



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

March 16, 2005

Mr. Ben Enticknap
Fishery Project Coordinator
Alaska Marine Conservation Council
Box 101145
Anchorage, Alaska 99510

Dear Mr. Enticknap:

Thank you for your most recent letter regarding the effects of bottom trawling on Essential Fish Habitat for Bering Sea crabs, and particularly red king crabs (RKC). We appreciate your continued interest in this issue, and the enclosed document responds to each of your specific points. While we understand your concerns, we note the longstanding involvement of the North Pacific Fishery Management Council, its plan teams, and the National Marine Fisheries Service in adopting area closures to protect RKC. Dew and McConnaughey's hypothesis regarding the decline in RKC is interesting, but their work has not fully taken into account the history of management efforts that are far more relevant to the current distribution of RKC brood stock. The distribution of female RKC is only one facet of the stock's habitat use, and current closure areas are well tailored to RKC life history. Finally, bycatch limits provide some measure of protection to RKC in areas where trawling overlaps with RKC distribution.

The National Marine Fisheries Service encourages an open dialogue with constituents, and we answer technical inquiries to the best of our ability. Also, we recommend that you pursue technical discussions of this nature through participation in meetings of the Council's crab plan team and associated Council meetings. Dialog in those forums may ultimately be more efficient and informative than exchanging letters.

Sincerely,

For
James W. Balsiger
James W. Balsiger
Administrator, Alaska Region

Enclosure

cc: North Pacific Fishery Management Council



**National Marine Fisheries Service (NMFS) Response to Issues Raised in the
February 3, 2005 Alaska Marine Conservation Council (AMCC) Letter Regarding the
Effects of Bottom Trawling on Bering Sea Crab Habitat**

March 16, 2005

1) NMFS has not made a convincing case that the area north of Unimak to Black Hill was not “brood-stock habitat” for Red King Crab (RKC) prior to the 1970s.

In our December 7, 2004 reply to AMCC, we specifically referenced the area “...north of Unimak Island” and stated that “Abundance in the area immediately north of Unimak Island declined drastically in the late 1970s and by 1980 the area north of Unimak Island was no longer a very important area.” The area from Port Moller, north of Black Hill, west to Amak Island and north to approximately 58 degrees north latitude was, and continues to be, a very important portion of the distribution of mature female RKC. The area west of 163 degrees west longitude has been important intermittently and is not currently very important according to the NMFS annual survey (Fig. 1). Over the past five years we note the following:

Percent of females found east of the indicated longitude.

	West Longitude Degrees	Survey Year				
		2000	2001	2002	2003	2004
All females	162	53.3	80.9	77.3	57.8	52.3
	163	98.8	98.5	99.4	90.0	98.3
	164	99.3	98.9	99.4	99.2	98.4
Females	162	53.3	80.9	77.3	57.8	52.3
>89 mm	163	98.8	98.5	99.4	90.0	98.3
Carapace	164	99.3	98.9	99.4	99.2	98.4

For your reference, 162 degrees is just east of Black Hill, 163 degrees is just east of Amak Island and 164 degrees is approximately the longitude of Mt. Shishaldin on the eastern portion of Unimak Island. Since 50% of females are, on average, mature at 88-89 mm carapace length (CL) the distribution of large females (>89 mm CL) above is a reasonable representation of the importance of the area east of 163 degrees as opposed to the north Unimak Island area. This size group also includes the multiparous portion of the stock. While only 32.0% of females >89 mm CL were found by the survey to be east of 163.0 degrees in 1977, this figure increased to 66.1% by 1979 and to 92.5% in 1980 when joint venture fishing began (almost entirely east of 162 degrees). The retreat of mature females from the north Unimak Island area began well before there was significant bottom trawling in the area. During the 1980s the percentage of females east of 163 degrees varied between 83.8 % (1983) and 99.7% (1984). In 1990, 98.6 % of large

females were east of 163 degrees and the percentage was even higher throughout the 1990's. The North Unimak Island area has not included more than 2% of the surveyed population of large females in the past 15 years or been a dominant area relative to the distribution of mature female RKC during the last 27 years.

The 1959 survey information is of interest because that was the year before the Japanese closure first went into effect. Very little groundfish bottom trawling occurred prior to 1959 and the total annual landings of all species of groundfish (excluding halibut) from all areas east of 170 degrees were less than 25,000 tons until 1958 when about 54,000 tons were taken (see INPFC Bull. 37). Available information does not indicate that early Japanese trawling was concentrated in the area north Unimak Island. U.S. trawling for king crab occurred in the eastern Bering Sea (EBS) but much of this effort was east of the North Unimak Island area due to the distribution of the crabs. Both the 1959 survey and Japanese tangle net fishing records indicate that female RKC were not prevalent west of Amak Island in the late 1950s. The 1959 data show that the area north of Unimak Island was not consistently important habitat for adult female RKC even before the advent of significant trawling.

We agree that the 1968 data are interesting, but hasten to note the paucity of females west of 163 degrees in the north Unimak Island area. The current closure areas would provide protection to the vast majority of the mature female distribution in both 1959 and 1968. We understand AMCC's concern relative to sampling in May, but the time of sampling would be a larger problem in judging onshore-offshore distribution than in judging east-west distribution. Spring surveying in 1968 took place from May 1 to June 5 and fall surveying took place from September 18 to October 8. The east-west distribution of the fall sample of 404 large females that were measured was as follows:

Longitude Degrees	% of Females >89 mm CL
160	0.2%
161	24.5%
162	37.6%
163	74.3%
164	84.4%
165	99.5%
166	100.0%

The sampling included many unmeasured females, mostly east of 163 degrees, so the above figures may under-represent the proportion found east of 163 degrees. Thus, the north Unimak Island area was not dominant or primary relative to the distribution of mature female RKC. Distribution in 1968 is quite relevant since larvae produced in that year must have contributed to peaking populations of the 1970s.

The information reported by Wigutoff and Carlson (1950) does show crab females in the North Unimak Island area. However, their data and your Fig. 2 are difficult to use in the evaluation of the east-west distribution of the female spawning stock in 1948 for the following reasons:

- A) Almost all effort was expended south of 56 degrees north latitude and hence precludes comparative analysis relative to the area north of 56 degrees and between 160 and 163 degrees west that has consistently been an important area in the distribution of mature females.
- B) The data are pre-conditioned on directed fishing for males, are not analogous to survey data, and are not likely to be representative of the distribution of females.
- C) Counts of females appear to be approximate as they are numbered by 100s while the males appear to have been counted individually. Of the tows where 500 or more females were reported, more than 80% are rounded to the nearest hundred (i.e., all entries end in 00).
- D) In neither tabular data (Appendix 6A) nor in the text do Wigutoff and Carlson give any indication as to whether the females captured were mature or immature.
- E) Wigutoff and Carlson's tabular data by tow show a total of 1099 tows, of which the first 77 occur in the Gulf of Alaska. Of the 1022 trawl tows that occurred in the EBS your Fig. 2 claims to represent 138 tows. We do not understand which tows you chose or why you consider them to be representative.
- F) The legend within Fig. 2 says April to July, while the figure title indicates July and the stated sample size corresponds to April. We don't know how this is to be interpreted.

The monthly distribution of trawl tows described in Wigutoff and Carlson's report was:

April	138	13.5%
May	466	45.6%
June	389	38.1%
July	29	2.8%

Given your reservations about May sampling in the 1968 data, we do not understand why you find Wigutoff and Carlson's tallies so informative. In any case information from 1948 seems less relevant than data from the past 25 years or the current situation.

We conclude that the portion of the Unimak to Port Moller area east of 163 degrees west Longitude is of primary importance relative to the distribution of female brood stock.

2) NMFS does not provide any rationale for how current bycatch caps and area closures would make it possible for female red king crab to utilize the area north of Unimak Island to Black Hill while high-intensity trawling is occurring there.

High intensity trawling is not occurring throughout the Unimak Island to Black Hill area, and is largely restricted to areas that have been uninhabited by mature females for the past 15 to 25 years (see text below). Additionally, observer monitoring has advanced in recent years.

Observers are placed on EBS trawlers according to the following schedule:

Vessel Length	% With Observers	Comment
< 60 feet	0	Very rare in the EBS
60 – 125	30	CDQ Vessels have 100% coverage
> 125 feet	100	Most EBS trawlers.

Additionally, almost all CDQ vessels carry two observers. Observers sample 50% of tows made on a random basis and do not work set hours. If substantial numbers of crabs migrated into areas that are heavily trawled, they would almost certainly be detected either by observers on trawlers, by the annual survey, or by other observer programs monitoring groundfish pot vessels, crab vessels (ADF&G), and scallop vessels (ADF&G).

The area east of 163 degrees is protected by a combination of seasonal and total closures (all RKC habitat east of 162 degrees from the Alaska Peninsula north to Cape Newenham). The area east of 162 degrees contains the majority of the mature females and almost all of the known inshore early juvenile (1-2 years) nursery areas. Many of these nursery areas, as well habitat for juvenile RKC in general, were totally unprotected by the Japanese trawl closure area later called the pot sanctuary. The trawl closure area was primarily designed to avoid conflicts between fixed gear (Japanese and later Soviet tangle net fishing) and mobile gear (Danish seines, pair trawlers, and stern trawlers). The closure area that is depicted in Figs. 1 and 2 of AMCC's letter was not designed as a conservation measure for RKC stocks or habitat, and simply reflects opinion (circa 1959) as to the distribution of large male RKC and associated tangle net fishing. Given that this closure area has had no operational significance in regulating fishing effort since it was rescinded in 1983, it is largely of historical interest. Present closure areas were designed specifically to protect both the RKC stock and its habitat, beginning in 1987 with the establishment of a year around no trawling zone (area 512 in Fig. 1). An April 15 to June 15 closure in area 516 was added in 1989 to protect adults during the mating and molting period. An additional closure area (stippled in Fig. 1) was added in 1994 in reaction to relatively high RKC bycatch by trawlers in the area. Continued low abundance of RKC in 1994-1995 led to closure of almost all grounds east of 162 degrees to protect nursery grounds and habitat.

The ability of the NPFMC and NMFS to adapt to changing circumstances is clear from the above referenced record of management actions. We recommend you review the paper by Ackely and Witherall, who provide a well reasoned account of the process involved (1999. Development of a Marine Habitat Protection Area in Bristol Bay, Alaska. P511-526 in: Ecosystem Approaches for Fisheries Management. Alaska Sea Grant Program. AK-SG_99_01, p511-526). From our perspective, the existing NPFMC process has worked well. We expect that the NPFMC will continue to recommend that NMFS modify time-area closures if and when various monitoring programs indicate that there is a need to do so.

3) NMFS assertion that the area north of Unimak to Black Hill has not been important red king crab habitat since the late 1970s does not invalidate the hypothesis that trawling in

this region is the mechanism that redistributed the population during the late 1970s and 1980s and continues to inhibit its recovery today.

Many of our comments above address this issue. The hypotheses as stated are not entirely disprovable because we can not collect data in the past. We note that a number of factors may have been involved besides trawling, including possible handling mortality in rapidly expanding crab fisheries, increases in the abundance of known predators and competitors, as well as the natural tendency of large populations to occupy larger ranges than small ones. Oceanographic information suggests that RKC larvae settling in areas west of 164 degrees near Unimak Island may have originated in the eastern Aleutians or Gulf of Alaska where RKC are now in very low abundance, so metapopulation considerations may also be important. In our opinion, the weight of evidence suggests that the female portion of the RKC stock was already starting to vacate the area west of 163 degrees before intensive trawling took place.

4) Bottom trawling in Bristol Bay red king crab brood-stock habitat is not only a bycatch issue; it is an impact to essential fish habitat.

The information provided above demonstrates that relevant areas of king crab habitat are being protected from damage due to trawling. We also point out that bycatch limitations on RKC offer further protection because they limit fishing effort by invoking area closures. Insofar as bottom trawling may have an adverse impact, tanner crab and halibut bycatch limits should be beneficial in reducing bycatch of RKC. For example, in most recent years the bycatch of halibut has been more likely to lead to Area 1 bottom trawl closures than that of RKC. Bycatch limits also allow for observations that might influence management action (per item 3) while limiting direct damage to the stock.