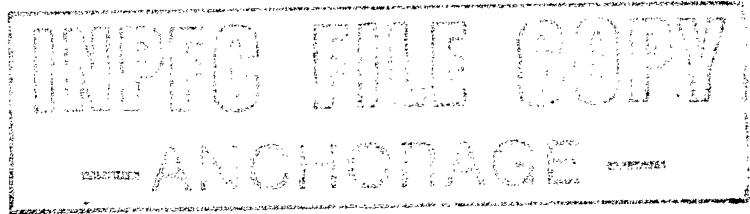


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UNITED STATES CRAB RESEARCH IN THE
EASTERN BERING SEA DURING 1985

by
Bradley G. Stevens

Northwest and Alaska Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
7600 Sand Point Way NE
Seattle, Washington 98112



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CRAB RESEARCH IN THE
EASTERN BERING SEA DURING 1985

Crab research in the eastern Bering Sea (EBS) in 1985 included the annual trawl survey for red king crab (*Paralithodes camtschatica*), blue king crab (*P. platypus*), tanner crabs (*Chionoecetes bairdi* and *C. opilio*) and Korean hair crab (*Erimacrus isenbeckii*). The 1985 EBS trawl survey (June 6 to September 3) was conducted aboard the F/V Argosy (chartered private vessel) and the R/V Alaska (chartered from the University of Washington). This report considers recent trends in abundance which can be referenced to historical trends by comparison with data given in Otto et.al. (1984a). More extensive accounts of the EBS research, that detail comparative fishing power between vessels, the distribution of commercial stocks and trends in size-frequency distributions are given in Otto et.al. (1984b) and Stevens (1985).

1985 Trawl Survey

Areas covered by the 1984 and 1985 surveys were similar and included all commercially important concentrations of crabs in the eastern Bering Sea. The survey consisted of 358 successful trawl tows and covered an area of approximately 132,000 square nautical miles. Sampling procedures were identical to those of previous surveys. Both vessels used an eastern otter trawl with

a 25.3 m headrope and 34.1 m footrope (see Wathne 1977). Survey data were analyzed using the "area-swept" technique (Alverson and Pereyra 1969) and stratified random sampling (Cochran 1963) to provide estimates of stock abundance. Analysis of relative fishing power between vessels indicated that catch rates were similar. We assumed that the trawl caught all crabs in its path. Estimates of stock abundance are, hence, considered an index because actual gear efficiency is unknown.

Abundance of King Crabs

Red King Crab

Estimated abundance for all size-sex groupings decreased from 1984 levels (Table 1), but decreases were statistically significant ($P < 0.05$) only for juvenile (< 110 mm) males and all females. The abundance of legal males, although stable remains low in a historical sense. The abundance of females above the median size at maturity (89 mm) is now at its lowest recorded level.

Blue King Crab

The abundance of Pribilof District blue king crab (Table 1) has been declining since 1981. While female abundance has been more stable during this period than male abundance, statistically significant ($P < 0.05$) declines occurred from 1983 to 1984 and from 1984 to 1985. Declines in male abundance for all size groups occurred but were not statistically significant. All segments of the population are at their lowest recorded levels.

In the Northern District, declines in the abundance of all size/sex groups occurred but were not statistically significant ($P < 0.05$). All segments of the stock are now at their lowest recorded levels.

Abundance of Tanner Crab

C. bairdi

While there is some evidence for separate stocks of *C. bairdi* in the Bering Sea (Somerton 1981), they are currently managed as a single unit. We have, however, presented separate population estimates for historical reasons (Table 2).

In southern districts (south of 58° N.) and the Northern District, significant ($P < 0.05$) declines in abundance over the past year occurred for small (< 85 mm) males, intermediate (85-129 mm) males and all females (Table 2). The abundance of large males and females also declined but this decline was not statistically significant. Due to the scarcity of small crab we expect a continued decline in abundance.

C. opilio

The population of *C. opilio* in the Bering Sea is immense and ranges from the Bering Straits to Unimak Island. Clines in average size and reproductive parameters are gradual and continuous and not indicative of separate stocks. Separate descriptions of abundance in the northern and southern districts are given below for historical reasons (Table 2).

The abundance of small (<110 mm) and large (>109 mm) males and small (<65 mm) and large (>64 mm) females declined significantly ($P < 0.05$) in the southern districts. In the Northern District, significant declines occurred in all size/sex groups. It is worth noting that although legal minimum size is 78 mm, recruitment to the fishery currently takes place at 95 to 100 mm and that most of the catch consists of crab larger than 109 mm.

Abundance of Korean Hair Crab

Korean hair crab occurred from the Pribilof Islands area to the north side of the Alaska Peninsula and into Bristol Bay. The distribution of large males shows a major center of abundance in the Pribilof Island area and a minor one just north of the Alaska Peninsula.

The abundance of Korean hair crab declined in all areas for all size/sex groups (Table 3). These declines were not statistically significant but seem to be a continuation of trends observed from 1981 onward. Very few females have been taken during the survey and their abundance estimates have not been meaningful.

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Table 1.--Annual abundance estimates (millions of crabs) for *P. camtschatica* and *P. platypus* in the Pribilof, Bristol Bay and northern Districts from NMFS surveys.

P. camtschatica (Pribilof and Bristol Bay)								
Size ¹	Males			Total	Females			Grand Total
	<110	110-134	>134		<90	>89	Total	
1981	56.6	18.4	11.3	86.3	36.3	67.3	103.6	189.9
1982	107.2	17.4	4.7	129.3	77.2	54.8	132.0	261.3
1983	43.3	10.4	1.5	55.2	24.3	9.7	34.0	89.2
1984	81.8	12.6	3.1	97.6	57.6	17.6	75.1	172.7
1985	13.7	10.1	2.5	26.3	6.9	6.8	13.7	40.0

Limits²

Lower	7.6	7.4	1.9	18.1	2.5	3.5	6.7
Upper	19.7	12.9	3.1	34.5	11.2	10.0	20.6
±%	44	27	25	31	64	48	51

P. platypus (Pribilof)								
Size ¹	Males			Total	Females			Grand Total
	<110	110-134	>134		<90	>89	Total	
1981	4.8	1.4	4.2	10.4	3.4	11.6	15.0	25.4
1982	1.2	0.7	2.2	4.1	0.7	8.6	9.3	13.4
1983	0.6	0.8	1.3	2.8	0.2	9.2	9.4	12.2
1984	0.5	0.3	0.6	1.3	0.3	3.1	3.4	4.8
1985	0.06	0.2	0.3	0.5	0.2	0.5	0.7	1.2

Limits²

Lower	0.0	0.1	0.2	0.3	0.0	0.2	0.2
Upper	0.1	0.3	0.5	0.8	0.4	0.9	1.2
±%	138	68	48	44	128	71	67

P. platypus (Northern)								
Size ¹	Males			Total	Females			Grand Total
	<105	105-119	>119		<80	>79	Total	
1981	1.2	1.8	3.1	6.3	0.0	0.5	0.5	6.8
1982	3.2	2.6	6.8	12.5	0.4	0.7	1.1	13.7
1983	1.8	1.6	3.5	6.9	0.2	2.4	2.7	9.6
1984	1.4	0.6	1.6	3.6	0.2	0.5	0.7	4.3
1985	0.5	0.4	1.1	1.9	0.1	0.2	0.2	2.1

Limits²

Lower	0.2	0.2	0.7	1.3	0.0	0.0	0.0
Upper	0.7	0.5	1.5	2.5	0.2	0.3	0.4
±%	56	47	34	32	200	104	102

¹ Carapace length (mm), categories reflect smaller average size in the Northern and Southern (Pribilof Bristol Bay) Districts from NMFS surveys.

² Mean ± 2 standard errors for most recent year.

Table 2 - Annual abundance estimates (millions of crabs) for tanner crabs in the southern (Pribilof and Bristol Bay) and Northern Districts from NMFS surveys.

<i>C. bairdi</i>								
Size: ¹	Males				Females			Grand Total
	<85	85-129	>129	Total	<85	>84	Total	
Southern:								
1981	106.0	213.2	22.7	341.8	324.2	79.1	403.3	745.1
1982	28.7	99.7	17.4	145.8	126.4	83.6	210.0	355.8
1983	116.0	57.1	11.9	185.0	180.1	45.4	225.5	410.5
1984	65.2	38.1	8.7	112.1	107.0	33.4	140.4	252.5
1985	21.5	17.3	6.0	45.0	24.2	15.6	39.8	84.7
Limits ²								
Lower	13.8	13.5	4.5	35.8	14.8	7.8	26.9	
Upper	29.2	21.2	7.6	54.2	33.5	23.4	52.7	
±%	36	22	25	20	39	50	32	
Northern:								
1981	23.3	24.4	0.4	48.1	51.1	3.9	55.0	103.1
1982	12.6	39.4	2.6	54.5	288.4	15.4	303.8	358.3
1983	17.3	15.7	0.8	33.8	53.0	2.2	55.1	89.0
1984	6.7	8.0	0.3	15.0	13.0	1.0	14.0	29.0
1985	11.3	5.0	0.1	16.4	18.0	0.3	18.3	34.7
Limits ²								
Lower	5.2	2.7	-0.1	10.1	9.2	0.1	9.5	
Upper	17.4	7.4	0.4	22.7	26.7	0.5	27.1	
±%	55	47	200	38	49	62	48	
<i>C. opilio</i>								
Size: ¹	Males			Females			Grand Total	
	<110	>109	Total	<65	>64	Total		
Southern:								
1981	987.0	15.7	1,002.7	1,962.1	129.7	2,091.8	3,094.5	
1982	759.4	10.8	770.1	1,433.9	91.4	1,525.3	2,295.5	
1983	562.0	12.9	574.9	683.1	41.6	724.8	1,299.7	
1984	286.7	54.0	340.6	294.7	36.8	331.5	672.2	
1985	187.5	27.9	215.4	95.5	1.1	96.6	312.0	
Limits ²								
Lower	102.9	22.0	130.2	25.8	0.2	26.9		
Upper	272.1	33.8	300.7	165.2	1.9	166.3		
±%	45	21	40	73	81	72		

Table 2 (Continued)

Northern:							
1981	934.4	6.5	940.9	1,137.4	46.9	1,184.4	2,125.3
1982	1,292.2	10.9	1,303.1	1,036.2	96.9	1,133.1	2,436.2
1983	1,274.0	9.2	1,283.2	1,161.6	15.3	1,176.9	2,460.0
1984	1,030.1	20.0	1,050.0	854.8	5.9	860.7	1,910.7
1985	394.4	12.8	407.2	283.3	1.8	285.1	692.3

Limits²

Lower	246.5	10.2	259.6	132.6	0.6	134.2
Upper	542.2	15.4	554.8	434.0	2.9	435.9
±%	37	20	36	53	65	53

¹ Carapace width.

² Mean ± 2 standard errors for most recent year.

Table 3 - Annual abundance estimates (millions of crabs) for hair crabs (*Erimacrus isenbeckii*) from NMFS surveys, all districts combined.

Size: ¹	Males			Females	Grand
	<90	>89	Total	Total	Total
1981	6.1	15.8	21.8	0.8	22.6
1982	1.3	7.3	8.6	0.3	8.9
1983	0.6	4.1	4.7	0.8	5.4
1984	0.8	2.7	3.5	0.3	3.8
1985	0.5	2.2	2.8	0.2	3.0

Limits²

Lower	0.2	1.3	1.7	0.0
Upper	0.9	3.1	3.8	0.4
±%	66	40	37	83

¹ Carapace width in mm.

² Mean ± 2 standard errors for most recent year.