Background information for Regulatory Proposal PropB: IPHC Closed Area - Removal

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This document provides additional information relevant to the IPHC Secretariat's regulatory proposal to remove the IPHC Closed Area (IPHC-2017-AM093-PropB), including

1) Past considerations
2) History of boundaries
3) Bycatch
4) Nursery grounds
5) Other nearby closed areas
6) Impacts of allowing directed Pacific halibut fishing

As noted in IPHC-2017-AM093-PropB, retaining the IPHC Closed Area (IPHC Regulation 10 (2016)) in its current form, whereby the directed fishery is prohibited from fishing within the area, is unfounded, as the designation as a nursery ground has no basis or relevance to the directed Pacific halibut fishery.

The directed Pacific halibut fishery catches few juvenile Pacific halibut compared to other fisheries operating in the Bering Sea (over 90% for groundfish trawl). In addition, removing the IPHC Closed Area would not create any new fish or increase the harvest recommendations in Area 4CDE as Regulatory Areas 4CDE and the IPHC Closed Area are considered as a single unit for stock assessment purposes. This change would, however allow directed Pacific halibut fishery access to fishing in the area. Other fisheries have continued to fish in the area since it was originally closed in 1967.

1) PAST CONSIDERATIONS BY IPHC AND THE NPFMC

In the past, the IPHC has closed areas to protect Pacific halibut nursery grounds and subsequently reopened them. As described in Trumble 1998 (Appendix I), the IPHC closed two areas in 1932 in Canadian and Southeast Alaskan waters and reopened them in 1960 after surveys showed an accumulation of older and larger fish in the area.

Since the IPHC Closed Area in the Bering Sea was created in 1967, removal of the closed area has come up several times with the most recent time being in 2011-2013. The IPHC closed area was initially created to protect juvenile Pacific halibut in a nursery ground from foreign fishing effort including Japanese and Soviet trawl fisheries and longline fisheries (Technical Report 15 (p.13-14) and Appendix II). The Closed Area provided protection for juvenile Pacific halibut in the 1960s and 1970s when these fleets were excluded from the area and bycatch mortality dropped to a low of 4.21Mlb in 1985 (IPHC unpublished (Appendix III)). After Americanization of the fishing fleet in the 1980s, foreign fishing fleets were excluded from fishing in US waters to encourage growth in fishing by US vessels, vessels were again allowed to fish in the Closed Area. In other words, the IPHC Closed Area no longer served its intent to protect small, immature Pacific halibut once the area opened to US fisheries. The

North Pacific Fishery Management Council chose other measures to reduce bycatch of Pacific halibut including fishery-specific bycatch limits and other closed areas within the IPHC Closed Area. The only fishery that remains excluded from the IPHC Closed Area is the directed commercial longline Pacific halibut fishery.

In 1990, the IPHC Closed Area in the Bering Sea was **reduced** in size because IPHC survey data suggested that while the abundance of large Pacific halibut was low, relatively few juveniles would be vulnerable to capture with longlines (see IPHC Technical Report 27 (p.26) and Appendix II). More recently, in 2015, the IPHC survey fished with longline gear in the IPHC Closed Area and found 32% (683 lb) of the catch in the area with Pacific halibut longline was U32 (a proxy for juvenile halibut) out of a total catch in the closed area of 2,107 lb (19 stations). The rest of the Area 4CDE survey in that year caught 28% (8,360 lb) of U32 out of a total catch of 30,010 lb (143 stations). For comparison, 97% of the Pacific halibut bycatch from the groundifsh trawl fishery in Area 4CDE including within the IPHC Closed Area was under 32 inches total length (U32) in 2015 (See section on bycatch from fisheries currently in the area).

After the IPHC Closed Area was reduced in size in 1990, the Commission requested a review of the Closed Area in the late 1990s (Trumble 1998, Appendix I). The paper states that:

1) the IPHC Closed Area does not reduce Pacific halibut bycatch mortality,
2) provides little biological benefit to the Pacific halibut resource, and
3) does not protect nursery grounds because fisheries that catch juvenile halibut are fishing in the area.

In addition, the paper refers to the IPHC Closed Area as a possible buffer for uncertainty in the stock assessment and management of Pacific halibut. However, as noted in IPHC unpublished (Appendix III), "*Since 1998, the Commission has accumulated sufficient data and has been able to generate stock assessments for the Bering Sea with considerably greater confidence than was possible in 1998. Therefore, the staff no longer sees a purpose for the Closed Area as such a guard against uncertainty*."

Between 2011 and 2013, the Commission reviewed the purpose of the IPHC Closed Area and considered removing it or, conversely, allowing directed commercial longline Pacific halibut fishing in the area. The series of events from this most recent 2011-13 consideration are described below.

> The status and effect of the IPHC Closed Area was discussed at the IPHC's 2011 Interim Meeting and the 2012 Annual Meeting. During the 2012 Annual Meeting, the Commission "*briefly discussed the current use of the closed area. Dr. Leaman iterated that the staff position is that there is no compelling reason to exclude only halibut fishers when other harvesters are allowed to exploit the area. It was noted that the process of opening the area and allocating catch would require actions by the NPFMC. The Commission decided to write a letter to the NPFMC stating that the IPHC is considering opening the area as soon as 2013, and requires guidance on how to approach it*."
>
> IPHC sent a letter to the North Pacific Fishery Management Council (NPFMC) on 9 August 2012 noting that the IPHC was reviewing the purpose of the closed area and was contemplating potential action to no longer prohibit directed commercial halibut longline fishing in the area. (Appendix IV)
>
> NPFMC responded in a letter, dated 19 October 2012, stating the NPFMC "*did not identify any allocative impacts of such an action on its Area 4CDE Catch Sharing Plan and supports incorporating the closed area into Area 4E, should the IPHC choose to do so, with the*

understanding that such an action would not result in an increase in the commercial catch limit for that expanded area." (Appendix V)

At the IPHC's 2012 Interim Meeting, the Commissioners discussed the IPHC staff proposal to remove the IPHC Closed Area.

IPHC staff presented the proposal at the December 2012 North Pacific Fishery Management Council (NPFMC) meeting.

At the IPHC's 2013 Annual Meeting, the Commissioners did not approve the proposal to remove the IPHC Closed Area, noting "*The letter to the Commission from the NPFMC that described impacts to current programs in the event that the IPHC Closed Area was opened, was reviewed. Following some discussion, the Commission decided that although this may be considered in the future, opening this area is not a high priority issue at this time*."

2) HISTORY OF BOUNDARIES FOR AREA 4CDE AND IPHC CLOSED AREA

As described in the background of IPHC-2017-AM093-PropB,

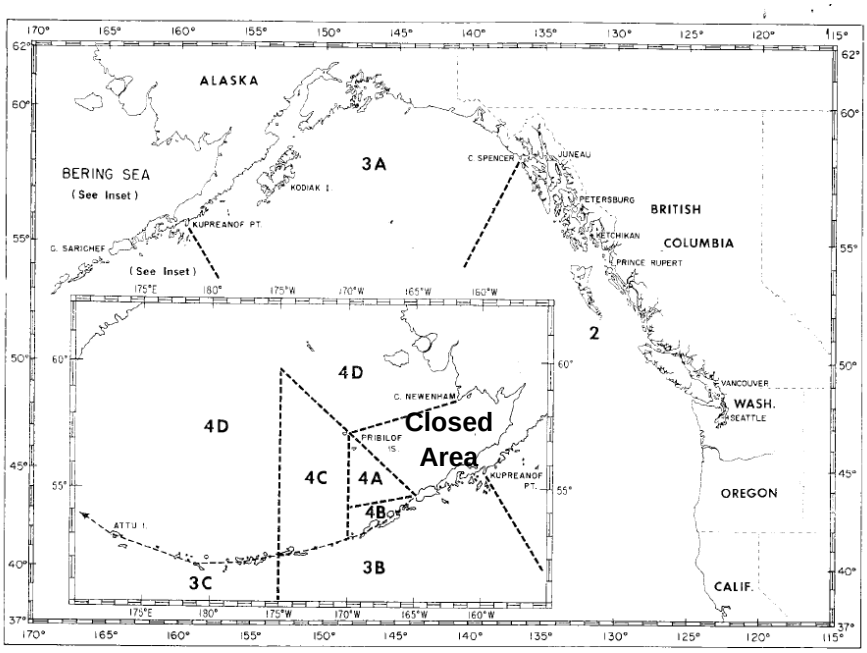
In 1967, the IPHC designated an area in Bristol Bay as being closed to longline fishing (within regulatory Area 4E). The justification for the closure was that it was considered to be a nursery area for juvenile Pacific halibut.

In 1990, Area 4E was expanded into 'inner' Bristol Bay, reducing the closed area to its current boundaries as described in Regulation 10 of the IPHC Regulations (2016).

At the time of the closure's implementation, limited trawling occurred in Bristol Bay. However, over the years, trawling has expanded substantially in the region, and now includes Bristol Bay, thereby negating any likely benefits of a closed area for the directed fishery only.

Appendix VI includes maps and regulations of the boundary changes for the IPHC Closed Area in the Bering Sea before and after the 1967 change and the 1990 change, as well as the current 2016 boundary (which is the same as 1990 and is included for reference). IPHC Technical Report 27 also provides a summary of boundary changes. The 1967 and 2016 maps are displayed here as a summary.

1967



Pacific Coast of North America showing the 1967 regulatory areas as defined by the International Pacific Halibut Commission

2016

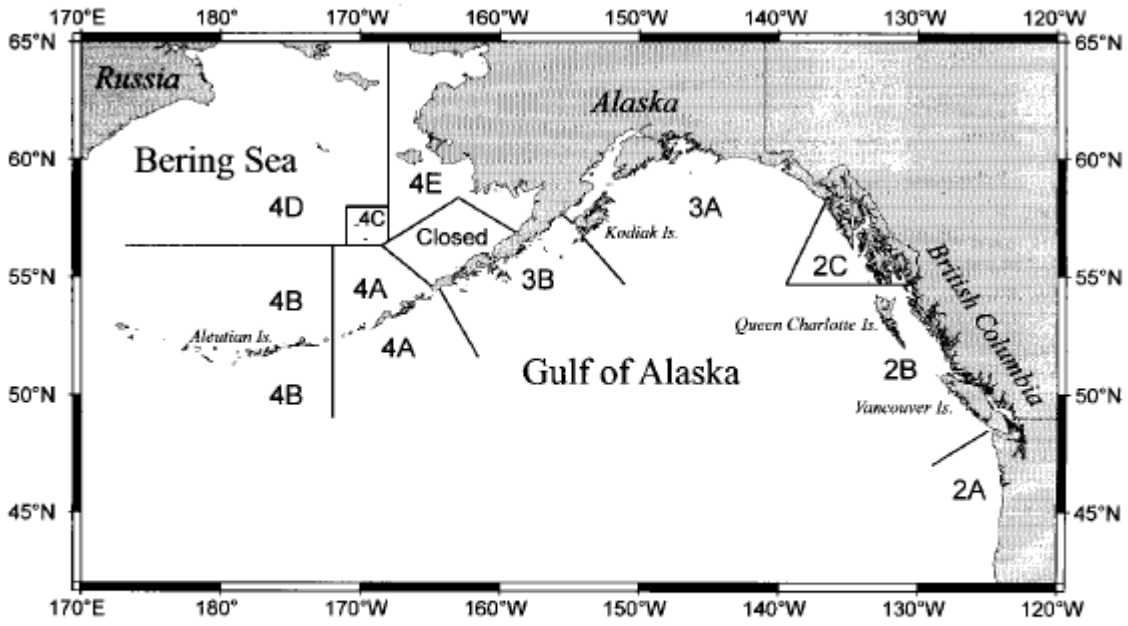


Figure 1. Regulatory areas for the Pacific halibut fishery.

3) NURSERY GROUND

As stated in the discussion section of IPHC-2017-AM093-PropB,

> *"In response to the Commission's requests detailed in paragraph 66 of the IM092 Report, the IPHC Secretariat have searched and found no scientific evidence/basis indicating that the Area is a nursery ground of any significance, relative to any other grounds, for Pacific halibut. Thus, allowing the directed fishery would have no clear negative impacts on the area as a nursery ground."*

Concentrations of young Pacific halibut exist throughout much of the range of the population from the Bering Sea to at least as far south as British Columbia. A "nursery ground" may be defined broadly as any habitat in which "a juvenile fish or invertebrate species grows at higher densities, avoids predation more successfully, or grows faster there than in a different habitat" (Beck et al. 2001). The IPHC does not have a consistent definition, but generally Pacific halibut nurseries are considered those nearshore habitats where young halibut reside until emigrating to the offshore areas more commonly occupied by adult fish. The age and length range definitions have differed by study and have included halibut < 65 cm fork length (Best 1969, 1974), halibut through age-1 (Loher and Wischniowski 2008), and halibut through age-2 (Best and Hardman 1982). It appears that the majority of halibut settlement and rearing occurs west of Cape St. Alias in the central Gulf of Alaska (Best 1974, Best and Hardman 1982) and

throughout the southeastern Bering Sea (Best 1977). Evidence of this larger range of nursery grounds comes from:

Best, E. A. 1974. Juvenile halibut in the Gulf of Alaska: trawl surveys, 1970-1972. Int. Pac. Halibut Comm. Tech. Rep. 12. (http://www.iphc.int/publications/techrep/tech0012.pdf) These data demonstrate nursery-age halibut from Unimak through Shelikof Bay (off Sitka). The lack of any age-1 or even age-2 halibut at Dixon entrance was the first indication that 2C represented the farthest-south settlement and true recruitment potential for halibut.

Best, E.A. 1974. Juvenile halibut in the eastern Bering Sea: trawl surveys, 1970-1972. Int. Pac. Halibut Comm. Tech. Rep. 11. (http://www.iphc.int/publications/techrep/tech0011.pdf) Noting that all sampling was conducted in the Bristol Bay region; that is, didn't extend west to the Pribilofs or North to Nunivak-and-beyond. And, for all of these surveys, the age-1 captures are the best indication of nursery area; age-2 can be useful if the gear wasn't good enough to catch the smaller fish, but isn't really ideal.

Best, E.A. 1977. Distribution and abundance of juvenile halibut in the southeastern Bering Sea. Int. Pac. Halibut Comm. Sci. Rep. 62. (http://www.iphc.int/publications/scirep/SciReport0062.pdf). This paper captures age-1 halibut off Cape Navarin (Russia, just across IPHC's 4D Edge border) suggesting spawning and nursery ranges as far west as the Russian border.

Best, E. A. and Hardman, W. H. 1982. Juvenile halibut surveys, 1973-1980. Int. Pac. Halibut Comm. Tech. Rep. 20. (http://www.iphc.int/publications/techrep/tech0020.pdf)

Loher, T. and Wischniowski, S. 2007. Using otolith chemistry to determine halibut nursery origin. Int. Pac. Halibut. Comm. Report of Assessment and Research Activities 2006:201-204. (http://www.iphc.int/publications/rara/2006rara/2k6rara06.pdf) See Table 1 and Figure 1 noting age-0 and -1 halibut at every Area 2C location sampled.

Loher, T. and Wischniowski, S. 2008. Using otolith chemistry to determine halibut nursery origin: progress in 2007. Int. Pac. Halibut. Comm. Report of Assessment and Research Activities 2007: 555-562. (http://www.iphc.int/publications/rara/2007rara/2k7rara06.pdf) Figure 1 (pg. 562) shows age-0 halibut caught off of British Columbia (Dogfish Banks area) [Note: Until the 2000s, IPHC researchers did not use a net designed to catch age-0 fish, which is what should be used to help identify nursery grounds.]

References for nursery ground definition:

Best, E.A. 1969. Recruitment investigations: Trawl catch records Bering Sea, 1967. Int. Pac. Halibut Comm. Tech. Rep. 1. 23 p.

Best, E. A. 1974. Juvenile halibut in the eastern Bering Sea: Trawl surveys, 1970-1972. Int. Pac. Halibut Comm. Tech. Rep. 11. 32 p.

Beck, M.W., Heck, K.L. Jr., Able, K.W., Childers, D.L., Eggleston, D.B., Gillanders, B.M., Halpern, B., Hays, CG., Hoshino, K., Minello, T.J., Orth, R.J., Sheridan, P.F., and Weinstein, M.P. 2001. The identification, conservation, and management of estuarine and marine nurseries for fish and invertebrates. BioScience 51(8):633-641.

Loher, T. and Wischniowski, S. 2007. Using otolith chemistry to determine halibut nursery origin: progress in 2007. Int. Pac. Halibut. Comm. Report of Assessment and Research Activities 2007:555-562.

4) OTHER NEARBY CLOSED AREAS

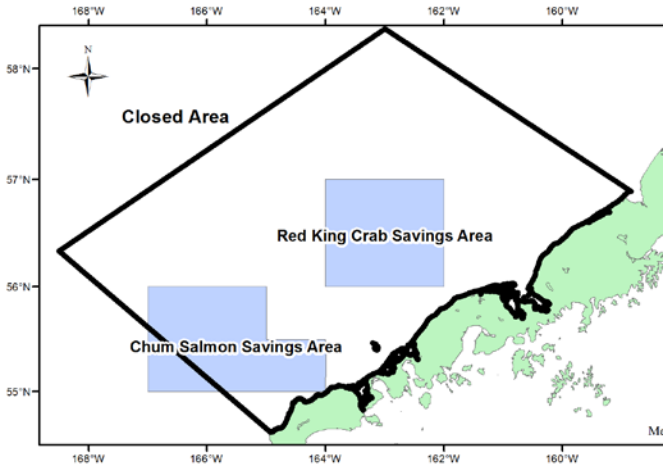
There are several closed areas for other non-halibut fisheries that are located within or near the IPHC's Closed Area. An initial review shows the following nearby closed areas:

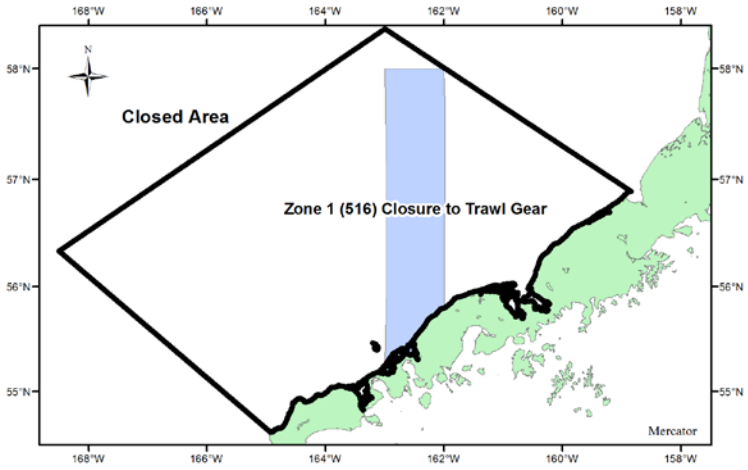
- Chum Salmon Savings Area
- Red King Crab Savings Area
- Steller Sea Lion Protection Areas, Bering Sea Subarea - Pollock Restriction Area (SSLPA, Bering Sea Subarea - Pollock RA)
- Zone 1 (516) Closure to Trawl Gear
- Scallop Closed Areas - Eastern Bering Sea
- Trawl Gear Restricted Area - Bristol Bay (TGRA - Bristol Bay)
- Zone 1 (512) Closure to Trawl Gear
- Steller Sea Lion Protection Areas, Bering Sea Subarea - Groundfish, Pollock, Pacific Cod, and Atka Mackerel Closures (SSLPA, Bering Sea Subarea)
- Alaska Maritime National Wildlife Refuge (AK Maritime NWR)
- Nearshore Bristol Bay Trawl Closure
- Catcher Vessel Operational Area (CVOA)

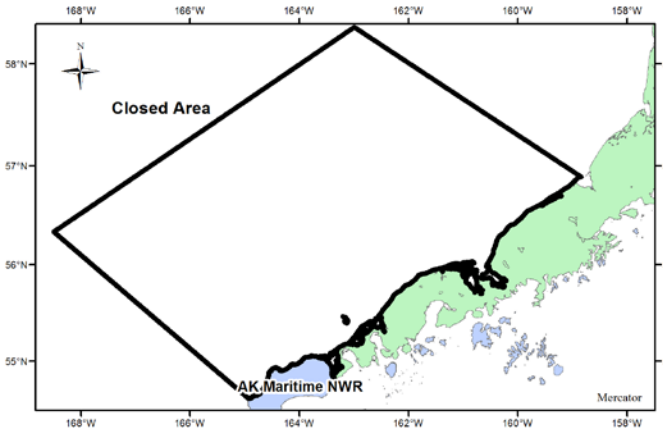
The figures[1] below show the location of these other nearby closed areas.

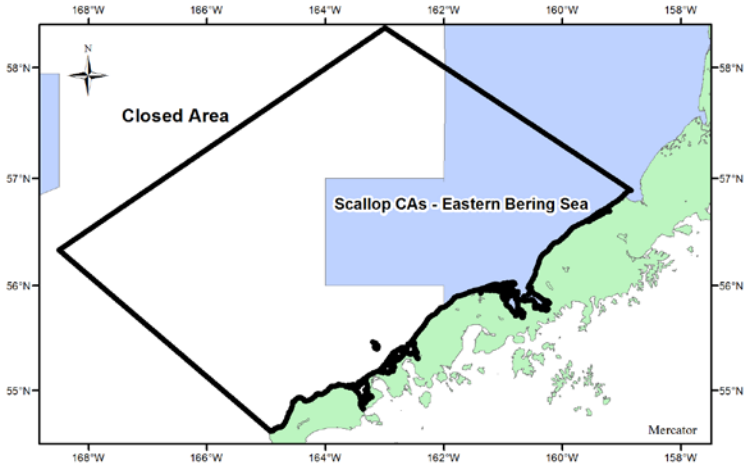
While more information needs to be collected on which fisheries are restricted from these other nearby closed areas and when, we know that groundfish trawl (bottom and pelagic), groundfish hook-and-line, and groundfish pot gear all fish in the IPHC's Closed Area because we have bycatch data from those fisheries in the area (See Bycatch section of this report).

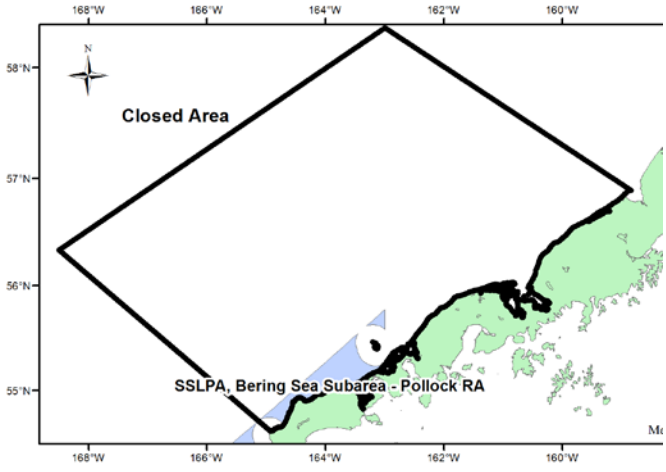
[1] Data from http://marineprotectedareas.noaa.gov/dataanalysis/mpainventory/

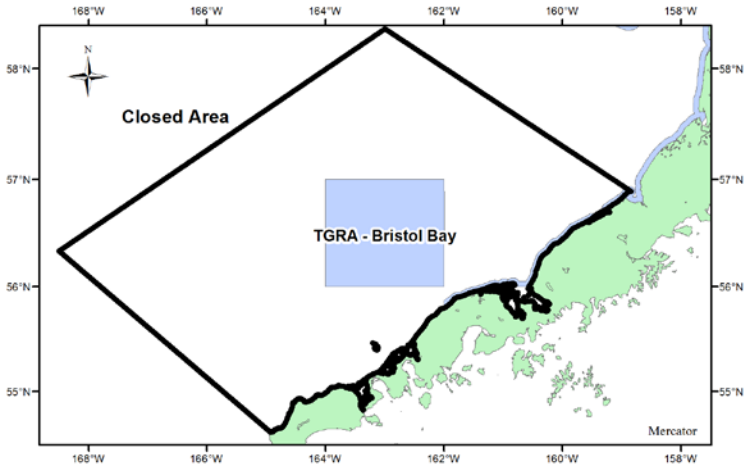

Closed Area
Red King Crab Savings Area
Chum Salmon Savings Area

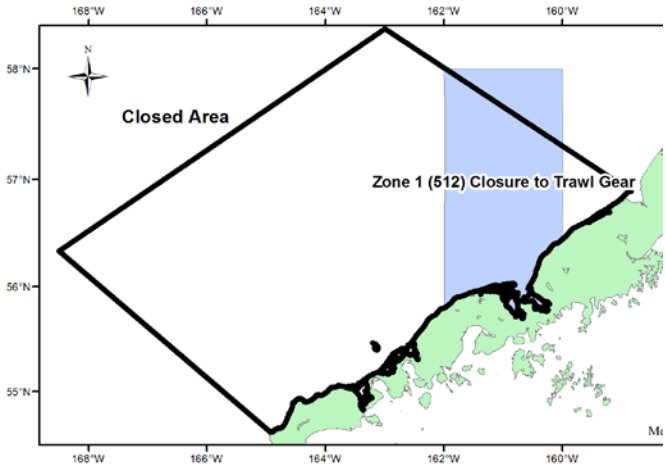

Closed Area
Zone 1 (516) Closure to Trawl Gear
Mercator

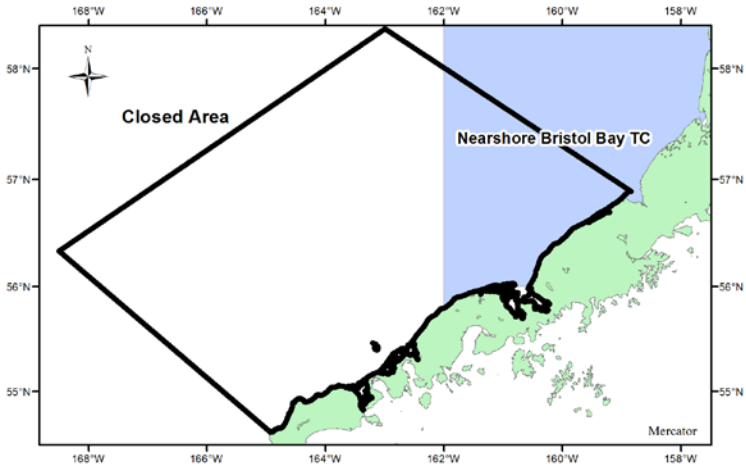

Closed Area
AK Maritime NWR
Mercator

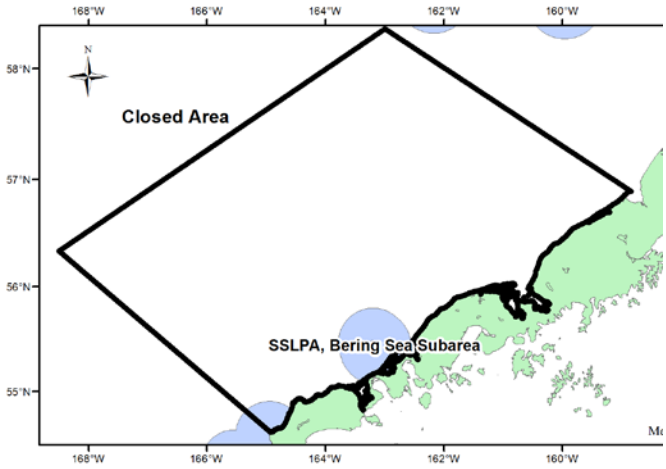

Closed Area
Scallop CAs - Eastern Bering Sea
Mercator

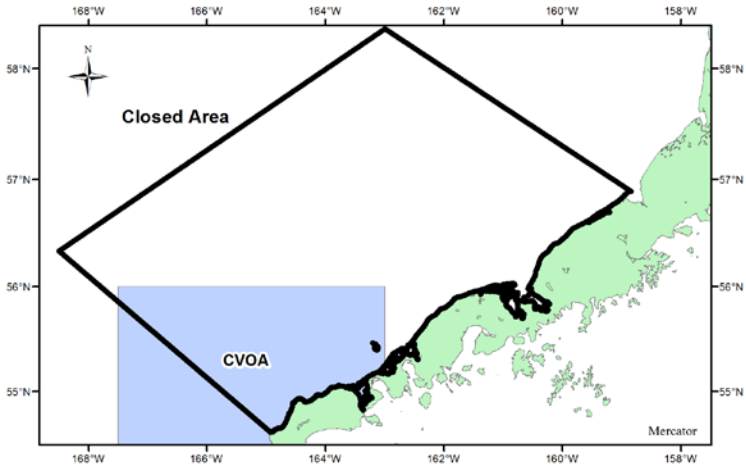

Closed Area
SSLPA, Bering Sea Subarea - Pollock RA


Closed Area
TGRA - Bristol Bay
Mercator









5) BYCATCH FROM FISHERIES CURRENTLY IN THE CLOSED AREA

Several fisheries operate in the IPHC Closed Area, including groundfish trawl (bottom and pelagic), groundfish hook-and-line, and groundfish pot gear. Most of these fisheries catch Pacific halibut (adults and juveniles) as bycatch, and they are required by regulation to discard any Pacific halibut caught (except that full retention fisheries may retain halibut). The amount of bycatch by gear type from the IPHC Closed Area compared to that from Area 4CDE from 2015 and 2016 is shown in Table 1. When looking at all gears combined in 2015 and 2016, over half of the bycatch in Area 4CDE (including the Closed Area) was from the Closed Area and was primarily from groundfish trawl. In addition, data from 2015 shows that for Area 4CDE including the closed area, 97% of the Pacific halibut bycatch is under 32 inches total length (U32). Length data from 2016 is not yet available.

Table 1. Bycatch in the IPHC Closed Area (CA) in 2015-2016 (net weight, lbs)

Year	Area	Trawl	% of Annual Total	H&L	% of Annual Total	POT	% of Annual Total	All Gear	% of Annual Total
2015	4CDE	1,349,227	40%	269,515	8%	-		1,618,742	48%
	CA	1,653,465	49%	114,089	3%	1,653		1,769,208	52%
	4CDE+CA	3,002,692	89%	383,604	11%	1,653	0%	3,387,950	
2016	4CDE	1,321,119	41%	201,723	6%	-		1,522,842	47%
	CA	1,574,099	49%	109,129	3%	1,653		1,684,881	53%
	4CDE+CA	2,895,218	90%	310,852	10%	1,653	0%	3,207,723	

6) IMPACT OF ALLOWING DIRECTED PACIFIC HALIBUT FISHERY ACCESS

This change makes no "new fish" available to the directed fishery. The Pacific halibut stock in the IPHC Closed Area is already included in the IPHC stock assessment, which treats Regulatory Areas 4CDE and the IPHC Closed Area as a single unit for assessment purposes. The overall harvest advice for Area 4CDE includes the current Closed Area, meaning there would be no change in total catch available to the directed fishery by opening this area.

Based on survey results, the IPHC Secretariat expects that fishing in this area will encounter similar numbers and sizes of Pacific halibut as are found in nearby areas of Area 4E with comparable ocean and bottom characteristics.

The primary impact of this change on the directed fishery revolves around who from Area 4CDE would be permitted to fish in the former area designated as the IPHC Closed Area if it were opened. Domestic allocation is a matter for the North Pacific Fishery Management Council (NPFMC).

ADDITIONAL DOCUMENTATION / REFERENCES

IPHC Technical Report 27, 1993. "Regulations of the Pacific Halibut Fishery, 1977-1992." Stephen H. Hoag, Gordon J. Peltonen, and Lauri L. Sadorus. 50 p. http://www.iphc.int/publications/techrep/tech0027.pdf

IPHC Technical Report 15, 1977. "Regulations of the Pacific Halibut Fishery, 1924-1976." Bernard E. Skud. 47 p. http://www.iphc.int/publications/techrep/tech0015.pdf

Leaman unpublished. Updated Review of the IPHC Bering Sea Closed Area. Int. Pac. Halibut. Comm. 2 p.

Trumble, 1998. Evaluation of Maintaining the IPHC Closed Area in the Bering Sea. Int. Pac. Halibut. Comm. Report of Assessment and Research Activities 1998: 243-248. http://iphc.int/publications/rara/1998rara/1998rara06.pdf

APPENDICES

Appendix I: Trumble, 1998. Evaluation of Maintaining the IPHC Closed Area in the Bering Sea.

Appendix II: Excerpts on closed area changes from IPHC Technical Reports 15 and 27.

Appendix III: IPHC, unpublished. Updated Review of the IPHC Bering Sea Closed Area.

Appendix IV: IPHC letter to NPFMC dated 9 August 2012.

Appendix V: NPFMC letter responding to IPHC dated 19 October 2012.

Appendix VI: Maps and regulations showing closed area changes between 1966 -1967 and 1989-1990. 2016 remains the same as 1990 and is displayed for reference.

APPENDIX I

Trumble, 1998. Evaluation of Maintaining the IPHC Closed Area in the Bering Sea. Int. Pac. Halibut. Comm. Report of Assessment and Research Activities 1998: 243-248. http://iphc.int/publications/rara/1998rara/1998rara06.pdf

Evaluation of Maintaining the IPHC Closed Area in the Bering Sea

by

Robert J. Trumble

ABSTRACT

The existing IPHC closed area in the Bering Sea provides little biological benefit to the halibut resource or fishery. In spite of the weak Bering Sea data set, the very low directed fishery exploitation on legal-sized fish has little effect on halibut abundance. Except for bycatch mortality from groundfish fisheries, which is substantial, the nearly unfished Bering Sea shelf may function as a reserve. Marine reserves may be appropriate for areas of high exploitation or high data uncertainty. At this time, only data uncertainty provides justification for a reserve in the Bering Sea. Should circumstances make a reserve potentially desirable, a special project to develop a purpose and criteria for a reserve should occur.

INTRODUCTION

Over the years, the International Pacific Halibut Commission (IPHC) has closed and reopened areas to halibut fishing, and worked with the U.S. and foreign governments to close areas to groundfish fishing (Skud 1977). Halibut nursery areas in Canadian waters closed and reopened to halibut fishing, and a nursery area established in 1967 in the eastern Bering Sea (Fig. 1) remains closed to the present. Other areas of the Bering Sea-Aleutian Islands and Gulf of Alaska with high halibut bycatch had closed to groundfish fisheries, at least seasonally, to foreign groundfish fisheries. All of the Bering Sea and Gulf of Alaska halibut bycatch closed areas subsequently reopened as the groundfish fisheries converted to American fleets.

During development of the groundfish fisheries of the Bering Sea by foreign and U.S. vessels, bycatch of halibut occurred throughout the Bering Sea, including the Bering Sea closed area. During the five years that preceded the closure, the commercial halibut fishery caught a total of 103,000 pounds from what became the closed area, and 97,000 pounds occurred in 1962 (IPHC 1967). No commercial harvest occurred in the area during 1966, the last year before the closure. Commercial halibut fishing on the continental shelf in the Bering Sea adjacent to the closed area is now about 300,000 pounds. An additional 1.6 million pounds of harvest occurs around the Pribilof Islands, an area of relief northwest of the closed area. Given the large halibut mortality caused by bycatch and the apparent lack of interest in commercial fishing in the closed area, the IPHC staff proposed in 1998 to review the purpose and need for the closed area. The IPHC asked the staff to prepare a report on the consequences of eliminating the closed area.

BACKGROUND

Among its earliest actions to reverse a perceived decline in halibut stocks, the IPHC in 1932 established permanent closures of two areas in Canadian waters defined as halibut nursery grounds.

On these grounds, small halibut dominated, and larger halibut occurred only as strays (Babcock et al. 1931). The IPHC considered the closures superior to minimum size limits and prohibitions on small hooks. The closure was intended as a reserve with total protection of small halibut, by eliminating culling of undesirable, small fish during the fishery. Small fish in the closed areas could grow to more desirable sizes, but no restrictions would be placed on small halibut captured outside of the closed areas. Economic inefficiencies of prohibiting small hooks would not occur. The IPHC considered the nursery closures as economic, but not biological, measures. Overfishing of larger halibut in open areas was viewed as the chief threat to the productivity of the resource.

The nursery area closures remained until reopened in 1960. Surveys during the late 1950s demonstrated an "accumulation of old and large fish" such that the closed areas "do not currently qualify for closure as nursery grounds" (IPHC 1960).

During the early 1960s, directed halibut fishing by foreign fleets and heavy fishing by fishermen of the U.S. and Canada caused a significant decline in abundance of halibut in the Bering Sea-Aleutian Islands. In 1966, the IPHC staff recommended management measures for the halibut fishery in the Bering Sea that included a proposal to close an area of the eastern Bering Sea to all halibut fishing (IPHC 1967). A "closed nursery ground would aid in the protection of the large population of small, immature halibut in that area" (IPHC 1997). The IPHC implemented the Bering Sea closed area in 1967, and it has remained in place since with small modifications. The IPHC also recommended closures to foreign groundfish fishing in areas of high abundance of halibut. As a result of negotiations through the International North Pacific Fisheries Commission and bilateral meetings with foreign governments, Japan and Russia agreed to closures for groundfish fisheries that included the IPHC closed area (Skud 1977)

The intent of the IPHC for the Bering Sea closed area, to protect small, immature halibut, was violated when the area opened to U.S. groundfish fisheries, which catch large numbers of these small halibut as bycatch. A large component of the halibut bycatch mortality in the Bering Sea-Aleutian Islands region comes from the IPHC closed area. Since the early 1990s when the Americanization of the groundfish fisheries occurred, bycatch mortality documented by samples from observers in the IPHC closed area has increased from about 20 percent to about 40 percent of the Bering Sea-Aleutian Islands total (NMFS unpublished data). Of the groundfish catch monitored by observers, catch in the IPHC closed area during this period increased from about 10 percent to about 40-50 percent of the total.

MARINE PROTECTED AREAS

Marine protected areas (MPA), which encompass such terms as reserves, sanctuaries, and closed areas, are gaining international favor as a mechanism for ecosystem and fishery management (Attwood et al 1997a). In many cases, insufficient information precludes proper management under the pressure of intense fishing or attempts to modify the environment of an area. Under the Precautionary Principle, MPAs offer an opportunity to maintain marine environments intact while further study occurs. Attwood et al. (1997a) further suggest that MPAs may enhance fish yield, if substantial spill-over of fish occurs from the MPA. They note that evidence for such enhancement comes from conceptual arguments and theoretical models, rather than from direct observations.

Attwood et al. (1997b) summarized the role of MPAs in fisheries management with "recognition of:

(i) the failure of conventional single-species management to control bycatch and habitat destruction;
(ii) the failure of conventional fishery control methods for fish with certain types of life-history characteristics;
(iii) the importance of conserving ecosystem structure as the context for stable fishery production;
(iv) the value of undisturbed ecosystems for comparative study."

Lauck et al. (1998) extended the concept of MPAs (or marine reserves in their terminology) to fisheries management. They noted the widespread failure of stock assessment models to provide accurate and timely advice and the failure of management to prevent stock collapse, as a result of irreducible scientific uncertainty and inability to control catches. These authors liken a marine reserve for fisheries to an insurance policy, in which a premium paid (lower overall harvest because of the closed area) minimizes the risk of a fishery collapse. In rough terms, they recommended that the size of the reserve should include on the order of 50 percent of the fish stock abundance. As exploitation rates decline, the necessary size of the reserve becomes smaller. The proportion of harvest lost because of a marine reserve is less than the proportion closed, because exploitation in the remaining open area can increase.

RELEVANCE OF MPA/RESERVES TO THE BERING SEA CLOSED AREA

MPAs are an attractive concept for many situations in fishery management, especially those with limited or insufficient information. However, evaluation of the concept is generally lacking, and criteria for selecting MPAs are generally vague. Even so, the IPHC closed area meets few of the justifications for an MPA.

The closed area does not reduce halibut bycatch mortality. Bycatch is managed with bycatch mortality limits through the North Pacific Fishery Management Council, and with quota reductions and harvest rate reductions by the IPHC.

Ecosystem effects from the IPHC closed area have little benefit. The fishing by other gear types throughout the Bering Sea-Aleutian Island area, especially on the Bering Sea shelf, preclude an undisturbed ecosystem. A small no-trawl zone occurs on the eastern edge of the IPHC closed area. Evaluation of ecosystem stability in the Bering Sea must include the other fisheries, both in and out of the IPHC closed area and the no-trawl zone.

Of the issues favoring development of MPAs, only uncertainty of the stock assessment and concomitant management program apply to Pacific halibut. Stock assessment results in the Bering Sea are currently inadequate because of insufficient time series of catch and survey data (Sullivan and Parma 1998), and because exploitation rates are low. Questions still remain on stock assessment issues in the Gulf of Alaska.

Uncertainty

In the Gulf of Alaska, two estimates of exploitable biomass occur for Area 3B. The stock assessment model (Sullivan and Parma 1998) gives a value of exploitable biomass about half that estimated from CPUE ratios scaled with biomass of areas with good data (Trumble and Hoag 1998). Retrospective analysis of halibut abundance demonstrated that the age-based model formerly used

for halibut stock assessment underestimated exploitable biomass (Parma 1993), and helped document the need for length-age-based model. Clearly, a degree of uncertainty exists for stock assessment in all or part of the IPHC management areas.

Exploitation rates

Halibut fishing mortality contributes very little to total mortality in the Bering Sea (W. G Clark, IPHC, pers. comm.). Estimates of total mortality (fishing plus natural) exceed the estimate of natural mortality currently used.

Data available from the Bering Sea are the weakest of any IPHC regulatory area, but exploitation is so low that the effect hardly registers. Exploitation is higher in the Gulf of Alaska, but the strongest data set occurs there. The present IPHC closed area is insufficient to offer the degree of insurance suggested by Lauck et al. (1998). The closed area is far too small and accounts for too few halibut to offer significant benefits. However, it costs the fishery virtually nothing because of little of no interest in fishing there. The Bering Sea shelf functions as a closed area to halibut fishing, because the density is so low that halibut fishermen have little interest in fishing in any but a few spots. Yet because of the large surface area, the halibut abundance on the shelf amounts to about a third of the total abundance in the Bering Sea (Clark 1998). Lauck et al. demonstrated that the need for a reserve diminishes as exploitation decreases. The existing closed area in the Bering Sea provides little biological benefit to the halibut resource or fishery.

ALTERNATIVE ACTIONS

The IPHC staff has several options concerning the closed area and the MPA concept.

1. Status quo. Leave the closed area as it is. This action requires no further evaluations.
2. Push for expansion of the closed area/no-trawl zone to make a reserve of a meaningful size. This action would require substantial evaluation.
3. Develop an alternate closed area. This action would require substantial evaluation.
4. Eliminate the IPHC closed area. This action would require substantial evaluation.

We cannot develop a justification for any specific MPA/Reserve in the Bering Sea or Gulf of Alaska at this time. Should circumstances develop that make an MPA/Reserve potentially desirable, then a special project to establish objectives and criteria for a halibut-specific MPA should occur.

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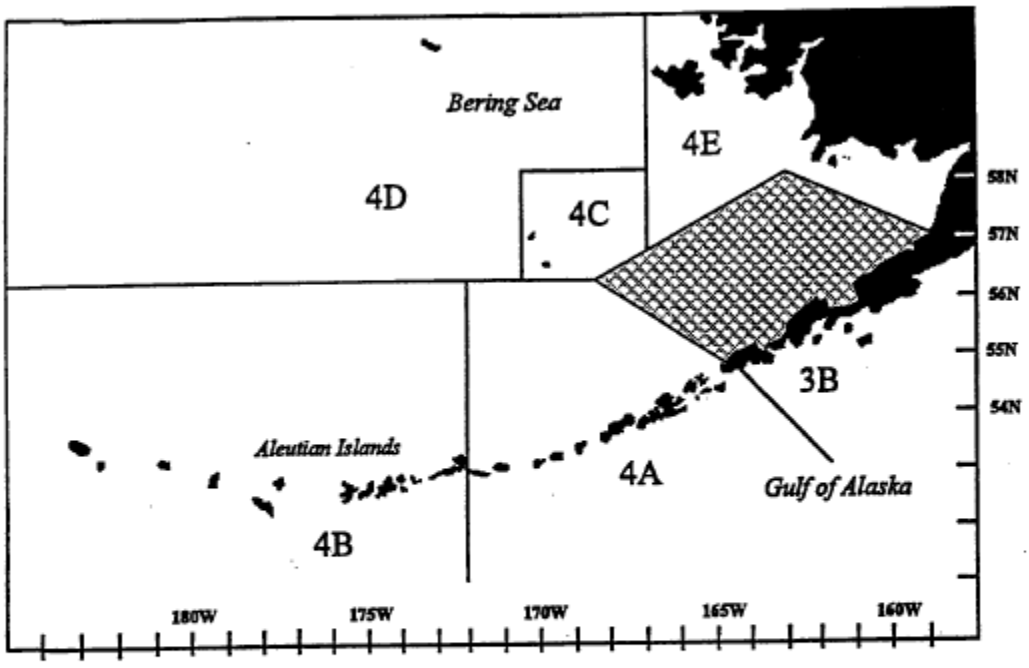

Figure 1. **Area closed by IPHC to longline fishing for Pacific halibut.**

APPENDIX II

Excerpts on closed area changes from IPHC Technical Reports 15 and 27

IPHC Technical Report 15, p.13-14

"Regulations of the Pacific Halibut Fishery, 1924-1976." Bernard E. Skud. 47 p. (1977)
http://www.iphc.int/publications/techrep/tech0015.pdf

Closed Areas

In 1932, a year-round closure to halibut fishing was established in two "nursery areas" to protect young halibut. One of these areas was in the vicinity of Noyes Island and Timbered Islet in southeastern Alaska and the other was the Masset grounds, off the north coast of Graham Island in British Columbia. These closures were retained until 1960, when the areas were opened to fishing during the regular season in Regulatory Area 2. Studies during the late 1950's had shown an "accumulation of old and large fish" in these nursery areas which "do not currently qualify for closure as nursery grounds under the provisions of the Convention" (IPHC 1960). In 1967, Area 4E in the southeastern Bering Sea was declared a nursery area and a year-round closure was instituted that still is in effect.

Although not a part of IPHC regulations, certain areas are closed to foreign trawlers to reduce the incidental catch of halibut. As explained below, these closures were established even though IPHC has no authority to regulate domestic fishing for species other than halibut and has no control over foreign vessels. Bell (1970), Skud (1973), and Hoag (1976) described the effects of Japanese and Soviet trawl fisheries on the North American longline fishery. Although targeting on other species, e.g., pollock (*Theragra chalcogrammus*) and yellowfin sole (*Limanda aspera*), the foreign fleets annually caught millions of pounds of halibut. In 1973, realizing the importance of these productive trawl fisheries and recognizing that foreign trawling likely would continue even if national fishery zones were extended, IPHC proposed that foreign trawling be prohibited in certain areas of the Bering Sea when the incidence of halibut was high. Through the International North Pacific Fisheries Commission (INPFC) and bilateral meetings, Canada and the United States successfully negotiated with Japan and the U.S.S.R. to establish the closures which, in recent years, have been expanded in both time and area and include closures in the Gulf of Alaska (Figure 3).

IPHC Technical Report 15, p.13-14 (con't)

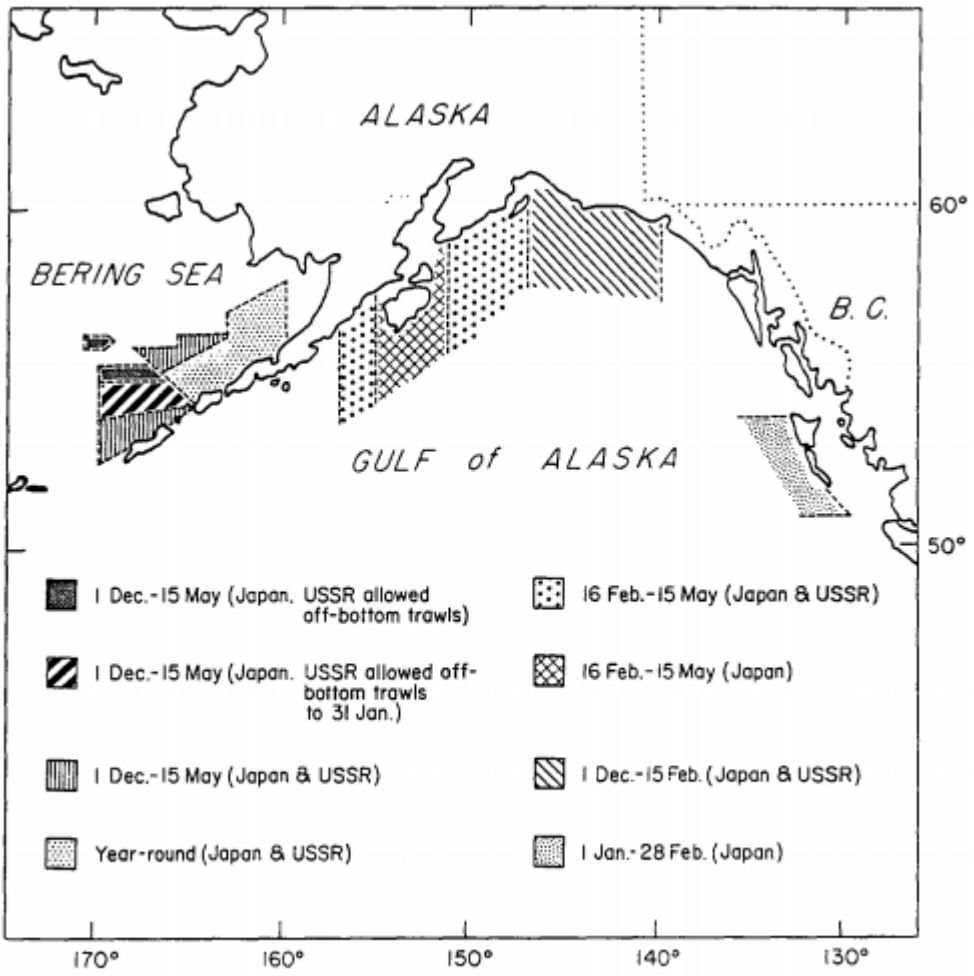

Figure 3. Foreign trawl closures pertaining to halibut in the Bering Sea and the Gulf of Alaska.

IPHC Technical Report 27, p.17

"Regulations of the Pacific Halibut Fishery, 1977-1992." Stephen H. Hoag, Gordon J. Peltonen, and Lauri L. Sadorus. 50 p. (1993)
http://www.iphc.int/publications/techrep/tech0027.pdf

Only minor changes in regulatory areas have occurred since 1984 when Area 4E was introduced in the Bering Sea to provide a separate catch limit and season in an area that previously experienced little fishing. In 1990, Area 4E was expanded to include part of Bristol Bay that previously had been closed to halibut fishing because of concern for juvenile halibut. A 1987 IPHC survey with longline gear (Gilroy and Hoag 1993) suggested that while the abundance of large halibut was low, relatively few juveniles would be vulnerable to capture with longlines. The U.S. government divided the Area 4E catch limit into two components; providing 70% to a northwest portion (the original Area 4E) and 30% to a southeastern portion (the Bristol Bay addition). This division was implemented to assure that fishing in Bristol Bay would not prevent local communities in the northwest portion from participating in the fishery.

Appendix III

Leaman unpublished. Updated Review of the IPHC Bering Sea Closed Area. Int. Pac. Halibut. Comm. 2 p.

Updated Review of the IPHC Bering Sea Closed Area

Bruce M. Leaman

Background

The IPHC Bering Sea Closed Area (Fig. 1) was created by the Commission in 1967 to protect a nursery area for juvenile halibut, in response to severe declines in halibut abundance. The current Closed Area is slightly smaller than the original definition due to reductions that occurred when Areas 4C and 4E were created. The Closed Area had historically accounted for a relatively small percentage (<10%) of the directed halibut landings in the Bering Sea but was a source of significant halibut mortality from foreign vessel bottom trawling. The Commission recommended the closure to both directed halibut fishing, which was under Commission jurisdiction, and to bottom trawling, which was not under Commission jurisdiction. However, through negotiations within the International North Pacific Fisheries Commission and bilateral agreements with foreign governments, the Closed Area was also closed to foreign bottom trawling. Throughout the late 1960s until the early 1970s, the Closed Area provided significant protection for juvenile halibut, with bycatch mortality dropping to an estimated low of 4.21 Mlb in 1985. Coincidentally, halibut abundance improved dramatically, fuelled in part by strong year classes of the mid 1970s.

However, as Americanization of the Bering Sea trawl fisheries occurred in the early 1980s, following promulgation of the U.S. Extended Economic Zone, the protection to juvenile halibut afforded by the Closed Area diminished for domestic fisheries under exclusive U.S. jurisdiction. The North Pacific Fishery Management Council did attempt to control bycatch mortality by instituting gear and fishery-specific limits and closures within the Closed Area, throughout the 1980s. However, mortality on halibut again increased substantially in the 1985-1991 period, reaching a peak of 10.72 Mlb in 1992. Bottom trawling within the Closed Area accounts for a significant proportion of the halibut mortality in the Bering Sea. The Closed Area remains open to all fishing except directed halibut longline fishing.

The Commission requested a review of the Closed Area in 1998 (Trumble 1999). That review examined the purpose of the Closed Area and its value to halibut management. The summary of that review is reproduced below:

> The closed area does not reduce halibut bycatch mortality. Bycatch is managed with bycatch mortality limits through the North Pacific Fishery Management Council, and with quota reductions and harvest rate reductions by the IPHC.
>
> Ecosystem effects from the IPHC closed area have little benefit. The fishing by other gear types throughout the Bering Sea-Aleutian Island area, especially on the Bering Sea shelf, preclude an undisturbed ecosystem. A small no-trawl zone occurs on the eastern edge of the IPHC closed area. Evaluation of ecosystem stability in the Bering Sea must include the other fisheries, both in and out of the IPHC closed area and the no-trawl zone.
>
> Of the issues favoring development of MPAs, only uncertainty of the stock assessment and concomitant management program apply to Pacific halibut. Stock assessment results in the Bering Sea are currently inadequate because of insufficient time series of catch and survey data (Sullivan and Parma 1998), and because exploitation rates are low. Questions still remain on stock assessment issues in the Gulf of Alaska.

Evaluation

As noted in the 1998 review, the sole perceived purpose of the Closed Area was as a hedge against uncertainty concerning assessment and management of halibut in the Bering Sea. Since 1998, the Commission has accumulated sufficient data and has been able to generate stock assessments for the Bering Sea with considerably greater confidence than was possible in 1998. Therefore, the staff no longer sees a purpose for the Closed Area as such a guard against uncertainty.

Halibut bycatch mortality is currently managed through Prohibited Species Caps for various directed fisheries, often with particular time and area specificity, and the IPHC Closed Area plays no role in the management of bycatch. Therefore, from a halibut assessment and management perspective, the staff perceives no continued purpose in maintaining the current Closed Area in the eastern Bering Sea.

Should the Commission choose to open the Closed Area, the staff recommends it be incorporated as part of Area 4E and, since the data from the Closed Area are already included in the assessment, that there be no changes to the catch limit assigned to Area 4CDE. This would also not require any action on the North Pacific Fishery Management Council's Catch Sharing Plan for Area 4CDE.

Reference

Trumble, R.J. 2009. Evaluation of the maintaining the IPHC Closed Area in the Bering Sea. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2008: 243-248.

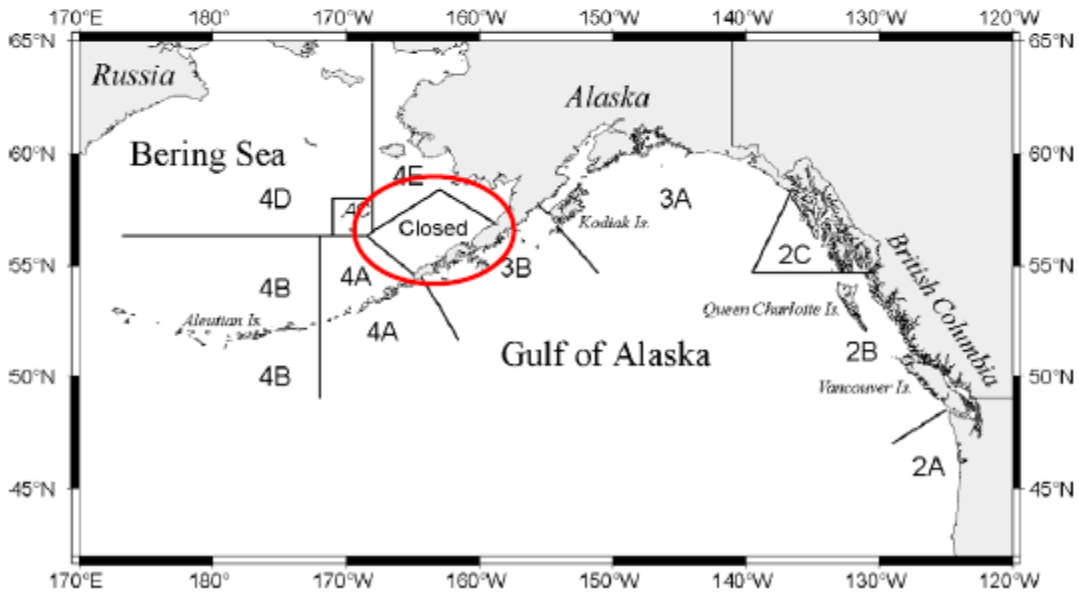

Figure 1. Eastern Bering Sea Area currently closed to halibut fishing.

APPENDIX IV

COMMISSIONERS:

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JUNEAU, AK

DAVID BOYES
COURTENAY, B.C.

RALPH G. HOARD
SEATTLE, WA

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OTTAWA, ON

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA

AND THE UNITED STATES OF AMERICA

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August 9, 2012

Mr. Eric Olson, Chair
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501-2252

Dear Eric,

The Commission has been contemplating potential actions on the Closed Area (CA) on the Bering Sea shelf. The CA was created by the Commission in 1967 to protect a nursery area for juvenile halibut from mortality arising through bottom trawling by foreign fishing vessels. Bilateral agreements between the U.S. and foreign governments led to fishery closures which included the IPHC CA. Throughout the late 1960s until the early 1970s, the CA provided significant protection for juvenile halibut, with bycatch mortality dropping to an estimated low of approximately 4.2 Mlb in 1985. However, with the Americanization of the fishery after extension of fisheries jurisdiction in 1977, the bilaterally-based closed areas were reopened and the IPHC's intent of protection for juvenile halibut afforded by the IPHC CA was lost. Mortality on halibut again increased substantially in the 1985-1991 period, reaching a peak of approximately 10.7 Mlb in 1992. Bottom trawling within the CA accounts for a significant proportion of the halibut mortality in the Bering Sea. The CA currently remains open to all fishing except directed commercial halibut longline fishing.

Halibut bycatch mortality is currently managed through Prohibited Species Caps for various directed fisheries, often with time and area specificity, and the IPHC CA plays no meaningful role in the management of bycatch mortality. Therefore, from a halibut assessment and management perspective, the Commission is reviewing the continued purpose in maintaining the current CA in the eastern Bering Sea. As part of this discussion, the Commission is considering how directed commercial halibut fishing within the area of the current CA would be managed under the Council's IQ framework.

Although the Commission has treated Area 4CDE as a single management unit since 1998, the Council uses a Catch Sharing Plan to divide the IPHC catch limit for Area 4CDE into individual catch limits for Areas 4C, 4D, and 4E, for domestic allocation purposes. Should the Commission choose to open the CA, the IPHC staff has recommended it be incorporated as part of Area 4E and, since the data from the CA are already included in the stock assessment and catch limit determination, that there be no changes to the catch limit assigned to Area 4CDE. However, the Commission seeks the Council's comments on whether it perceives a requirement for any action to the Council's Catch Sharing Plan for Area 4CDE, should the CA be opened. The Commission would be grateful to receive your commentary on this issue prior to its Interim Meeting, scheduled for November 28-29, 2012.

Sincerely,

Bruce

Bruce M. Leaman, Ph.D.
Executive Director

cc: IPHC Commissioners

APPENDIX V

North Pacific Fishery Management Council

Eric A. Olson, Chairman
Chris Oliver, Executive Director

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October 19, 2012

Dr. Bruce Leaman, Executive Director
International Pacific Halibut Commission
2320 West Commodore Way, Suite 300
Seattle, Washington 98199-1287

Dear Bruce:

At its October 2012 meeting the North Pacific Council reviewed your letter of August 9, 2012, in which you requested comments on potential IPHC action to open the closed area on the Bering Sea shelf to halibut fishing. The Council acknowledged several points in your letter, specifically that the closed area no longer provides the intended benefits to the halibut stock because of other management measures in place to limit halibut prohibited species catch (or bycatch) in the area and only prohibits the directed commercial halibut longline fishery from fishing in the area. The Council did not identify any allocative impacts of such an action on its Area 4CDE Catch Sharing Plan and supports incorporating the closed area into Area 4E, should the IPHC choose to do so, with the understanding that such an action would not result in an increase in the commercial catch limit for that expanded area. The Council noted that if the IPHC identifies allocative impacts when it reviews the proposal during its Interim Meeting, then the Council would consider those identified by the IPHC during its December 2012 Council meeting. This timeline would allow for additional Council comments prior to any action by the IPHC at is January 2013 Annual Meeting.

Jane DiCosimo will represent the Council at the 2012 IPHC Interim Meeting to provide additional details as requested on the status of this and other Council actions.

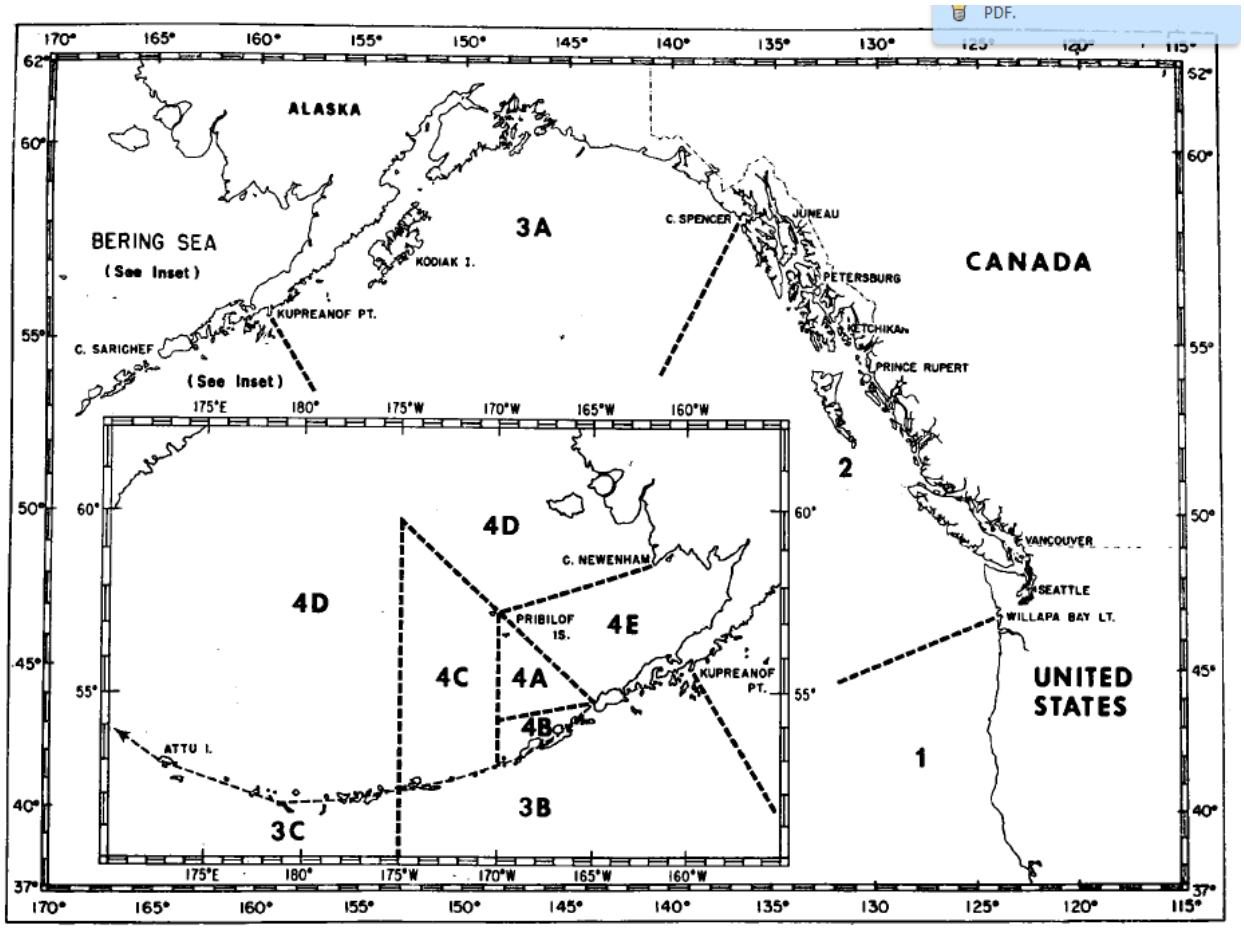
Sincerely,

Chris Oliver
Executive Director

APPENDIX VI

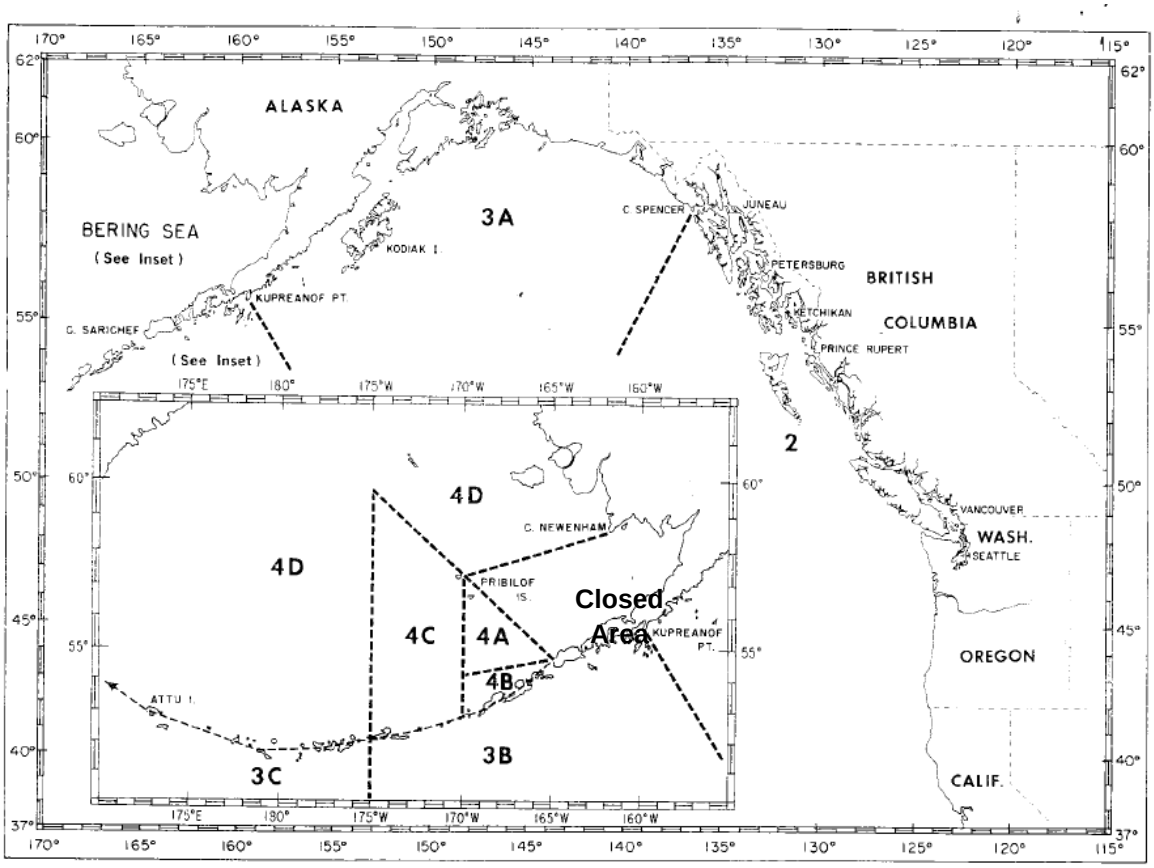
Maps and regulations showing closed area changes between 1966 -1967 and 1989-1990. 2016 remains the same as 1990 and is displayed for reference.

1966



Pacific Coast of North America showing the 1966 regulatory areas as defined by the International Pacific Halibut Commission

1967



Pacific Coast of North America showing the 1967 regulatory areas as defined by the International Pacific Halibut Commission

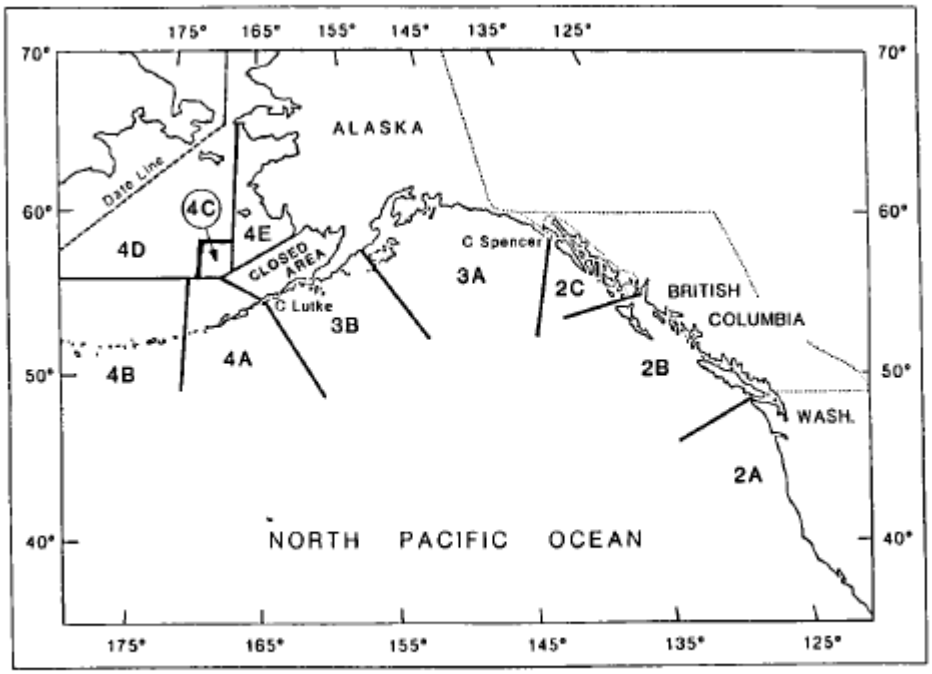
1967 IPHC Regulations

Section 4. Closed Nursery Grounds

(a) The following area in southeastern Bering Sea has been found to be populated by small, immature halibut and is designated as a nursery ground and closed to halibut fishing, and no person shall fish for halibut in such area, or shall have halibut in his possession while fishing for other species therein, or shall have halibut in his possession therein except in the course of a continuous transit across such area.

(b) The southeastern flats in Bering Sea shall include all the waters within the following boundary: from Cape Sarichef Light at the western end of Unimak Island, which light is approximately latitude 54° 36′ 00″ N., longitude 164° 55′ 42″ W.; thence to a point northeast of St. Paul Island, approximately latitude 57° 15′ 00″ N., longitude 170° 00′ 00″ W.; thence to Cape Newenham, which cape is approximately latitude 58° 39′ 00″ N., longitude 162° 10′ 25″ W.; thence easterly and southerly along the Alaska coastline to Cape Kabuch Light at the head of Ikatan Bay, which light is approximately latitude 54° 49′ 00″ N., longitude 163° 21′ 36″ W.; thence to the point of origin at Cape Sarichef Light.

1989



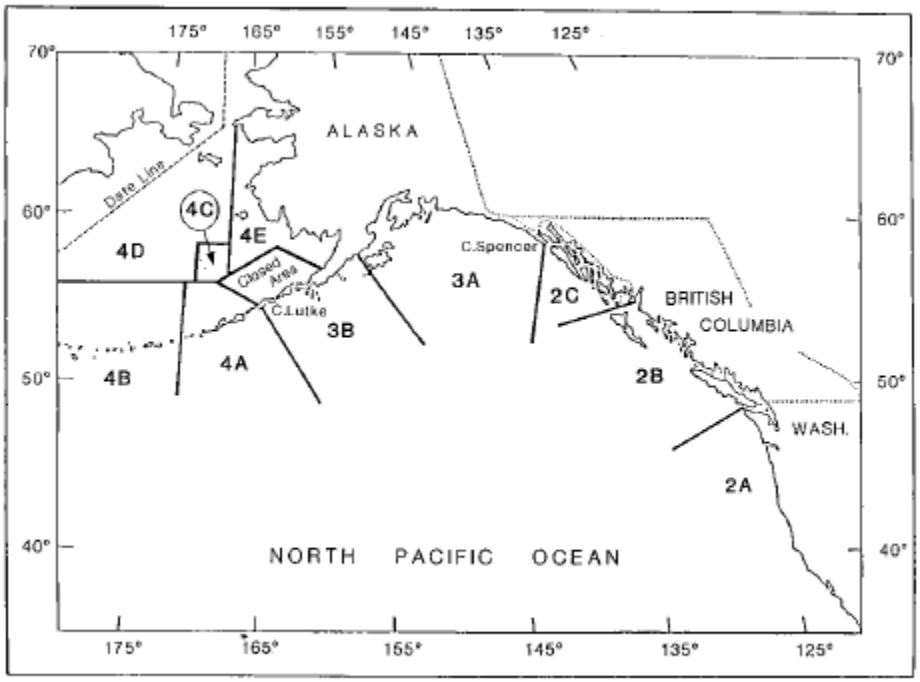
Regulatory areas for the Pacific halibut fishery.

1989 IPHC Regulations

Closed Area

8. All waters in the Bering Sea that are east of a line from Cape Sarichef Light (latitude 54°36′00″ N., longitude 164°55′42″ W.) to a point at latitude 56°20′00″ N., longitude 168°30′00″ W., south of a line from the latter point to Cape Newenham (latitude 58°39′00″ N., longitude 162°10′25″ W.) and north of latitude 54°49′00″ N. in Isanotski Pass are closed to halibut fishing and no person shall fish for halibut therein or have halibut in his possession while in those waters except in the course of a continuous transit across those waters.

1990



Regulatory areas for the Pacific halibut fishery.

1990 IPHC Regulations

Closed Area

8. All waters in the Bering Sea north of latitude 54°49′00″ N. in Isanotski Strait that are enclosed by a line from Cape Sarichef Light (latitude 54°36′00″ N., longtitude 164°55′42″ W.) to a point at latitude 56°20′00″ N., longitude 168°30′00″ W.; thence to a point at latitude 58°21′25″ N., longitude 163°00′00″ W.; thence to Strogonof Point (latitude 56°53′18″ N., longitude 158°50′37″ W.); and then along the northern coasts of the Alaska Peninsula and Unimak Island to the point of origin at Cape Sarichef Light are closed to halibut fishing and no person shall fish for halibut therein or have halibut in his possession while in those waters except in the course of a continuous transit across those waters.

2016

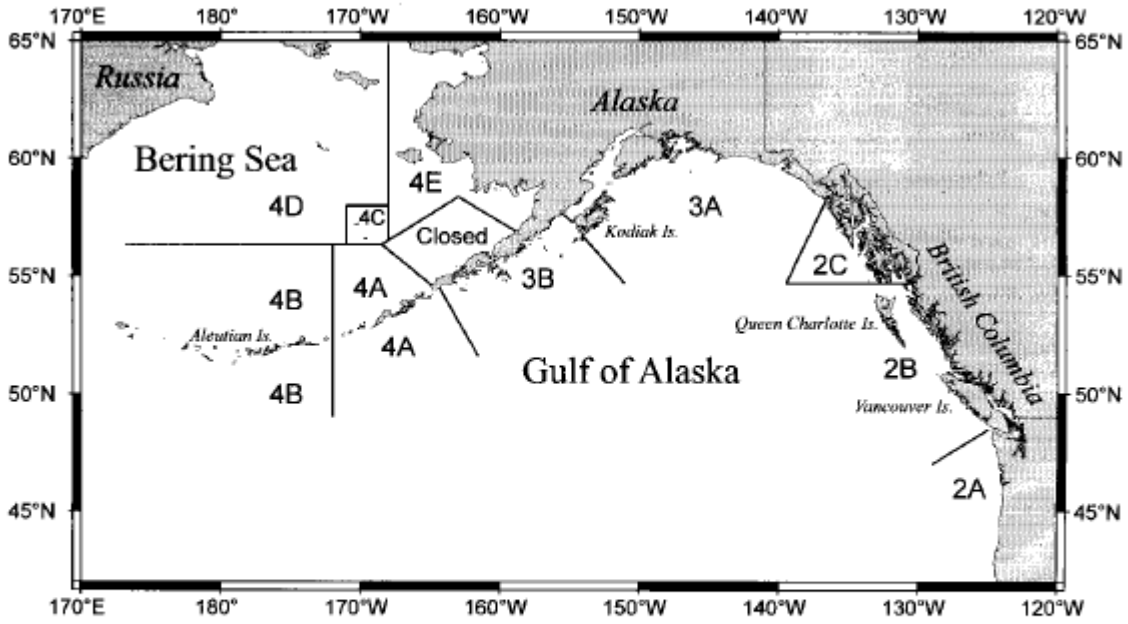


Figure 1. Regulatory areas for the Pacific halibut fishery.

2016 IPHC Regulations

10. Closed Area

All waters in the Bering Sea north of 55°00′00′′ N. latitude in Isanotski Strait that are enclosed by a line from Cape Sarichef Light (54°36′00′′ N. latitude, 164°55′42′′ W. longitude) to a point at 56°20′00′′ N. latitude, 168°30′00′′ W. longitude; thence to a point at 58°21′25′′ N. latitude, 163°00′00′′ W. longitude; thence to Strogonof Point (56°53′18′′ N. latitude, 158°50′37′′ W. longitude); and then along the northern coasts of the Alaska Peninsula and Unimak Island to the point of origin at Cape Sarichef Light are closed to halibut fishing and no person shall fish for halibut therein or have halibut in his/her possession while in those waters except in the course of a continuous transit across those waters. All waters in Isanotski Strait between 55°00′00′′ N. latitude and 54°49′00′′ N. latitude are closed to halibut fishing.