

REVIEW OF THE KING AND TANNER CRAB FISHERIES  
IN PRINCE WILLIAM SOUND

Shellfish Report to the Alaska Board of Fisheries



by

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## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
INTRODUCTION . . . . .	1
TANNER CRAB FISHERY	
INTRODUCTION . . . . .	1
1996 MANAGEMENT OUTLOOK . . . . .	3
KING CRAB FISHERY	
INTRODUCTION . . . . .	3
1995-96 MANAGEMENT OUTLOOK . . . . .	5

LIST OF TABLES

<u>TABLE</u>	<u>Page</u>
1. Prince William Sound Area historical Tanner crab catch in pounds, by season 1968 - 1995 .....	6
2. King crab catch in pounds, Prince William Sound Management Area 1960 - 1995 .....	7

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Prince William Sound Tanner crab fishing districts . . . . .	8
2. Male Tanner crab length frequency from the Prince William Sound trawl survey, 1991 - 1995. . . . .	9
3. Prince William Sound 1994 brown king crab fishing areas and seasons . . . . .	10

## INTRODUCTION

This report documents the most recently completed commercial Tanner and king crab fisheries in the Prince William Sound Management Area (Area E). The Area is comprised of all waters of Prince William Sound and the Gulf of Alaska from Cape Suckling to the east and Cape Fairfield to the west.

The Tanner crab fishery has remained closed since the 1988 season due to low stock abundance. Red and Blue king crabs have remained closed since the 1991-1992 season due to low stock abundance. A limited brown king crab fishery was prosecuted during the 1994-95 season. Harvest data and ex-vessel value from the brown king crab fishery are confidential because there were two participants.

## TANNER CRAB FISHERY

### *Introduction*

In the Prince William Sound Management Area, Tanner crabs have historically been the primary shellfish resource in terms of landed weight. The average harvest per year over the past 27 years is 2,750,000 lb. This includes 10 years when no harvest occurred. The harvest had been equally divided between the Gulf of Alaska and Prince William Sound (PWS).

The management area is divided into 4 Tanner crab management districts (Figure 1). The Northern and Hinchinbrook Districts include most of the waters inside PWS proper while the Eastern and Western Districts encompass the Gulf of Alaska portion of the management area and southwestern PWS.

The Tanner crab fishery in PWS is classified as "superexclusive". This term means that a boat validly registered to fish in the PWS registration area may not participate in any other Tanner crab fishery within the state during that registration year (August 1 - July 31). Conversely, a boat validly registered to fish in another registration area may not fish in PWS during that registration year. Other regulations unique to the fishery are a 175-pot limit in Area waters west of 146°40' West longitude. East of this line a 100-pot limit is in effect. The minimum legal size limit for Tanner crab in Area E is 135 mm (5.3 in). The fishery regulatory season dates are January 15 - March 31.

Tanner crab fishing began in 1968 when 1.2 million lb were landed. The fishery peaked at 13.9 million lb in the 1972-73 season prior to implementation of the minimum legal size in 1976. The area experienced decreasing harvests during the late 70's and early 80's. These decreasing harvests preceded district closures during the 1984 and 1985 seasons, small post recruit fisheries from 1986 to 1988, and full area closures from 1989 to 1995 (Table 1).

There are three reasonable explanations for the decline in abundance of the Prince William Sound Tanner crab stock:

- 1) The overharvest of immature and mature males and the harvest of females prior to the adoption of the minimum size limit of 5.3 inches in 1976. For example in 1974, 3.8 million lb were commercially harvested of which 2.7 million lb were below the current minimum size limit.
- 2) Lengthy seasons also had significant adverse effects on the stocks due to excessive trapping, handling, and lost gear. Seasons from 1974 through 1981 lasted seven months.
- 3) Unfavorable environmental conditions: warming ocean temperatures may be a contributing factor to the sharp decline and continued low abundance of Tanner crabs in the management area by favoring the production of predators and providing suboptimal environmental conditions for survival of crab larvae or their prey.

The commercial Tanner crab fishery in the PWS management area remained closed in 1995. Since 1991, the department's trawl survey has described a decreasing trend in the overall male stock component. From 1993 to 1995 all size classes except prerecruit-4 and smaller experienced dramatic declines in the newshell segments of the respective classes (Figure 2). For example, from 1993 to 1994 estimates of true recruit crabs declined from 54,000 to 4,000, true prerecruit-1 crabs declined from 109,000 to 18,000, and true prerecruit-2 crabs declined from 99,000 to 34,000. The total legal male estimate of 51,000 crabs was approximately one half of the 1993 survey estimate and remained well below the historic low harvest of 226,000 crabs. Therefore, the stock remained in a depressed condition and could not support sustainable fisheries.

## *1996 Management Outlook*

Based upon the extremely low estimate of true prerecruit-1 crabs (4800) assessed in 1995, recruitment to the legal stock component is expected to be poor in 1996. Skip molting remains a limiting factor in the prerecruit-1 size class where 94% crabs are in an old shell condition. Recruitment is expected to remain at a very low level after 1995 because of the decline in abundance of all prerecruit age classes. If weak year classes persist, the stock rebuilding process will be prolonged.

The propagation of weak year classes is a direct function of diminished reproductive capacity. The reduction in the Tanner stock was largely caused by the overharvest of legal, sublegal, and even female crabs during the lengthy seasons of the 1970's. The department plans to maintain maximum reproductive potential to insure recovery when ocean conditions favor shellfish production. In this context the near-term goal is to provide maximum reproductive potential, eliminate handling and trapping losses, and when possible allow small fisheries similar to the 1986 through 1988 seasons.

## **KING CRAB FISHERY**

### *Introduction*

Three species of king crabs are found in the Prince William Sound Management Area: red *Paralithodes camtschaticus*, blue *Paralithodes platypus*, and brown *Lithodes aequispina*. Red king crabs are sparsely distributed throughout PWS with historic concentrations occurring in eastern PWS and Hinchinbrook Entrance. Blue king crabs occur in the Port Wells - Harriman Fjord area with other small isolated pockets associated with glacial fjords in western PWS. Brown king crabs are found in central and western PWS at depths of 150-400 fathoms. Waters in the Gulf of Alaska portion of the management area have no documented concentrations of king crabs except for a very sparse distribution of brown king crabs.

The king crab fishery in Area E is designated as superexclusive. The minimum legal carapace width for red and brown king crabs is 7.0 in (178 mm). The minimum size is 5.9 in (150 mm) for blue king crab. The regulatory season opens throughout Prince William Sound on October 1 and closes on December 20. A second season opens on January 15 and closes by regulation March 15. The split season allows a three-week period when gear must be

removed from the fishing grounds and eliminates the preemption of fishing locations prior to the Tanner crab fishery which opens January 15.

Historically, the abundance of red king crabs was ascertained during Tanner crab pot surveys. An annual index was conducted 1977-91 to track the red king crab population. Presently red king crab abundance is assessed through catches in the Tanner crab trawl survey. Brown and blue king crab populations are assessed by commercial fishery dockside interviews and size frequency analysis of commercial catch samples.

Catch reporting by species did not begin until the 1979-80 season (Table 2). The harvest of nearly 300,000 lb in 1972 is believed to be primarily blue king crab. During the period 1979-1984 the stocks of both blue and red king crab declined. Fisheries for both species remained closed from the 1984-85 season to the 1991-92 season. These closures coincided with the development of the brown king crab fishery. Fishery performance in the brown king crab fishery indicates that the stock of brown crab is small as evidenced by the low catch per unit of effort coupled with declines in average weight, size, and geographic distribution.

At the spring 1988 meeting, the Alaska Board of Fisheries adopted a guideline harvest range of 40,000 - 60,000 lb for brown king crab in Area E. This range was adopted to help stabilize the legal segment of the brown king crab stock from declines in average size, weight, and distribution that were experienced since the beginning of the fishery in 1982. It appears that this guideline was established too late because harvests in 1989-90 and 1991-92 did not attain the low end of this harvest range and the season was closed in 1992-93 and 1993-94 due to low abundance. Only the brown king crab fishery opened during the 1994-95 season. The fisheries for red and blue king crabs remained closed due to low abundance.

Since the department does not survey the brown king crab stock, the 1994-95 fishery was informational in nature and designed to put the stock at minimal risk. The brown king crab fishery was delayed from the regulatory opening date of October 1 to November 1 in order to address apparent deadloss due to high water temperature and low salinity. The western portion of PWS was divided into two areas (Figure 3) and fishing opened in each area for a period of 15 days. The southern area, comprising waters west of 147°20' W. longitude and south of a line from Nellie Juan Light to Point Eleanor, was open November 1-15. The northern area, comprising waters west of 147°20' W longitude and north of the aforementioned line was open November 15-30.

Two vessels participated in the fishery. Catch is confidential due to the number of participants, however, both catch and catch rates were very low.

## *1995-96 Management Outlook*

Fishery performance data from the 1994-95 season demonstrated that the brown king crab stocks in PWS remained at a very low level. These same data provided no indication of significant impending recruitment to the legal segment of the stock. Reports indicated that the catch of sublegal and female crabs was very low.

The 1991-92 fishery for red and blue king crab likewise provided no indication of impending recruitment. The incidental catch of red king crabs from the department's 1995 stock assessment in the eastern portion of PWS also indicated that this stock remained depressed.

The department does not plan to open the brown king crab fishery for the 1995-96 season. Interviews with participants in the 1994-95 brown king crab fishery indicated that the brown king crab stock in PWS will remain depressed for several years.

The red king crab fishery will remain closed during the 1995-96 season. The 1995 trawl survey did not capture any red king crab. Additionally, the very low number of red king crabs captured in the department's trawl surveys during 1992-1994 indicate little likelihood of change in the depressed status of this stock. Fishery performance data from the 1991-92 fishery also indicated little potential for near term change in this stock's status.

The blue king crab fishery is scheduled to remain closed for the 1995-96 season based on the 1991-92 season fishery performance. Increased recruitment due to immigration is highly unlikely because there is a low probability that this isolated stock is related to other blue king crab populations in Alaska. During the last regulatory season in 1991-92, fishermen reported very few undersized male and female blue king crabs, therefore, a recovery of the stock is not expected in the near term.



Table 1. Prince William Sound Area historical Tanner crab catch in pounds, by season  
1968 - 1995.

Season	Inside	Outside	Total	Vessels	Lndgs	Percent recruit	Avg. wt.	Number of crabs
1968-69			1,235,613					
1969-70			1,284,597					
1970-71			4,159					
1971-72			7,788,498					
1972-73			13,927,868					
1973-74	1,658,000	8,500,000	10,158,000					
1974-75	1,187,000	2,667,000	3,854,000					
1975-76	3,322,482	3,810,262	7,132,744					
	Northern	Hinchinbrook	Western	Eastern				
1976-77(1)	782,048	766,650	701,725	70,925	2,321,348	23	316	
1977-78	994,721	1,161,831	2,079,549	570,573	4,806,674	38	591	2.2
1978-79	649,977	708,562	2,248,545	3,443,471	7,050,555	51	783	2.1
1979-80	140,228	332,583	1,462,059	4,057,847	5,992,717	49	561	2.0
1980-81	152,196	812,352	1,561,207	250,076	2,775,831	30	304	2.1
1981-82	351,139	722,834	1,503,253	288,425	2,865,651	29	216	--
1982-83	471,422	31,447	921,663	45,308	1,469,840	40	304	2.1
1984 (2)	Closed	Closed	Closed	No Effort	0	0	0	--
1985	Closed	Closed	No Effort	No Effort	0	0	0	--
1986	137,720	236,241	160,829	587	535,377	14	35	26
1987	152,834	222,052	196,246	0	571,132	23	65	51
1988	55,929	226,509	191,654	0	474,092	21	46	34
1989	Closed	Closed	Closed	Closed	0	0	0	--
1990	Closed	Closed	Closed	Closed	0	0	0	--
1991	Closed	Closed	Closed	Closed	0	0	0	--
1992	Closed	Closed	Closed	Closed	0	0	0	--
1993	Closed	Closed	Closed	Closed	0	0	0	--
1994	Closed	Closed	Closed	Closed	0	0	0	--
1995	Closed	Closed	Closed	Closed	0	0	0	--

(1) New districts established and first season of the minimum legal size.

(2) Calendar year season established.

Table 2. King crab catch in pounds, Prince William Sound Management Area, 1960 - 1995.

Year/season	Total pounds all specie
1960	246,965
1961	236,081
1962	31,478
1963	43,569
1964	14,028
1965	5,500
1966	11,000
1967	41,800
1968	200,000
1969	48,100
1970	94,300
1971	144,200
1972	296,200
1973	207,916
1974	85,379
1975	53,423
1976-77	17,087
1977-78	86,595
1978-79	114,000

Seasons	S P E C I E S			Avg. wt. brown	Total pounds	Vessels	Landings
	Red	Blue	Brown				
1979-80	52,026	13,662	0		65,688	18	109
1980-81	32,433	7,282	20		39,735	14	65
1981-82	25,358	5,634	0		30,992	11	43
1982-83	30,809	10,433	147,016	9.7	188,258	31	187
1983-84	16,467	5,324	50,535	8.8	73,226	18	69
1984-85	235	closed	40,232	--	40,467	4	14
1985-86	closed	closed	51,800	5.8	51,800	4	11
1986-87	closed	closed	65,674	6.1	65,837	4	11
1987-88	closed	closed	68,270	6.6	68,270	4	15
1988-89	closed	closed	48,442	6.6	48,442	5	14
1989-90	closed	closed	closed	--	0	0	0
1990-91	closed	closed	2,180	--	2,180	2	2
1991-92	60	0	780	--	840	2	2
1992-93	closed	closed	closed	--	0	0	0
1993-94	closed	closed	closed	--	0	0	0
1994-95	closed	closed	**		**	1	**

(\*\*) Harvest data is confidential due to the limited number of participants.

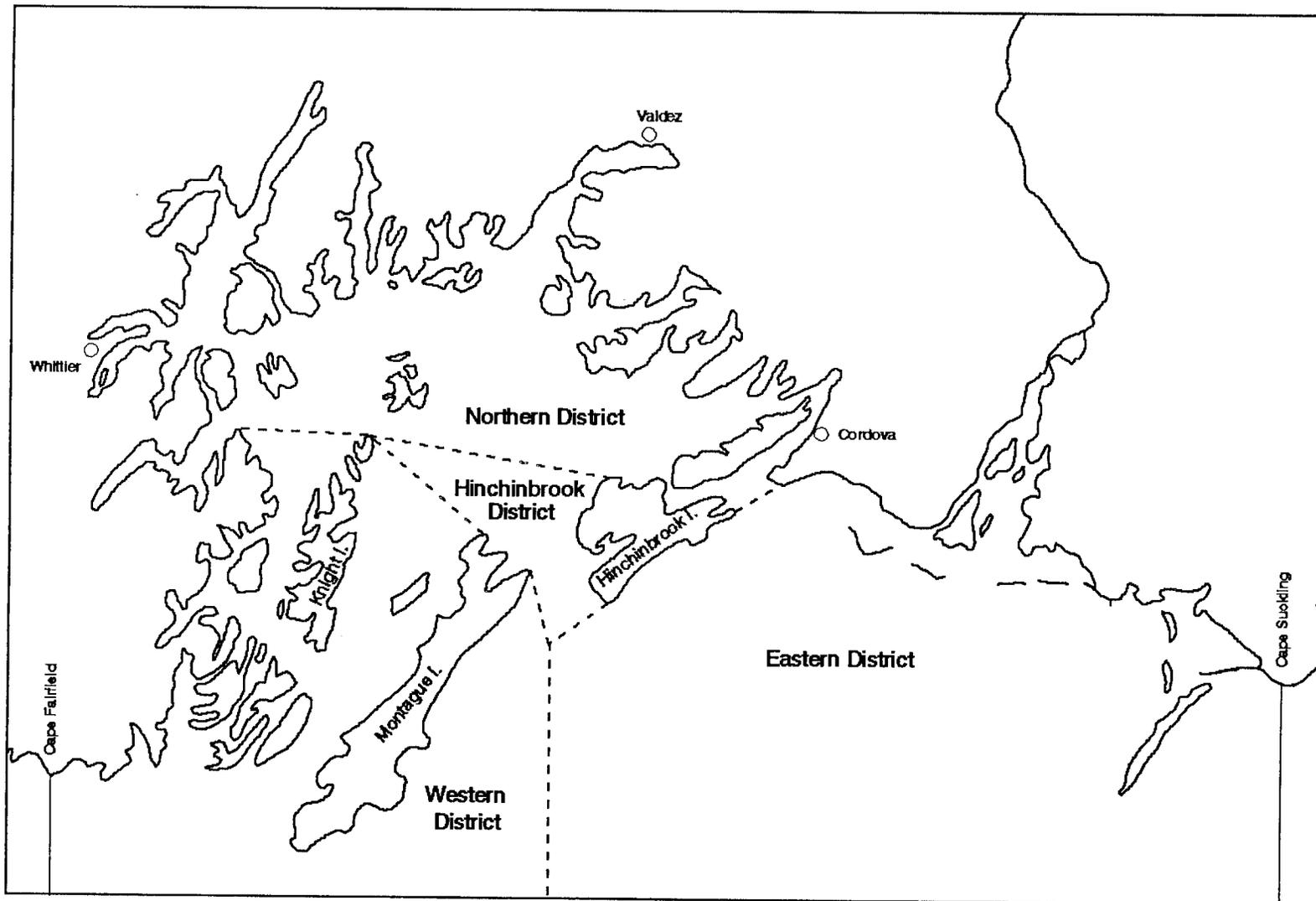


Figure 1. Prince William Sound Tanner Crab Fishing Districts.

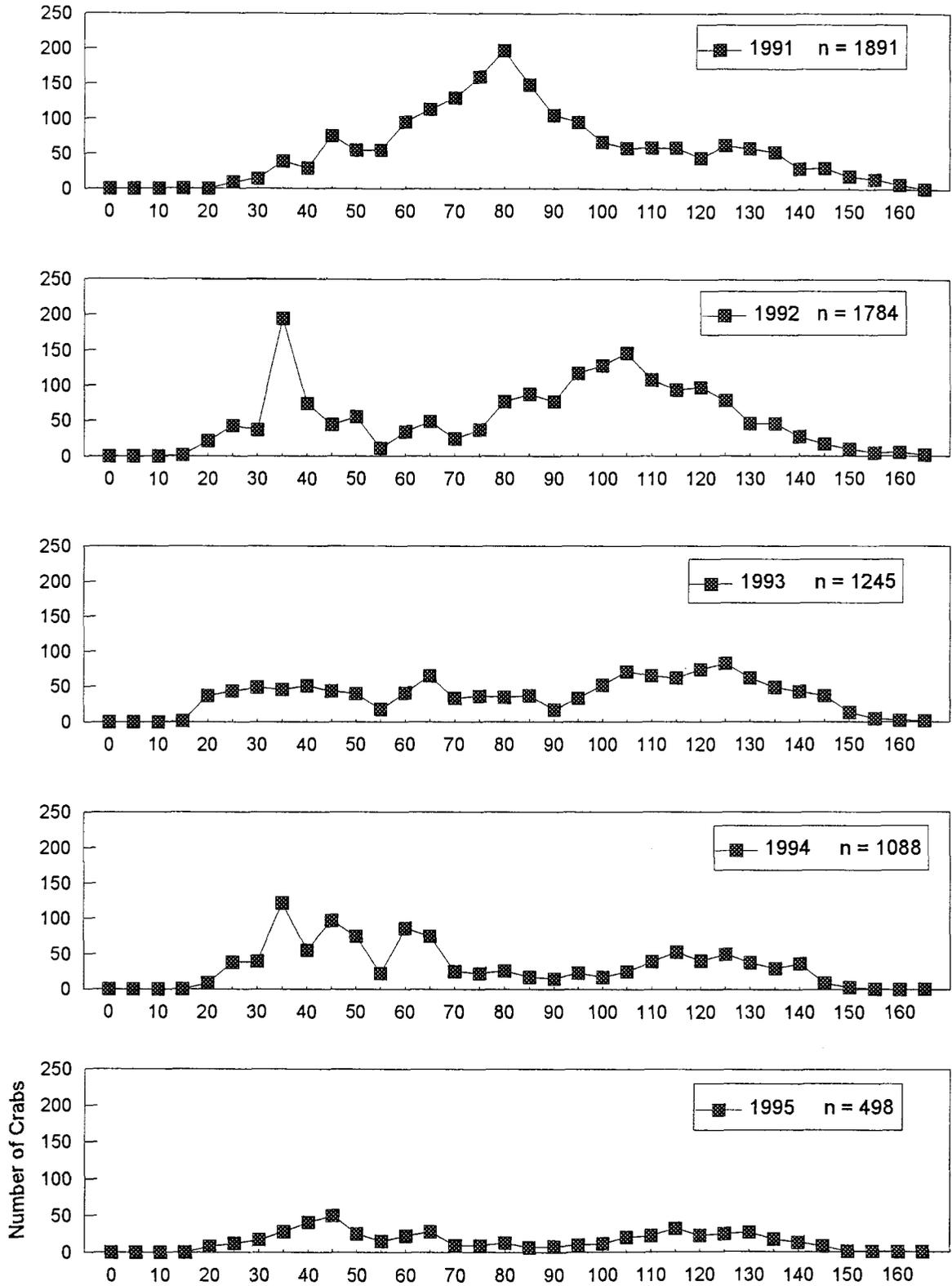


Figure 2. Male Tanner crab length frequency from Prince William Sound trawl survey, 1991 - 1995.

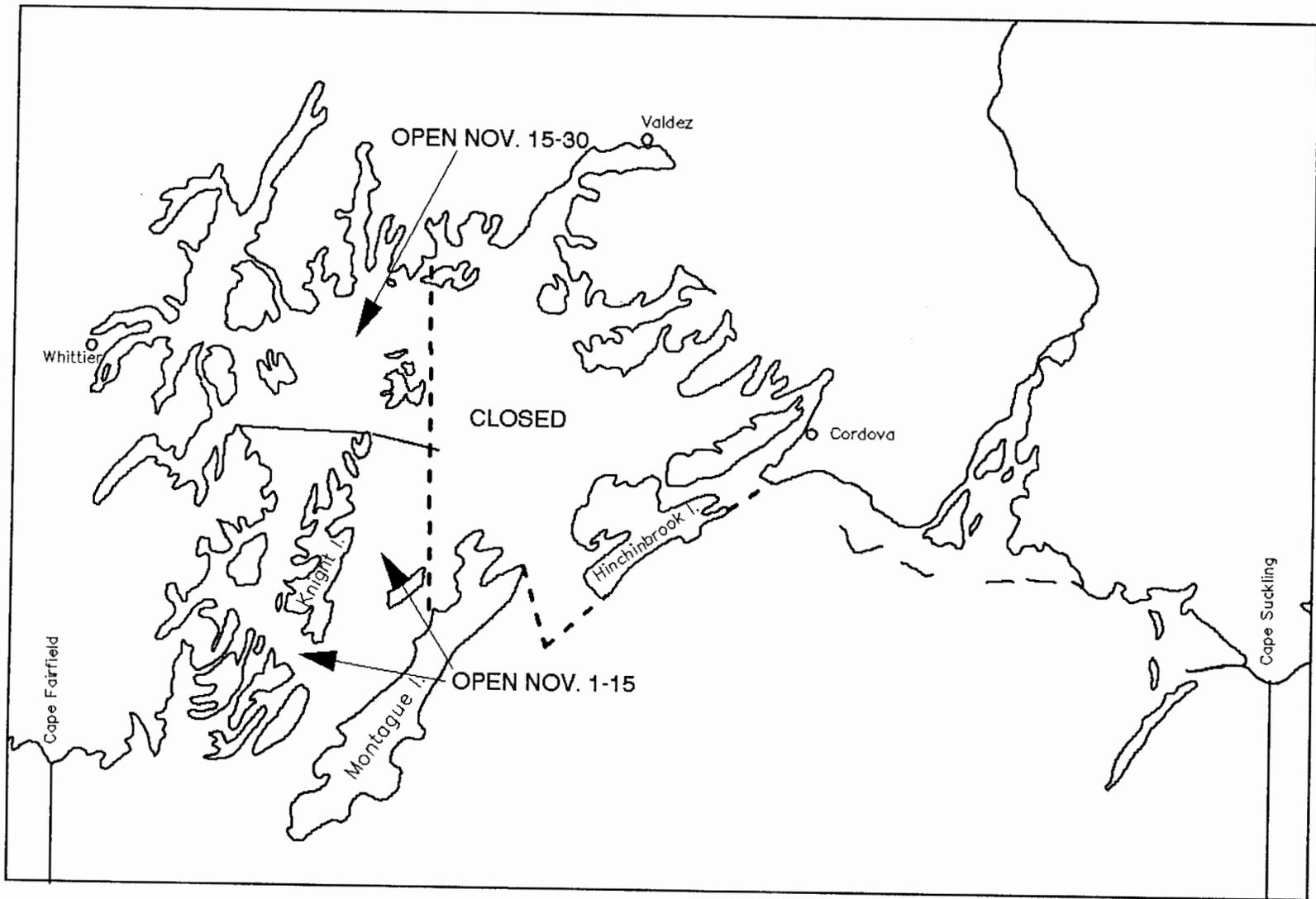


Figure 3. Prince William Sound 1994 brown king crab fishing areas and seasons.

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