



**Alaska  
Fisheries Science  
Center**

National Marine  
Fisheries Service

U.S. DEPARTMENT OF COMMERCE

## **AFSC PROCESSED REPORT 2001-07**

### Report to Industry on the 2001 Eastern Bering Sea Crab Survey

December 2001



This report does not constitute a publication and is for information only.  
All data herein are to be considered provisional.

Cover Photo: The carapace of this mature female snow crab, *Chionoecetes opilio*, is covered with the barnacle *Balanus* sp. Crabs rarely have this dense a barnacle covering.

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**Alaska Fisheries Science Center  
Processed Report 2001-07**

**REPORT TO INDUSTRY ON THE  
2001  
EASTERN BERING SEA  
CRAB SURVEY**

**by  
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**December 2001**

## RESULTS OF THE 2001 NMFS BERING SEA CRAB SURVEY EXECUTIVE SUMMARY

This document summarizes data presented in the Report to Industry on the 2001 Eastern Bering Sea Trawl Survey. Numbers presented are indices of population abundance, not necessarily absolute abundance. Percent changes are relative to 2000. GHLs (Guideline Harvest Levels) are for the combined open-access and CDQ fisheries unless otherwise noted. MSST (Minimum Spawning Stock Threshold) levels are established in the plan. For further information, contact Dr. Louis J. Rugolo at 907.481.1715 or Dr. Robert S. Otto at 907.481.1711, NMFS, 301 Research Court, Kodiak, AK 99615.

### Red king crab (*Paralithodes camtschaticus*) Bristol Bay.

Legal males: 5.1 million crabs; 41% decrease.

Pre-recruits: 4.3 million crabs; 41% decrease.

Large Females: 21.2 million crabs; 22% increase.

Status: Abundance of mature and legal males declined sharply owing to mortality, fishery removals, and poor recruitment. Legal male abundance is approximately 68% of the previous 20-year average. Total mature biomass is above MSST, allowing a 10% exploitation rate. Effective spawning biomass and total mature biomass levels are comparable to levels in 2000.

GHL: 7.15 million pounds (3,243 metric tons, t), with 6.614 million pounds (3,000 t) allocated to the open access fishery, and 0.536 million pounds (243 t) to the CDQ fishery. Fishery opened October 15, 2001.

### Red king crab (*P. camtschaticus*) Pribilof District.

Legal males: 1.8 million crabs; 54% increase.

Pre-recruits: 2.5 million crabs; 587% increase.

Large Females: 4.0 million crabs; 549% increase.

Status: Data suggest an increasing trend in abundance of legal males, but caution is urged due to extremely low precision of the estimates. Crabs were highly concentrated. Females are considered to be poorly estimated. Total mature biomass is above MSST; no fishery threshold has been established in the plan.

GHL: Fishery will not open in 2001 due to concerns about incidental blue king crab catch, and to low confidence in the abundance indices.

### Pribilof Islands blue king crab (*P. platypus*) Pribilof District.

Legal males: 0.4 million crabs; 16% decrease.

Pre-recruits: 0.1 million crabs; 48% decrease.

Large Females: 1.6 million crabs; 17% increase.

Status: Male population is 42% of the previous 20-year average. Trends are not easily detectable. Total mature biomass is only slightly (6%) above MSST; the male stock is notably below the fishery threshold definition.

GHL: Fishery will not open in 2001.

St. Matthew blue king crab (*P. platypus*) Northern District.

Legal males: 1.1 million crabs; 29% increase.

Pre-recruits: 0.6 million crabs; 80% increase.

Large Females: 0.2 million crabs; 22% increase.

Status: Legal male population is 47% of the previous 20-year average following a steep decline that began in 1998. Total mature biomass is below MSST; the stock remains in overfished condition. Female abundance is considered poorly estimated due to their preference for inshore rocky grounds which are untrawlable.

GHL: Fishery will not open in 2001.

Tanner crab (*Chionoecetes bairdi*) Eastern District.

Legal males: 6.3 million crabs; 28% increase.

Pre-recruits: 17.3 million crabs; 4% decrease.

Large Females: 13.2 million crabs; 4% decrease.

Status: Legal male population has declined steeply (86%) since 1990, and remains essentially unchanged over the last 5 years. Legal male abundance is 44% of the previous 20-year average. Total mature biomass is below MSST; female biomass is below the fishery threshold. The stock remains in an overfished condition.

GHL: Fishery will not open in 2001.

Snow crab (*C. opilio*) All districts combined.

Large males: 77.5 million crabs; 2% increase.

Pre-recruits: 281.1 million crabs; 114% increase.

Large Females: 1524 million crabs; 3% increase.

Status: Abundance of large males is unchanged and is 46% of the previous 20-year average. Population is experiencing recruitment of crabs to smaller size groups which may yield legal males in several years conditional on losses to mortality and the fishery. Total mature biomass is above MSST and the fishery threshold, but significantly (62%) below the rebuilt threshold.

GHL: 30.82 million pounds (13,997 t), with 28.51 million pounds (12,930 t) allocated to the open access fishery, and 2.31 million pounds (1,048 t) to the CDQ fishery. Fishery will open January 15, 2002.

Hair crab (*Erimacrus isenbeckii*) All districts combined.

Large males: 1.8 million crabs; 58% decrease.

Large Females: Not well estimated.

Status: Legal male population has declined sharply (72%) since 1995 and remains at 49% of the previous 20-year average. Recruitment trends are unclear. The 2000 fishery in the Northern District performed poorly, yet was targeted at a notably larger (2.5-fold) level of large male abundance than that estimated in 2001.

GHL: Fishery will not open in 2001.

# THE 2001 EASTERN BERING SEA SURVEY

The National Marine Fisheries Service (NMFS) conducts an annual trawl survey in the eastern Bering Sea (EBS) to determine the distribution and abundance of crab and groundfish resources. This report summarizes survey results for commercially important crabs. It is intended to aid the fishing industry in locating productive grounds and judging overall availability of various species. Survey-derived data are also used as part of the basis for management decisions. Results are presented for red king crab (*Paralithodes camtschaticus*), blue king crab (*P. platypus*), hair crab (*Erimacrus isenbeckii*), Tanner crab (*Chionoecetes bairdi*) and snow crab (*C. opilio*).

Information on groundfish resources is available from the Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, Washington 98115-0070.

Landing statistics for 2001 are preliminary data obtained from the Alaska Department of Fish and Game (F. Bowers, ADF&G, Dutch Harbor, personal communication). Those needing final statistics should contact ADF&G directly.

## Survey Area and Methods

The 2001 EBS crab survey consisted of 379 bottom trawl tows which covered an area of approximately 139,548 square nautical miles (nmi). Twenty five additional tows were made at the northern end of the standard survey area to assess the size and composition of the snow crab stock in that area. These data are examined separately from the standard population analyses. The survey area (Figure 1) has been standardized since 1990. The extra 25 northern stations are shown in bold. The survey was conducted aboard two chartered vessels, the F/V *Aldebaran* and F/V *Arc-turus*, between May 29 and July 19. The same vessels have been used since 1993. Methodology was identical to that of previous sur-

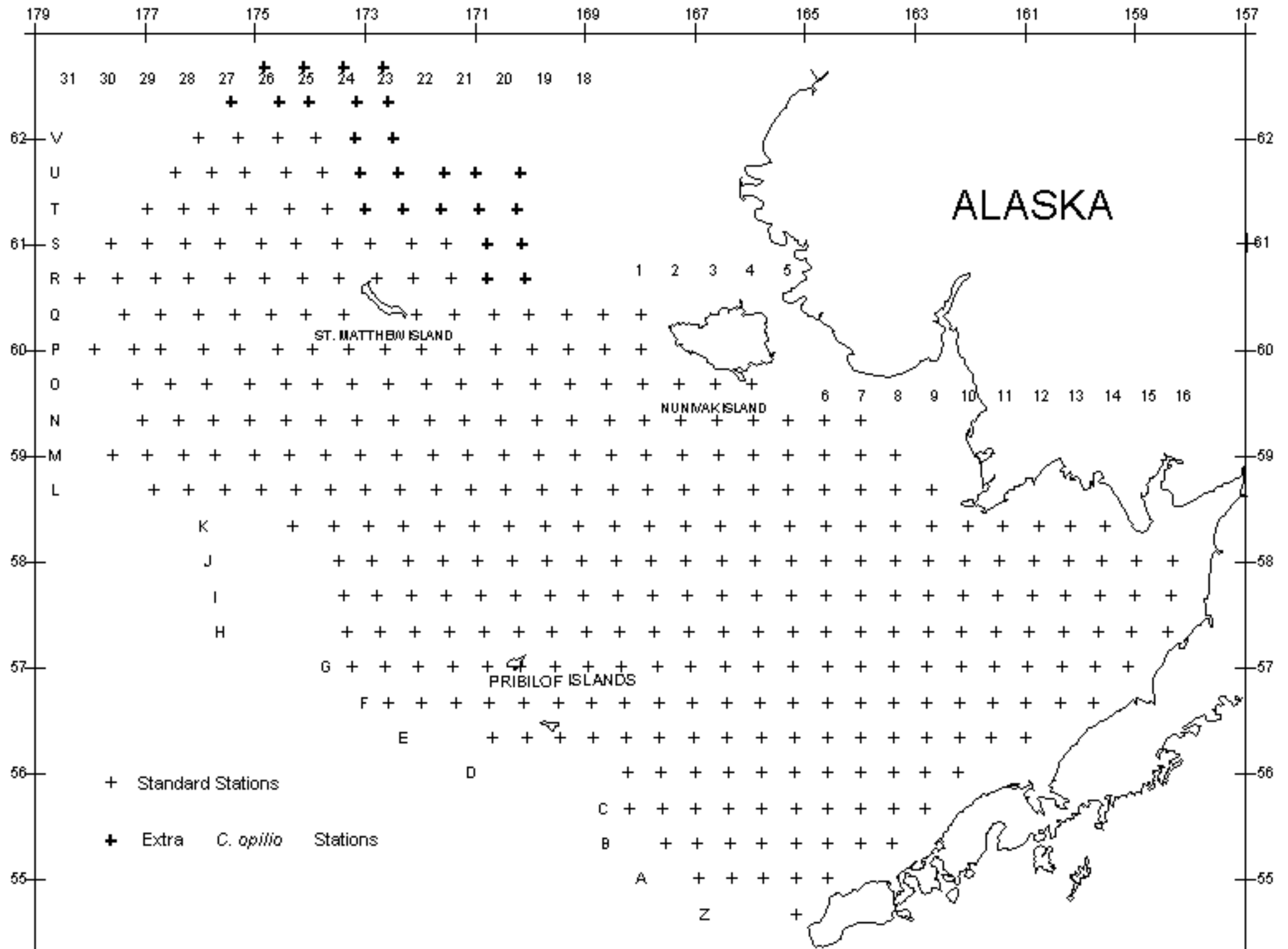
veys, and most tows were made at the centers of squares defined by a 20x20 nmi (37x37 km) grid. Near St. Matthew Island and the Pribilof Islands, additional tows were made at the corners of squares.

Both vessels fished an eastern otter trawl with an 83 ft (25.3 m) headrope and a 112 ft. (34.1 m) footrope. This has been the standard trawl since 1982. Each tow was one-half hour in duration; average length was 1.47 nmi (2.73 km). Crabs were sorted by species and sex, and then a sample of crabs was measured (to the nearest millimeter) to provide a size-frequency distribution. Crab sizes are reported as carapace width (cw) for Tanner, snow and hair crabs, and carapace length (cl) for all others. Procedures for estimating abundance were similar to previous years (see Appendix A). Note that population estimates are indexes and are most precise for large crabs; they may not represent absolute abundance and are least precise for females and small crab due to variance in crab behavior and gear selectivity.

Because of variations in tow length, catches presented in accompanying charts and tables are standardized to the nearest whole number of crab caught per square nmi. Where more than one tow was made in a square (including corner tows), charts indicate average crab density for all tows. Tables 7-11 present data for all tows where a species was caught, without averaging. It is advisable to cross-reference charts and tables.

The following abbreviations are used in the text: (in) inches, (m) meters, (km) kilometers, (mm) millimeters, (fm) fathoms, (lbs) pounds, (°C) degrees Celsius, (nmi) nautical miles, (cl) carapace length, (cw) carapace width, (MSST) minimum stock size threshold, (NPFMC) North Pacific Fishery Management Council, and (MSFCMA) Magnuson-Stevens Fishery Conservation and Management Act. GHL refers to Guideline Harvest Levels which

Figure 1. NMFS eastern Bering Sea crab survey area in 2001.





## Red King Crab Bristol Bay Statistical Area

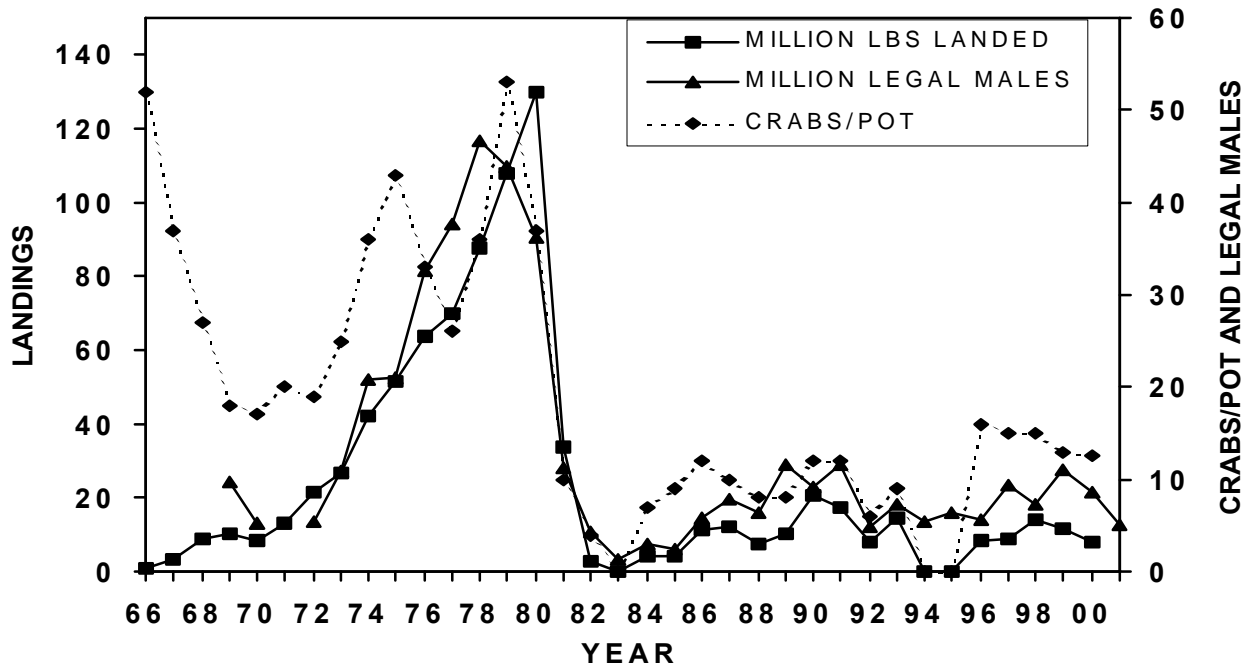


Figure 2. U.S. landings in millions of pounds, CPUE as crabs/pot-lift, and abundance of legal red king crab (*P.camtschaticus*) in millions in Bristol Bay, estimated from NMFS trawl surveys (abundance data include the Pribilof District prior to 1983).

are for the combined open-access and Community Development Quota (CDQ) fisheries. FMP refers to the current (1998) version of the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. Terminology for shell condition categories is explained in Appendix B.

### Distribution and Abundance of Crab Stocks

#### Bristol Bay Red King Crab (*P. camtschaticus*)

Legal-sized ( $\geq 6.5$  in cw or 135 mm cl) male crabs were widely dispersed with no pronounced concentrations (Chart 1 and Table 7). The abundance index of legal male red king crab in the Bristol Bay Registration Area (south of  $58^{\circ}39'N$  and east of  $168^{\circ}W$ ) was 5.1 million (Table 1 and Figure 2). This estimate represents a 41% decrease from last year and is two-thirds of the average for the previous

20 years (7.6 million). The index (4.3 million) for pre-recruit crab (110-134 mm cl) also decreased 41%. Abundance of small males decreased by 12%. A recruiting cohort with a modal size of 60 mm in 1999 (Figure 3) grew to about 80 mm in 2000 and 100 mm in 2001. No legal male crab were in molting or softshell condition, and 48% were new-hardshell crabs; the remainder were oldshell crabs.

The abundance index for large ( $\geq 90$  mm cl) females in Bristol Bay was 21.2 million crabs. This estimate represents a 22% increase from last year. Among female crabs, 81% were mature, of which 99% had molted and extruded new, uneyed eggs. Fluctuations in the timing of molting, mating, and embryo extrusion may be related to annual variations in water temperature.

ADF&G has developed a length-based assessment (LBA) model, which was fitted to the survey time series data. Resultant estimates of the abundance of mature males and

Table 1. Annual abundance estimates (millions of crabs) for red king crab (*P. camtschaticus*) from NMFS surveys. Bristol Bay and Pribilof Districts are combined except where noted with a (B) or (P).

Carapace Length(mm) Width(in)	Males				Females			Grand Total
	Small	Pre-rec	Legal	Total	Small	Large	Total	
	<110 <5.2	110-134 5.2-6.4	≥135 ≥6.5		<90 <4.3	≥90 ≥4.3		
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
1986	11.8	12.3	5.9	30.1	4.5	5.4	9.8	39.9
1987	20.1	12.6	7.9	40.6	16.8	18.3	35.1	75.7
1988	8.5	6.4	6.4	21.3	2.7	15.7	18.4	39.7
1989	8.6	9.4	11.9	29.9	4.4	16.9	21.2	51.1
1990	8.2	10.2	9.2	27.6	7.2	17.5	24.7	52.2
1991	8.1	6.4	12.0	26.5	4.7	12.6	17.4	43.9
1992	7.0	5.5	5.8	18.3	2.2	13.4	15.6	33.9
1993	5.7	10.2	9.8	25.7	2.5	19.2	21.7	47.4
1994	6.2	6.7	7.5	20.4	3.4	10.1	13.5	33.9
1995	9.7	6.0	8.9	24.6	4.9	10.4	15.3	33.9
1996	17.2	3.5	6.0	26.7	13.7	12.9	26.6	53.3
1997	27.5	9.6	10.4	47.4	1.8	25.9	27.7	75.1
1998(B)	10.9	16.5	7.4	34.8	5.5	35.5	40.8	75.6
1999(B)	8.1	7.1	11.0	26.1	6.2	14.5	20.6	46.7
2000(B)	11.2	7.2	8.7	27.0	5.6	17.4	23.0	50.0
2001(B)	9.9	4.3	5.1	19.3	3.8	21.2	24.9	44.2
<u>Limits<sup>1</sup></u>								
Lower	4.9	2.7	3.5	12.6	0.0	8.1	10.5	23.0
Upper	14.9	5.8	6.8	26.0	7.7	34.3	39.4	65.5
±%	51	37	33	35	105	62	58	48
1998(P)	0.2	0.5	0.4	1.1	0.0	1.0	1.0	2.2
1999(P)	6.6	0.6	1.2	8.4	6.5	3.2	9.6	18.1
2000(P)	0.0	0.4	1.2	1.5	0.0	0.6	0.6	2.2
2001(P)	1.4	2.5	1.8	5.6	0.0	4.0	4.0	9.6

<sup>1</sup> Mean ± 2 standard errors for most recent year; Bristol Bay only.

## Red King Crab Length Frequency Bristol Bay

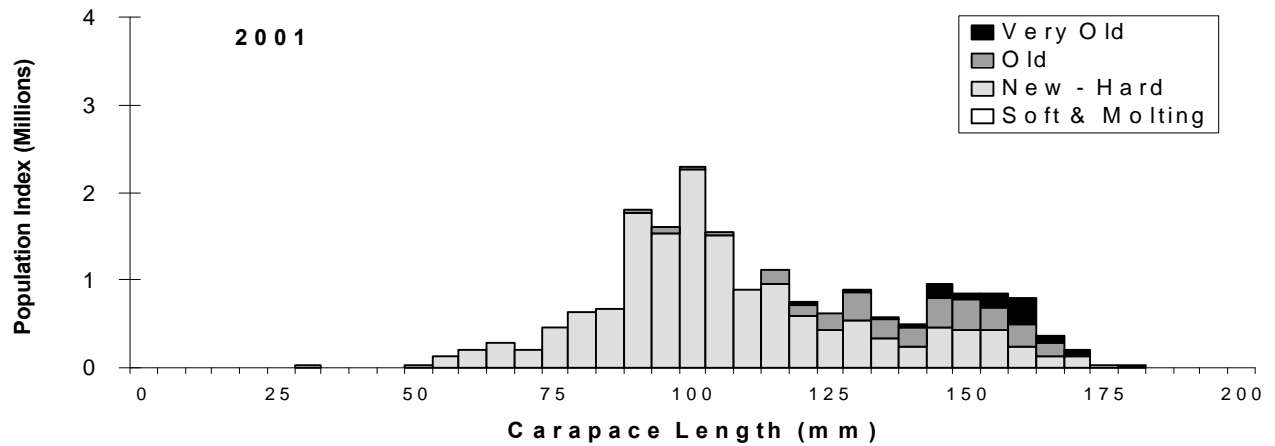
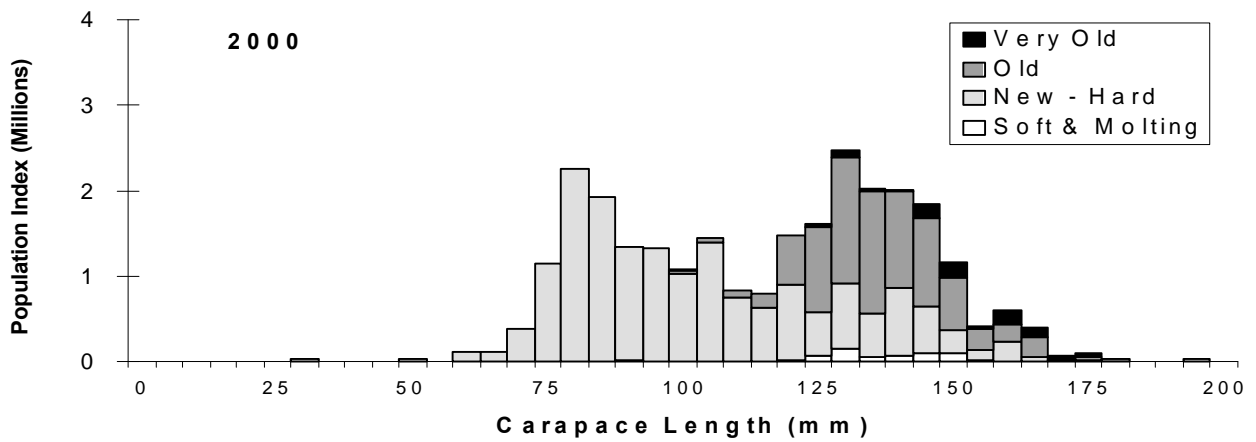
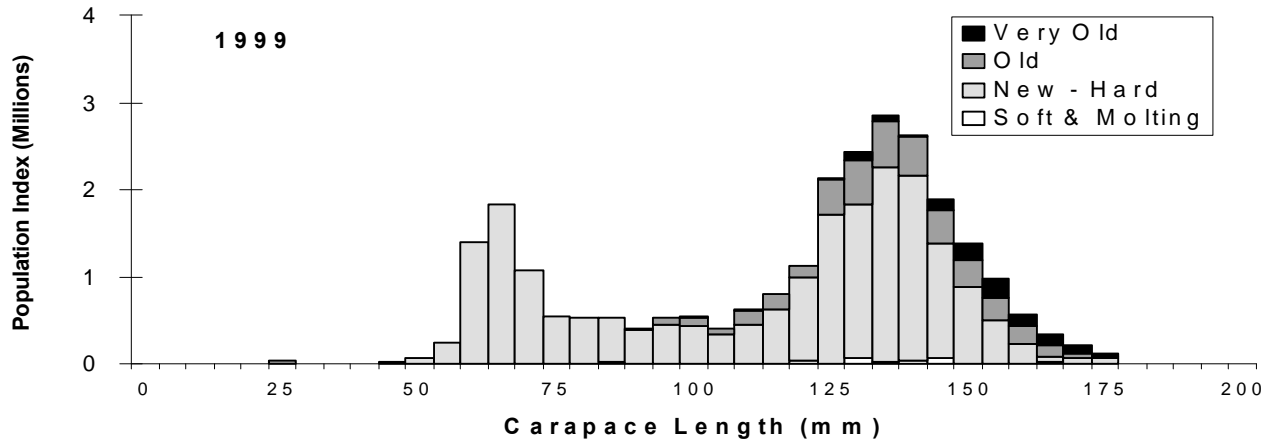


Figure 3. Size-frequency of male red king crab (*P. camtschaticus*) by 5 mm length classes, 1999-2001.

## Blue King Crab Pribilof District

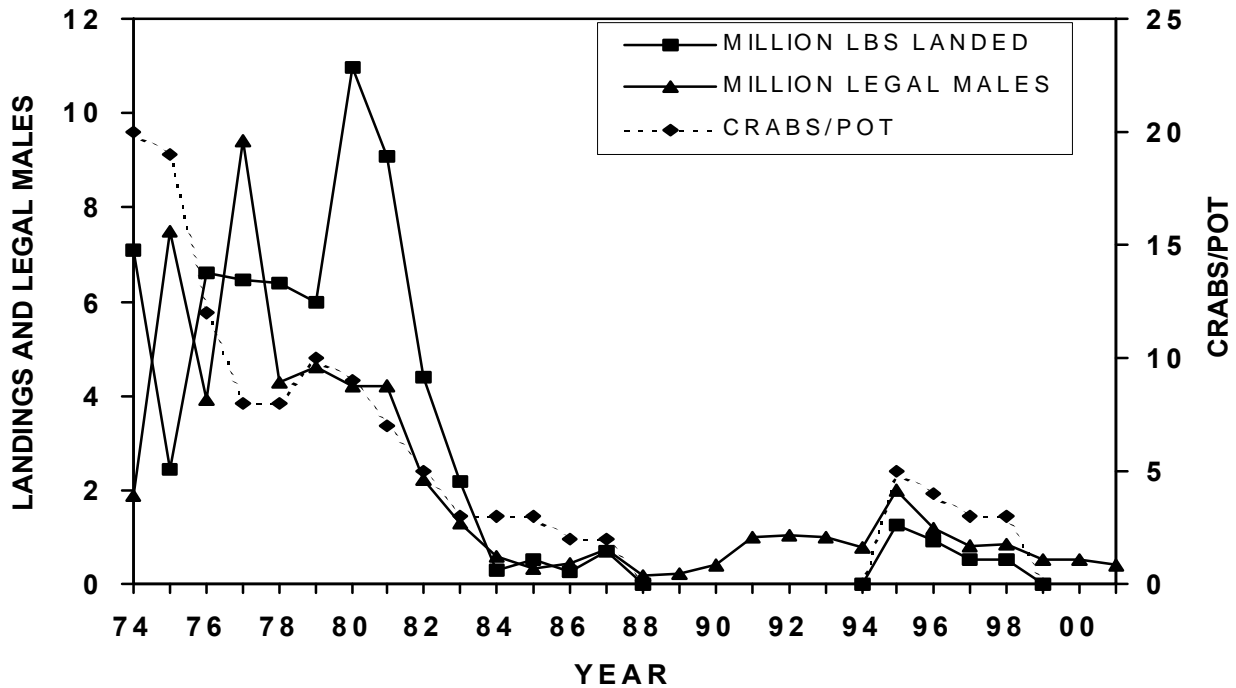


Figure 4. U.S. landings in millions of pounds, CPUE as crabs/pot-lift, and abundance of legal blue king crab (*P. platypus*) in millions in the Pribilof District, estimated from NMFS trawl surveys.

females are used to establish the fishery GHL (ADF&G Regional Information Report 5J99-09). The LBA estimate of 21.2 million mature females was slightly greater than the survey estimate for large females and equated to 40.6 million pounds of effective spawning biomass. Total mature biomass is above the MSST threshold, allowing a 10% harvest rate under the ADF&G harvest strategy. This resulted in a GHL of 7.15 million lbs (3,243 t), including 536 thousand lbs of CDQ. The total GHL translates into approximately 1.10 million crabs at an average weight of 6.5 lbs.

### Pribilof Islands Red King Crab (*P. camtschaticus*)

In the Pribilof District (south of 58° 39'N and west of 168° W), the abundance index for legal male red king crab was 1.8 million (Table 1), a 54% increase from last year. The index for large females showed a 549%

increase from 2000. From 1996 to 1998, a combined fishery for red and blue king crabs in the Pribilof District opened on September 15. However, due to low abundance of blue king crab (see next section), the combined fishery has not opened since 1998. Historically, red king crab have not been abundant in the Pribilof Islands and landings were taken incidentally during the blue king crab fishery. Although this stock is not considered overfished under provisions of the MSFCMA (Appendix C), the fishery will remain closed due to the desire to avoid bycatch of blue king crab that mingle in the same grounds, and due to the extremely low precision of the abundance estimates. In the absence of a St. Matthew fishery, effort levels were also feared to be excessive.

### Pribilof Islands Blue King Crab (*P. platypus*)

Legal ( $\geq 6.5$  in cw or 135 mm cl) males

Table 2. Annual abundance estimates (millions of crabs) for blue king crab (*P. platypus*) in the Pribilof District from NMFS surveys.

	<u>Pribilof District</u>							Grand Total
	Males				Females			
	Small	Pre-rec	Legal	Total	Small	Large	Total	
Carapace Length(mm)	<110	110-134	≥135		<90	≥90		
Width(in)	<5.2	5.2-6.4	≥6.5		<4.3	≥4.3		
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	4.7
1985	0.1	0.2	0.3	0.5	0.2	0.5	0.7	1.2
1986	<0.1	<0.1	0.4	0.5	<0.1	1.9	1.9	2.4
1987	0.6	0.1	0.7	1.4	0.4	0.6	1.0	2.4
1988	1.1	0.0	0.2	1.3	0.8	0.4	1.2	2.5
1989	3.2	0.1	0.2	3.5	2.3	1.3	3.6	7.1
1990	1.8	1.2	0.4	3.5	1.8	2.7	4.5	8.0
1991	1.3	1.0	1.0	3.4	0.6	2.8	3.4	6.7
1992	1.6	1.2	1.0	3.8	1.3	2.1	3.4	7.1
1993	1.0	0.8	1.0	2.8	0.3	2.2	2.5	5.3
1994	0.3	0.5	0.8	1.6	0.1	4.3	4.3	5.9
1995	0.8	1.2	2.0	3.9	0.4	4.0	4.5	8.4
1996	0.3	0.7	1.2	2.3	0.1	4.6	4.7	7.0
1997	0.3	0.4	0.8	1.5	0.1	2.5	2.6	4.1
1998	0.8	0.4	0.8	2.0	0.3	2.0	2.3	4.3
1999	0.1	0.2	0.5	0.8	<0.1	2.5	2.5	3.2
2000	0.1	0.2	0.5	0.8	0.0	1.4	1.4	2.2
2001	0.0	0.1	0.4	0.6	0.0	1.6	1.6	2.2
<u>Limits</u> <sup>1</sup>								
Lower	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper	0.1	0.3	1.0	1.4	0.1	4.0	4.0	5.4
±%	139	127	146	136	200	147	145	143

<sup>1</sup>Mean ± 2 standard errors for most recent year.

### Blue King Crab Length Frequency Pribilof District

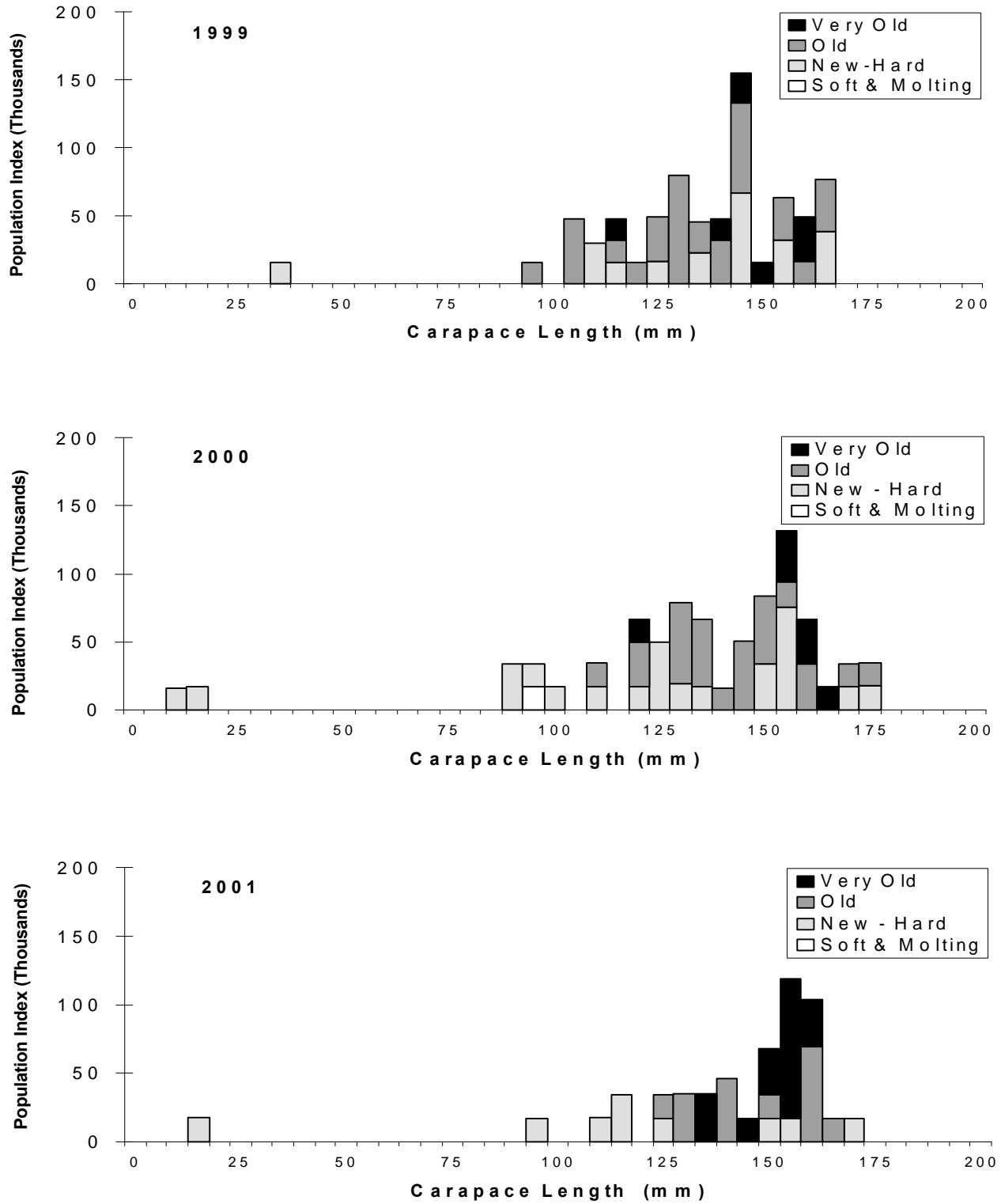


Figure 5. Size-frequency of Pribilof District male blue king crab (*P. platypus*), by 5 mm length classes, 1999-2001.

## Blue King Crab Northern District

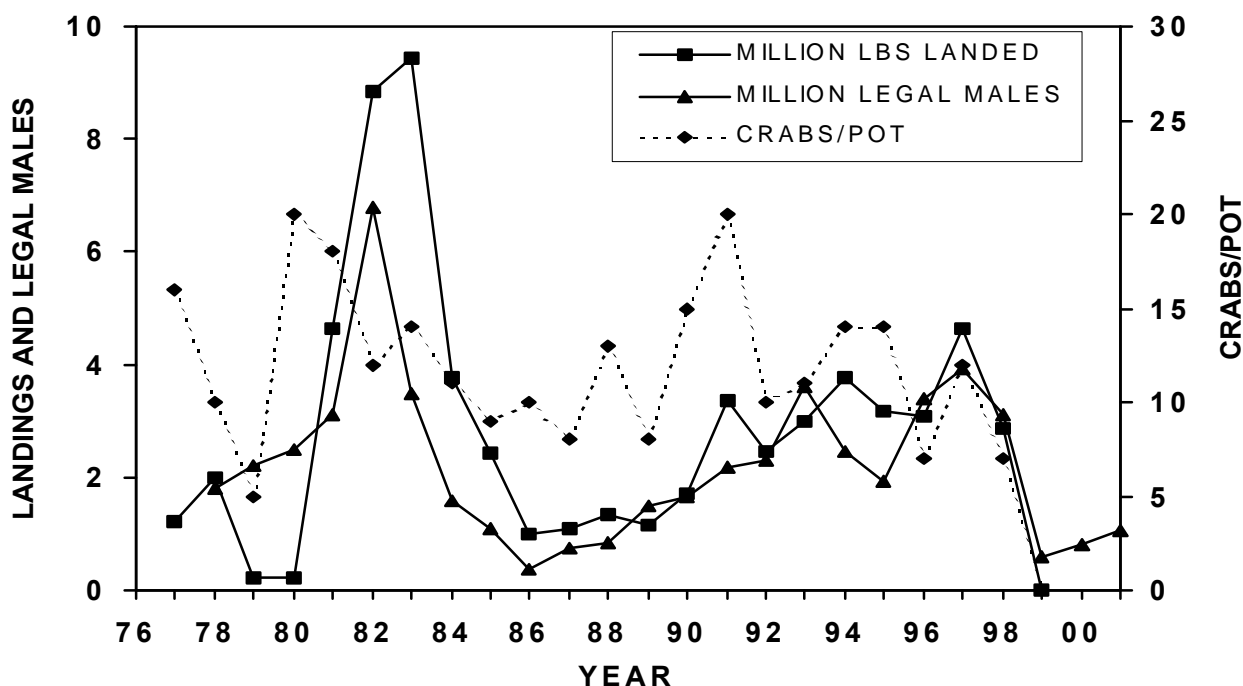


Figure 6. U.S. landings in millions of pounds, CPUE as crabs/pot-lift, and the abundance of legal blue king crabs (*P. platypus*) in millions in the Northern District (St. Matthew Island), estimated from NMFS trawl surveys.

were found primarily north and east of St. Paul Island (Chart 2 and Table 8A). The abundance index for legal males was 0.4 million (Table 2 and Figure 4), a 16% decrease from last year, and well below the average for the previous 20 years (1.0 million). The index (0.1 million crab) of pre-recruits (110-134 mm cl) is down 48% relative to last year. The abundance of small males (<110 mm cl), is very difficult to determine. Size-frequency data (Figure 5) are very sparse and only 24 legal males were captured. Shell conditions among legal males were 0% softshell or molting, 12% new-hardshells, and 88% oldshells.

The abundance index (1.6 million crabs) for large ( $\geq 90$  mm cl) females showed a 17% increase from last year. However, estimates of female abundance are usually very imprecise due to the preference of these crab for rocky habitat which is not well sampled by trawls. Among sampled mature females, none were softshell, 26% were new hardshells,

of which 96% carried new eggs, and 74% were oldshells, of which 100% carried empty embryo cases. Blue king crab are predominantly biennial spawners. Only a portion of the female population spawns in a given year, while the remainder is in a non-embryo-bearing phase. This fishery was closed from 1988 through 1994 due to low stock abundance, then re-opened from 1995-1998. The fishery was not opened in 1999, 2000, or 2001. The population is in extremely low historical abundance (Figure 4), and trends are not easily detectable. Total mature biomass is slightly (6%) above MSST(Appendix C). The fishery remained closed in 2001 because of low stock abundance since both ADF&G catch- survey analysis and the NMFS survey estimates of mature male abundance are well below (43%) the 0.77 million crab level established as a threshold in the ADF&G harvest strategy.

Table 3. Annual abundance estimates (millions of crabs) for blue king crab (*P. platypus*) in the Northern District (St. Matthew Island) from NMFS surveys.

	<u>Northern District</u>							Grand Total
	Males				Females			
	Small	Pre-rec	Legal	Total	Small	Large	Total	
Carapace Length(mm)	<105	105-119	$\geq 120$		<80	$\geq 80$		
Width(in)	<4.3	4.3-5.4	$\geq 5.5$		<3.8	$\geq 3.8$		
1981	1.2	1.8	3.1	6.3	<0.1	0.5	0.5	6.8
1982	3.2	2.6	6.8	12.5	0.4	0.7	1.1	13.6
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	0.1	0.2	2.1
1986	0.6	0.4	0.4	1.4	0.3	0.1	0.3	1.7
1987	1.1	0.7	0.7	2.5	0.5	0.2	0.7	3.2
1988	1.4	0.7	0.8	2.9	0.9	0.8	1.7	4.6
1989	4.8	1.0	1.5	7.3	1.6	1.7	3.3	10.5
1990	1.4	0.8	1.7	3.9	0.4	0.2	0.6	4.50
1991	2.9	1.5	2.2	6.6	0.8	0.7	1.5	8.1
1992	2.3	1.5	2.3	6.0	0.9	0.4	1.3	7.4
1993	4.6	2.0	3.6	10.2	1.4	3.0	4.4	14.6
1994	1.5	1.4	2.5	5.4	0.1	0.4	0.5	5.9
1995	1.9	1.1	1.9	4.9	0.6	0.1 <sup>1</sup>	0.7	5.6
1996	2.6	2.0	3.4	8.0	1.1	0.9	2.0	10.0
1997	2.4	2.3	3.9	8.6	0.6	0.8	1.4	10.0
1998	2.3	1.8	3.1	7.2	0.6	0.5	1.1	8.4
1999	0.5	0.2	0.6	1.4	0.3	<0.1 <sup>1</sup>	0.3	1.7
2000	0.6	0.3	0.8	1.7	0.1	0.1	0.2	1.7
2001	0.8	0.6	1.1	2.5	0.3	0.2	0.5	2.9
<u>Limits<sup>2</sup></u>								
Lower	0.0	0.2	0.5	1.1	0.0	0.0	0.0	0.9
Upper	1.6	0.9	1.6	3.8	0.8	0.4	1.2	4.9
±%	98	68	55	54	159	126	143	68

<sup>1</sup> These estimates have low precision since few crabs were caught.

<sup>2</sup> Mean  $\pm$  2 standard errors for most recent year.



## Blue King Crab Length Frequency Northern District

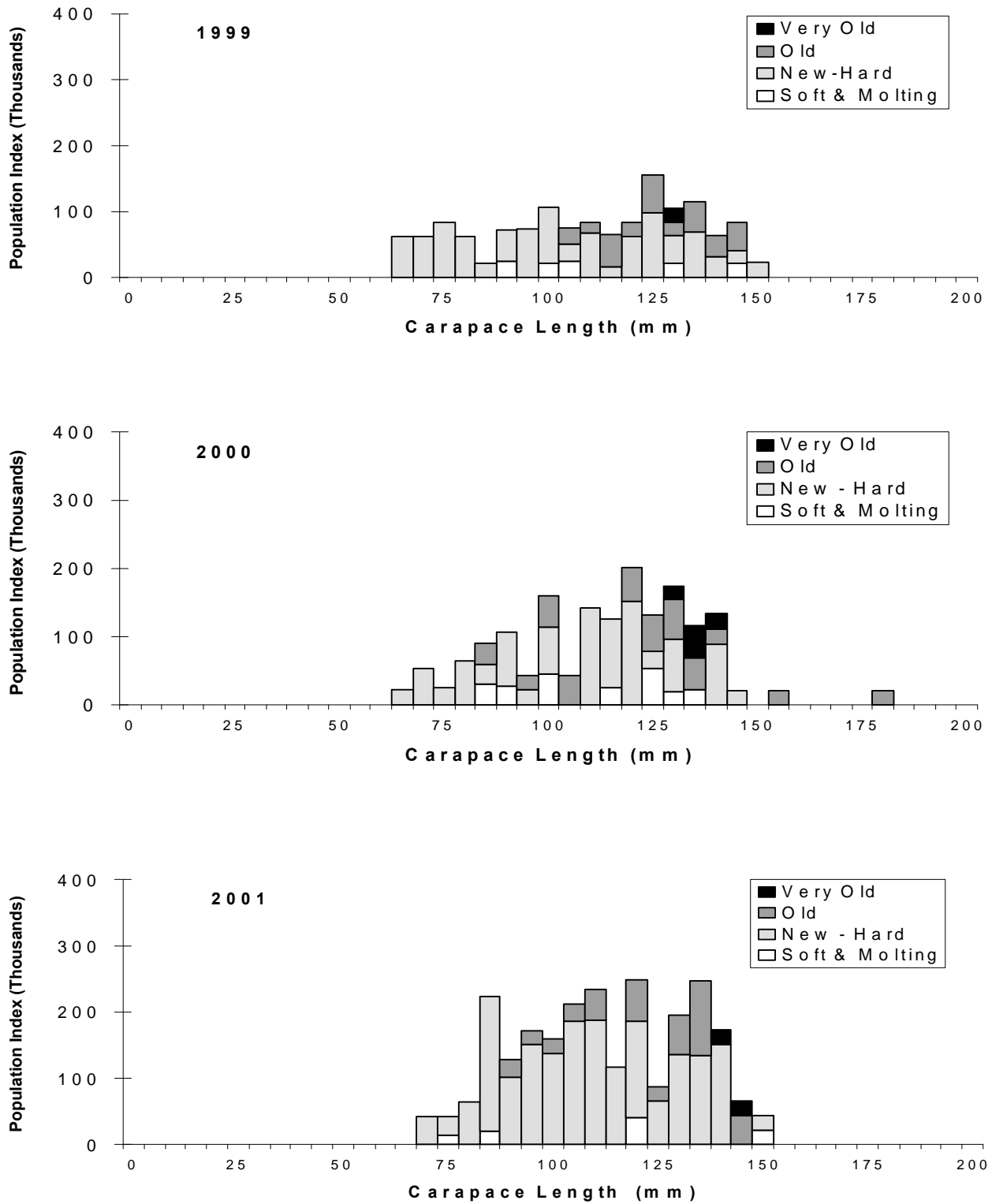


Figure 7. Size-frequency of Northern District (St. Matthew Island) male blue king crab (*P. platypus*), by 5 mm length classes, 1999-2001.

## Tanner Crab Eastern District

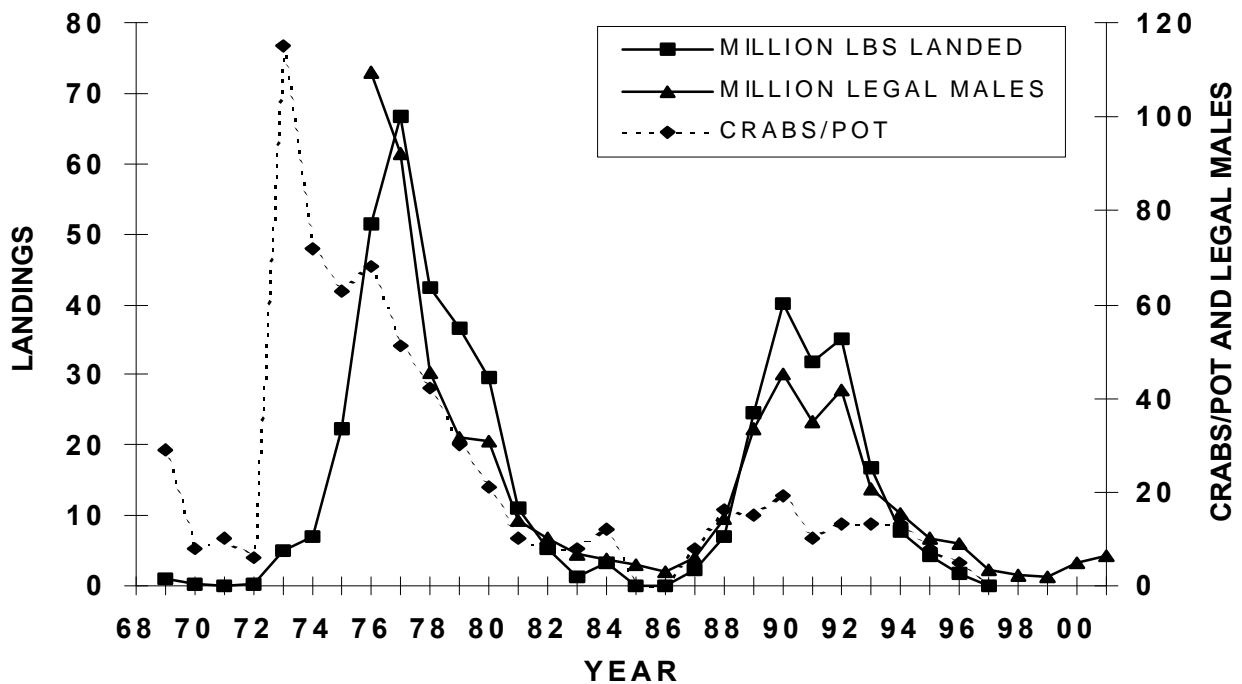


Figure 8. U.S. landings in millions of pounds, CPUE as crabs/pot-lift, and the abundance of legal male Tanner crab (*C. bairdi*) in millions in the Bristol Bay and Pribilof Districts (prior to 1989) or the Eastern District (since 1989), estimated from NMFS trawl surveys.

### St. Matthew Island Blue King Crab (*P. platypus*)

Legal ( $\geq 5.5$  in cw or 120 mm cl) males were captured primarily southwest of St. Matthew Island (Chart 2 and Table 8B). The abundance index for legal males was 1.1 million crabs (Table 3 and Figure 6), representing a 29% increase from last year. The abundance index (0.6 million) of pre-recruit crabs (105-119 mm cl) increased 80% from last year. Legal and pre-recruit male abundance indices are still well below their averages for the previous 20 years (2.3 and 1.2, respectively). Size-frequency was similar to last year (Figure 7). Among legal males captured (24), 4% were softshell, 58% were new-hardshells, and 38% oldshells. The index for large females ( $\geq 80$  mm cl) is poorly determined due to a habitat preference for inshore, rocky and untrawlable grounds. Only 26 females were captured. Due to low stock abundance, the fishery was not opened in 1999, 2000, or 2001. This stock

is considered overfished under the provisions of the MSFCMA and rebuilding plan (Appendix C).

### Tanner Crab (*C. bairdi*)

The legal minimum size of 5.5 in cw (spine tip to spine tip) is equivalent to 138mm cw measured between the spines (scientific measure). Legal males were sparsely distributed with regions of highest abundance in southwest Bristol Bay (Chart 3 and Table 9). The abundance index for legal male *C. bairdi* in the Eastern District (east of 173° W) was 6.3 million crabs (Table 4 and Figure 8), a 28% increase from last year although still only about one-half of the 14.4 million crab 20-year average. Virtually all the legal males occurred in the Eastern District. The abundance index (17.3 million) for pre-recruit crabs (110-137 mm cw) showed a 4% decrease, and the index of 284.8 million for small males (<110 mm cw) showed a 177% increase. The 2001 male

Table 4. Annual abundance estimates (millions of crabs) for Tanner crabs (*C. bairdi*) from NMFS surveys. Data since 1988 are for Eastern District; all prior data for Bristol Bay and the Pribilof Districts; both areas contain virtually all legal males.

Carapace Width(mm) Width(in)	Males				Females			Grand Total
	Small	Pre-rec	Legal	Total	Small	Large	Total	
	<110 <4.3	110-137 <sup>1</sup> 4.3-5.4	$\geq$ 138 <sup>1</sup> $\geq$ 5.5		<85 <3.4	$\geq$ 85 $\geq$ 3.4		
1981	270.3	59.6	12.0	341.8	324.2	79.1	403.3	745.1
1982	77.3	60.3	8.2	145.8	126.4	83.6	210.0	355.8
1983	141.8	38.1	5.1	185.0	180.1	45.4	225.5	410.5
1984	82.5	24.9	4.7	112.1	107.0	33.4	140.4	252.5
1985	29.8	11.4	3.9	45.0	24.2	15.6	39.8	84.8
1986	109.0	14.7	2.6	126.4	68.2	13.7	81.9	208.3
1987	229.9	22.0	5.9	257.8	192.4	35.5	227.8	485.6
1988	287.3	62.8	14.3	364.4	184.8	81.0	265.8	630.2
1989	403.0	110.9	33.6	547.5	338.6	63.8	402.4	949.9
1990	286.1	87.4	45.1	418.6	266.5	97.4	363.9	782.5
1991	267.2	115.8	35.1	418.1	232.1	116.8	348.9	767.0
1992	121.0	112.7	41.8	275.5	98.9	63.9	162.8	438.3
1993	76.6	70.5	20.6	167.7	57.6	29.6	87.2	254.9
1994	47.9	43.2	15.4	106.6	57.9	27.5	85.4	192.0
1995	40.4	35.7	10.0	86.1	66.6	37.2	103.8	189.9
1996	52.6	26.7	9.2	88.5	59.3	27.7	87.1	175.6
1997	65.6	9.9	3.4	78.9	70.1	10.0	80.1	159.0
1998	74.2	12.1	2.2	88.5	61.4	6.5	67.9	156.5
1999	191.3	14.5	2.0	207.8	125.5	16.1	141.6	349.5
2000	102.8	18.1	4.9	125.8	79.7	13.1	93.4	219.2
2001	284.8	17.3	6.3	308.3	278.7	13.2	291.9	600.1
<u>Limits<sup>2</sup></u>								
Lower	179.3	13.0	2.8	200.3	170.8	6.7	182.1	288.1
Upper	390.4	21.6	9.8	416.7	386.6	19.7	401.7	819.0
±%	37	25	55	35	39	49	38	52

<sup>1</sup> Values prior to 1987 are interpolated from 5 mm width classes.

<sup>2</sup> Mean  $\pm$  2 standard errors for most recent year.

## Tanner Crab Width Frequency Eastern District

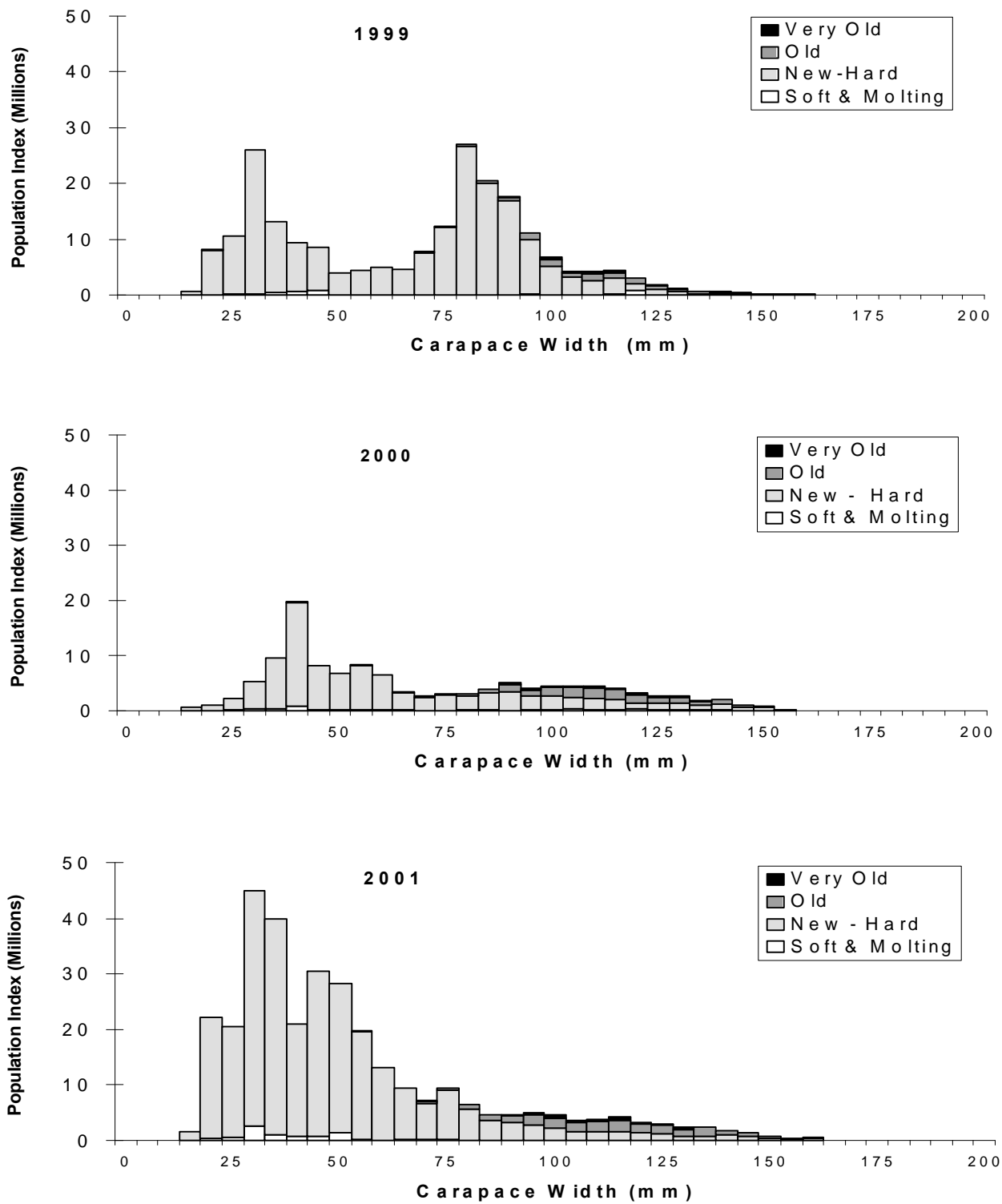


Figure 9. Size-frequency of male Tanner crab (*C. bairdi*) in the Eastern District, by 5 mm width classes, 1999-2001.

## Snow Crab All Districts

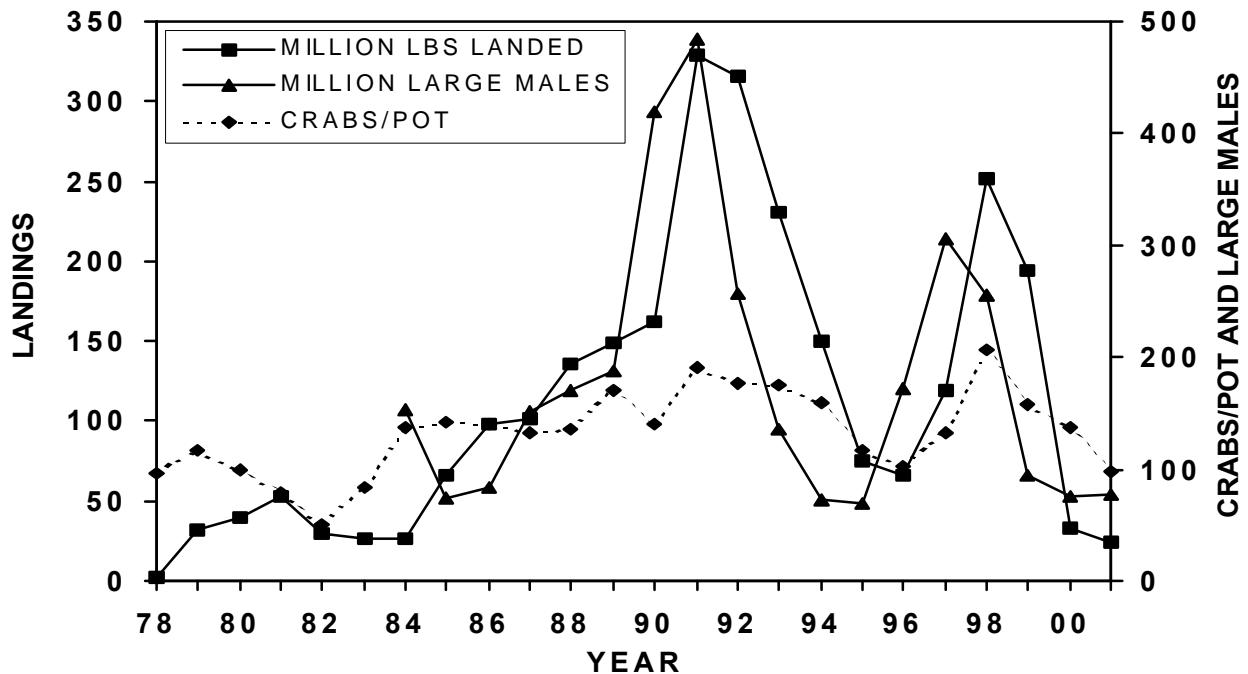


Figure 10. U.S. landings in million of pounds, CPUE as crabs/pot-lift, and the abundance of large male snow crab (*C. opilio*) in millions (all districts combined), estimated from NMFS trawl surveys.

size-frequency is dominated by two very large modes in the 20-60 mm cw range. It is often difficult to follow these modes to larger widths in subsequent survey years. Among legal males, 1% were molting or softshell, 51% were new-hardshells, and 48% were oldshells. Most oldshell crab will not molt again during their lifespan.

The abundance index (13.2 million) of large ( $\geq 85$  mm cw) females showed a 4% decrease. Among sampled mature females, 7% were softshells; 30% were new-hardshells, of which 94% carried new eggs; and 67% were oldshells, of which 97% carried new eggs. Fewer than 1% of mature females sampled had not completed hatching by the time of the survey.

The fishery has been closed since 1996 due to low abundance and it will remain closed in 2001. The estimated spawning biomass for this stock has been below the MSST since 1997 (Appendix C). The fishery will

remain closed this year under the Rebuilding Plan for the Bering Sea *C. bairdi* stock that has been approved by the Alaska Board of Fisheries and the North Pacific Fishery Management Council.

### Snow Crab (*C. opilio*)

Although the legal minimum size limit for *C. opilio* is 3.1 in cw (78 mm cw), processors currently prefer a minimum size of 4.0 in cw (102 mm). In this 2001 report, we changed the designation of the size categories (Table 5) and accompanying discussion in the text to better reflect fishery preference and the pre-recruit class. The size ranges for male snow crab used in this report are defined as follows: small,  $< 3.1$  in (78 mm); pre-recruits, 3.1-3.9 in cw (78-101 mm); and large  $\geq 4.0$  in cw (102 mm).

Large ( $\geq 102$  mm cw) males showed a remarkably uniform density across their range (Chart 4 and Table 10). The abundance index

Table 5. Annual abundance estimates (millions of crabs) for eastern Bering Sea snow crabs (*C. opilio*) from NMFS surveys (all districts combined).<sup>1</sup> Abundance estimates for 25 northern stations outside the standard survey area are shown separately.

Carapace Width(mm) Width(in)	Males				Females			Grand Total
	Small	Pre-rec	Legal	Total	Small	Large	Total	
	<78 <3.1	78-101 3.1-3.9	≥102 ≥4.0		<50 <2.0	≥50 ≥2.0		
1981	1553.8	335.3	54.5	1943.6	668.6	2607.6	3276.2	5219.8
1982	1429.9	573.1	70.2	2073.2	402.7	2255.8	2658.4	4731.6
1983	1292.1	490.7	75.3	1858.1	673.1	1228.5	1901.6	3759.7
1984	912.0	325.5	153.2	1390.6	610.5	581.7	1192.2	2582.8
1985	420.2	127.6	74.9	622.6	258.2	123.5	381.7	1004.3
1986	1039.8	139.2	83.1	1262.0	790.6	422.0	1212.6	2474.6
1987	4070.5	405.2	144.4	4620.0	2903.0	2795.0	5698.0	10318.0
1988	2996.3	470.9	171.0	3638.2	1235.3	2322.7	3558.0	7196.2
1989	2823.7	822.4	187.1	3833.1	1922.8	3790.7	5713.5	9546.6
1990	1834.5	1025.9	420.3	3280.7	1463.3	2798.1	4261.4	7542.1
1991	3277.4	693.8	484.1	4455.3	3289.0	3575.0	6863.9	11319.2
1992	2827.0	331.4	256.4	3414.8	2433.9	1914.3	4348.2	7763.0
1993	5345.9	250.7	135.0	5731.5	3989.8	1982.6	5972.4	11703.9
1994	4027.6	254.9	71.6	4354.0	3417.6	1674.3	5091.8	9445.8
1995	3607.7	479.0	68.8	4155.5	2090.3	2409.4	4499.7	8655.2
1996	1815.2	884.9	171.6	2871.7	1189.0	1364.2	2553.2	5424.9
1997	781.7	709.2	305.7	1796.6	927.9	1383.1	2311.0	4107.6
1998	658.8	356.0	254.6	1269.3	803.0	1160.8	1963.8	3233.1
1999	392.0	124.9	94.2	611.1	315.5	474.3	789.8	1400.9
2000	904.2	131.7	76.1	1111.9	648.4	1480.9	2129.3	3241.2
2001	1509.7	281.1	77.5	1868.4	468.5	1524.5	1992.9	3861.3
East(%) <sup>2</sup>	27.7	12.7	26.5	24.3	21.1	31.4	29.0	26.7
<u>Limits<sup>3</sup></u>								
Lower	875.6	194.0	62.0	1177.1	46.8	564.0	876.9	2054.0
Upper	2143.8	368.2	93.0	2559.6	890.1	2484.9	3109.0	5668.6
±%	42	31	20	37	90	63	56	47
<u>Northern Stations</u>								
2001	432.4	3.1	0.0	435.5	165.6	64.2	229.8	665.3
<b>Nor</b>								

<sup>1</sup> Values for 1981-1983, and small and pre-recruit males for 1984, are interpolated from 5 mm width classes.

<sup>2</sup> Percent of size group in Eastern District (east of 173°).

<sup>3</sup> Mean ± 2 standard errors for most recent year.

## Snow Crab Width Frequency All Districts

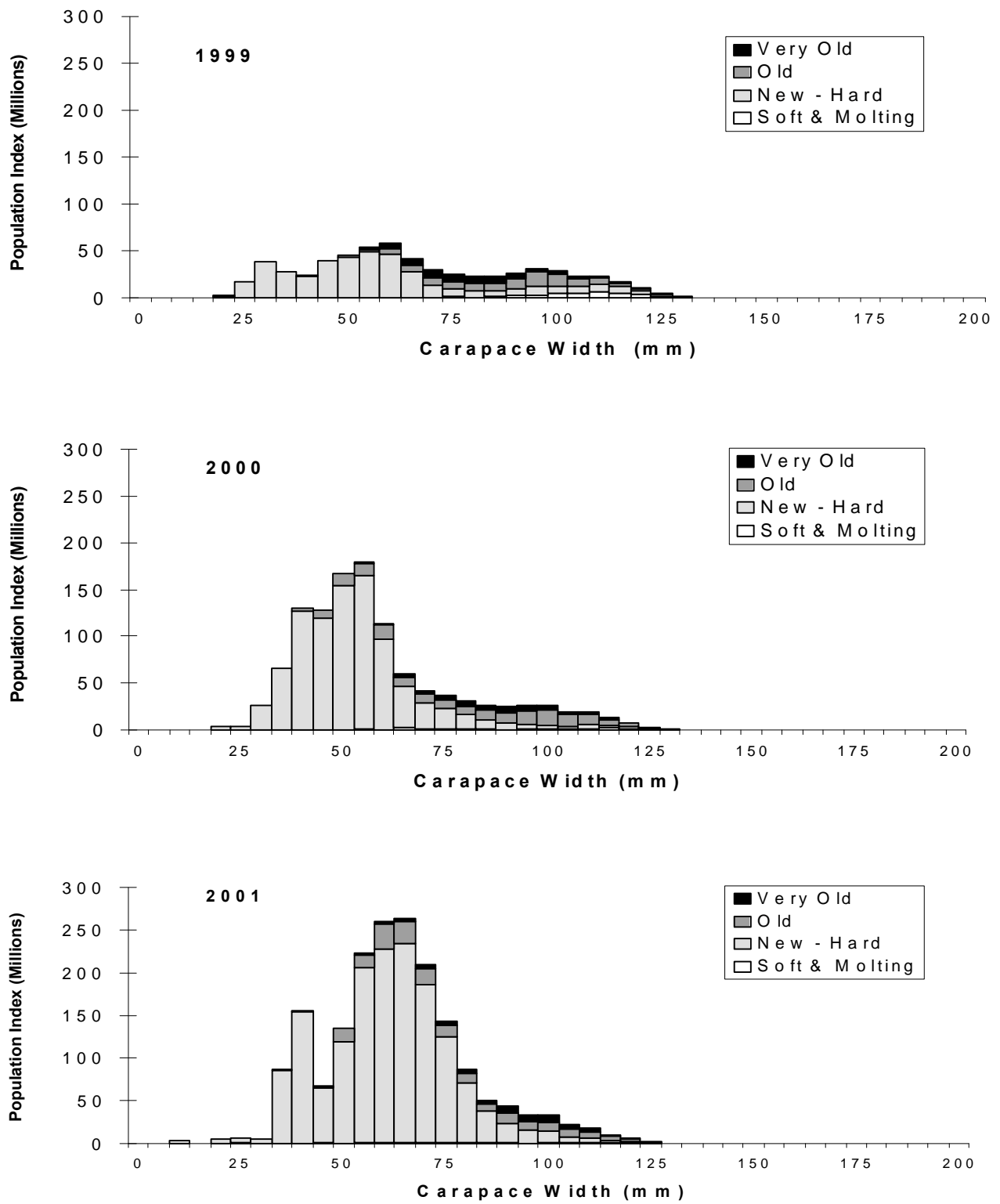


Figure 11. Size-frequency of male snow crab (*C. opilio*), all districts combined, by 5 mm width classes, 1999-2001.

## Hair Crab All Districts

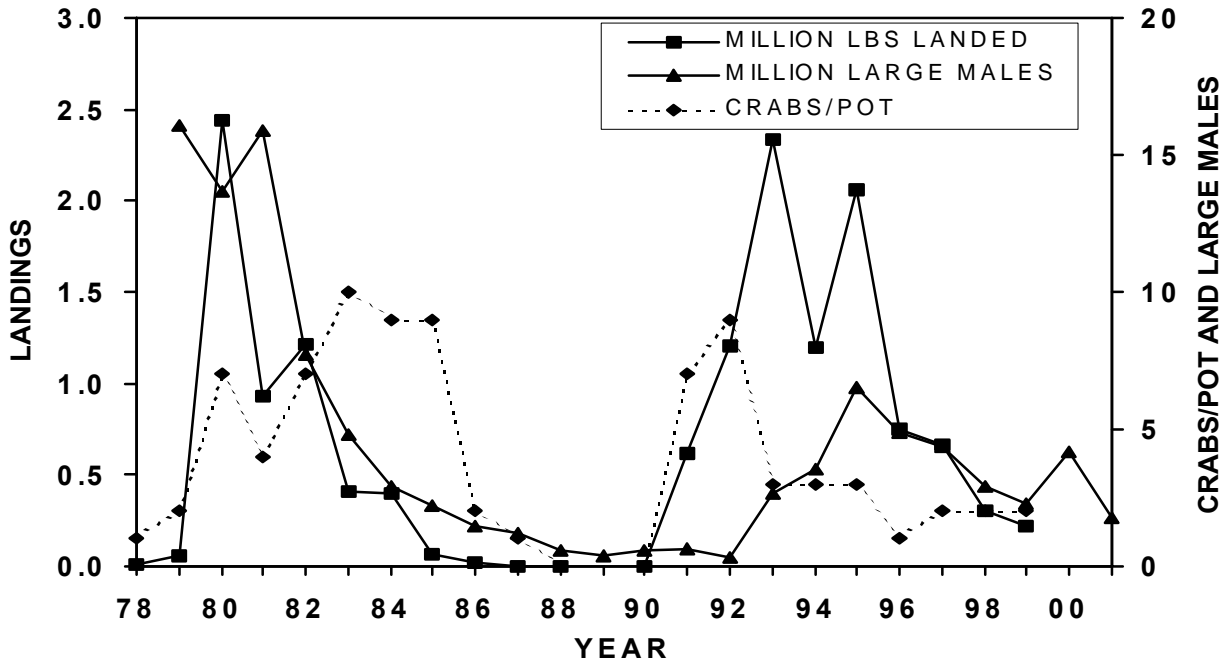


Figure 12. U.S. landings in millions of pounds, CPUE as crabs/pot-lift, and the abundance of large male hair crab (*E.isenbeckii*) in millions (all districts combined), estimated from NMFS trawl surveys.

for large ( $\geq 102$  mm cw) males (Eastern and Western Districts combined) is 77.5 million crabs (Table 5 and Figure 10), which represents a 2% increase from last year but is about one-half of the 20-year average (167.6 million). Approximately 46% of these crab were in the Eastern District as compared to 46% in 2000 and 70% in 1999. Pre-recruit males (78-101 mm cw) showed a 113.5% increase in abundance due to recruitment. The abundance index (1524 million) for large females ( $\geq 50$  mm cw) showed a 3% increase. A strong male size-frequency mode centered at 50-60 mm in 2000 advanced to 60-70 mm in 2001 (Figure 11). Among large male crabs, 9% were in molting or softshell condition, 29% were new-hardshells indicating a recent molt, and 62% were oldshells. Among sampled mature females, 55% were new-hardshells, of which 100% carried new eggs and 45% were oldshells, of which 87% carried new eggs; the

remainder had not produced a new clutch.

The spawning biomass (571.0 million lbs) of the eastern Bering Sea stock of *C. opilio* is well above the minimum stock size threshold of 460.8 million lbs as defined in the FMP, a 21% increase over that in 2000. The population is experiencing recruitment of crabs to smaller size groups which may yield legal males in several years conditional on losses to mortality and the fishery. A very restricted fishery was allowed under the current Rebuilding Plan for the Bering Sea *C. opilio* stock. The GHL for 2002 has been set at 30.82 million lbs (13,997 t) of large crabs ( $\geq 4.0$  in cw) of which 2.31 million lbs are for CDQ fisheries. The fishery will open on January 15, 2002. In 2001, the GHL was 27.3 million lbs while landings were 24.8 million lbs and the average CPUE for the open access and CDQ fisheries was 97 crab/pot-lift.



Table 6. Annual abundance estimates (millions of crabs) for hair crab (*E. isenbeckii*) from NMFS surveys.

Carapace Length(mm) Width (in)	Males			Females		Grand Total
	Small	Large	Total	Total		
	<83 <3.25	$\geq$ 83 $\geq$ 3.25				
1981	2.8	14.3	17.2	0.9	18.0	
1982	0.5	8.1	8.6	0.4	9.0	
1983	0.2	4.4	4.6	0.8	5.5	
1984	0.7	3.3	4.1	0.5	4.6	
1985	0.3	2.6	2.9	0.3	3.1	
1986	0.7	1.8	2.5	0.4	2.9	
1987	1.6	1.3	2.9	0.9	3.8	
1988	3.0	0.9	3.9	0.9	4.7	
1989	11.4	1.5	12.8	0.7	13.5	
1990	13.0	1.1	14.1	0.9	15.0	
1991	4.5	1.3	5.7	1.2	6.9	
1992	2.5	1.2	3.6	0.5	4.2	
1993	9.1	2.6	11.8	1.5	13.3	
1994	4.7	3.6	8.2	1.3	9.5	
1995	4.6	6.5	11.1	0.7	11.8	
1996	3.6	4.9	8.4	1.1	9.5	
1997	1.6	4.3	5.9	0.3	6.3	
1998	0.5	2.9	3.5	1.4	4.9	
1999	1.4	2.3	3.7	1.9	5.6	
2000	0.5	4.2	4.7	1.3	6.0	
2001	0.5	1.8	2.3	2.1	4.4	
<u>Limits<sup>1</sup></u>						
Lower	0.2	1.1	1.4	1.1	2.5	
Upper	0.8	2.5	3.1	3.2	6.3	
±%	60	41	37	50	43	

<sup>1</sup>Mean ± 2 standard errors for most recent year.

## Hair Crab Length Frequency All Districts

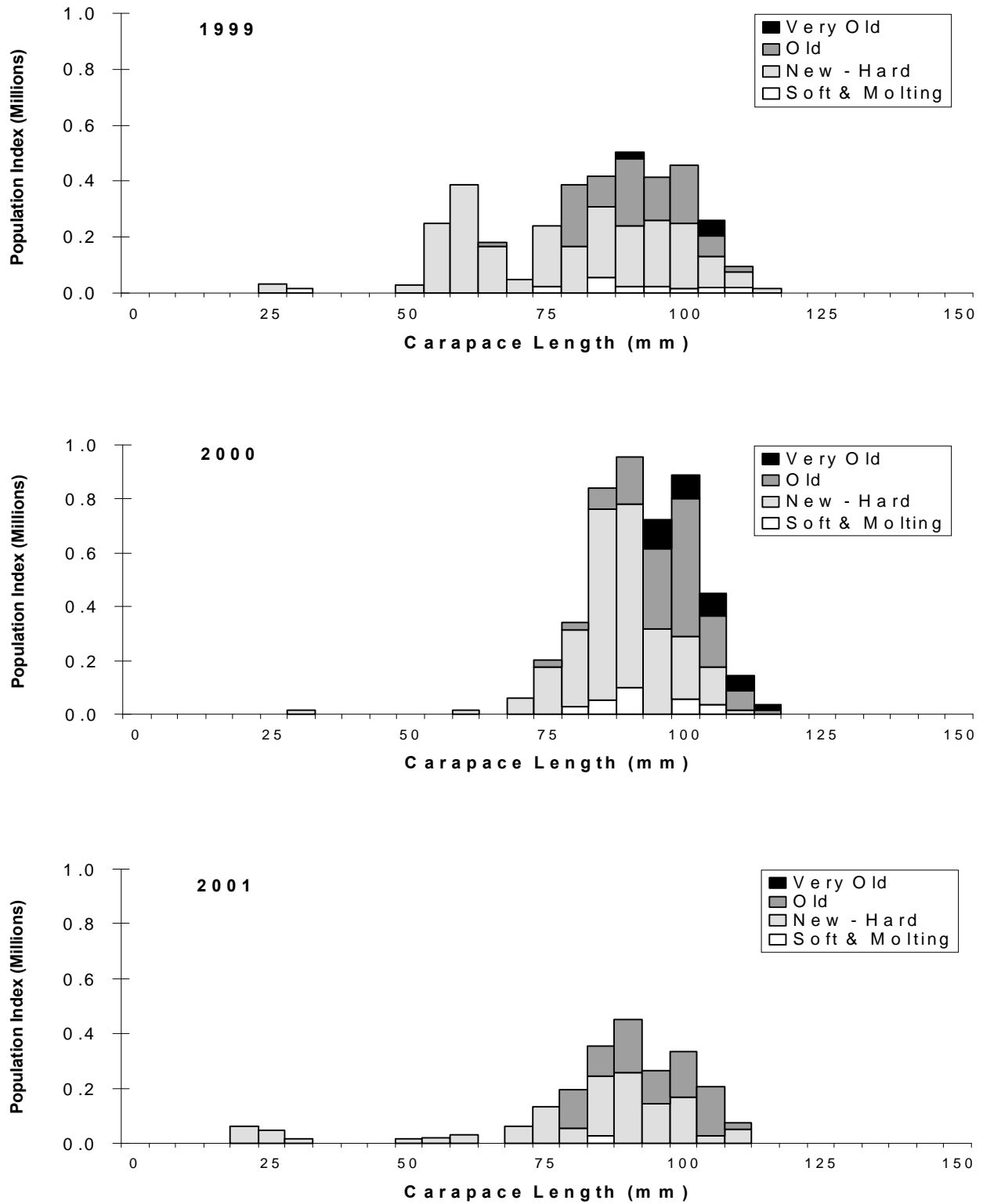


Figure 13. Size-frequency of male hair crab (*E. isenbeckii*), by 5 mm length classes, 1999-2001.

## Hair Crab (*Erimacrus isenbeckii*)

Historically, hair crab have been concentrated just north of the Alaska Peninsula and near the Pribilof Islands (Chart 5 and Table 11). In recent years, however, abundance of hair crab north of 58° N lat. has been increasing. Female and small male crabs are infrequently encountered in this survey, therefore, these data provide little understanding of their distribution.

The abundance index for large ( $\geq 3.25$  in cw or  $\geq 83$  mm cl) male hair crab (Table 6 and Figure 12) is 1.8 million, a 58% decrease from last year and one-half the 20-year average of 3.7 million. Size-frequencies (Figure 13) indicate little recruitment to the stock. The abundance index of total females is usually unreliable. Fifty-eight percent of males and 77% of females were new-hardshell crabs.

Changes in abundance indexes of hair crab are difficult to interpret due to patchy distribution, burying habits, in-shore distribution, and suspected variability in catchability between years. Further, changes in fishery practices and management over the time series decreases the usefulness of correlations between fishery and survey data (Figure 12).

The directed fishery for hair crab in the Pribilof Islands has no statutory minimum legal size regulation, so we have defined large crabs as those larger than a minimum size of 3.25 in cw that has been specified as a condition of permits during recent years. There are also no regulatory districts defined, but management is based on districts defined for red king crab (e.g., Bristol Bay, Pribilofs, and Northern districts). Currently, there are an estimated 1.0 million lbs of large male ( $\geq 83$  mm cw) crabs in the Northern District. A GHF of 236,368 lbs was set for the Northern District in 2000. In 2000, less than 2,000 lbs were taken with CPUE of 0.3 crab/pot-lift.

## Snow Crab (*C. opilio*) - Northern Area

In 2001, we extended survey transects north of St. Matthew Island for a total of twenty-five additional stations (Figure 1). This extension was intended to better define

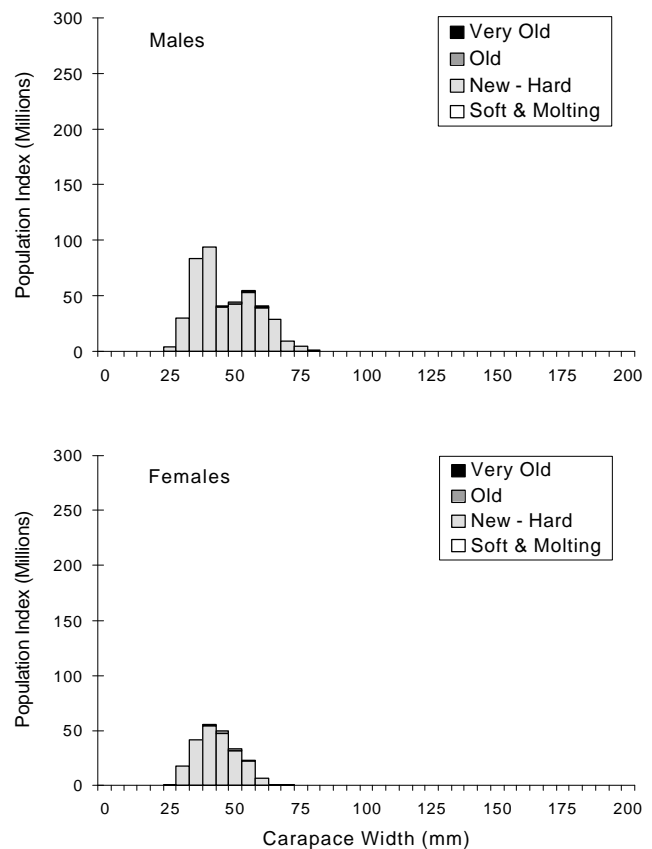


Figure 14. Size-frequency of male and female snow crabs (*C. opilio*) taken in the northern area, by 5 mm width classes in 2001.

the northern distributional boundary of the mature snow crab stock, and particularly the distribution of mature females. The distribution of juvenile snow crab in this area was also of interest in terms of insight into subsequent patterns of recruitment to the adult stock. Since these stations have not been part of the survey data time series from which guideline harvest levels or overfishing definitions are derived, they are not included for the purpose of making survey estimates.

In the northern area, the abundance index of small ( $<78$  mm cw) male snow crab was 432.4 million (99.3% of total males), while pre-recruit male crab (78-101 mm cw) were estimated at 3.1 million (0.7% of total). No large ( $\geq 102$  mm cw) males were taken. The vast majority (98.2%) of male crabs were new-hardshells indicating a recent molt, 0.2% were in molting or softshell condition, and 1.6% were oldshells. The abundance index of small

(<50 mm cw) female crab was 165.6 million (72.1% of total females), compared to 64.2 million (27.9% of total) for large ( $\geq 50$  mm cw) females. Among all female crab, 96.7% were new-hardshells, and 26.3% were mature. The abundance indices of the different sex and size groups in the north, relative to those in the standard survey area, are shown in Table 5.

In general, both males and females were considerably smaller in the northern area (Figure 14) than their counterparts to the south (Figure 11). The modal length of the smallest size mode (40-44 mm cw) was identical in both areas. The absence of larger size modes in the north is consistent with the idea that snow crab move south and west as they grow and mature. Mature female crab were taken in both areas, however they represented a larger fraction of total females in the southern area (71.6%) than in the north (26.3%). In eastern Canada, mature female snow crab from the coldest waters produce an egg clutch every other year. The possibility that this also occurs in the eastern Bering Sea is currently under study.

### Acknowledgments

Successful completion of the annual EBS crab and groundfish survey is crucially dependent on the skippers and crews of the participating vessels. We wish to extend a special thanks to Glenn Sullivan and Rich Hoyer of the F/V *Arcturus* and Norman Bakken and Jeff Boddington of the F/V *Aldebaran* and their crews.

We also wish to thank all of the people who participated in this survey, including P. Cummiskey, K. Gravel, J. Kuras, E. Munk, B. Otto, S. Persselin, B. Stevens, and K. Swiney. This document was produced by J. Corlew.

## APPENDIX A

### Methods of Estimating Crab Population Size

Population abundance indices are determined by the 'area-swept' method, using a stratified systematic sampling design. Distance traveled by the trawl was determined from positions recorded at the beginning and ending of each tow. Area fished (area swept by the trawl) was calculated by multiplying the distance traveled by the effective width of the trawl. Wingspread on this trawl ranges from 47-58 ft. For consistency with previous reports an effective width of 50 ft (15.2 m) was assumed.

All stations (grid squares) within a district or management area were used for estimating the abundance of each species. Stations where multiple (corner or repeat) tows were made were grouped into strata; these include a block of 12 stations southwest of St. Matthew Island and 16 stations around St. Paul Island.

The catch-per-unit-effort (CPUE) was calculated for each station as number of crabs per square nautical mile. Average CPUE was calculated within each multiple tow block and

each management district. Abundance indices were calculated by extrapolating the average CPUE of each size/sex group over the geographic area of each district. Variance and standard error (SE) of the index were calculated arithmetically. Confidence intervals were calculated by adding or subtracting 2 SEs to the population estimate. Note that, since the data are usually not normally distributed, variance estimates and confidence intervals are approximate. Nevertheless, they are provided in order to indicate the range of the data relative to previous years' estimates.

Threshold levels have been established for certain crab stocks by the Crab Plan Team of The North Pacific Fishery Management Council. In accordance with Alaska Board of Fisheries policy, and the Alaska Department of Fish and Game's Management Plan for Westward Region Crab stocks, such fisheries will be closed if the abundance index falls below the threshold level.

## APPENDIX B

### Crab Shell Condition

All crabs measured in the NMFS eastern Bering Sea trawl survey are coded as to shell condition. Shell condition incorporates several factors including exoskeleton discoloration, scratching and wear, and fouling by encrusting organisms, and can be used to estimate the time since a crab has last molted. The shell condition categories used in this report and the estimated times since last molting that they imply are given below:

**Molting<sup>1</sup>:** Joints swollen and/or well developed second exoskeleton present. Crab is actively molting or will molt within days.

**Softshell<sup>1</sup>:** Carapace is still soft and pliable from recent molt. Crab has molted within weeks.

**New-hardshell:** Carapace firm to hard and lacking scratches, wear, discoloration, and encrusting organisms. Crab has probably molted within the last year.

**Oldshell:** Usually has at least some scratching, spine wear. Crab may have darker coloration, and encrusting organisms are frequently present. Crab has probably not molted within the last year.

**Very oldshell:** Undersides of legs yellowed; abundant scratches and stains; spines and claws very worn; encrusting organisms almost always present and often abundant. Time since the last molting is almost certainly greater than one year but not definitely known.

**Very, very oldshell:** Shells extensively stained and usually with extensive cover of encrusting organisms. Time since the last molting not definitely known.

<sup>1</sup> Note that in the report, Molting and Softshell categories are frequently combined. The time span over which these conditions occur in a crab is only a matter of weeks. A high percentage of molting and softshell crabs in a survey population indicates that the molting season is not yet over.

## APPENDIX C

### Overfishing Definitions Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

The Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs (FMP) was rewritten in 1998. The FMP does not include hair crab. For the king, Tanner and snow crab stocks that the NMFS surveys annually, there have been changes in management targets and constraints that reflect changes in the MSFCMA. These changes did not materially affect management decision making until the 1999-2000 fishing seasons because the Tanner crab fishery had already been closed due to low stock abundance following the 1996 season. This Appendix provides an explanation of how the North Pacific Fishery Management Council's Crab Plan Team defined management parameters as required under the new MSFCMA.

The FMP delegates many management measures to the State of Alaska, including the determination of harvest rate or annual Guideline Harvest Level (GHL) for each fishery. GHLs are constrained such that overfishing is prevented or, in the case of overfished stocks, that stocks may be allowed to recover at a rate specified by a required recovery plan (usually within 10 years). In essence, State harvest strategies may be more conservative than those specified by the FMP but may not be less so.

Crab fisheries in the eastern Bering Sea (EBS) were never prosecuted in a manner similar to finfish fisheries. In the latter, the entire mature segment of a population (frequently called spawning biomass) is typically vulnerable to fishing and sustainable yield (SY) or its maximum (MSY) can be regarded as a biological parameter related to stock productivity and mortality. By contrast, EBS crab fisheries have been subject to various constraints since their inception in the 1940s. These constraints restricted fisheries from harvesting substantial portions of the mature population.

These included prohibition of harvesting of females, and the setting of size limits to ensure that males would have at least one opportunity to breed before reaching legal size. Typically, EBS crab fisheries have also been constrained by quotas or guideline harvest levels (GHLs) that, by policy, were intended to promote stability in the face of variable recruitment, even if it were necessary to forego some harvest.

In the previous editions of the FMP, the mean catch over the history of a fully developed fishery was considered as MSY for a given stock. Considering the history of regulations imposed and in light of the MSFCMA, the averaged crab catch history is more closely related to optimum sustainable yield (OSY) than to MSY. This is because the regulatory process has considered social (e.g., desire for stabilized economy), economic (e.g., processing costs and marketability of females and small males) as well as biological (e.g., growth, mortality, abundance) factors.

For the new FMP, MSY is computed on the basis of what is known of the abundance of the mature portion of the population, or total mature biomass (TMB). Note that TMB is simply an estimate, or index, of the total biomass of individuals that are physiologically mature and makes no assumptions as to what proportion of them actually spawn (spawning biomass or SB). Various State harvest strategies do consider estimated spawning biomass and are hence examples of more conservative management (see Zheng et al. 1997).

A fixed fraction of the annual TMB is considered as SY for that year and the average of SYs over a suitable period of time is considered as MSY. In the FMP, it is assumed that the level of instantaneous fishing mortality (F) that corresponds to MSY is equal to the natural mortality (M) of an unfished stock:

$$F = M = F_{msy}$$

This strategy is considered as moderately conservative and is one of several that are recommended for situations where moderate amounts of pertinent data are available (Restrepo et al. 1998). The value of M was determined by taking the largest crab size observed during surveys or other sampling conducted prior to the development of substantial fishing (Wallace et al. 1949, NMFS unpublished), converting this to estimated age and then computing M from equations given by Hoenig (1983). Longevity of Bristol Bay red king crab was considered as representative for all king crabs (genera *Paralithodes* and *Lithodes*) and that of Bering Sea Tanner crab (*Chionoecetes bairdi*) representative for the genus *Chionoecetes*. The largest red king crab observed by Wallace et al. (1949) was 197 mm in carapace length (cl) and the largest known from Bristol Bay fisheries are 205 mm cl. Growth models (e.g., Balsiger 1974) indicate that a male crab of 157 mm is about 14 years old while tagging studies indicate that a king crab of this size may be recovered as much as 6 years later. The maximum age of red king crab near Kodiak (ADF&G unpublished, news release) was estimated at 24 years. For the purposes of computing MSY, values of 22 to 24 years were considered as maximum and correspond to F-values of 0.19 to 0.20. A value of F=0.20 was chosen for king crab. During the 1969 and 1970 NMFS trawl surveys, 20,117 Tanner crab were measured and a maximum size of 199 mm carapace width (cw) was obtained. Using Somerton's (1981) growth model as well as tagging data, a Tanner crab of this size would be approximately 15 years of age, which corresponds to F = 0.295. A value of F=0.30 was chosen for computing MSY.

In each year, the TMB for surveyed stocks was computed by considering the vulnerability (V = probability of capture in the survey), the proportion mature (P), the mean weight

(W) and unadjusted survey index (N) for of the i-th size group (5 mm steps) of each sex group. The mature biomass (B) for a given (i-th) 5 mm size group for the j-th sex (males=1, females =2) was calculated as :

$$B_{ij} = N_{ij} * W_{ij} * P_{ij} / V_{ij}$$

The TMB for a given year is the sum of B over size and sex. This is considered as an estimate of the annual average biomass theoretically available for harvest (W \* NA/Z considered equivalent to TMB). This simplifies Baranov's catch (C) equation to:

$$C = F * TMB = SY.$$

This was done because the timing of fisheries relative to the survey or to recruitment is in part an OY consideration and also varies from stock to stock.

MSY computations require that environmental (including ecological) conditions remain reasonably constant over the period during which SYs are averaged. In this FMP, the 15-year period (1983-1997) was considered representative of current environmental conditions because: 1) several crab stocks declined from the 1970s until the early 1980s and then stabilized somewhat (e.g., Bristol Bay red king crab); 2) predator/competitor fish populations that increased sharply in the late 1970s (regime shift) seem to have stabilized somewhat by 1983; 3) recruitment from the generally high crab populations of the 1970s would have been evident or have dissipated by 1983 ; and 4) for less stable stocks, abundance went through both high and low periods within these 15 years although it was generally less than that of the 1970s. In choosing 1983-97, the Plan Team recognized that MSY would be much reduced, for many stocks, as compared to a longer time series but felt that it was extremely important to choose a period that was representative of current environmental conditions. It is recognized that MSY estimates will have to be periodically evaluated and up-



dated as more information becomes available and as environmental conditions may change. Over a representative period, the MSY is considered as the average harvest that could be sustained by a stock if the fishery were to exploit all mature crabs. In practice, due to constraints noted above, the harvest of legal male crab will be much less than MSY.

The average of annual sustainable yields (SY) is taken as MSY, and the average of the TMBs, providing these SY estimates are taken as the MSY biomass. A stock is considered overfished if the TMB falls below 50% of the MSY biomass, which is also referred to as the minimum stock size threshold (MSST). The status of surveyed stocks relative to MSST is summarized in Figures C-1 through C-3.

Tanner crab, St. Matthew Island blue king crab, and snow crab are currently considered overfished. A rebuilding plan for Tanner crab was approved by the Alaska Board of Fisheries and approved by the Secretary of Commerce in 1998. Approved rebuilding plans for St. Matthew Island blue king crab and EBS snow crab followed in 1999 and 2000 respectively.

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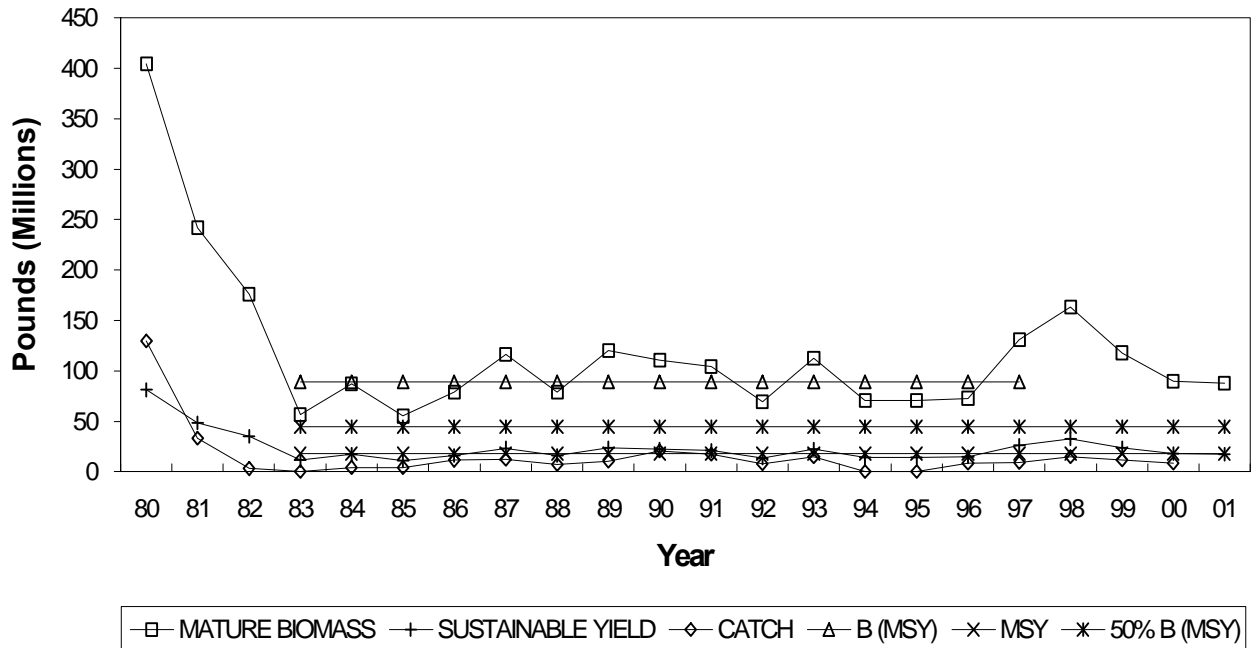
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### Bristol Bay Red King Crab History vs. Overfishing Definition



### Pribilof Islands Red King Crab History vs. Overfishing Definition

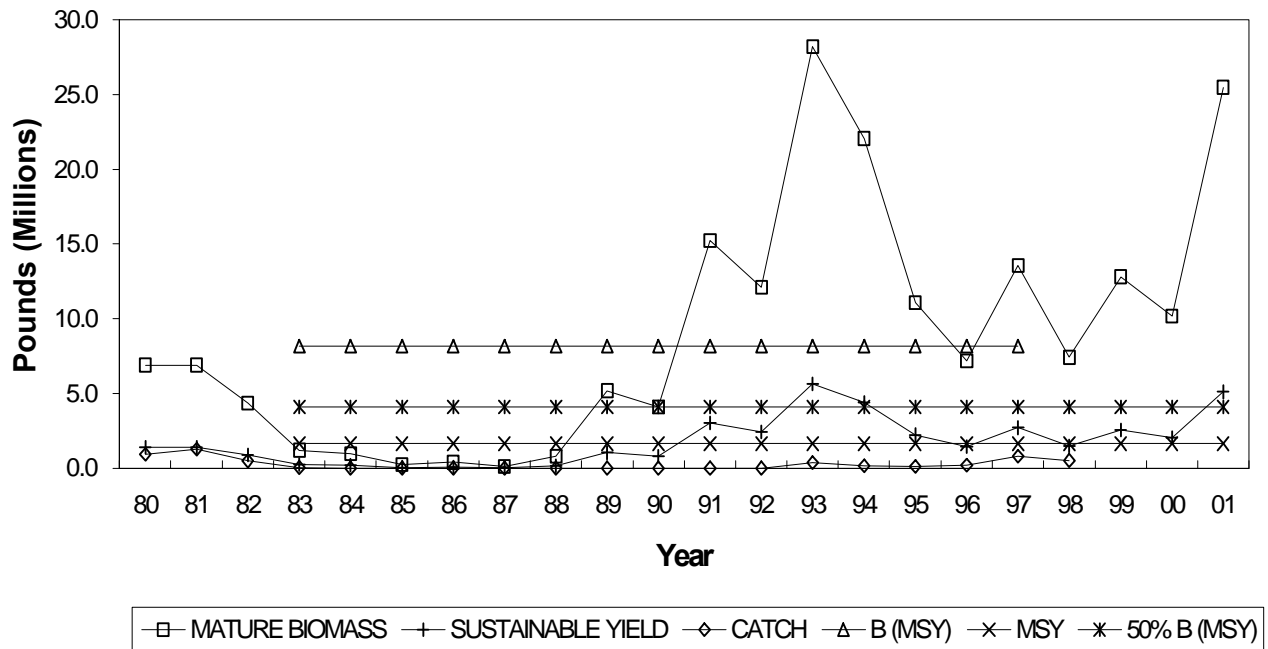
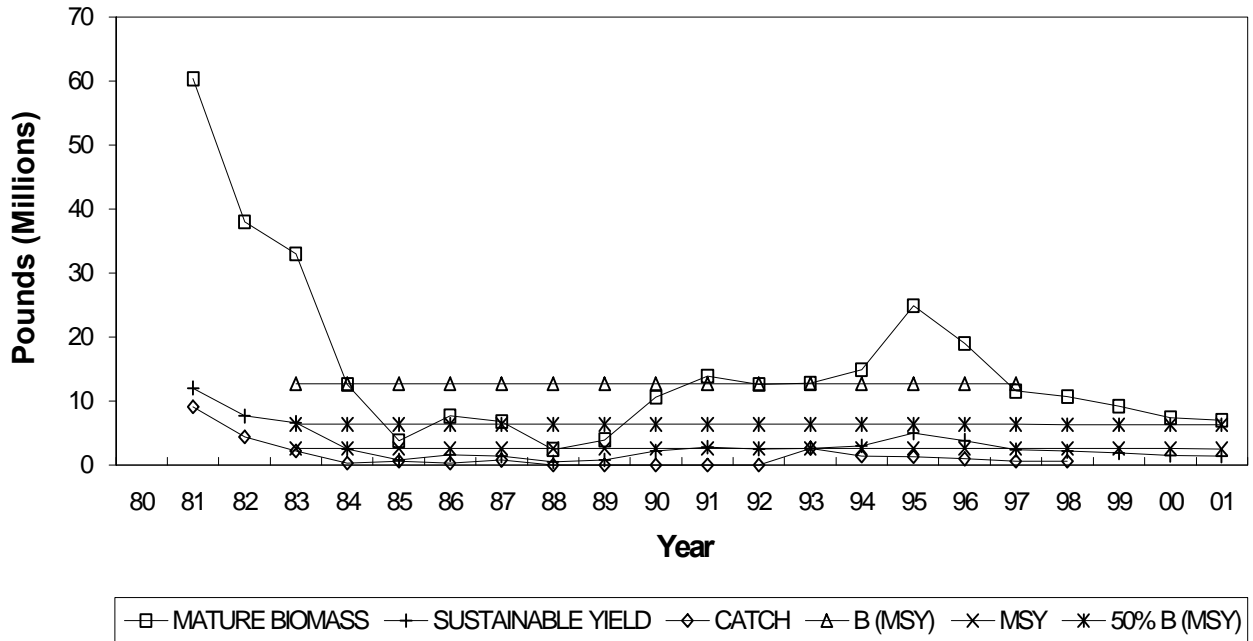


Figure C-1. History of Bristol Bay and Pribilof Islands red king crab fisheries relative to overfishing under the Magnuson-Stevens Fishery Conservation and Management Act. Stocks are considered overfished if mature biomass is below 50% MSY.

### Pribilof Islands Blue King Crab History vs. Overfishing Definition



### St. Matthew Island Blue King Crab History vs. Overfishing Definition

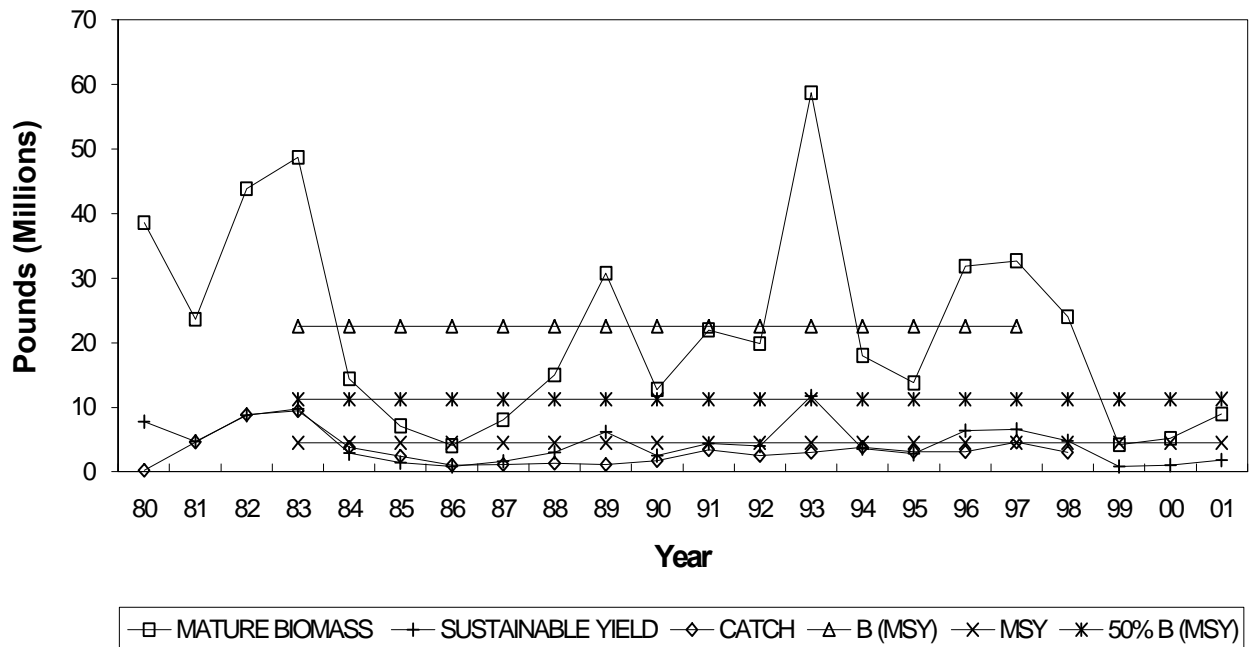
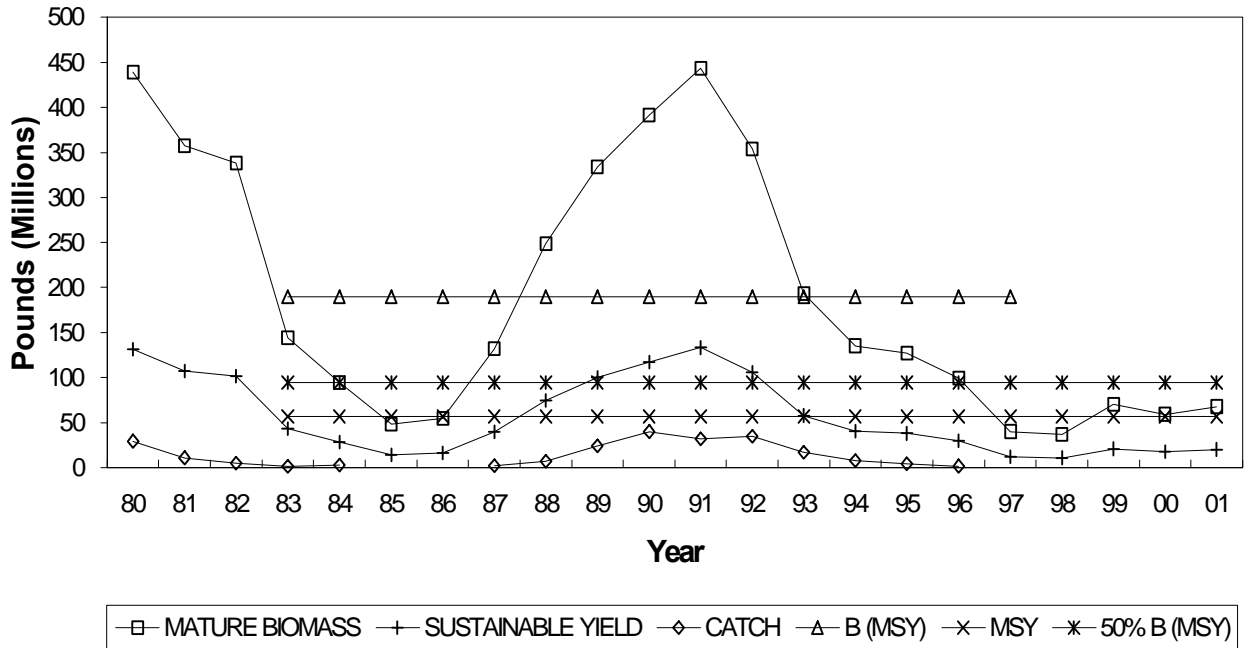


Figure C-2. History of Pribilof Islands and St. Matthew Island blue king crab fisheries relative to overfishing under the Magnuson-Stevens Fishery Conservation and Management Act. The St. Matthew Island stock is considered overfished because mature biomass falls below 50% MSY.

### Eastern Bering Sea Tanner Crab History vs. Overfishing Definition



### Eastern Bering Sea Snow Crab History vs. Overfishing Definition

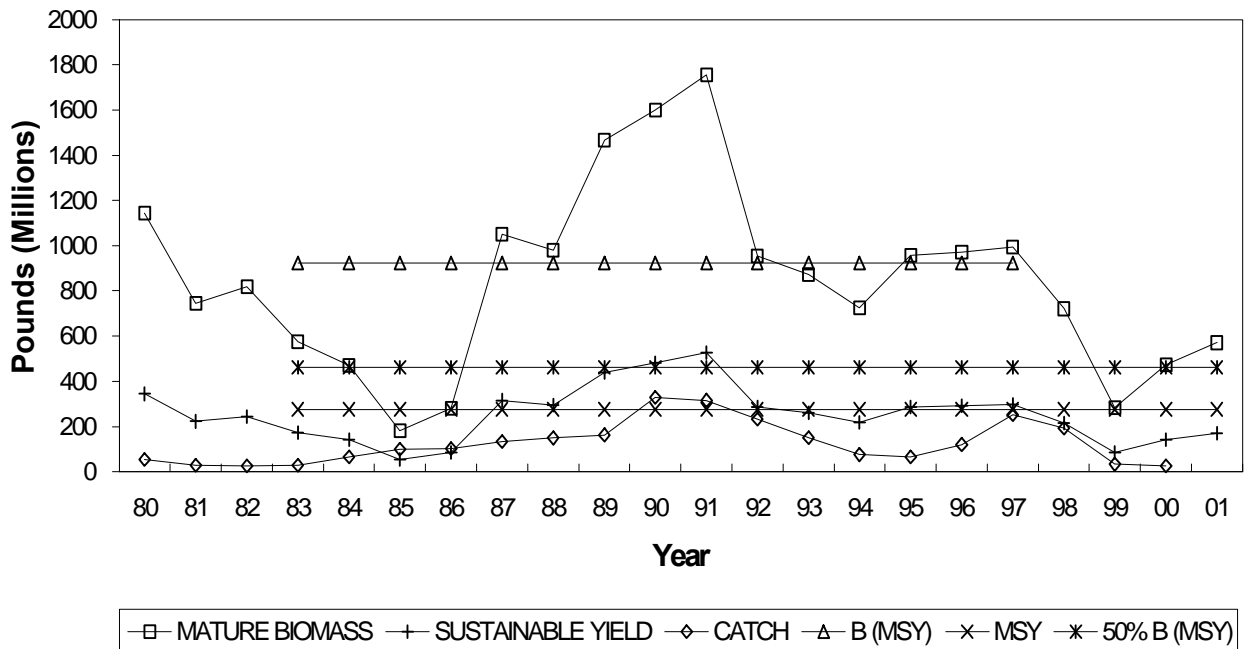
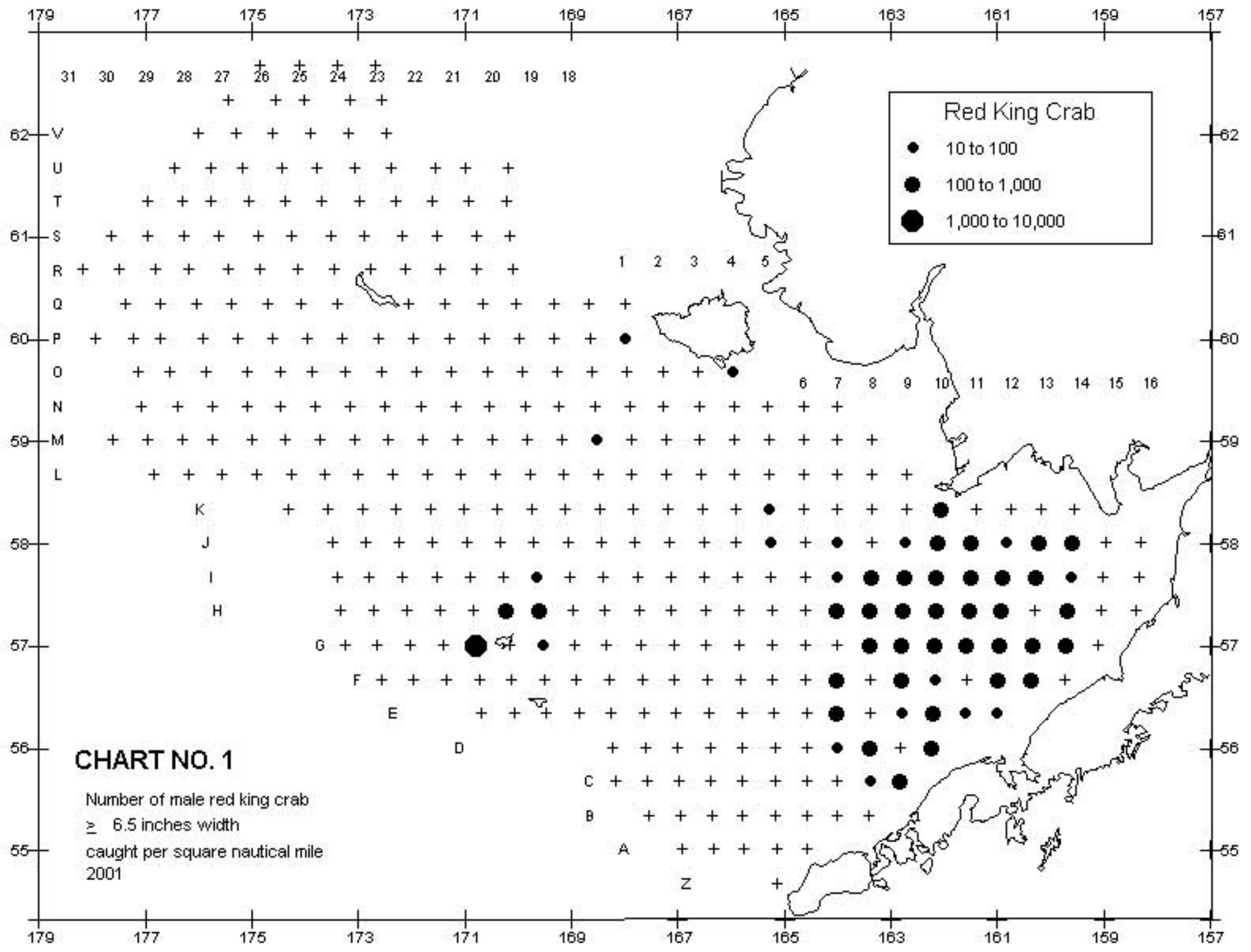
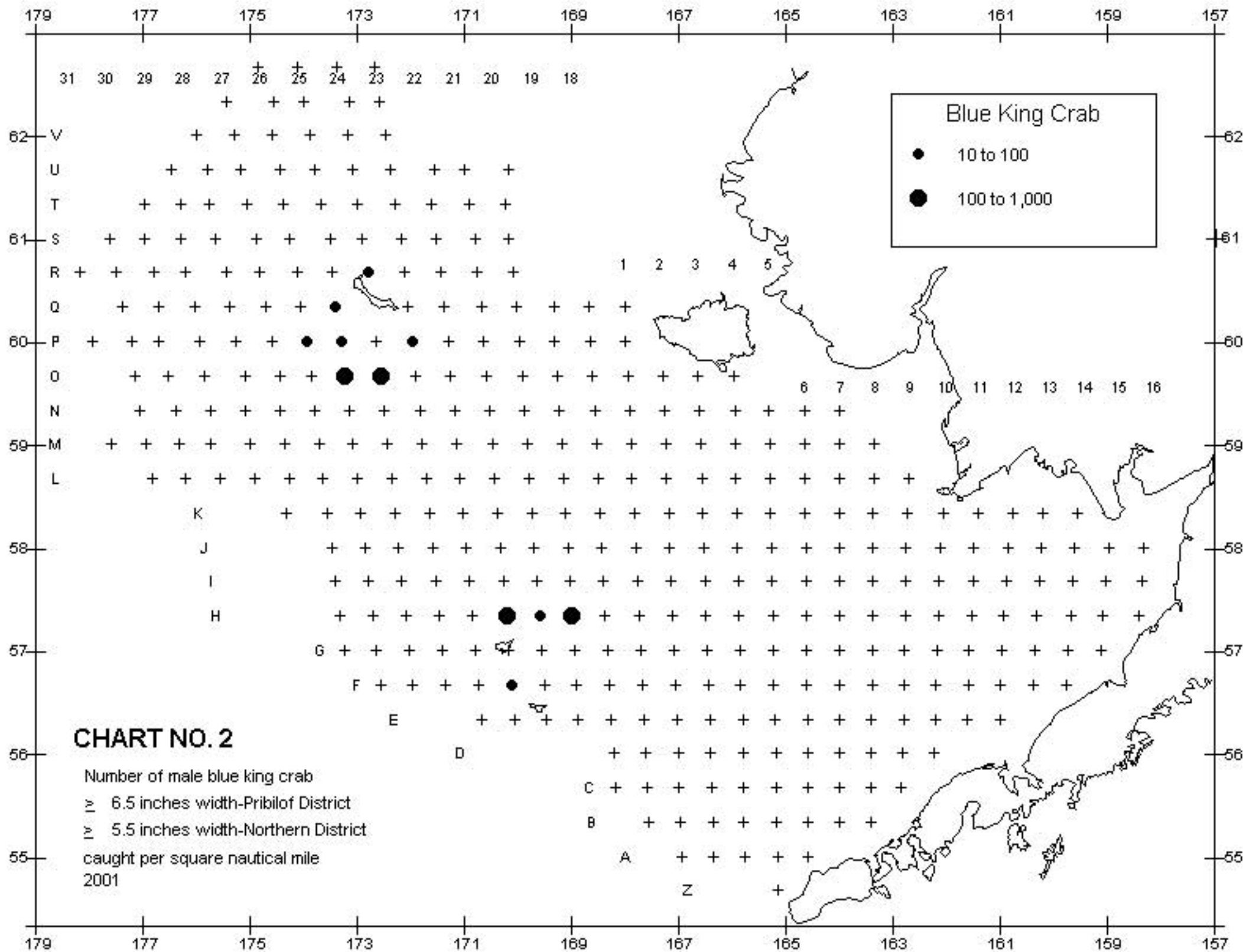
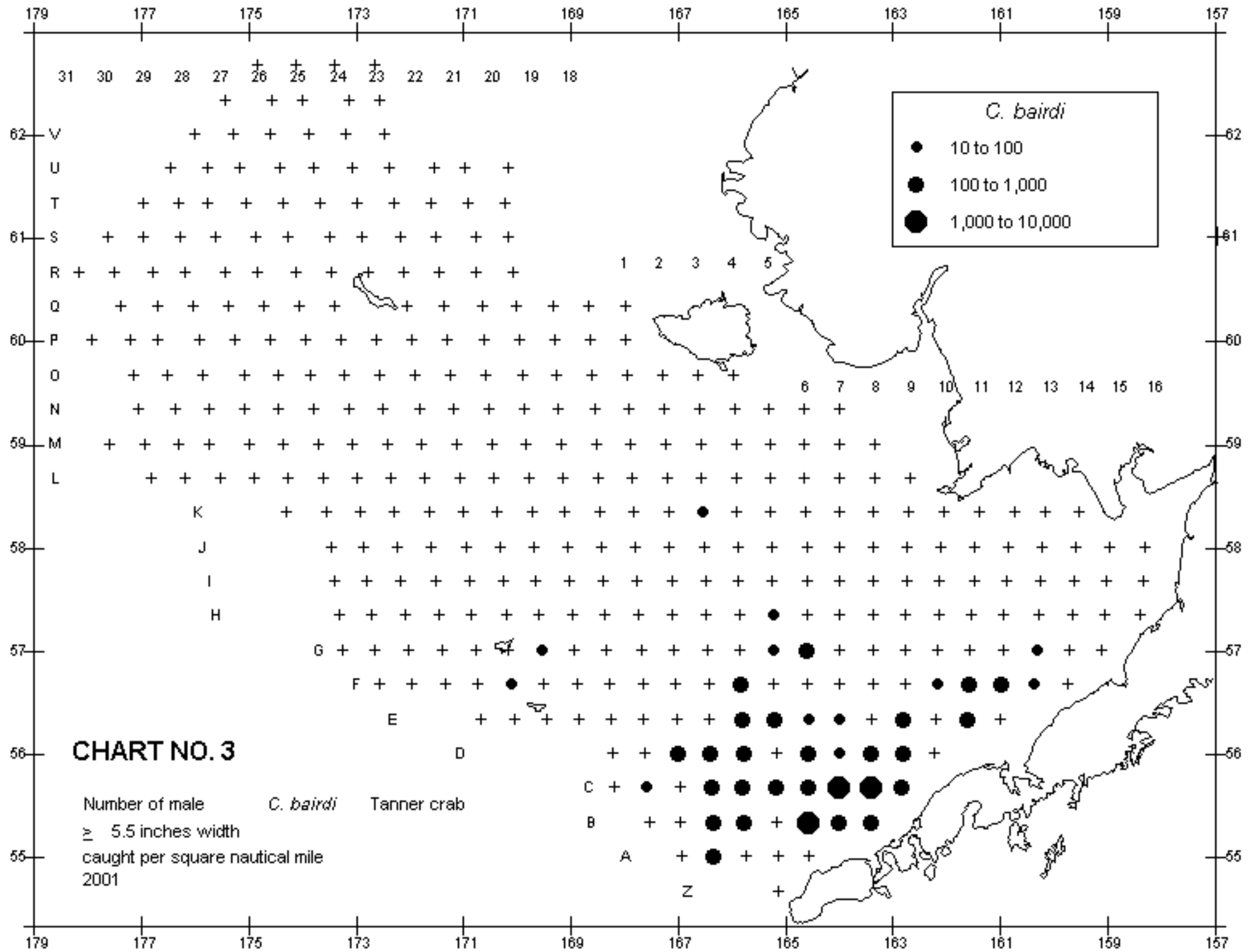
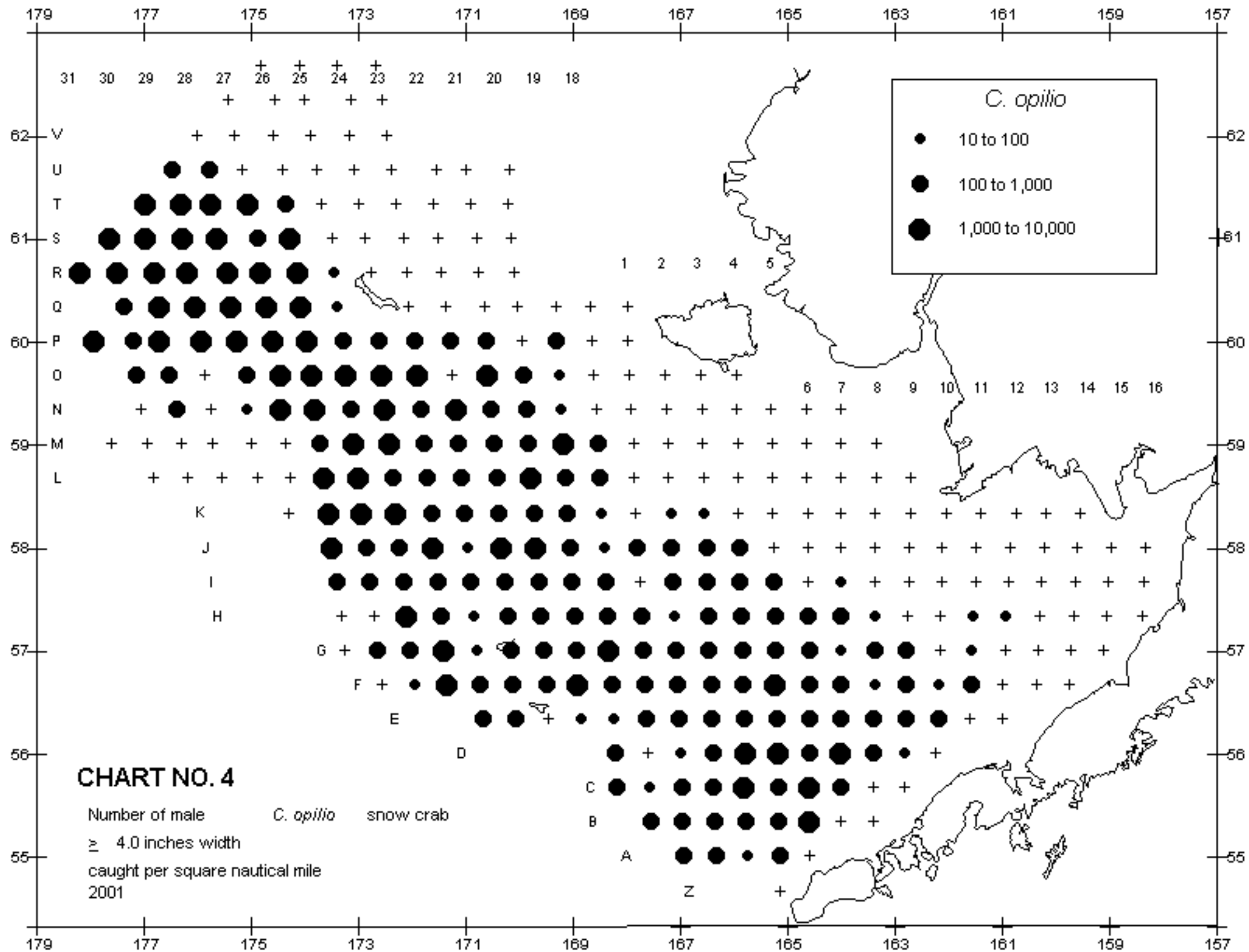


Figure C-3. History of eastern Bering Sea Tanner and snow crab fisheries relative to overfishing under the Magnuson-Stevens Fishery Conservation and Management Act. Both stocks are considered overfished because mature biomass is below 50% MSY.













**Table 7. Summary of crab density by tow (# per square nmi) for Red King Crab. (*Paralithodes camtschaticus*)**

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
C08	6/8/01	55 39.1	163 24.8	42	79	0	0	79	0	0	0	79
C09	6/3/01	55 39.7	162 51.0	27	304	152	0	456	76	0	76	532
D07	6/8/01	55 58.9	163 57.7	48	78	0	0	78	0	0	0	78
D08	6/8/01	55 59.6	163 24.4	46	241	0	0	241	0	0	0	241
D09	6/3/01	56 0.0	162 48.9	41	0	81	161	242	403	0	403	645
D10	6/3/01	56 0.1	162 13.8	37	854	776	233	1863	1164	0	1164	3027
E07	6/8/01	56 20.5	163 58.6	45	837	167	0	1004	0	0	0	1004
E08	6/8/01	56 18.5	163 24.8	45	0	168	0	168	0	0	0	168
E09	6/3/01	56 20.2	162 47.4	41	78	156	0	234	78	0	78	313
E10	6/3/01	56 20.1	162 11.2	40	169	85	761	1015	3977	169	4146	5161
E11	6/3/01	56 19.8	161 37.1	33	80	160	160	400	1041	0	1041	1442
E12	6/3/01	56 19.7	160 59.9	28	82	82	164	329	821	0	821	1150
F07	6/8/01	56 37.0	163 55.9	40	113	0	0	113	0	0	0	113
F08	6/8/01	56 39.5	163 21.3	40	0	83	0	83	0	0	0	83
F09	6/4/01	56 39.8	162 46.4	38	458	153	458	1068	76	0	76	1144
F10	6/4/01	56 39.7	162 9.8	39	74	0	1103	1177	2206	441	2648	3825
F11	6/4/01	56 39.7	161 36.5	48	0	158	1585	1743	10777	475	11253	12996
F12	6/3/01	56 41.3	160 58.9	36	330	907	1237	2473	2391	0	2391	4864
F13	5/31/01	56 41.1	160 22.3	32	329	657	1807	2793	4271	82	4353	7146
G08	6/7/01	56 59.1	163 22.9	34	310	310	310	931	155	0	155	1086
G09	6/4/01	57 0.1	162 46.6	32	325	487	325	1137	325	162	487	1625
G10	6/4/01	57 0.1	162 9.8	31	246	82	657	986	164	0	164	1150
G11	6/2/01	56 59.8	161 34.5	36	157	157	392	706	471	0	471	1176
G12	6/2/01	56 59.5	160 56.8	34	245	408	3180	3833	1794	1631	3425	7257
G13	5/31/01	57 0.4	160 19.7	32	638	239	638	1516	1117	80	1197	2713
G14	5/31/01	56 59.9	159 43.0	30	322	643	482	1447	482	0	482	1929
G15	5/31/01	56 59.9	159 7.3	16	0	81	81	162	0	0	0	162
G20	6/28/01	57 0.3	169 32.9	32	79	0	0	79	0	0	0	79
G22	6/28/01	57 6.9	170 27.7	26	5981	11332	6374	23686	18617	0	18617	42303
H07	6/7/01	57 19.7	164 0.5	32	316	0	0	316	0	0	0	316
H08	6/7/01	57 19.4	163 23.3	27	645	81	0	726	0	0	0	726
H09	6/4/01	57 20.0	162 45.9	25	571	652	163	1386	82	0	82	1468
H10	6/4/01	57 19.8	162 9.8	26	472	315	472	1259	472	79	551	1810

Table 7. Summary of crab density by tow (# per square nmi) for Red King Crab. (*Paralithodes camtschaticus*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
H11	6/2/01	57 19.9	161 33.0	28	400	0	240	641	801	0	801	1442
H12	6/2/01	57 19.3	160 56.5	32	151	226	1656	2032	10990	0	10990	13022
H13	5/31/01	57 18.3	160 18.5	30	0	292	292	585	731	0	731	1315
H14	5/31/01	57 20.3	159 40.8	29	164	246	491	900	409	0	409	1309
H15	5/30/01	57 21.3	159 1.9	25	0	81	0	81	81	161	242	323
H16	5/29/01	57 21.3	158 24.2	17	0	0	85	85	0	0	0	85
H20	6/29/01	57 19.6	169 34.0	34	1092	168	0	1260	0	0	0	1260
H20	6/24/01	57 29.6	169 21.9	37	80	0	0	80	0	0	0	80
H21	6/28/01	57 10.1	169 53.1	26	0	0	0	0	0	83	83	83
H21	6/29/01	57 29.9	169 59.3	36	954	0	0	954	0	0	0	954
I07	6/7/01	57 39.7	164 0.1	26	83	0	0	83	0	0	0	83
I08	6/7/01	57 39.9	163 21.1	25	152	0	76	228	76	0	76	304
I09	6/4/01	57 39.9	162 44.9	22	479	239	80	798	80	0	80	878
I10	6/4/01	57 40.3	162 8.5	24	160	0	320	481	320	0	320	801
I11	6/2/01	57 39.9	161 30.4	27	405	243	1052	1700	2995	729	3724	5424
I12	6/2/01	57 38.2	160 54.3	30	367	220	440	1026	586	0	586	1613
I13	6/1/01	57 40.1	160 15.8	28	627	78	78	784	549	0	549	1333
I14	6/1/01	57 40.1	159 36.8	26	76	302	227	604	680	0	680	1284
I15	5/30/01	57 39.6	159 0.9	24	0	0	81	81	0	81	81	161
I20	6/29/01	57 39.9	169 39.4	37	80	0	0	80	0	0	0	80
J05	6/12/01	57 59.6	165 14.8	26	80	0	80	160	0	0	0	160
J07	6/7/01	58 0.0	164 0.8	24	80	0	0	80	80	0	80	161
J08	6/7/01	57 59.6	163 22.4	22	0	82	0	82	0	0	0	82
J09	6/4/01	57 59.9	162 45.0	20	82	0	0	82	0	0	0	82
J10	6/5/01	57 59.9	162 6.3	19	161	81	81	323	242	0	242	565
J11	6/2/01	57 59.6	161 29.0	28	163	82	571	815	408	734	1142	1957
J12	6/2/01	57 58.9	160 49.7	24	75	300	4501	4876	1951	4726	6677	11553
J13	6/1/01	57 59.7	160 13.1	26	750	834	250	1834	1084	83	1167	3001
J14	6/1/01	58 0.9	159 36.5	22	153	153	0	306	153	0	153	459
J15	5/30/01	57 59.1	158 57.0	20	0	0	0	0	0	77	77	77
J21	6/29/01	58 0.1	170 20.0	39	0	0	76	76	0	0	0	76
K05	6/12/01	58 20.1	165 17.4	23	80	0	0	80	80	0	80	161
K10	6/5/01	58 20.4	162 3.2	24	252	168	168	588	0	0	0	588

**Table 7. Summary of crab density by tow (# per square nmi) for Red King Crab. (*Paralithodes camtschaticus*)**

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
K11	6/2/01	58 13.2	161 32.7	20	0	153	0	153	0	0	0	153
K13	6/1/01	58 17.2	159 58.1	23	0	0	438	438	146	0	146	585
L05	6/12/01	58 39.6	165 19.9	20	0	0	0	0	84	0	84	84
L06	6/12/01	58 39.7	164 39.6	19	0	84	0	84	0	0	0	84
L07	6/6/01	58 39.7	164 0.7	17	0	0	0	0	79	0	79	79
L19	6/24/01	58 39.7	169 9.0	33	0	0	0	0	82	0	82	82
M01	6/22/01	59 0.7	167 52.9	20	0	78	0	78	0	0	0	78
M02	6/22/01	58 59.3	167 13.1	20	0	0	0	0	93	0	93	93
M18	6/23/01	58 59.7	168 33.3	24	85	0	0	85	85	0	85	170
N01	6/22/01	59 19.2	167 55.3	20	0	0	86	86	0	0	0	86
O02	6/22/01	59 39.5	167 18.7	15	0	0	0	0	0	73	73	73
O04	6/13/01	59 37.0	165 57.2	13	77	0	0	77	77	0	77	154
O18	6/23/01	59 39.7	168 37.0	20	0	0	0	0	87	0	87	87
P01	6/22/01	59 60.0	167 59.3	13	81	0	0	81	0	0	0	81
Q01	6/22/01	60 20.8	167 59.5	15	0	0	0	0	87	0	87	87

NOTE: Minimum carapace sizes used are: Large Males > 6.5 in; Medium Males = 5.2 to 6.5 in; Large Females > 4.3 in.

**Table 8A. Summary of crab density by tow (# per square nmi) for Pribilofs Blue Kings. (*Paralithodes platypus*)**

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
F20	6/28/01	56 39.9	169 29.9	42	0	0	0	0	162	0	162	162
F20	6/26/01	56 49.8	169 18.6	42	0	0	0	0	75	0	75	75
F21	6/28/01	56 50.0	169 52.3	38	78	0	0	78	78	0	78	156
G19	6/26/01	57 9.7	168 40.1	40	0	0	0	0	78	0	78	78
G20	6/28/01	57 0.3	169 32.9	32	0	0	0	0	395	0	395	395
G20	6/26/01	57 9.8	169 18.9	38	0	0	0	0	673	0	673	673
H19	6/24/01	57 29.9	168 45.9	37	0	163	0	163	82	0	82	245
H19	6/26/01	57 19.6	168 59.5	37	1426	317	79	1823	5547	0	5547	7370
H20	6/29/01	57 19.6	169 34.0	34	84	0	0	84	252	0	252	336
H20	6/24/01	57 29.6	169 21.9	37	0	0	0	0	0	80	80	80
H21	6/28/01	57 10.1	169 53.1	26	248	83	0	331	0	0	0	331
H21	6/29/01	57 29.9	169 59.3	36	80	0	0	80	0	0	0	80
I19	6/24/01	57 39.9	169 2.6	36	0	0	84	84	0	0	0	84

NOTE: Minimum carapace sizes used are: Large Males > 6.5 in; Medium Males = 5.2 to 6.5 in; Large Females > 4.3 in.

**Table 8B. Summary of crab density by tow (# per square nmi) for St. Matt. Blue Kings. (*Paralithodes platypus*)**

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
N25	7/10/01	59 20.0	173 9.1	53	86	0	0	86	0	0	0	86
O24	7/10/01	59 40.0	172 33.8	44	324	0	0	324	0	0	0	324
O25	7/10/01	59 30.2	172 52.5	50	402	0	0	402	0	0	0	402
O25	7/10/01	59 49.9	172 54.6	41	623	389	156	1168	0	0	0	1168
O25	7/10/01	59 40.0	173 13.9	50	718	0	0	718	0	0	0	718
P19	6/23/01	60 0.7	169 19.2	24	0	0	80	80	0	0	0	80
P23	7/3/01	59 59.8	171 57.8	34	0	78	0	78	78	0	78	156
P23	7/3/01	59 50.1	172 15.2	39	154	0	0	154	0	0	0	154
P24	7/11/01	60 0.1	172 37.9	35	86	0	0	86	0	0	0	86
P24	7/3/01	60 9.7	172 19.6	30	162	243	162	567	81	0	81	648
P25	7/11/01	60 0.1	173 18.4	39	162	81	162	405	0	0	0	405
P26	7/10/01	59 50.1	173 34.8	50	395	316	79	790	0	0	0	790
Q21	7/1/01	60 19.8	170 39.9	33	82	0	0	82	82	0	82	165
Q23	7/3/01	60 20.3	172 3.4	31	0	0	158	158	0	0	0	158
Q25	7/11/01	60 11.2	173 1.8	31	234	156	1407	1797	391	860	1250	3048
Q25	7/11/01	60 10.0	173 34.3	38	317	238	555	1109	0	79	79	1189
Q25	7/11/01	60 20.0	173 25.5	33	0	450	150	600	0	150	150	750
Q28	7/17/01	60 21.0	175 22.6	60	0	0	0	0	78	0	78	78
R24	7/11/01	60 40.0	172 47.1	22	158	79	158	395	0	0	0	395
U26	7/13/01	61 39.9	174 26.6	42	76	0	0	76	0	0	0	76
W26	7/13/01	62 19.5	174 34.6	38	0	0	0	0	77	0	77	77
W27	7/13/01	62 20.0	175 15.6	41	0	0	0	0	78	0	78	78
X24	7/12/01	62 39.8	173 11.8	33	0	0	80	80	0	80	80	159
X25	7/13/01	62 39.6	173 54.8	37	0	0	80	80	0	80	80	160

NOTE: Minimum carapace sizes used are: Large Males > 5.5 in; Medium Males = 4.3 to 5.5 in; Large Females > 3.8 in.

Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.

(*Chionoecetes bairdi*)

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
A02	6/18/01	55	0.4	166	55.3	78	0	200	15938	16138	333	23915	24248	40386
A03	6/18/01	54	60.0	166	20.5	77	405	2267	12953	15625	4453	22344	26797	42421
A04	6/18/01	54	59.9	165	45.7	69	0	87	31347	31433	261	45218	45479	76912
A04	6/10/01	54	50.3	165	32.4	82	0	0	13150	13150	0	17511	17511	30662
A05	6/10/01	55	0.5	165	9.2	59	0	314	6901	7214	78	10508	10586	17801
B01	6/18/01	55	20.6	167	28.4	77	0	86	4193	4279	0	5306	5306	9584
B02	6/18/01	55	19.9	166	57.1	74	0	264	1143	1407	88	1582	1670	3077
B03	6/18/01	55	21.0	166	21.1	71	406	1219	8450	10075	2844	5200	8044	18118
B04	6/18/01	55	20.8	165	46.5	64	172	687	25449	26308	1289	22768	24057	50365
B05	6/10/01	55	19.9	165	10.5	59	0	504	10581	11085	0	10581	10581	21666
B06	6/10/01	55	21.2	164	32.8	54	3656	1828	5484	10967	1942	4798	6740	17708
B07	6/8/01	55	20.3	164	2.0	42	164	0	327	491	82	82	164	655
B08	6/8/01	55	20.2	163	24.7	27	920	1422	1506	3849	84	335	418	4267
C01	6/20/01	55	39.4	167	35.4	72	83	167	3001	3251	333	9002	9336	12587
C02	6/20/01	55	40.3	166	59.8	72	0	527	615	1143	0	352	352	1495
C03	6/18/01	55	40.4	166	23.1	67	706	1333	1412	3450	314	784	1098	4548
C04	6/19/01	55	40.6	165	47.8	63	729	1731	108478	110938	1593	104846	106440	217378
C05	6/10/01	55	40.6	165	10.0	57	238	317	27241	27796	79	31628	31707	59503
C06	6/10/01	55	38.7	164	34.7	51	420	504	4955	5878	0	9405	9405	15284
C07	6/8/01	55	41.7	164	0.1	49	1172	860	4142	6174	1016	4611	5626	11800
C08	6/8/01	55	39.1	163	24.8	42	1185	1658	1421	4264	237	711	948	5212
C09	6/3/01	55	39.7	162	51.0	27	304	1217	1293	2813	152	76	228	3041
C18	6/27/01	55	39.2	168	11.9	73	0	0	10699	10699	0	18833	18833	29532
D01	6/20/01	56	0.4	167	36.8	71	0	85	2803	2888	85	4077	4161	7049
D02	6/20/01	56	0.9	167	0.6	72	179	804	357	1340	89	0	89	1429
D03	6/19/01	55	59.8	166	23.3	66	333	1667	15671	17671	5001	3751	8752	26424
D04	6/19/01	56	0.5	165	47.8	57	164	655	7775	8593	573	7366	7938	16532
D05	6/10/01	56	0.9	165	12.4	51	0	1117	19154	20271	479	19234	19713	39984
D06	6/10/01	55	59.8	164	36.5	49	395	711	19584	20690	79	21953	22032	42722
D07	6/8/01	55	58.9	163	57.7	48	78	621	11343	12042	233	12438	12671	24712
D08	6/8/01	55	59.6	163	24.4	46	402	643	11735	12780	723	9244	9967	22747
D09	6/3/01	56	0.0	162	48.9	41	242	0	403	645	81	242	323	968
D10	6/3/01	56	0.1	162	13.8	37	0	78	310	388	78	155	233	621

**Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.**

*(Chionoecetes bairdi)*

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
D18	6/27/01	56	0.9	168	13.9	81	0	147	12001	12147	0	15880	15880	28027
E01	6/20/01	56	20.4	167	39.1	68	0	0	8296	8296	82	9610	9692	17988
E02	6/20/01	56	21.2	167	2.6	60	0	246	2046	2292	1309	1146	2455	4747
E03	6/19/01	56	20.4	166	24.9	55	0	837	3765	4602	2845	3598	6442	11044
E04	6/19/01	56	19.8	165	48.5	48	158	237	3396	3790	158	3712	3869	7660
E05	6/11/01	56	20.6	165	11.9	45	233	854	2328	3415	78	1475	1552	4967
E06	6/11/01	56	20.5	164	35.5	45	80	721	2803	3604	240	2643	2883	6487
E07	6/8/01	56	20.5	163	58.6	45	84	586	1339	2008	84	586	669	2677
E08	6/8/01	56	18.5	163	24.8	45	0	756	420	1176	168	420	588	1764
E09	6/3/01	56	20.2	162	47.4	41	156	625	1485	2266	234	156	391	2657
E10	6/3/01	56	20.1	162	11.2	40	0	592	931	1523	85	254	338	1861
E11	6/3/01	56	19.8	161	37.1	33	561	961	320	1842	80	0	80	1922
E12	6/3/01	56	19.7	160	59.9	28	0	164	164	329	0	82	82	411
E18	6/27/01	56	20.3	168	15.0	82	0	701	30121	30822	0	32779	32779	63601
E19	6/27/01	56	20.0	168	53.4	69	0	76	9079	9155	0	10833	10833	19988
E20	6/27/01	56	20.6	169	28.5	75	0	0	7157	7157	0	6209	6209	13366
E21	6/27/01	56	20.4	170	5.4	59	0	153	5205	5359	77	6124	6201	11559
E22	6/27/01	56	20.2	170	41.0	65	0	81	1291	1371	0	887	887	2259
F01	6/20/01	56	40.8	167	40.6	53	0	0	1964	1964	0	1882	1882	3846
F02	6/20/01	56	40.3	167	3.3	50	0	246	1964	2210	82	573	655	2864
F03	6/19/01	56	40.1	166	26.0	44	0	322	3135	3456	322	884	1206	4662
F04	6/19/01	56	39.8	165	50.9	41	162	324	1133	1619	0	405	405	2024
F05	6/11/01	56	40.6	165	12.7	40	0	559	1197	1756	479	479	958	2713
F06	6/11/01	56	41.1	164	35.9	39	0	975	4956	5931	325	812	1137	7069
F07	6/8/01	56	37.0	163	55.9	40	0	113	792	905	226	113	339	1244
F08	6/8/01	56	39.5	163	21.3	40	0	250	1250	1500	83	333	417	1917
F09	6/4/01	56	39.8	162	46.4	38	0	229	687	915	76	534	610	1526
F10	6/4/01	56	39.7	162	9.8	39	74	147	1692	1912	0	294	294	2206
F11	6/4/01	56	39.7	161	36.5	48	951	951	0	1902	0	158	158	2060
F12	6/3/01	56	41.3	160	58.9	36	577	0	907	1484	0	824	824	2308
F13	5/31/01	56	41.1	160	22.3	32	82	411	493	986	0	493	493	1478
F14	5/31/01	56	39.4	159	44.7	18	0	80	0	80	0	0	0	80
F18	6/27/01	56	40.6	168	16.7	57	0	162	18852	19014	81	16051	16132	35146



Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.

(*Chionoecetes bairdi*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
F19	6/27/01	56 40.2	168 55.6	53	0	80	9999	10078	80	15532	15612	25690
F20	6/28/01	56 39.9	169 29.9	42	0	162	1538	1700	81	567	648	2348
F20	6/26/01	56 49.8	169 18.6	42	0	149	10252	10401	75	11218	11292	21693
F21	6/28/01	56 50.0	169 52.3	38	0	156	4142	4298	78	3282	3360	7658
F21	6/28/01	56 40.6	170 7.9	51	160	399	3512	4070	1836	3033	4868	8939
F22	6/27/01	56 40.0	170 44.2	60	0	423	2961	3384	0	2538	2538	5923
F23	7/8/01	56 39.8	171 21.8	63	0	80	2243	2323	0	2963	2963	5286
F24	7/8/01	56 40.1	171 57.9	67	0	90	181	271	0	271	271	542
F25	7/8/01	56 40.3	172 34.1	73	0	0	232	232	0	155	155	387
G01	6/20/01	57 0.3	167 42.3	40	0	158	3487	3645	0	1506	1506	5151
G02	6/20/01	57 0.0	167 5.1	60	0	81	567	648	0	0	0	648
G03	6/19/01	57 0.1	166 28.0	38	0	0	325	325	81	0	81	406
G04	6/19/01	56 59.0	165 50.5	38	0	159	239	398	80	159	239	636
G05	6/11/01	57 0.1	165 12.6	37	77	307	768	1152	0	0	0	1152
G06	6/11/01	56 59.8	164 35.7	37	225	113	1463	1800	225	0	225	2026
G08	6/7/01	56 59.1	163 22.9	34	0	233	931	1164	78	78	155	1319
G09	6/4/01	57 0.1	162 46.6	32	0	0	569	569	0	244	244	812
G10	6/4/01	57 0.1	162 9.8	31	0	0	1068	1068	82	2136	2218	3286
G11	6/2/01	56 59.8	161 34.5	36	0	0	392	392	0	863	863	1255
G12	6/2/01	56 59.5	160 56.8	34	0	163	652	815	0	815	815	1631
G13	5/31/01	57 0.4	160 19.7	32	80	160	239	479	0	0	0	479
G14	5/31/01	56 59.9	159 43.0	30	0	0	80	80	0	0	0	80
G18	6/26/01	56 59.4	168 19.0	43	0	0	12499	12499	246	7366	7611	20110
G19	6/26/01	57 9.7	168 40.1	40	0	0	4906	4906	234	4361	4595	9501
G19	6/26/01	56 50.2	168 37.4	51	0	0	8161	8161	0	10957	10957	19118
G19	6/26/01	56 59.7	168 56.8	42	0	0	1696	1696	0	2235	2235	3931
G20	6/28/01	57 0.3	169 32.9	32	0	790	49246	50036	158	34018	34176	84212
G20	6/26/01	57 9.8	169 18.9	38	75	748	22613	23435	75	20645	20719	44155
G21	6/28/01	56 59.9	170 10.7	37	0	472	1338	1810	79	79	157	1967
G22	7/8/01	57 0.2	170 47.7	51	0	0	632	632	79	158	237	869
G22	6/28/01	56 50.1	170 29.2	54	0	698	8149	8847	233	5355	5588	14435
G22	6/28/01	57 6.9	170 27.7	26	0	79	1259	1338	79	472	551	1889
G23	7/8/01	57 0.2	171 23.7	58	0	239	5906	6145	160	7183	7342	13488

**Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.**

*(Chionoecetes bairdi)*

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
G24	7/8/01	57	0.2	172	2.3	62	0	0	403	403	0	242	242	645
G25	7/8/01	57	0.3	172	41.6	65	0	0	1094	1094	78	1250	1328	2423
G26	7/8/01	57	0.3	173	14.8	75	0	0	85	85	0	169	169	254
H01	6/21/01	57	19.7	167	44.1	38	0	0	402	402	0	241	241	643
H02	6/21/01	57	20.5	167	6.3	37	0	0	2120	2120	245	2772	3017	5137
H04	6/14/01	57	20.3	165	51.2	36	0	260	346	606	87	0	87	692
H05	6/11/01	57	20.0	165	14.0	35	83	0	331	414	83	0	83	496
H06	6/11/01	57	19.4	164	37.0	35	0	83	167	250	0	333	333	583
H07	6/7/01	57	19.7	164	0.5	32	0	0	237	237	0	158	158	395
H08	6/7/01	57	19.4	163	23.3	27	0	242	81	323	0	0	0	323
H09	6/4/01	57	20.0	162	45.9	25	0	326	489	815	0	0	0	815
H11	6/2/01	57	19.9	161	33.0	28	0	0	160	160	0	0	0	160
H12	6/2/01	57	19.3	160	56.5	32	0	0	226	226	0	301	301	527
H13	5/31/01	57	18.3	160	18.5	30	0	0	292	292	0	292	292	585
H15	5/30/01	57	21.3	159	1.9	25	0	0	81	81	0	0	0	81
H18	6/26/01	57	20.5	168	20.9	38	0	0	1352	1352	0	477	477	1829
H19	6/24/01	57	29.9	168	45.9	37	0	0	245	245	82	245	326	571
H19	6/26/01	57	19.6	168	59.5	37	0	79	317	396	0	79	79	475
H20	6/29/01	57	19.6	169	34.0	34	0	1344	18687	20031	168	19582	19750	39780
H20	6/24/01	57	29.6	169	21.9	37	0	0	1121	1121	0	1041	1041	2162
H21	6/28/01	57	10.1	169	53.1	26	0	0	2317	2317	0	1489	1489	3806
H21	6/29/01	57	29.9	169	59.3	36	0	0	239	239	80	239	318	557
H21	6/28/01	57	19.4	170	13.4	28	0	84	0	84	0	0	0	84
H22	7/5/01	57	19.9	170	50.8	44	0	78	469	547	0	78	78	625
H22	6/29/01	57	29.7	170	35.0	39	0	0	588	588	0	1428	1428	2015
H23	7/5/01	57	20.0	171	27.9	53	0	0	318	318	0	159	159	477
H24	7/9/01	57	20.4	172	5.7	58	0	0	19339	19339	160	6327	6487	25826
H25	7/8/01	57	18.4	172	42.6	60	0	0	810	810	0	810	810	1619
H26	7/8/01	57	18.3	173	19.3	65	0	0	1045	1045	0	643	643	1688
I01	6/21/01	57	40.1	167	45.9	36	0	83	581	664	0	83	83	747
I02	6/21/01	57	40.6	167	7.5	36	0	0	421	421	0	0	0	421
I03	6/14/01	57	39.9	166	29.4	35	0	330	247	577	0	0	0	577
I04	6/14/01	57	40.6	165	51.8	33	0	176	527	703	0	0	0	703

Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.

(*Chionoecetes bairdi*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
I05	6/11/01	57 40.1	165 15.1	32	0	0	406	406	0	0	0	406
I06	6/11/01	57 40.2	164 37.4	27	0	239	80	318	0	0	0	318
I07	6/7/01	57 39.7	164 0.1	26	0	166	415	581	83	0	83	664
I08	6/7/01	57 39.9	163 21.1	25	0	76	0	76	0	0	0	76
I09	6/4/01	57 39.9	162 44.9	22	0	0	239	239	0	0	0	239
I10	6/4/01	57 40.3	162 8.5	24	0	160	0	160	0	0	0	160
I11	6/2/01	57 39.9	161 30.4	27	0	0	162	162	0	0	0	162
I12	6/2/01	57 38.2	160 54.3	30	0	0	440	440	0	293	293	733
I13	6/1/01	57 40.1	160 15.8	28	0	78	0	78	0	0	0	78
I18	6/24/01	57 40.0	168 23.8	37	0	0	84	84	0	0	0	84
I19	6/24/01	57 39.9	169 2.6	36	0	0	669	669	0	84	84	753
I20	6/29/01	57 39.9	169 39.4	37	0	0	8938	8938	0	9577	9577	18515
I20	6/24/01	57 49.5	169 22.0	34	0	0	2457	2457	0	396	396	2853
I21	6/29/01	57 39.8	170 16.3	38	0	0	7678	7678	0	5796	5796	13473
I22	7/5/01	57 39.7	170 53.3	45	0	84	1260	1344	0	252	252	1596
I22	6/29/01	57 49.7	170 36.4	40	0	0	425	425	0	566	566	991
I23	7/5/01	57 40.1	171 32.0	53	0	0	164	164	82	0	82	246
I24	7/9/01	57 40.0	172 9.8	57	0	0	15853	15853	0	14934	14934	30787
I25	7/9/01	57 40.3	172 48.3	63	0	0	8030	8030	80	7819	7899	15929
I26	7/9/01	57 40.1	173 23.9	78	0	76	8108	8184	0	8639	8639	16823
J02	6/21/01	58 0.1	167 9.5	33	0	255	679	934	0	0	0	934
J03	6/14/01	58 0.1	166 31.1	32	0	0	246	246	0	0	0	246
J05	6/12/01	57 59.6	165 14.8	26	0	80	240	320	0	0	0	320
J06	6/12/01	57 59.8	164 37.5	23	0	79	79	158	0	0	0	158
J07	6/7/01	58 0.0	164 0.8	24	0	80	80	161	0	0	0	161
J08	6/7/01	57 59.6	163 22.4	22	0	82	0	82	0	0	0	82
J11	6/2/01	57 59.6	161 29.0	28	0	82	0	82	0	0	0	82
J12	6/2/01	57 58.9	160 49.7	24	0	75	0	75	0	0	0	75
J13	6/1/01	57 59.7	160 13.1	26	0	83	83	167	0	0	0	167
J18	6/24/01	57 59.1	168 26.5	36	0	0	0	0	0	83	83	83
J19	6/24/01	57 50.8	168 43.7	37	0	0	82	82	0	0	0	82
J19	6/24/01	57 59.8	169 3.1	37	0	0	76	76	0	0	0	76
J20	6/29/01	57 59.5	169 40.8	37	0	0	1954	1954	0	1172	1172	3126

**Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.**

*(Chionoecetes bairdi)*

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
J21	6/29/01	57 50.3	169 59.8	39	0	0	17229	17229	0	17502	17502	34731
J21	6/29/01	58 0.1	170 20.0	39	0	0	4504	4504	0	2899	2899	7403
J22	7/5/01	58 0.1	170 58.5	46	0	0	85	85	0	0	0	85
J23	7/5/01	58 0.4	171 36.0	52	0	0	0	0	0	164	164	164
J24	7/9/01	57 59.6	172 14.6	56	0	160	4788	4948	319	4150	4469	9417
J25	7/9/01	58 0.2	172 51.7	57	0	0	1690	1690	0	614	614	2304
J26	7/9/01	58 0.0	173 28.8	62	0	0	5725	5725	0	5646	5646	11371
K03	6/14/01	58 19.7	166 33.0	24	82	0	0	82	0	0	0	82
K19	6/24/01	58 19.7	169 7.0	36	0	0	0	0	0	85	85	85
K20	6/29/01	58 19.9	169 43.1	37	0	0	239	239	0	80	80	319
K21	6/29/01	58 20.0	170 22.5	38	0	0	625	625	0	547	547	1172
K22	7/4/01	58 20.0	171 1.3	44	0	0	80	80	0	0	0	80
K23	7/4/01	58 20.2	171 39.4	50	0	77	306	383	0	230	230	612
K24	7/9/01	58 20.0	172 17.6	55	0	0	338	338	85	338	423	761
K25	7/9/01	58 20.0	172 55.9	57	0	0	0	0	0	167	167	167
K26	7/9/01	58 20.2	173 34.7	61	0	0	77	77	0	77	77	154
K27	7/15/01	58 20.1	174 18.0	87	0	0	708	708	0	1653	1653	2361
L20	6/30/01	58 40.0	169 47.6	36	0	0	250	250	0	333	333	583
L24	7/10/01	58 39.7	172 22.6	54	0	0	840	840	0	1680	1680	2519
L25	7/10/01	58 40.1	173 0.2	60	0	0	581	581	0	830	830	1412
L26	7/15/01	58 40.3	173 37.0	68	0	170	170	340	0	0	0	340
L27	7/15/01	58 40.1	174 15.4	83	0	0	78	78	0	0	0	78
L28	7/15/01	58 44.4	174 53.7	79	0	0	225	225	0	75	75	300
L29	7/16/01	58 40.5	175 32.9	72	0	84	418	502	335	669	1004	1506
L30	7/19/01	58 40.3	176 12.5	72	0	0	561	561	0	240	240	801
L31	7/19/01	58 39.8	176 49.0	73	0	0	79	79	0	0	0	79
M01	6/22/01	59 0.7	167 52.9	20	0	0	78	78	0	0	0	78
M19	6/23/01	59 0.1	169 13.0	28	0	0	162	162	0	0	0	162
M24	7/10/01	58 59.9	172 26.2	53	0	0	884	884	0	482	482	1366
M25	7/10/01	59 0.2	173 5.1	56	0	0	245	245	0	163	163	408
M26	7/15/01	59 0.2	173 43.1	63	0	78	313	391	0	156	156	547
M27	7/15/01	59 0.1	174 22.0	67	0	0	689	689	0	230	230	919
M28	7/16/01	58 59.6	175 1.9	69	0	0	2074	2074	154	2688	2842	4916

**Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.**

*(Chionoecetes bairdi)*

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
M29	7/16/01	58 60.0	175 43.8	71	0	0	599	599	0	479	479	1077
M30	7/19/01	58 58.6	176 18.9	72	0	0	156	156	0	0	0	156
M31	7/19/01	58 59.9	176 58.4	72	0	0	161	161	0	0	0	161
M32	7/19/01	59 0.4	177 35.3	72	0	0	236	236	0	0	0	236
N24	7/10/01	59 20.0	172 29.9	46	0	0	472	472	0	0	0	472
N25	7/10/01	59 20.0	173 9.1	53	0	0	257	257	0	86	86	342
N26	7/15/01	59 19.6	173 47.9	59	0	0	545	545	0	234	234	779
N27	7/15/01	59 19.7	174 26.9	63	0	0	319	319	0	0	0	319
N28	7/16/01	59 19.9	175 6.8	71	0	80	241	322	0	0	0	322
N29	7/16/01	59 20.2	175 45.3	73	0	0	567	567	0	162	162	729
N30	7/19/01	59 20.1	176 23.8	73	0	84	5104	5187	0	4100	4100	9287
O21	6/30/01	59 40.1	170 34.8	35	0	0	80	80	0	0	0	80
O24	7/10/01	59 40.0	172 33.8	44	0	0	162	162	0	0	0	162
O25	7/10/01	59 30.2	172 52.5	50	0	0	322	322	0	80	80	402
O25	7/10/01	59 49.9	172 54.6	41	0	0	312	312	0	0	0	312
O25	7/10/01	59 40.0	173 13.9	50	0	0	160	160	0	0	0	160
O26	7/15/01	59 39.9	173 52.0	56	0	0	160	160	0	0	0	160
O26	7/10/01	59 30.2	173 29.8	54	0	0	81	81	0	81	81	162
O27	7/15/01	59 39.6	174 27.1	61	0	0	78	78	0	0	0	78
O28	7/16/01	59 39.9	175 6.1	67	0	0	77	77	0	0	0	77
O30	7/19/01	59 40.2	176 31.5	73	0	0	815	815	82	408	489	1305
O31	7/19/01	59 40.3	177 8.9	91	0	246	327	573	82	409	491	1064
P24	7/3/01	60 9.7	172 19.6	30	0	0	162	162	0	0	0	162
P26	7/10/01	59 50.1	173 34.8	50	0	0	79	79	0	0	0	79
P30	7/18/01	60 0.1	176 42.9	76	0	82	326	408	0	0	0	408
Q28	7/17/01	60 21.0	175 22.6	60	0	0	155	155	0	0	0	155
Q29	7/17/01	60 20.4	176 1.8	65	0	0	82	82	0	0	0	82
Q30	7/18/01	60 20.3	176 43.3	73	0	165	83	248	83	83	165	414
R29	7/17/01	60 40.4	176 12.2	63	0	0	0	0	0	79	79	79
R31	7/18/01	60 40.1	177 30.3	78	0	297	74	371	0	149	149	520
R32	7/18/01	60 40.1	178 10.8	86	0	0	154	154	77	385	462	617
S29	7/17/01	61 0.2	176 17.1	59	0	0	0	0	0	79	79	79
S30	7/18/01	61 0.1	176 58.3	65	0	0	1201	1201	0	721	721	1922

**Table 9. Summary of crab density by tow (# per square nmi) for Tanner Crab.**

*(Chionoecetes bairdi)*

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
T30	7/18/01	61	20.2	176	58.8	62	0	0	80	80	0	80	80	159
U26	7/13/01	61	39.9	174	26.6	42	0	0	76	76	0	0	0	76
Z05	6/10/01	54	39.6	165	7.8	43	0	84	6466	6550	0	5039	5039	11589

NOTE: Minimum carapace sizes used are: Large Males > 5.5 in; Medium Males = 4.3 to 5.5 in; Large Females > 3.4 in.

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
A02	6/18/01	55	0.4	166	55.3	78	266	133	333	732	0	0	0	732
A03	6/18/01	54	60.0	166	20.5	77	567	324	162	1052	0	0	0	1052
A04	6/18/01	54	59.9	165	45.7	69	87	87	521	695	0	0	0	695
A04	6/10/01	54	50.3	165	32.4	82	0	78	0	78	0	0	0	78
A05	6/10/01	55	0.5	165	9.2	59	235	78	157	471	0	0	0	471
B01	6/18/01	55	20.6	167	28.4	77	171	0	86	257	0	0	0	257
B02	6/18/01	55	19.9	166	57.1	74	176	176	440	791	0	0	0	791
B03	6/18/01	55	21.0	166	21.1	71	894	244	406	1544	0	0	0	1544
B04	6/18/01	55	20.8	165	46.5	64	687	515	687	1890	0	0	0	1890
B05	6/10/01	55	19.9	165	10.5	59	168	168	0	336	0	0	0	336
B06	6/10/01	55	21.2	164	32.8	54	1028	343	114	1485	0	0	0	1485
C01	6/20/01	55	39.4	167	35.4	72	83	83	0	167	0	0	0	167
C02	6/20/01	55	40.3	166	59.8	72	176	88	176	440	0	0	0	440
C03	6/18/01	55	40.4	166	23.1	67	392	157	0	549	0	0	0	549
C04	6/19/01	55	40.6	165	47.8	63	1640	273	91	2005	0	0	0	2005
C05	6/10/01	55	40.6	165	10.0	57	872	555	475	1902	0	0	0	1902
C06	6/10/01	55	38.7	164	34.7	51	1008	168	0	1176	0	0	0	1176
C07	6/8/01	55	41.7	164	0.1	49	391	156	234	781	0	0	0	781
C08	6/8/01	55	39.1	163	24.8	42	0	0	79	79	0	0	0	79
C09	6/3/01	55	39.7	162	51.0	27	0	0	76	76	0	0	0	76
C18	6/27/01	55	39.2	168	11.9	73	409	0	0	409	0	0	0	409
D02	6/20/01	56	0.9	167	0.6	72	89	0	0	89	0	0	0	89
D03	6/19/01	55	59.8	166	23.3	66	500	333	250	1084	83	0	83	1167
D04	6/19/01	56	0.5	165	47.8	57	2046	491	900	3437	0	0	0	3437
D05	6/10/01	56	0.9	165	12.4	51	1836	1437	718	3990	0	0	0	3990
D06	6/10/01	55	59.8	164	36.5	49	711	553	395	1658	79	0	79	1737
D07	6/8/01	55	58.9	163	57.7	48	1009	233	388	1630	0	0	0	1630
D08	6/8/01	55	59.6	163	24.4	46	482	482	80	1045	0	0	0	1045
D09	6/3/01	56	0.0	162	48.9	41	81	0	0	81	0	0	0	81
D18	6/27/01	56	0.9	168	13.9	81	147	73	147	367	0	0	0	367
E01	6/20/01	56	20.4	167	39.1	68	329	0	0	329	0	0	0	329
E02	6/20/01	56	21.2	167	2.6	60	655	409	491	1555	164	0	164	1719
E03	6/19/01	56	20.4	166	24.9	55	502	418	167	1088	251	0	251	1339

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
E04	6/19/01	56 19.8	165 48.5	48	632	158	237	1027	79	0	79	1106
E05	6/11/01	56 20.6	165 11.9	45	310	233	155	698	0	0	0	698
E06	6/11/01	56 20.5	164 35.5	45	320	160	240	721	0	0	0	721
E07	6/8/01	56 20.5	163 58.6	45	251	84	84	418	0	0	0	418
E08	6/8/01	56 18.5	163 24.8	45	252	168	84	504	0	0	0	504
E09	6/3/01	56 20.2	162 47.4	41	313	156	0	469	0	0	0	469
E10	6/3/01	56 20.1	162 11.2	40	169	0	85	254	0	0	0	254
E18	6/27/01	56 20.3	168 15.0	82	78	0	78	156	0	0	0	156
E19	6/27/01	56 20.0	168 53.4	69	76	76	0	153	0	0	0	153
E21	6/27/01	56 20.4	170 5.4	59	306	306	1990	2603	77	230	306	2909
E22	6/27/01	56 20.2	170 41.0	65	242	0	81	323	0	81	81	403
F01	6/20/01	56 40.8	167 40.6	53	573	655	246	1473	0	0	0	1473
F02	6/20/01	56 40.3	167 3.3	50	818	327	327	1473	0	0	0	1473
F03	6/19/01	56 40.1	166 26.0	44	563	161	563	1286	0	0	0	1286
F04	6/19/01	56 39.8	165 50.9	41	162	162	81	405	0	0	0	405
F05	6/11/01	56 40.6	165 12.7	40	1038	559	399	1995	0	160	160	2155
F06	6/11/01	56 41.1	164 35.9	39	731	487	162	1381	0	0	0	1381
F07	6/8/01	56 37.0	163 55.9	40	226	905	226	1357	0	0	0	1357
F08	6/8/01	56 39.5	163 21.3	40	83	333	167	583	0	0	0	583
F09	6/4/01	56 39.8	162 46.4	38	305	381	229	915	0	0	0	915
F10	6/4/01	56 39.7	162 9.8	39	74	147	0	221	0	0	0	221
F11	6/4/01	56 39.7	161 36.5	48	475	0	317	792	0	0	0	792
F18	6/27/01	56 40.6	168 16.7	57	405	81	81	567	0	0	0	567
F19	6/27/01	56 40.2	168 55.6	53	1431	318	557	2306	0	0	0	2306
F20	6/28/01	56 39.9	169 29.9	42	405	81	324	810	0	0	0	810
F20	6/26/01	56 49.8	169 18.6	42	894	671	522	2087	0	149	149	2236
F21	6/28/01	56 50.0	169 52.3	38	313	391	547	1250	0	0	0	1250
F21	6/28/01	56 40.6	170 7.9	51	798	319	638	1756	0	0	0	1756
F22	6/27/01	56 40.0	170 44.2	60	169	254	169	592	0	0	0	592
F23	7/8/01	56 39.8	171 21.8	63	2963	961	1201	5126	0	0	0	5126
F24	7/8/01	56 40.1	171 57.9	67	90	90	181	362	0	0	0	362
F25	7/8/01	56 40.3	172 34.1	73	0	0	77	77	0	0	0	77
G01	6/20/01	57 0.3	167 42.3	40	475	396	951	1823	79	79	158	1981



Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
G02	6/20/01	57	0.0	167	5.1	60	324	162	81	567	0	0	0	567
G03	6/19/01	57	0.1	166	28.0	38	162	325	406	894	0	0	0	894
G04	6/19/01	56	59.0	165	50.5	38	795	1193	239	2227	0	0	0	2227
G05	6/11/01	57	0.1	165	12.6	37	614	3149	1459	5223	1383	0	1383	6606
G06	6/11/01	56	59.8	164	35.7	37	450	1800	900	3151	0	0	0	3151
G07	6/7/01	57	2.7	164	2.0	35	81	565	81	726	0	0	0	726
G08	6/7/01	56	59.1	163	22.9	34	155	388	78	621	0	0	0	621
G09	6/4/01	57	0.1	162	46.6	32	244	162	244	650	0	0	0	650
G10	6/4/01	57	0.1	162	9.8	31	0	246	0	246	0	0	0	246
G11	6/2/01	56	59.8	161	34.5	36	78	0	0	78	0	0	0	78
G18	6/26/01	56	59.4	168	19.0	43	1146	1719	5483	8348	0	82	82	8429
G19	6/26/01	57	9.7	168	40.1	40	779	467	3504	4750	234	467	701	5451
G19	6/26/01	56	50.2	168	37.4	51	1146	417	1052	2615	104	322	426	3041
G19	6/26/01	56	59.7	168	56.8	42	385	462	1310	2158	154	77	231	2389
G20	6/28/01	57	0.3	169	32.9	32	237	790	553	1579	0	0	0	1579
G20	6/26/01	57	9.8	169	18.9	38	1495	2692	10511	14698	748	8223	8971	23669
G21	6/28/01	56	59.9	170	10.7	37	157	79	0	236	0	0	0	236
G22	7/8/01	57	0.2	170	47.7	51	0	395	0	395	0	0	0	395
G22	6/28/01	56	50.1	170	29.2	54	233	466	1009	1707	0	0	0	1707
G23	7/8/01	57	0.2	171	23.7	58	1437	479	160	2075	80	0	80	2155
G24	7/8/01	57	0.2	172	2.3	62	807	81	81	968	0	0	0	968
G25	7/8/01	57	0.3	172	41.6	65	234	78	0	313	0	0	0	313
H01	6/21/01	57	19.7	167	44.1	38	161	402	241	804	0	0	0	804
H02	6/21/01	57	20.5	167	6.3	37	82	408	897	1386	0	163	163	1549
H03	6/19/01	57	20.1	166	28.6	36	565	1210	484	2259	81	0	81	2339
H04	6/14/01	57	20.3	165	51.2	36	260	952	260	1472	0	173	173	1645
H05	6/11/01	57	20.0	165	14.0	35	745	1241	248	2234	83	0	83	2317
H06	6/11/01	57	19.4	164	37.0	35	333	2751	3834	6918	250	834	1084	8002
H07	6/7/01	57	19.7	164	0.5	32	237	1106	1658	3001	79	0	79	3080
H08	6/7/01	57	19.4	163	23.3	27	81	81	81	242	0	0	0	242
H11	6/2/01	57	19.9	161	33.0	28	80	0	0	80	0	0	0	80
H12	6/2/01	57	19.3	160	56.5	32	75	0	0	75	0	0	0	75
H18	6/26/01	57	20.5	168	20.9	38	159	0	318	477	0	159	159	636

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
H19	6/24/01	57 29.9	168 45.9	37	82	326	734	1142	0	82	82	1223
H19	6/26/01	57 19.6	168 59.5	37	158	872	1189	2219	79	0	79	2298
H20	6/29/01	57 19.6	169 34.0	34	84	252	924	1260	0	0	0	1260
H20	6/24/01	57 29.6	169 21.9	37	240	801	881	1922	80	400	481	2403
H21	6/29/01	57 29.9	169 59.3	36	875	2624	795	4294	0	0	0	4294
H22	7/5/01	57 19.9	170 50.8	44	0	78	0	78	0	0	0	78
H22	6/29/01	57 29.7	170 35.0	39	168	168	252	588	0	0	0	588
H23	7/5/01	57 20.0	171 27.9	53	398	0	0	398	0	0	0	398
H24	7/9/01	57 20.4	172 5.7	58	1041	400	80	1522	160	0	160	1682
H25	7/8/01	57 18.4	172 42.6	60	0	81	0	81	0	0	0	81
H26	7/8/01	57 18.3	173 19.3	65	0	161	80	241	0	0	0	241
I01	6/21/01	57 40.1	167 45.9	36	0	0	664	664	0	0	0	664
I02	6/21/01	57 40.6	167 7.5	36	506	169	337	1012	0	0	0	1012
I03	6/14/01	57 39.9	166 29.4	35	495	330	412	1237	82	0	82	1319
I04	6/14/01	57 40.6	165 51.8	33	527	1055	879	2462	0	0	0	2462
I05	6/11/01	57 40.1	165 15.1	32	325	812	487	1625	81	81	162	1787
I06	6/11/01	57 40.2	164 37.4	27	0	80	239	318	0	0	0	318
I07	6/7/01	57 39.7	164 0.1	26	83	0	166	249	0	0	0	249
I18	6/24/01	57 40.0	168 23.8	37	253	421	169	843	0	0	0	843
I19	6/24/01	57 39.9	169 2.6	36	251	920	2677	3849	1171	7112	8283	12131
I20	6/29/01	57 39.9	169 39.4	37	798	2873	4017	7688	1330	10375	11705	19393
I20	6/24/01	57 49.5	169 22.0	34	792	3566	12679	17038	0	25551	25551	42589
I21	6/29/01	57 39.8	170 16.3	38	376	1505	2785	4667	0	452	452	5118
I22	7/5/01	57 39.7	170 53.3	45	336	420	84	840	168	0	168	1008
I22	6/29/01	57 49.7	170 36.4	40	71	779	212	1062	0	0	0	1062
I23	7/5/01	57 40.1	171 32.0	53	491	164	0	655	82	0	82	737
I24	7/9/01	57 40.0	172 9.8	57	887	565	323	1775	161	161	323	2097
I25	7/9/01	57 40.3	172 48.3	63	482	161	80	723	161	0	161	884
I26	7/9/01	57 40.1	173 23.9	78	455	152	0	606	0	0	0	606
J01	6/21/01	58 0.2	167 48.3	34	253	169	506	927	0	0	0	927
J02	6/21/01	58 0.1	167 9.5	33	510	934	1104	2548	85	0	85	2633
J03	6/14/01	58 0.1	166 31.1	32	327	327	246	900	0	82	82	982
J04	6/14/01	57 59.3	165 53.7	29	613	613	1226	2452	175	175	350	2802

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
J05	6/12/01	57	59.6	165	14.8	26	0	400	481	881	80	80	160	1041
J06	6/12/01	57	59.8	164	37.5	23	0	79	79	158	0	0	0	158
J18	6/24/01	57	59.1	168	26.5	36	83	83	166	332	0	166	166	498
J19	6/24/01	57	50.8	168	43.7	37	164	411	493	1068	82	411	493	1561
J19	6/24/01	57	59.8	169	3.1	37	458	1373	1984	3815	153	1831	1984	5798
J20	6/29/01	57	59.5	169	40.8	37	2540	8401	13677	24618	1368	3126	4494	29112
J21	6/29/01	57	50.3	169	59.8	39	771	4779	9190	14739	0	9818	9818	24557
J21	6/29/01	58	0.1	170	20.0	39	1838	18639	18912	39388	755	24530	25286	64674
J22	7/5/01	58	0.1	170	58.5	46	85	254	761	1100	85	0	85	1185
J23	7/5/01	58	0.4	171	36.0	52	1146	1228	327	2701	0	0	0	2701
J24	7/9/01	57	59.6	172	14.6	56	638	479	160	1277	0	0	0	1277
J25	7/9/01	58	0.2	172	51.7	57	307	384	154	845	77	0	77	922
J26	7/9/01	58	0.0	173	28.8	62	1019	157	235	1412	78	0	78	1490
K01	6/21/01	58	20.3	167	50.4	31	0	248	2565	2813	414	662	1076	3889
K02	6/21/01	58	19.3	167	12.3	27	87	606	1298	1991	87	0	87	2077
K03	6/14/01	58	19.7	166	33.0	24	82	0	165	247	0	0	0	247
K04	6/14/01	58	19.0	165	55.9	23	0	0	2783	2783	0	491	491	3274
K05	6/12/01	58	20.1	165	17.4	23	0	0	0	0	80	0	80	80
K18	6/24/01	58	19.5	168	28.2	34	93	465	5394	5952	1860	279	2139	8091
K19	6/24/01	58	19.7	169	7.0	36	508	1015	3554	5077	3300	1269	4569	9645
K20	6/29/01	58	19.9	169	43.1	37	160	1197	3033	4389	1117	479	1596	5986
K21	6/29/01	58	20.0	170	22.5	38	722	14256	23280	38258	1094	3282	4376	42634
K22	7/4/01	58	20.0	171	1.3	44	402	5787	4019	10208	241	0	241	10449
K23	7/4/01	58	20.2	171	39.4	50	459	230	306	995	230	77	306	1301
K24	7/9/01	58	20.0	172	17.6	55	5161	9815	1946	16922	657364	90226	747590	764512
K25	7/9/01	58	20.0	172	55.9	57	1750	750	333	2834	834	0	834	3668
K26	7/9/01	58	20.2	173	34.7	61	3854	3006	231	7091	0	0	0	7091
K27	7/15/01	58	20.1	174	18.0	87	0	0	79	79	79	0	79	157
L01	6/21/01	58	40.3	167	52.3	24	0	0	305	305	76	0	76	381
L02	6/21/01	58	39.9	167	13.2	22	0	0	78	78	0	0	0	78
L18	6/24/01	58	39.9	168	31.9	28	336	168	1260	1764	252	84	336	2099
L19	6/24/01	58	39.7	169	9.0	33	164	1859	23977	26000	6900	3943	10842	36842
L20	6/30/01	58	40.0	169	47.6	36	1337	4010	21220	26567	3084	11753	14837	41404

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
L21	6/30/01	58 40.3	170 26.0	39	246	4353	13306	17906	3368	2136	5503	23409
L22	7/4/01	58 39.9	171 4.9	44	355	11356	12776	24487	1096	169	1264	25751
L23	7/4/01	58 40.0	171 43.0	49	623	3271	2025	5919	156	0	156	6074
L24	7/10/01	58 39.7	172 22.6	54	504	924	2099	3527	65118	4341	69459	72987
L25	7/10/01	58 40.1	173 0.2	60	1495	1080	415	2990	87631	13353	100984	103974
L26	7/15/01	58 40.3	173 37.0	68	1359	594	255	2208	85	0	85	2293
L28	7/15/01	58 44.4	174 53.7	79	0	0	0	0	0	75	75	75
L29	7/16/01	58 40.5	175 32.9	72	0	0	84	84	0	0	0	84
L30	7/19/01	58 40.3	176 12.5	72	0	80	160	240	0	240	240	481
M02	6/22/01	58 59.3	167 13.1	20	0	0	93	93	0	0	0	93
M18	6/23/01	58 59.7	168 33.3	24	170	85	341	597	0	256	256	852
M19	6/23/01	59 0.1	169 13.0	28	1133	3257	13311	17701	971	1052	2024	19725
M20	6/30/01	58 59.8	169 49.5	33	332	2076	4402	6810	747	1993	2741	9550
M21	6/30/01	59 0.1	170 29.0	37	797	3633	8861	13291	266	266	532	13823
M22	7/4/01	59 0.0	171 7.1	41	173	8138	11082	19393	12467	173	12640	32034
M23	7/4/01	59 0.0	171 46.8	46	787	7791	7476	16053	3069	551	3620	19673
M24	7/10/01	58 59.9	172 26.2	53	1608	643	643	2894	1768	80	1849	4742
M25	7/10/01	59 0.2	173 5.1	56	1875	1223	652	3751	7747	1468	9214	12965
M26	7/15/01	59 0.2	173 43.1	63	860	313	0	1172	156	0	156	1328
M27	7/15/01	59 0.1	174 22.0	67	0	77	77	153	0	77	77	230
M30	7/19/01	58 58.6	176 18.9	72	0	0	313	313	0	391	391	703
M32	7/19/01	59 0.4	177 35.3	72	0	0	0	0	0	79	79	79
N18	6/23/01	59 20.1	168 34.4	21	0	0	1217	1217	0	434	434	1651
N19	6/23/01	59 19.9	169 14.6	26	80	80	5225	5385	723	161	884	6270
N20	6/30/01	59 19.9	169 52.0	32	233	1086	8537	9856	3415	1009	4424	14280
N21	6/30/01	59 20.0	170 32.1	36	332	2990	9467	12789	1329	0	1329	14118
N22	7/4/01	59 19.8	171 11.0	40	1624	6904	23148	31676	21524	2437	23960	55637
N23	7/4/01	59 20.1	171 50.3	42	971	4372	11091	16434	13143	2857	16001	32435
N24	7/10/01	59 20.0	172 29.9	46	3305	5036	7004	15345	551	551	1102	16447
N25	7/10/01	59 20.0	173 9.1	53	856	1112	428	2396	10440	3081	13521	15917
N26	7/15/01	59 19.6	173 47.9	59	1012	312	0	1324	78	234	312	1635
N27	7/15/01	59 19.7	174 26.9	63	1516	479	160	2155	1038	0	1038	3192
N28	7/16/01	59 19.9	175 6.8	71	80	0	0	80	0	80	80	161

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
N29	7/16/01	59 20.2	175 45.3	73	0	162	567	729	81	405	486	1214
N30	7/19/01	59 20.1	176 23.8	73	251	335	1841	2426	586	3598	4183	6610
O19	6/23/01	59 40.5	169 13.1	24	80	239	7502	7821	638	239	878	8699
O20	6/30/01	59 40.1	169 55.0	30	310	543	2871	3725	310	78	388	4113
O21	6/30/01	59 40.1	170 34.8	35	1034	3022	12565	16621	4931	80	5010	21631
O22	7/4/01	59 40.2	171 14.1	38	0	2674	48128	50802	65317	6111	71428	122230
O23	7/3/01	59 40.3	171 54.0	40	1422	2460	25555	29437	20042	4691	24733	54170
O24	7/10/01	59 40.0	172 33.8	44	4048	4534	12305	20887	50256	14891	65147	86033
O25	7/10/01	59 30.2	172 52.5	50	2781	14601	7231	24613	241	482	723	25336
O25	7/10/01	59 49.9	172 54.6	41	663	10603	40754	52020	34086	19173	53260	105279
O25	7/10/01	59 40.0	173 13.9	50	1756	11652	1038	14445	0	319	319	14765
O26	7/15/01	59 39.9	173 52.0	56	1842	2883	2082	6808	80	320	400	7208
O26	7/10/01	59 30.2	173 29.8	54	243	810	324	1376	729	405	1133	2510
O27	7/15/01	59 39.6	174 27.1	61	2196	2431	1804	6430	15219	2969	18188	24618
O28	7/16/01	59 39.9	175 6.1	67	766	995	153	1914	12554	3062	15616	17530
O30	7/19/01	59 40.2	176 31.5	73	326	1060	1875	3262	489	2854	3343	6605
O31	7/19/01	59 40.3	177 8.9	91	164	82	164	409	82	246	327	737
P18	6/23/01	60 0.0	168 40.1	20	0	0	577	577	0	165	165	742
P19	6/23/01	60 0.7	169 19.2	24	159	80	34171	34410	3738	1113	4851	39261
P20	6/30/01	60 0.5	169 57.3	28	0	0	2377	2377	158	79	238	2615
P21	6/30/01	60 0.0	170 37.5	34	602	376	15656	16635	9581	348	9929	26564
P22	7/4/01	60 0.8	171 20.0	37	350	1752	18223	20325	5957	350	6308	26633
P23	7/3/01	59 59.8	171 57.8	34	78	234	1250	1563	0	78	78	1641
P23	7/3/01	59 50.1	172 15.2	39	614	1613	31186	33413	93780	5516	99297	132710
P24	7/11/01	60 0.1	172 37.9	35	364	3275	17284	20923	5648	4108	9755	30678
P24	7/3/01	60 9.7	172 19.6	30	81	81	567	729	81	162	243	971
P25	7/11/01	60 0.1	173 18.4	39	872	2615	20698	24185	17244	7043	24287	48471
P26	7/14/01	59 60.0	173 57.4	52	2665	20559	36168	59392	233	155	388	59780
P26	7/10/01	59 50.1	173 34.8	50	1421	18242	5765	25428	0	158	158	25586
P27	7/14/01	60 0.2	174 36.0	57	1831	2823	1602	6256	9308	1984	11291	17547
P27	7/14/01	59 50.1	174 14.8	56	1613	1843	1075	4532	154	0	154	4686
P28	7/16/01	60 0.7	175 13.1	62	6567	7213	2045	15825	177332	44333	221665	237491
P29	7/16/01	60 0.1	175 55.8	69	1152	461	154	1767	384	77	461	2228

Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.

(*Chionoecetes opilio*)

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
P30	7/18/01	60	0.1	176	42.9	76	9051	10519	4893	24463	70463	35231	105694	130157
P31	7/18/01	59	60.0	177	12.7	74	866	2282	4623	7771	7397	10800	18197	25968
P32	7/18/01	60	0.3	177	54.7	76	1154	907	660	2720	412	0	412	3133
Q18	6/23/01	60	19.5	168	42.9	18	0	0	86	86	0	86	86	172
Q19	6/23/01	60	18.0	169	19.6	22	0	88	44289	44377	4641	3678	8319	52696
Q20	7/1/01	60	19.8	170	1.8	27	0	194	9140	9334	1329	0	1329	10663
Q21	7/1/01	60	19.8	170	39.9	33	0	495	13190	13685	3627	165	3792	17477
Q22	7/3/01	60	21.4	171	19.1	35	0	741	11120	11861	13096	3707	16803	28664
Q23	7/3/01	60	20.3	172	3.4	31	0	553	9081	9634	0	0	0	9634
Q25	7/11/01	60	11.2	173	1.8	31	0	78	313	391	0	156	156	547
Q25	7/11/01	60	10.0	173	34.3	38	0	3272	17910	21182	5151	2140	7291	28472
Q25	7/11/01	60	20.0	173	25.5	33	150	150	450	750	0	150	150	900
Q26	7/14/01	60	20.1	174	5.1	49	5124	53803	358686	417613	953513	28894	982408	1400021
Q27	7/14/01	60	10.3	174	21.9	54	1677	7927	20886	30490	21199	1898	23098	53588
Q27	7/14/01	60	19.1	174	43.3	54	482	4099	4662	9244	6430	1849	8279	17522
Q28	7/17/01	60	21.0	175	22.6	60	1009	2639	1397	5044	2173	1863	4036	9080
Q29	7/17/01	60	20.4	176	1.8	65	1712	2528	652	4893	979	571	1549	6442
Q30	7/18/01	60	20.3	176	43.3	73	5296	11418	11253	27967	97866	13981	111847	139814
Q31	7/18/01	60	19.4	177	22.7	79	965	723	482	2170	0	80	80	2251
R20	7/1/01	60	39.6	170	2.8	26	0	489	6850	7339	1223	163	1386	8725
R21	7/1/01	60	39.9	170	45.3	31	0	246	9084	9330	7192	0	7192	16522
R22	7/3/01	60	41.5	171	28.5	33	0	1952	57584	59536	54656	6832	61488	121024
R23	7/2/01	60	40.1	172	6.9	32	0	491	22915	23406	11285	4630	15915	39321
R24	7/11/01	60	40.0	172	47.1	22	0	395	7107	7502	474	158	632	8134
R25	7/11/01	60	40.1	173	27.9	34	81	0	162	243	0	405	405	648
R26	7/14/01	60	40.1	174	9.1	46	1412	18362	203390	223164	373475	37690	411165	634329
R27	7/14/01	60	39.9	174	49.6	52	1599	14128	32254	47982	68804	37758	106562	154544
R28	7/17/01	60	39.6	175	27.4	57	1579	10054	24785	36418	553	237	790	37208
R29	7/17/01	60	40.4	176	12.2	63	1895	7660	2211	11766	316	158	474	12240
R30	7/18/01	60	40.2	176	49.3	69	6230	7554	2881	16665	5529	1402	6931	23596
R31	7/18/01	60	40.1	177	30.3	78	2228	2897	2748	7873	594	1114	1708	9582
R32	7/18/01	60	40.1	178	10.8	86	2852	1156	1387	5395	1773	3391	5164	10559
S20	7/1/01	60	59.7	170	5.7	25	0	381	19054	19435	5829	1619	7448	26883

**Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.**

*(Chionoecetes opilio)*

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
S21	7/1/01	60	60.0	170	47.4	27	0	80	16939	17019	23269	7202	30472	47491
S22	7/3/01	60	59.3	171	30.0	32	0	0	49548	49548	36402	5056	41458	91006
S23	7/2/01	61	0.4	172	11.5	33	0	137	20807	20944	15453	2080	17533	38477
S24	7/11/01	61	0.1	172	48.8	34	0	1192	65537	66728	22029	4665	26694	93422
S25	7/11/01	61	1.4	173	29.3	40	0	1461	117642	119103	45435	10210	55646	174749
S26	7/14/01	60	59.7	174	11.7	45	1073	16102	134182	151357	112918	11292	124209	275566
S27	7/14/01	60	59.7	174	53.2	49	420	11332	103245	114997	69612	5314	74926	189923
S28	7/17/01	60	59.9	175	33.5	54	3191	30998	40571	74761	2634	958	3591	78352
S29	7/17/01	61	0.2	176	17.1	59	2671	16696	22261	41628	27316	1205	28521	70149
S30	7/18/01	61	0.1	176	58.3	65	3505	26543	24967	55014	3925	1602	5526	60540
S31	7/18/01	60	59.8	177	38.0	72	2075	14262	21264	37600	47685	1907	49593	87193
T20	7/1/01	61	19.6	170	9.5	25	0	0	11719	11719	1731	1023	2754	14473
T21	7/1/01	61	19.9	170	51.6	25	0	309	25678	25987	10792	7092	17884	43871
T22	7/2/01	61	19.8	171	32.0	29	0	0	24795	24795	4785	10440	15225	40020
T23	7/2/01	61	20.1	172	14.4	33	0	667	47688	48355	15914	8569	24482	72837
T24	7/12/01	61	20.4	172	55.6	37	0	2870	154616	157486	21985	25339	47324	204810
T25	7/11/01	61	19.8	173	35.0	39	0	1279	50839	52118	19668	10074	29742	81861
T26	7/13/01	61	20.1	174	20.5	42	957	6697	123414	131067	49570	14939	64508	195576
T27	7/13/01	61	20.1	175	0.7	46	1654	8600	56894	67148	10917	1680	12597	79745
T28	7/17/01	61	19.8	175	40.5	52	6554	78646	373570	458770	93546	10735	104281	563051
T29	7/17/01	61	20.2	176	18.5	56	1751	20313	34672	56736	2081	231	2312	59048
T30	7/18/01	61	20.2	176	58.8	62	6760	7157	9623	23540	2306	1034	3340	26880
U20	7/1/01	61	39.9	170	11.8	24	0	0	37621	37621	5238	491	5729	43350
U21	7/1/01	61	39.9	170	55.0	26	0	254	51864	52118	8639	17277	25916	78034
U22	7/2/01	61	40.6	171	33.7	29	0	0	75534	75534	4999	58733	63731	139265
U23	7/2/01	61	40.5	172	17.4	32	0	485	85272	85757	7767	26407	34174	119931
U24	7/12/01	61	40.4	173	5.6	36	0	912	63355	64267	13925	18458	32383	96650
U25	7/12/01	61	39.9	173	40.2	37	0	541	41079	41620	4843	13491	18334	59954
U26	7/13/01	61	39.9	174	26.6	42	0	152	87702	87854	6325	54326	60651	148505
U27	7/13/01	61	40.1	175	5.2	45	0	1579	35997	37576	20215	3110	23325	60900
U28	7/17/01	61	39.9	175	46.8	51	978	22490	210233	233701	123206	8800	132006	365707
U29	7/17/01	61	40.4	176	27.7	56	552	19305	90459	110316	63163	9717	72880	183197
V23	7/12/01	61	59.6	172	22.2	29	0	0	51828	51828	4537	20869	25405	77233

**Table 10. Summary of crab density by tow (# per square nmi) for Snow Crab.**

*(Chionoecetes opilio)*

Station	Date	N. Lat.		W. Long		Fathoms	Males				Females			GRAND TOTAL
							Large	Medium	Small	Total	Large	Small	Total	
V24	7/12/01	62	0.6	173	3.7	31	0	669	55565	56234	6203	31360	37563	93797
V25	7/12/01	61	60.0	173	50.6	33	0	239	46785	47024	4808	35259	40067	87091
V26	7/13/01	62	0.1	174	32.0	39	0	0	516868	516868	15904	532772	548676	1065544
V27	7/13/01	62	0.1	175	10.1	42	0	167	15404	15571	3660	4127	7788	23359
V28	7/17/01	61	59.8	175	50.0	48	0	4690	189946	194636	114905	16415	131320	325956
W23	7/12/01	62	20.2	172	23.7	28	0	0	85669	85669	0	74572	74572	160241
W24	7/12/01	62	20.0	173	9.9	31	0	157	15896	16053	1416	11332	12748	28801
W25	7/12/01	62	20.0	173	50.5	33	0	81	12756	12837	1706	4144	5850	18687
W26	7/13/01	62	19.5	174	34.6	38	0	0	142502	142502	1344	44364	45708	188210
W27	7/13/01	62	20.0	175	15.6	41	0	78	7424	7502	1719	1797	3517	11019
X23	7/12/01	62	39.7	172	28.8	26	0	0	18019	18019	0	12151	12151	30170
X24	7/12/01	62	39.8	173	11.8	33	0	0	23063	23063	4613	9543	14156	37218
X25	7/13/01	62	39.6	173	54.8	37	0	160	29632	29792	4407	16949	21356	51148
X26	7/13/01	62	39.7	174	38.0	38	0	0	5783	5783	938	2970	3907	9690

NOTE: Minimum carapace sizes used are: Large Males > 4.0 in; Medium Males = 3.1 to 4.0 in; Large Females > 2.0 in.



Table 11. Summary of crab density by tow (# per square nmi) for Hair Crab.

(*Erimacrus isenbeckii*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
B07	6/8/01	55 20.3	164 2.0	42	0	0	0	0	82	0	82	82
C07	6/8/01	55 41.7	164 0.1	49	0	0	0	0	0	78	78	78
C09	6/3/01	55 39.7	162 51.0	27	0	76	0	76	0	0	0	76
D08	6/8/01	55 59.6	163 24.4	46	0	0	161	161	0	80	80	241
D10	6/3/01	56 0.1	162 13.8	37	233	0	0	233	388	0	388	621
E10	6/3/01	56 20.1	162 11.2	40	169	0	0	169	169	0	169	338
F10	6/4/01	56 39.7	162 9.8	39	221	0	0	221	74	0	74	294
F12	6/3/01	56 41.3	160 58.9	36	0	0	0	0	82	0	82	82
F13	5/31/01	56 41.1	160 22.3	32	82	82	0	164	82	0	82	246
F20	6/28/01	56 39.9	169 29.9	42	81	0	0	81	0	0	0	81
F21	6/28/01	56 50.0	169 52.3	38	78	0	0	78	156	0	156	234
G09	6/4/01	57 0.1	162 46.6	32	0	0	81	81	0	0	0	81
G10	6/4/01	57 0.1	162 9.8	31	82	0	0	82	82	0	82	164
G13	5/31/01	57 0.4	160 19.7	32	0	0	0	0	80	0	80	80
G19	6/26/01	57 9.7	168 40.1	40	78	0	78	156	0	78	78	234
G20	6/28/01	57 0.3	169 32.9	32	0	79	0	79	79	158	237	316
G21	6/28/01	56 59.9	170 10.7	37	79	0	0	79	0	0	0	79
G22	6/28/01	57 6.9	170 27.7	26	393	79	0	472	0	0	0	472
H08	6/7/01	57 19.4	163 23.3	27	323	0	0	323	0	0	0	323
H10	6/4/01	57 19.8	162 9.8	26	79	0	0	79	0	0	0	79
H11	6/2/01	57 19.9	161 33.0	28	80	0	0	80	80	0	80	160
H18	6/26/01	57 20.5	168 20.9	38	0	0	0	0	80	0	80	80
H19	6/24/01	57 29.9	168 45.9	37	82	0	0	82	0	163	163	245
H19	6/26/01	57 19.6	168 59.5	37	713	79	79	872	158	238	396	1268
H20	6/24/01	57 29.6	169 21.9	37	0	0	0	0	80	0	80	80
H21	6/28/01	57 10.1	169 53.1	26	0	248	0	248	0	0	0	248
H21	6/28/01	57 19.4	170 13.4	28	84	0	0	84	0	0	0	84
I01	6/21/01	57 40.1	167 45.9	36	0	0	0	0	83	0	83	83
I06	6/11/01	57 40.2	164 37.4	27	80	0	0	80	0	0	0	80
I20	6/24/01	57 49.5	169 22.0	34	79	0	0	79	79	0	79	158
K01	6/21/01	58 20.3	167 50.4	31	83	0	0	83	0	0	0	83
K02	6/21/01	58 19.3	167 12.3	27	87	0	0	87	87	0	87	173
K18	6/24/01	58 19.5	168 28.2	34	186	0	0	186	0	0	0	186

Table 11. Summary of crab density by tow (# per square nmi) for Hair Crab.

(*Erimacrus isenbeckii*)

Station	Date	N. Lat.	W. Long	Fathoms	Males				Females			GRAND TOTAL
					Large	Medium	Small	Total	Large	Small	Total	
L01	6/21/01	58 40.3	167 52.3	24	229	0	0	229	76	0	76	305
L02	6/21/01	58 39.9	167 13.2	22	78	0	0	78	0	0	0	78
L03	6/14/01	58 39.5	166 33.1	21	77	0	0	77	0	0	0	77
L18	6/24/01	58 39.9	168 31.9	28	84	0	0	84	0	0	0	84
L21	6/30/01	58 40.3	170 26.0	39	82	0	0	82	0	0	0	82
M02	6/22/01	58 59.3	167 13.1	20	0	187	0	187	0	0	0	187
M18	6/23/01	58 59.7	168 33.3	24	85	0	0	85	85	0	85	170
M19	6/23/01	59 0.1	169 13.0	28	162	0	0	162	81	0	81	243
N01	6/22/01	59 19.2	167 55.3	20	0	0	0	0	257	0	257	257
N18	6/23/01	59 20.1	168 34.4	21	434	0	0	434	608	174	782	1217
N19	6/23/01	59 19.9	169 14.6	26	0	0	0	0	0	80	80	80
N20	6/30/01	59 19.9	169 52.0	32	78	0	0	78	0	0	0	78
O18	6/23/01	59 39.7	168 37.0	20	87	87	0	174	436	349	785	960
O19	6/23/01	59 40.5	169 13.1	24	0	0	0	0	160	0	160	160
P01	6/22/01	59 60.0	167 59.3	13	0	0	0	0	325	81	406	406
P18	6/23/01	60 0.0	168 40.1	20	247	0	0	247	247	165	412	660
P19	6/23/01	60 0.7	169 19.2	24	0	0	0	0	0	159	159	159
Q01	6/22/01	60 20.8	167 59.5	15	0	0	0	0	87	0	87	87
Q18	6/23/01	60 19.5	168 42.9	18	172	172	0	344	0	0	0	344
Q19	6/23/01	60 18.0	169 19.6	22	88	88	0	175	0	0	0	175
Q20	7/1/01	60 19.8	170 1.8	27	83	0	0	83	0	0	0	83

NOTE: Minimum carapace sizes used are: Large Males > 3.25 in; Medium Males = 2.0 to 3.25 in; Large Females > 2.6 in.