ALASKA CRAB COALITION

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October 20, 1994

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F/V ZOLOTOI

DATE: October 19, 1994

TO: Mr. Rick Lauber, Chairman
North Pacific Fishery Management Council
P.O. Box 103136
Anchorage, AK 99501

FROM: Gordon Blue
managing partner,
F/V ZOLOTOI
F/V OCEAN CAPE

RE: AGENDA ITEM D-3 (b) BERING SEA / ALEUTIAN ISLANDS GROUNDFISH AND BYCATCH SPECIFICATIONS FOR 1994: THE NEED FOR EMERGENCY TIME AND AREA CLOSURES IN THE GROUNDFISH FISHERIES TO PROTECT RED KING CRAB STOCKS.

Despite responsive management of the directed fishery for Red King Crab in Bristol Bay that seeks to identify and eliminate problems arising from prosecution of the directed fishery, the stocks of Red King Crab in the area remain troubled. (See Table I)[1]. This year there is a total closure of directed fishing for Red King Crab in Bristol Bay area. This results from failure of the NMFS survey to find enough Female King Crab to meet the statutory minimum number required for a directed fishery on mature males to open.

One suggested approach to solving this problem has been to lower the threshold on Female King Crab abundance. Justification is based on the perception that removals from these stocks due to fishing are minor. This is a grave misperception that is based on the notion that observed bycatch rates in the bottom trawl fisheries in Areas 511 and 516 have been accurately related to mortalities actually experienced in these fisheries. In fact, these mortalities are an order of magnitude greater than has been appreciated. The assertion that unobserved collateral mortality of Red King Crab in bottom trawling is very much greater than observed bycatch mortality effects can obviously not be proven by observer data, however other data streams can throw some light into this area.

Table II compiles data from several NMFS Publications [2,3,4]. For each year in which the total catch of OTHER FLATFISH (including catch of ROCK SOLE) rises above Fifty-thousand tons the coincident abundance of SMALL FEMALE RED KING CRAB is drastically depressed. Such coincidence cannot prudently be ignored.

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The highlight of Table II offers direct evidence of the unobserved destruction of millions of animals, rather than the 200,000 assumed by the (overattained) observed bycatch cap.

The "Large Female Red King Crab" is 3.5 inches or greater carapace width and typically six years old. At this size, 50% are capable of producing viable clutches of eggs. Female Red King Crab may have a mean life expectancy of ten years[5]. Small female Red King Crab (less than 3.5" width) that survive this long, will begin producing eggs in 1 to 6 years (depending on age at time of survey), and those eggs may produce males that will recruit to the directed fishery six or more years later. Removal of this one small female Red King Crab will cast a reproductive penumbra over the next 7 to 10 years.

The impact of trawl gear on nursery areas causes the removal from stocks of millions of animals above all other causes of mortality. This can be expected to result in the long- term decline and failure of the directed fishery without clear correlation of the decline in mature male stocks (Directed Fishery Target) to the factor responsible.

Table II also shows the effects of the "Other Flatfish" fisheries on Small Male Red King Crab to be of large significance. Figure 1 shows distribution of population of Bristol Bay Red King Crab and identifies areas of larval settlement and juvenile migration[6] that are particularly fragile, and are not protected by bycatch caps, since most trawl interaction with these stocks goes unobserved - they are too small to be retained in proportion to the numbers affected.

Figure 2 is a synopsis of bycatch from several sources. "Hot spots" of high observed bycatch of Red King Crab (2.5 or more crab/ton) for 1990- 93[7], are outlined in yellow. "Hot spots" identified for 1992-94 by industry participants as areas of "voluntary closurein 1995"[8] are outlined in red. Areas of bycatch of 2.5 or more crab/ton[9] for 1982- 89 as compiled by NMFS in efforts to limit bycatch in trawl fisheries are noted by year and outlined in blue in the affected blocks. The area 512 trawl closure established to protect King Crab stocks in 1986, is outlined in orange.

These areas of "hot spots" for bycatch are shrinking with time. The diminishing bycatch areas result from diminishing standards and diminishing stocks, rather than through effective bycatch mitigation. It is unacceptable to limit bycatch by eliminating the species bycaught from an area. This is in danger of accomplishment if present practice continues.

Since abundance of small Red King Crab appears to rise as effort in Other Flatfish diminishes, constraining the catch at some number smaller than 50,000 tons may be sufficient to protect Red King Crab stocks. This raises the issue of the effect on Small Red King Crab stocks of predation by Flatfish. Small King Crab use podding behavior to defend against predation. (See p.10.) Bottom trawls disrupt these pods, scattering and injuring the crab and increasing the opportunity for predation. The single recent occurrence of a catch of less than 50,000 tons in a year of high Flatfish stocks is 1990, and the abundance of small female Red King Crab appears to have increased in that year. This is only a single point and not conclusive in itself, since the data does show variation within the very clear population trend. It has been suggested that some benefit to crab stocks could accrue from properly timed seasons for Other Flatfish. However, market forces determine the interest of a fleet in prosecuting a fishery, not biological considerations of predator- prey relationship. The present Rock Sole fishery is a roe fishery: the carcass of the female is used to package the roe and males and small females are discarded. The roe bearing season is of short duration and occurs at the precise time when King Crab stocks are most vulnerable, due to their molt. This wasteful frenzy intensifies as the end of the roe bearing period (i.e. spawning) approaches, and King Crab bycatch rises, year after year, far above the cap. Fishery managers are unable to gather and process data quickly enough to prevent this.[a]

Fishery managers in our system can constrain a fleet from fishing, they cannot compel a fleet to fish. The only viable tool managers have to protect juvenile and other Red King Crab from decimation by bottom trawling, is to protect the critical areas of habitat by closure to trawling.

This is a well understood process. Beginning in 1964, Japanese and Soviet trawl fisheries were excluded from areas of Bristol Bay. Figure 3[10,11] shows the evolution of these closures. Overall abundance of Red King Crab in the Eastern Bering Sea increased while the closures continued in place.

In a November 1977 paper titled "Alaska Shellfish Regulations: Present Impacts on Fishery Participants" Professors Katz and Bledsoe discussed ramifications of the Americanization of the groundfish fishery then nascent. They remarked: "The crabs congregate in well established breeding grounds, during their annual molting- breeding season, and are highly vulnerable to trawl damage at those times due to their soft shell condition. Should an active [domestic] groundfish fishery develop, these grounds are almost certain to be closed to trawling..."[12] They neither appreciated the need to protect small King Crab from trawling at all times of the year, nor did they sufficiently appreciate the strength of the impulse to Americanize groundfish. In 1981 NMFS relaxed these prohibitions in favor of US - Soviet Joint Venture Fishermen trawling for sole in the Bristol Bay area. This damage was reduced by Council action in April 1986, with the adoption of Amendment 10 establishing the present No-Trawl Zone, in Area 512.

It is necessary to the long- term health of the Bristol Bay Red King Crab stocks that the Council act now to protect the vulnerable stocks in area 516 and near shore in area 511 by an immediate, total closure of these areas to trawling, particularly in the Other Flatfish category, including Rock Sole and Flathead Sole. The area of sensitivity is well documented and is equivalent to the area of greatest extent protected from foreign trawling prior to Magnuson, as shown in Figure 3.

[a] cf. **Cotter, Larry,** The Pacific Associates, Discards in the Groundfish Fisheries of the Bering Sea/Aleutian Islands & The Gulf of Alaska During 1992, May 1993, also revised 1994.

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TABLE I: Historic King Crab Catch

	YEAR	CATCH (THOUSANDS OF POUNDS)
STOCKS/NURSERIES PROTECTED	1975	51,326.2
	1976	63,919.7
	1977	69,967.8
	1978	87,618.3
	1979	107,828.0
	1980	129,948.5
TRAWL CLOSURE LIFTED	1981	33,591.4
	1982	3,001.2
	1983	CLOSED
	1984	4,182.4
	1985	4,174.9
AMENDMENT 10	1986	11,393.9
	1987	12,289.1
	1988	7,387.8
	1989	10,264.8
	1990	20,362.3
	1991	17,177.9
	1992	8,043.0
	1993	14,600.0
	1994	CLOSED

TABLE II: Other Flatfish Catch & Red King Crab Abundance
Eastern Bering Sea

YEAR	OTHER FLATFISH CATCH (thousands of tons) (1) (includes ROCKSOLE)	RED KING CRAB (millions of crab) ABUNDANCE ESTIMATES (2) SMALL Female	LARGE Female	SMALL Male	MED Male	LARGE Male
1960						
1961						
1962						
1963	35,643					
1964	30,604					
1965	11,676					
1966	24,864					
1967	32,109					
1968	29,647					
1969	34,749	18.3	28.5	41	20.3	9.8
1970	64,690	4.3	13	9.5	8.4	5.3
1971 *	92,452	NA	NA	NA	NA	NA
1972	76,813	7	12.1	14.1	8	5.4
1973 *	43,919	24.8	76.8	50	25.9	10.8
1974 *	37,357	37.7	72	59	31.2	20.9
1975	20,393	70.8	58.9	84.9	31.7	21
1976	21,746	35.9	71.8	70.2	49.3	32.7
1977	14,393	33.5	150.1	80.2	63.9	37.6
1978	21,040	38.2	128.4	62.9	47.9	46.6
1979	19,724	45.1	110.9	48.1	37.2	43.9
1980	20,406	44.8	67.6	56.8	23.9	36.1
1981	23,428	36.3	67.3	56.6	18.4	11.3
1982	23,809	77.2	54.8	107.2	17.4	4.7
1983	30,454	24.3	9.7	43.3	10.4	1.5
1984	44,286	57.6	17.6	81.8	12.6	3.1
1985	71,179	6.9	6.8	13.7	10.1	2.5
1986	76,328	4.5	5.4	11.8	12.3	5.9
1987	50,372	16.8	18.3	20.1	12.6	7.9
1988	137,418	2.7	15.7	8.5	6.4	6.4
1989	63,452	4.4	16.9	8.6	9.4	11.9
1990	22,568	7.2	17.5	8.2	10.2	9.2
1991	77,082	4.7	12.6	8.1	6.4	12
1992	86,477	2.2	13.4	7	5.5	5.8
1993	92,754	2.5	19.2	5.7	10.2	9.8
1994						

(1) SAFE Report, 9/94
BSAI Plan Team
Table 2, pp 22-3.

(2) NWAFC Processed Report 90-09 & AFSC Processed Report 93-14
Reports to the Industry on the 1990 and 1993 Eastern Bering Sea Crab Surveys
Table 1. Page 5

* 90-09 notes that 1971 survey was limited, not used for population estimates, and that 1973 & 1974 estimates are "considered unreliable."

FIGURE 1: Distribution of Bristol Bay Red King Crab Federal Fishing Areas Superimposed

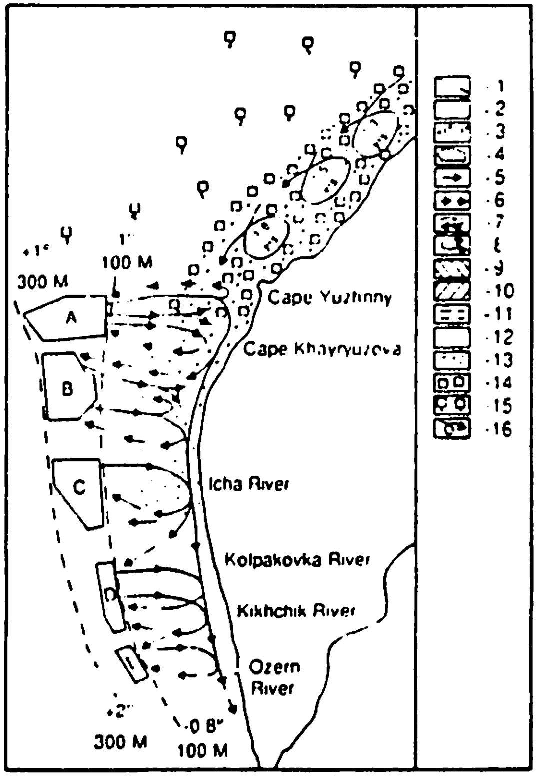


Diagram of the distributional structure of the West Kamchatka red king crab population. 1. isobaths, 2. currents, 3. bottom water temperature in the overwintering area, 4. overwintering area of subpopulations: A and B - Khayryuzovskiy independent; C - Ichinskiy semi-independent, D - Kolpakovskiy and Kikhchiskiy dependent; E - Ozernovskiy pseudopopulation; 5. spring spawning migration, 6. fall migration to the winter habitat, 7. migrational links between subpopulations, 8. individual pods of adult males, 9. summer distribution of adult males (frequency of 1-23 individuals per catch), 10. egg bearing females, 11 undersize males, 12. pelagic larvae rarely seen, 13. concentrations of zoea stages I and II, 14. drift and concentrations of zoea III and IV, 15. larval settlement zone, 16. migration of juveniles of age 1-8.

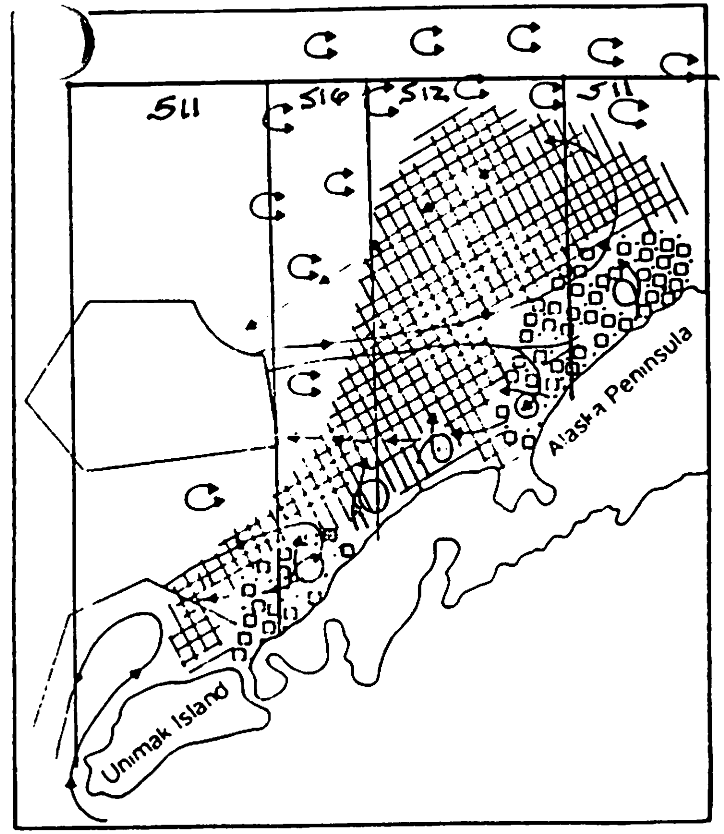


Diagram of the distributional structure of the Bristol Bay red king crab population. Symbols same as in Figure←

During winter the Bristol Bay crab populations concentrate in the southern regions of Bristol Bay at depths of 80-90 m where water temperatures are about 3-4°C. Adult males often occupy different habitats from females and juveniles during this period. In April, as in West Kamchatka, depending on the extent of the cold intermediate layer, the crab begin their spring migration to the shallow areas of Bristol Bay. However, in contrast to the adult crab of the West Kamchatka population, a portion of the males molt during winter, remain in the overwintering region and forage.

During May when the females are migrating to the shallow regions of Bristol Bay, the larvae are released, and some individuals have already molted at this time and carry new eggs under the abdomen The juvenile crabs of this population are widely distributed over the whole bay During June they inhabit areas with bottom water temperatures of 2-4°C. and 3-7°C in August (Rodin, 1970). During the summer in Bristol Bay there is a gradual decrease in the abundance of females and juvenile males from the open areas of the bay to the shore Beginning in September and early October, decreasing water temperatures lead to redistribution and migration of the crab to their overwintering habitat (Fig

FIGURE 2: Areas of High Observed Bycatch Red King Crab taken in "Flatfish Trawl" Fishery

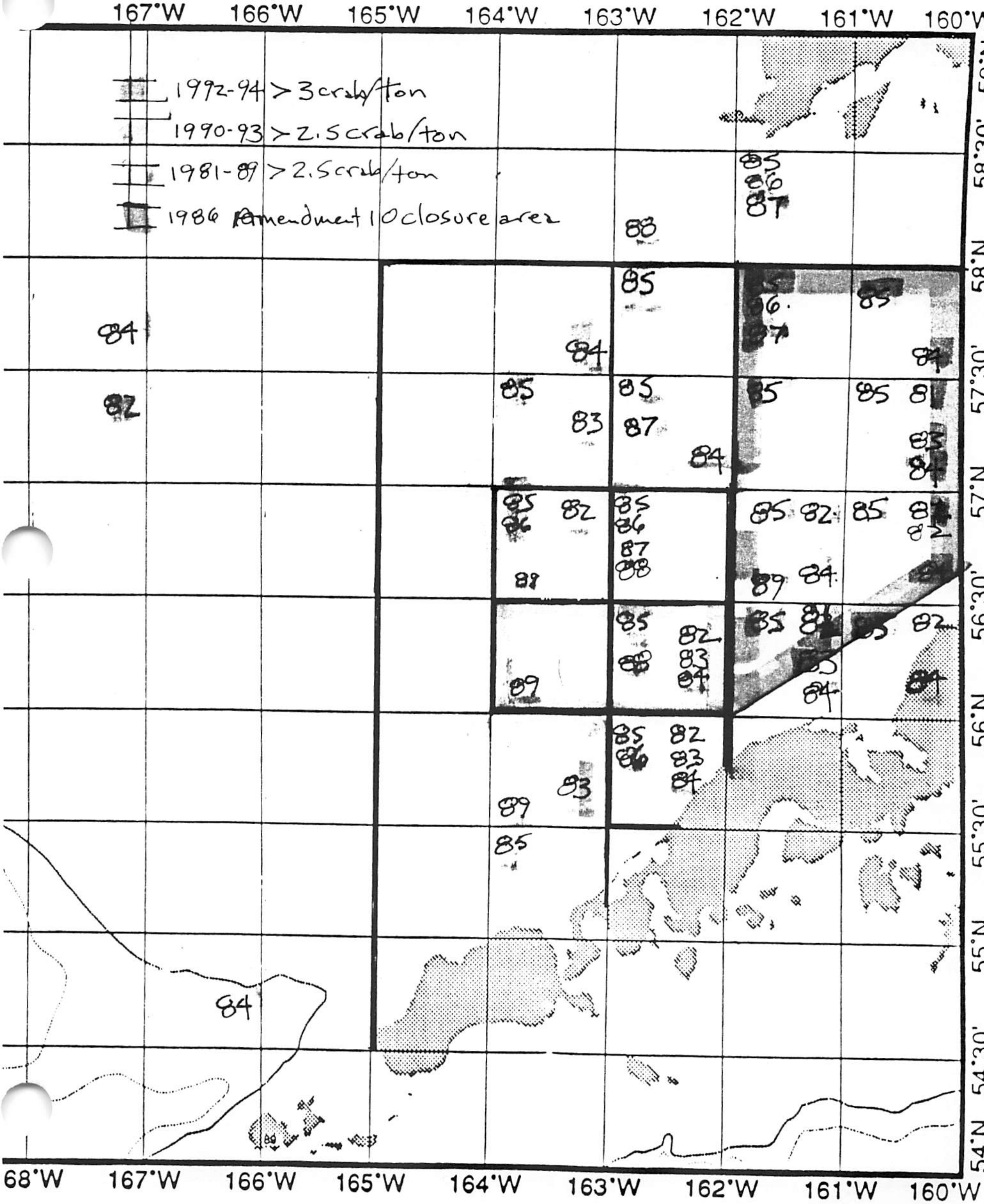
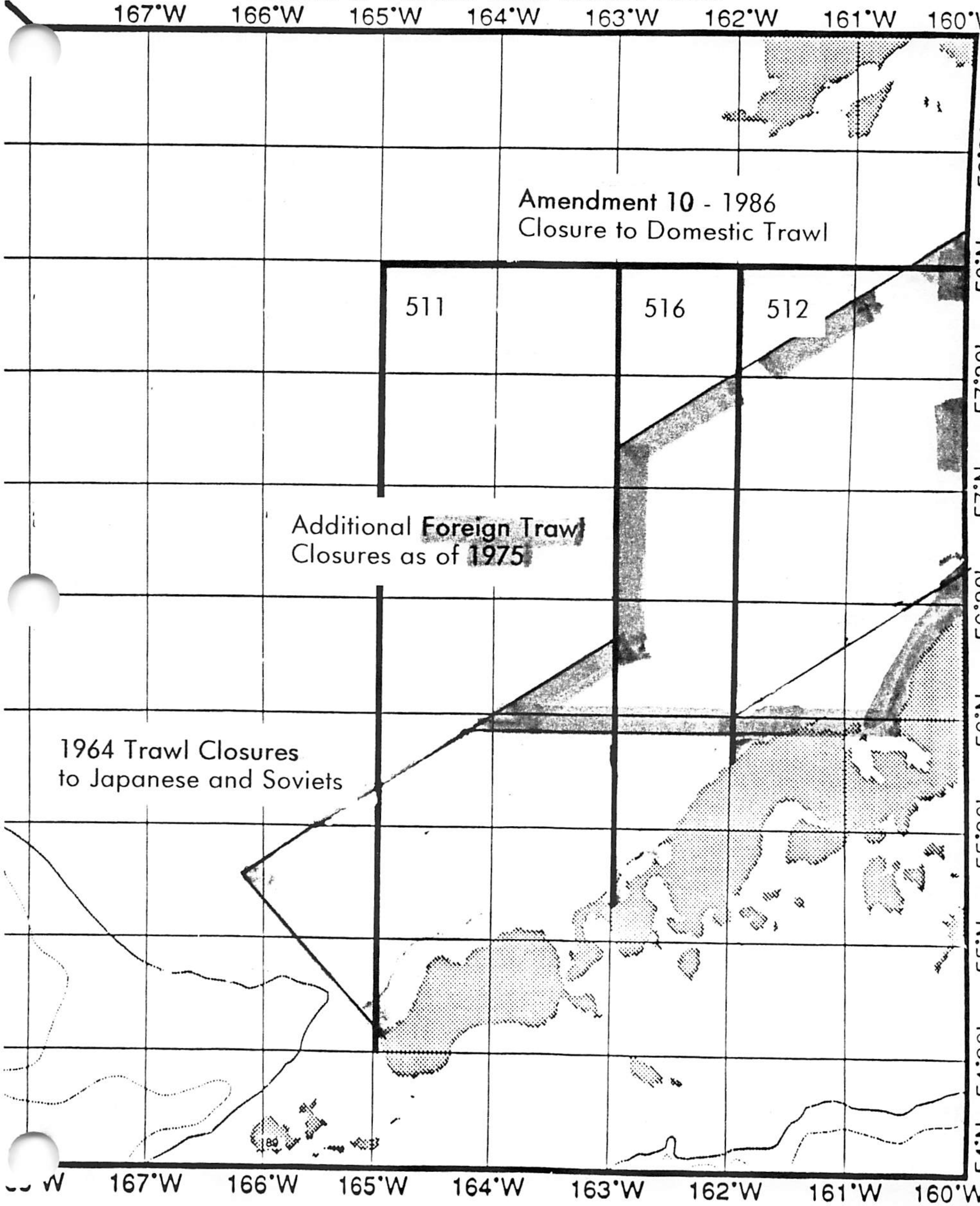


FIGURE 3: Historic Trawl Closure Areas



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NWAFC PROCESSED REPORT 88-23

REPORT TO INDUSTRY ON THE 1988 EASTERN BERING SEA CRAB SURVEY

OCTOBER 1988

Cover--Resting red king crab pod shortly before breakup on 12 February 1988, approximately 1 hr after sunset. Shortly after this photograph was taken, the pod dispersed into its nocturnal foraging pattern. Photograph by C. Braxton Dew.

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All data herein are to be considered provisional.