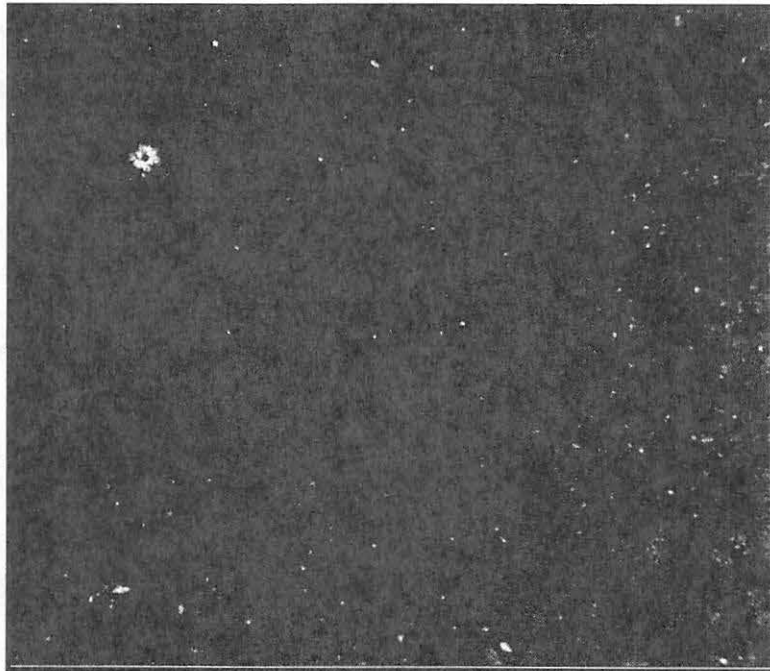


Figure 1. Photographs of the seafloor in and near a skate nursery site in the eastern Bering Sea. Top photo shows seafloor just outside the nursery; bottom photo shows seafloor within the nursery. The distance between the locations photographed was approximately 500m.

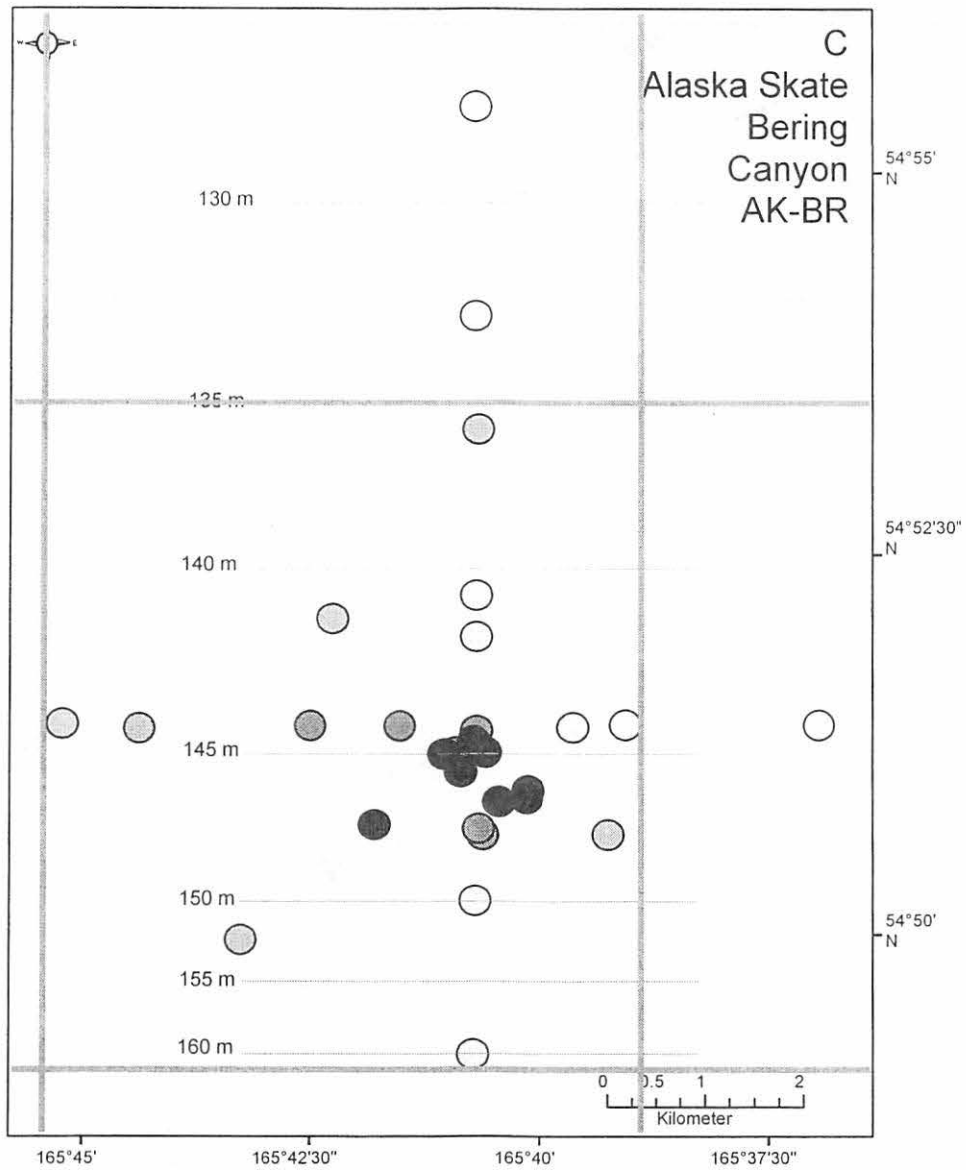


Figure 2. Example of data used to delineate the boundaries of the proposed skate nursery HAPC areas. Red lines indicate the extent of research bottom trawls that contained greater than 1,000 egg cases/ km². The boundary lines were then snapped to the next largest/smallest minute of latitude or longitude (i.e. the nearest minute of latitude/longitude away from the center of the nursery).

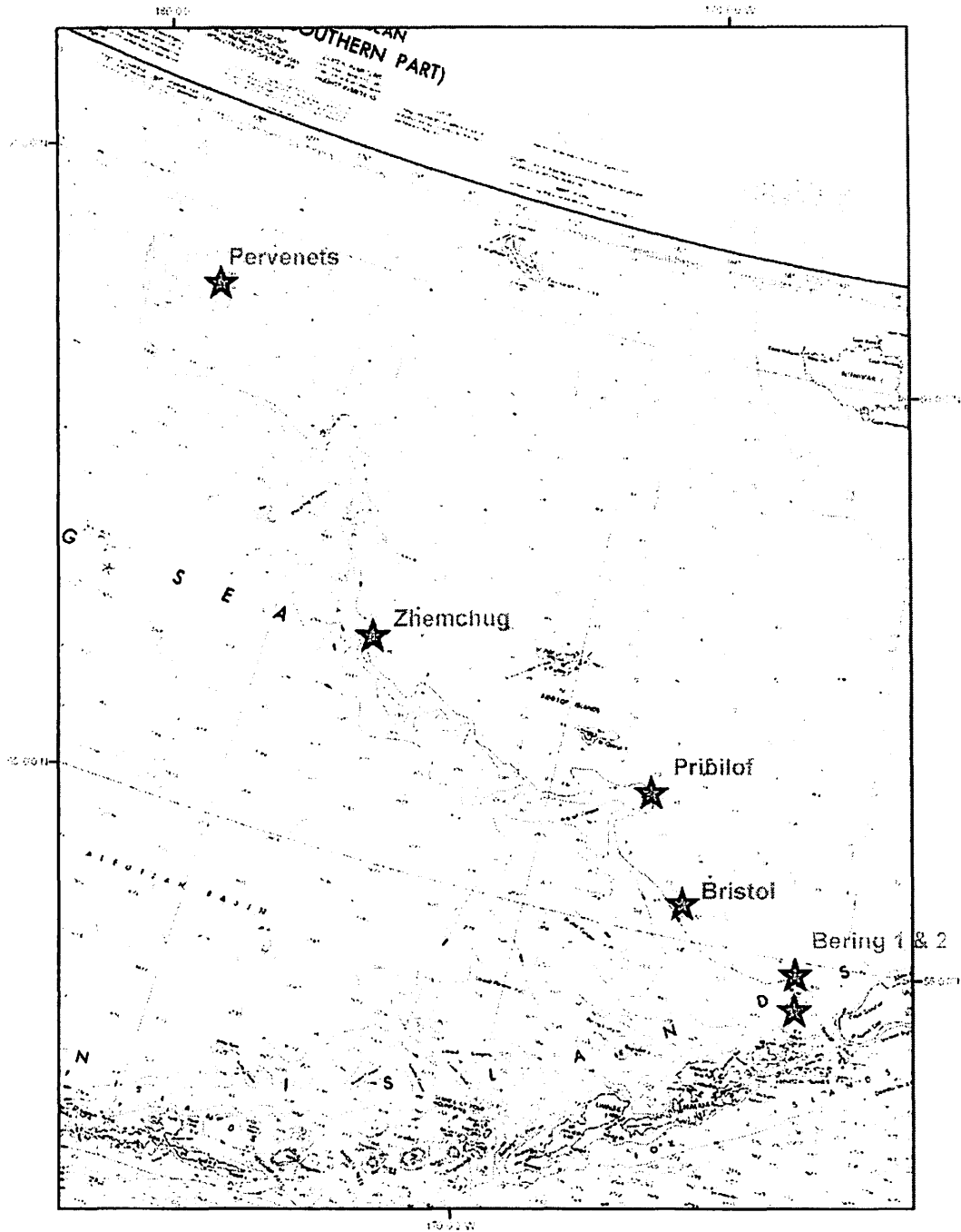


Figure 3. Overview map showing general locations (red stars) of six proposed skate nursery HAPC areas in the eastern Bering Sea.

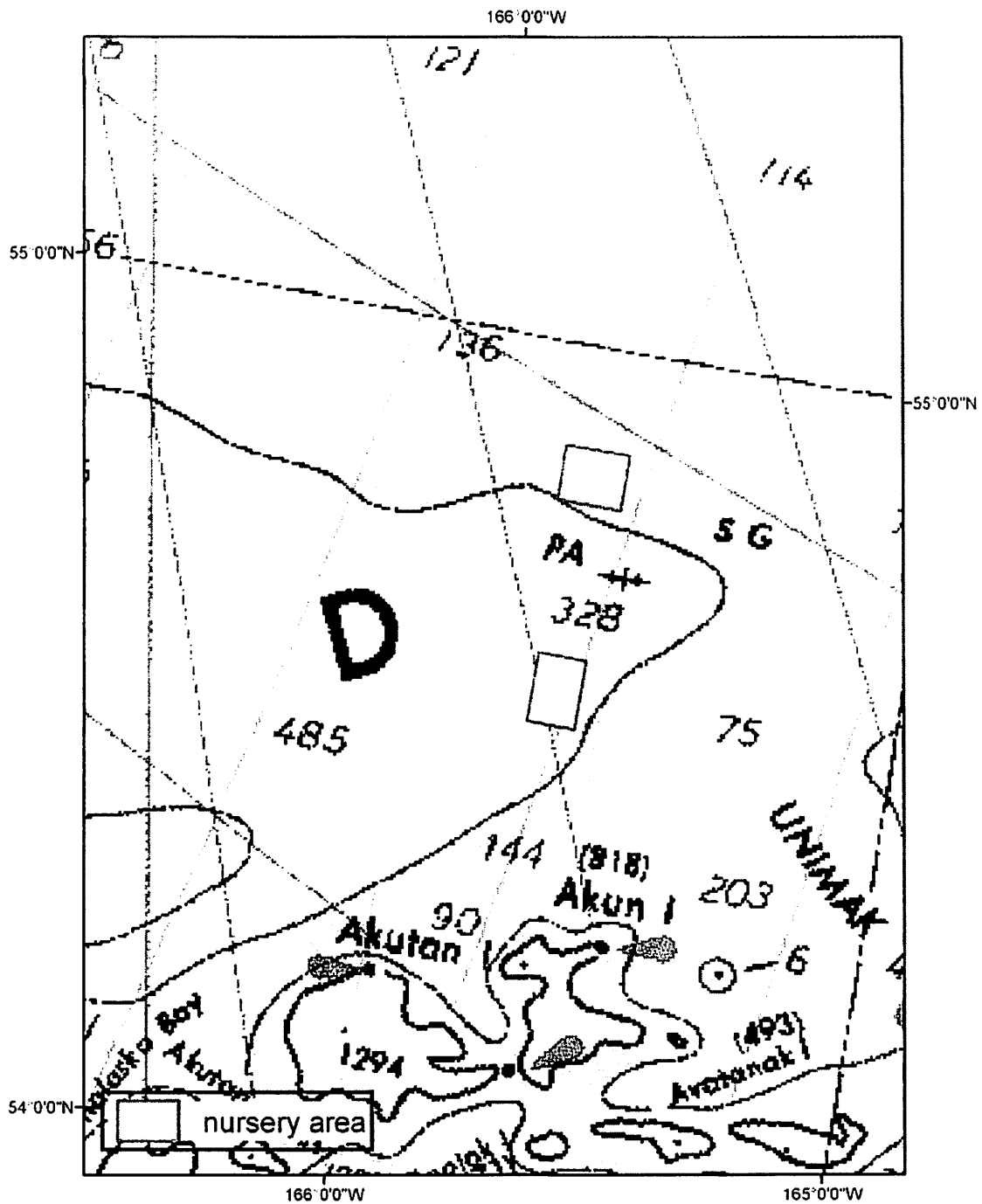


Figure 4. Map detail of proposed HAPC sites “Bering 1” and “Bering 2” in the vicinity of Bering Canyon in the eastern Bering Sea.

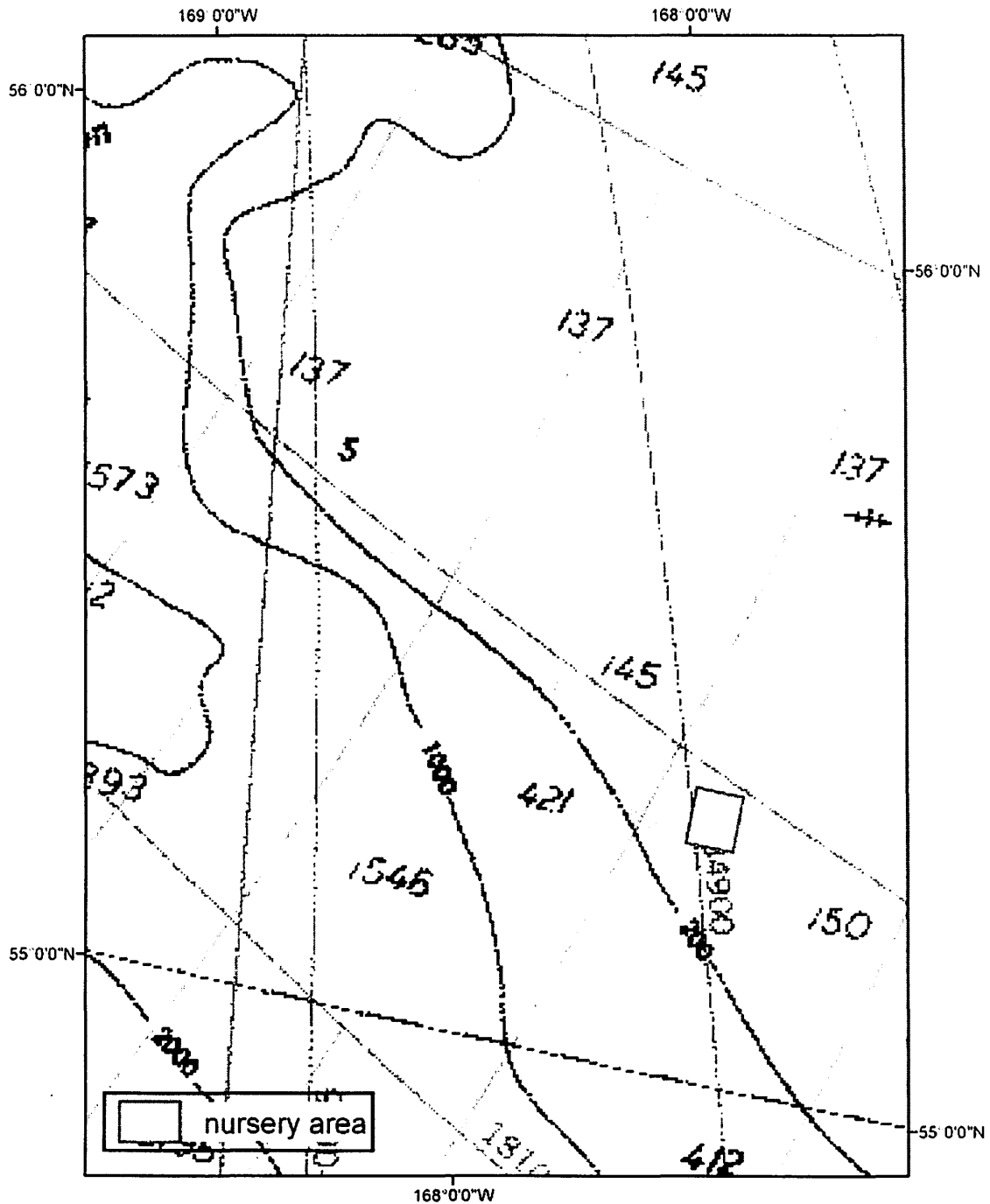


Figure 5. Map detail of proposed HAPC site "Bristol" in the vicinity of Bristol Canyon in the eastern Bering Sea.

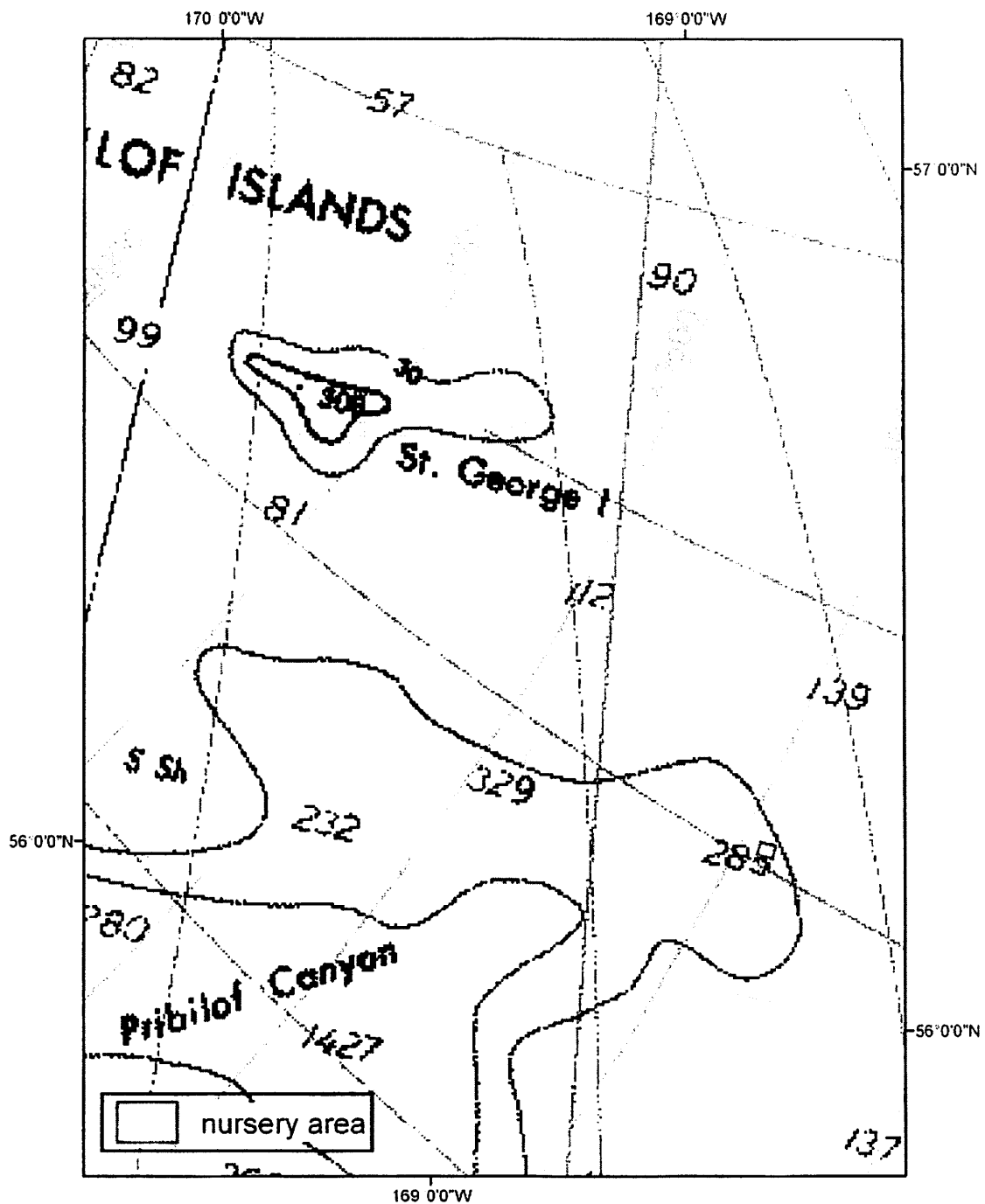


Figure 6. Map detail of proposed HAPC site "Pribilof" in the vicinity of Pribilof Canyon in the eastern Bering Sea.

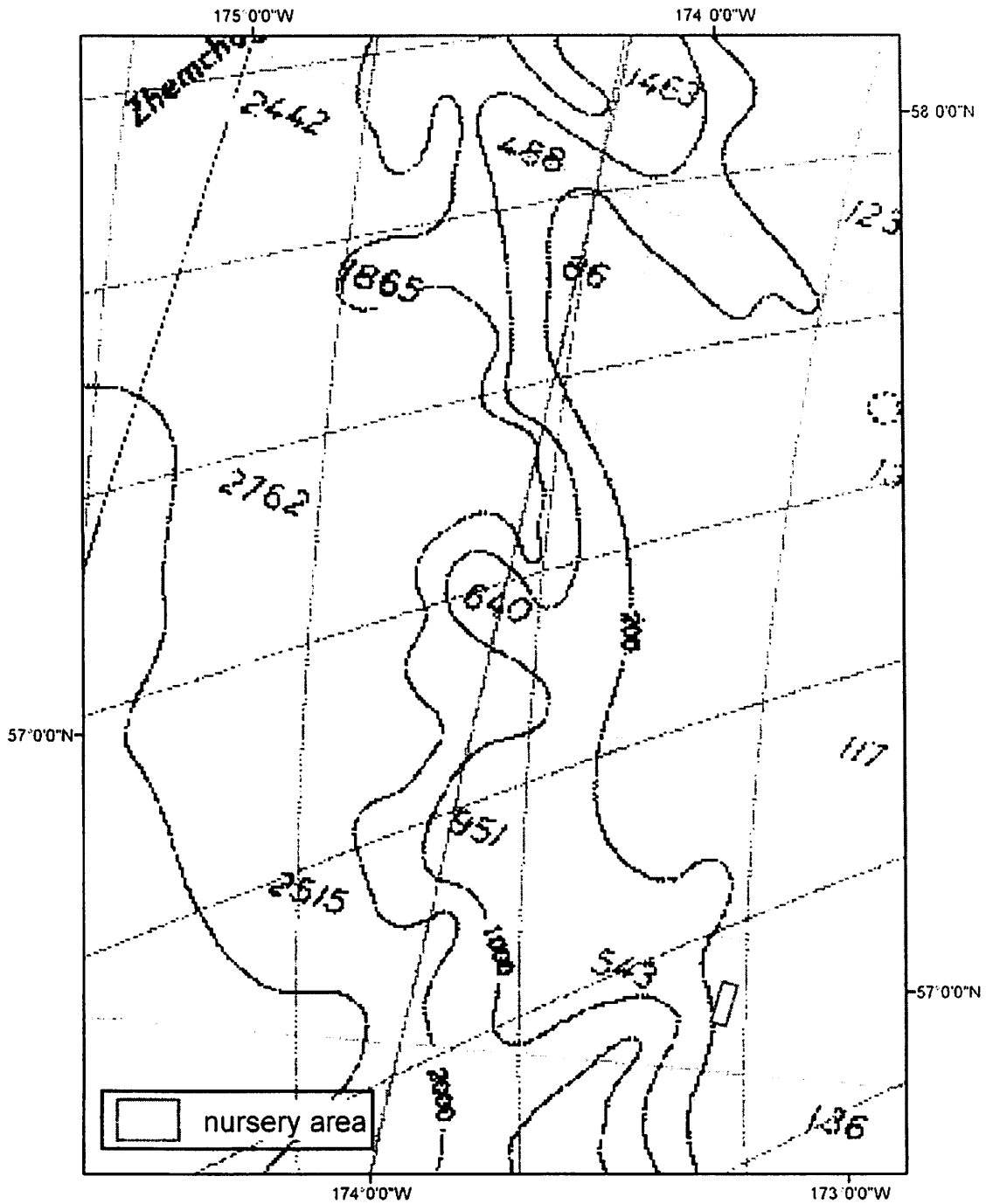


Figure 7. Map detail of proposed HAPC site "Zhemchug" south of Zhemchug Canyon in the eastern Bering Sea.

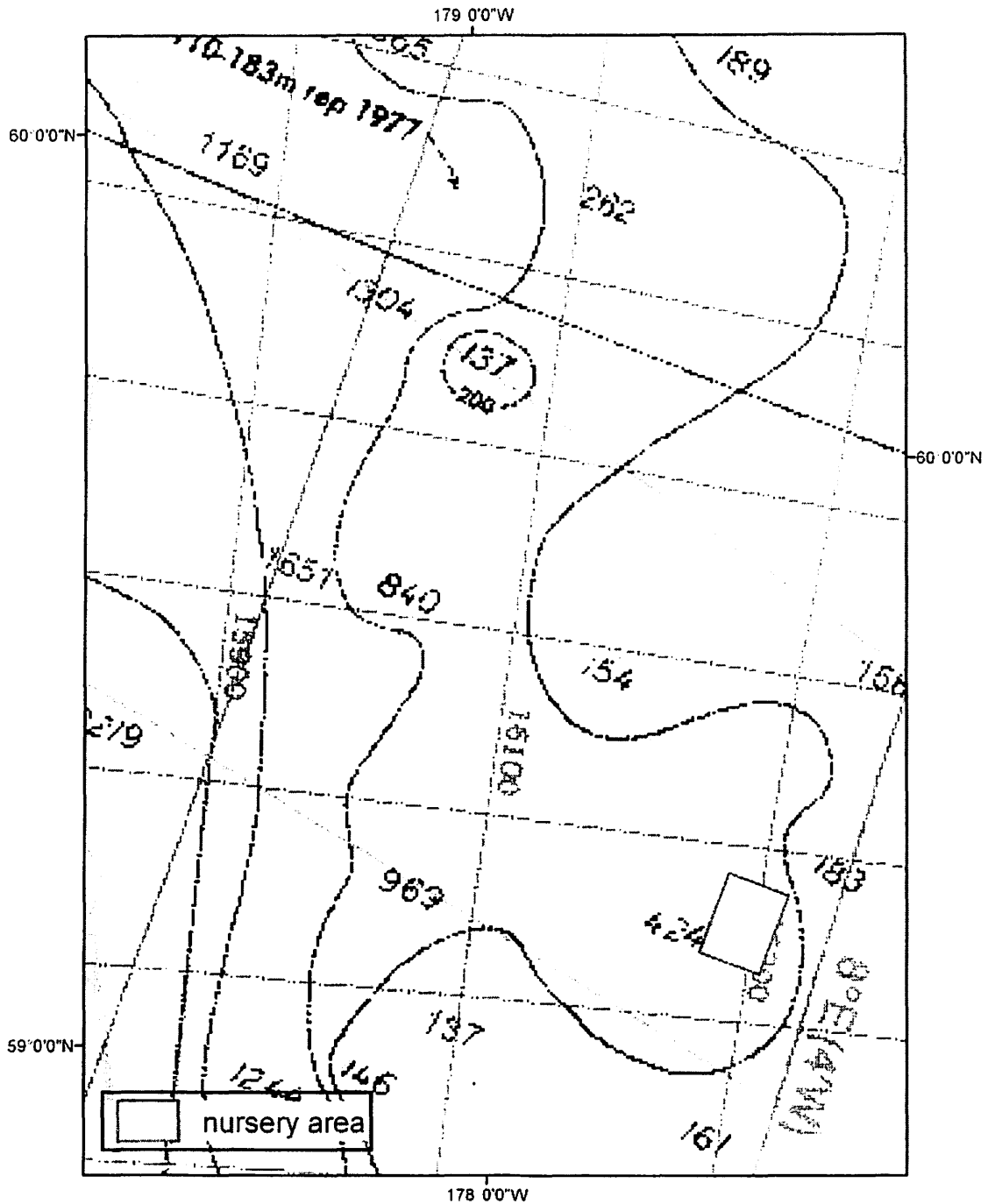


Figure 8. Map detail of proposed HAPC site “Pervenets” in the vicinity of Pervenets Canyon in the eastern Bering Sea.

HAPC PROPOSAL APPLICATION**1 Proposer information**

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2 Proposal Summary

Title: Proposal of HAPC and MPA Designation for the Alaska Skate Nurseries in the East Bering Sea (EBS)
Summary:

Establish the four known nursery sites for the Alaska skate in the eastern Bering Sea as essential fish habitat (EFH) and habitats of particular concern (HAPCs) and further designate these as marine protected areas (MPAs) prohibiting indiscriminate and destructive fishing practices such as trawling—mid-level, and bottom trawling. This proposal is based on the knowledge that these are marine ecosystems that are unique and environmentally significant in many ways. Among other things, they are areas critical for recruitment and to sustain current skate populations, are rich sources of micronutrients upon which other sea life depends, and that they hold a significant diversity of coldwater corals. (NOAA-01) This proposal includes authorizing the necessary funds for monitoring and enforcement adequate to ensure MPA success in restoring the ecosystem in accord with the Council's purview under the Magnuson-Stevens Act.

What habitat is the proposed area intended to protect?:

In the Eastern Bering Sea (EBS) protect the deep canyons, slope and shallows in the canyon areas (in or near Bering, Pribilof, Pervenets, and Zhemchug canyons) (NOAA-05, 2009) skate nursery habitat where the skates deposit their eggs, also the areas where the young are reared, and additional area to allow for affects of global warming, in keeping with the precautionary approach advised by the first MSA national standards guideline, NSG1, due to lack of data available. *See pp.* F-21–F-22 (NPFMC-01, 2009); (NOAA-02, 1998); (NPFMC-02, 2009)

What FMP species is the proposed area intended to protect?:

The proposed area intends to protect members of the fish family Rajidae, genus *Bathyraja*—the Alaskan skate *Bathyraja parmifera*, and the Aleutian skate, *B. aleutic*. These currently are by-catch species, not targeted species. (NOAA-03, 2005) (NPFMC-01, 2009)

3 Geographic delineation of the proposed HAPC

Proposing here protections applied to a two mile radius around the skate nurseries identified by NOAA. See NOAA map referenced here for scaled reference points. NOAA chart (NOAA-05, 2009); sourced from (NOAA-04, 2009).

4 Responsiveness to HAPC considerations and Council priorities

Due to skates vulnerability to overfishing, the Council set managing BSAI skates, establishing an ACL for these as opposed to continuing the current situation where skates pose a significant tonnage in bycatch thereby preventing the NPFMC from constructing accurate stock assessments and management plans, as its top priority in 2009 for managing “other species.” (NPFMC-03, 2009) This proposal supports that priority with recommendations to implement protections necessary to provide the opportunity to collect the data required to establish accurate and adequate ACLs for this species.

The responses below are based on the designations provided in the chart of Evaluation Criteria for HAPC Proposals included in the Proposal Application Packet, page 3.

1. The importance of the ecological function provided by the habitat.
 - a. Ecological Importance: 3 *"Complex habitat condition and substrate serve as refugia, concentrate prey, and/or are known to be important."*
 - i. Nursery sites are important habitat for reproduction and recruitment of skates in the Bering Sea. It is yet unknown whether the four sites that exists are sufficient to maintain the skate population necessary for ecological balance in the region. "Scientists at the NMFS concluded that 'areas supporting large numbers of egg cases are extremely important and warrant special consideration...'" (NOAA-07, 2008) Declaring these areas HAPC and further establishing them as MAPs will give the protections needed and the time to gather the necessary data to make appropriate determinations. (NOAA-06)
2. The extent to which the habitat is sensitive to human-induced environmental degradation.
 - a. Sensitivity: 2 or 3 *"Habitat is highly sensitive and slow to recover; exceeds 10s of years. Effects will persist and more than minimal."*
 - i. Due to the lack of data a precise report of the effects on the habitat and the skate populations from human impacts is unavailable. What is available however indicates severe declines in the skate population due to fishing pressures and dictates an urgent need to gather precise biological and ecological data while abating current pressures until such data can be gathered and evaluated. (Skates, 2010)
3. Whether, and to what extent, development activities are, or will be, stressing the habitat type.
 - a. Level of Disturbance: 3 *"Habitat is or will be severely stressed or disturbed by development. Cumulative impacts require consideration from long term effects."*
 - i. Available data raises concerns that skate populations have been greatly reduced in recent years, that embryonic development in sub-arctic waters is prolonged due to low water temperatures indicating potential negative impact on skate recruitment and stock assessments, and that skate habitat may be linked to the maintenance of invertebrate diversity in the EBS. (Skates, 2010)
4. The rarity of the habitat type.
 - a. Rarity: 3 *"Habitat uncommon and occurs in discrete areas within only one Alaska region . . ."*
 - a. The skate nurseries identified all exist specifically and only in the Eastern Bering Sea (EBS). (NOAA-05, 2009)

5 Purpose and objectives

Purpose and need:

Given that crucial data is missing to determine the importance of the skate nurseries of the EBS to the Bering Sea ecosystem and other marine systems, the purpose of this proposal is to impose restraints on indiscriminate and destructive fishing practices until data on the EBS skate nurseries can be gathered and sufficiently evaluated to make such a determination.

Specific objectives for proposal:

Apply the precautionary principle as advised by the MSA in adhering to the National Standards Guidelines (NSGs) established under it, especially NSGs 1, 6, 8, and 9; the conservation requirements of NSG 1, supported by NSG 8 placing conservation requirements over mitigating economic impacts in the short term; NSG 6 constructing conservation measures allowing for variations and contingencies such as climate change; and NSG 9 to minimize bycatch and where it is unavoidable to minimize mortality of the bycatch. (NOAA-08, 2006)

Methods to measure progress toward those objectives:

Monitor bycatch of skates for reduction. Most of the skate haul taken by the longline Pacific cod and bottom trawl pollock and flatfish fisheries are discarded. Work with current estimates of discarded skate bycatch and monitor for reduction. Data for 1992-1995 assessed 13,000 – 17,000 mt. per year in skate bycatch. *See p. D-63* (NPFMC-01, 2009) This is not intended to present a complete set of methods for measuring progress but simply to point to one obvious measure. The Council has expertise to bear in this area that surpasses my limited knowledge. I rely on that expertise.

6 Proposed management measures, if appropriate

Proposed management measures to meet objectives:

Designate the areas proposed for HAPC in this submission as no-take marine protected areas (MPAs) as has been done in other areas to “protect spawning aggregations, prevent disturbance during spawning, protect the larger and more reproductively successful females, and protect juveniles while they develop.” This is one of the key tools that RFMCs have used to carry out their mandate from the Magnuson-Stevens Act (MSA) to manage fisheries and protect Essential Fish Habitat (EFH). (Witherell, 2009) Skate nurseries appear to be such EFH.

In addition to establishing MPAs and restricting trawling in these Canyons—allow no bottom contact, no pollock trawling, no bottom trawling—take all steps necessary to make the MPA successful by avoiding failure due to non-compliance—a known failure point for other attempted MPAs—with an effective and sufficiently funded monitoring program.

7 Effects

Expected benefits of the proposed HAPC to FMP species:

Expected benefits include the significant reduction of wasteful bycatch discards of skates, reparation of the marine ecosystem in the areas protected, improved management data, and protection for this species from overfishing. Marine reserves are important to establishing healthy marine habitats and in so doing benefitting the fisheries in the surrounding areas.

Identification of fisheries, sectors, stakeholders, and communities who would be affected by the establishment of the proposed HAPC:

Groundfish fisheries and other fisheries may be affected due to restrictions on areas accessible and gear restrictions. MPAs will require enforcement and therefore involve enforcement the Coast Guard. MPAs will also require monitoring which could involve community members or other stakeholders to function as observers. This is not intended to convey an exhaustive report of parties affected. The NPFMC has access to sources of data on this matter. This proposal relies on the NPFMC for its knowledge and expertise in the area of determining the spectrum and scope of interests affected.

8 Supporting information

All sources cited within the prior sections are listed in the bibliography included at the end of this proposal. See “Works Cited” section. This proposal does not include a study of socioeconomic costs.

Works Cited

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- Witherell David** Marine Protected Areas for Fishery Management [Journal]. - [s.l.] : The Journal of Marine Education, 2009. - 3 : Vol. 25.