

REVIEW OF THE KING AND TANNER CRAB FISHERIES
IN PRINCE WILLIAM SOUND
Shellfish Report to the Alaska Board of Fisheries



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INTRODUCTION

This report documents the most recently completed 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. A limited king crab fishery was prosecuted during the 1991-92 season. Harvest data and ex-vessel value from the king crab fishery is confidential because the attorney general has ruled that any time a fishery or statistical area has fewer than four participants, catch information may not be made public.

TANNER CRAB FISHERY

Introduction

Prince William Sound (PWS) Management Area Tanner crab (Chionoecetes bairdi) have historically been the primary shellfish resource in terms of landed weight. Over 74 million pounds have been harvested during the past 24 years (Table 1). Historically, the harvest has been approximately equally divided between the Gulf of Alaska and Prince William Sound.

The management area is divided into four 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. 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° 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 135mm (5.3 in.).

Tanner crab fishing began in 1968 when 1.2 million pounds were landed. The fishery peaked during the 1972-73 season when 13.9 million pounds were taken. The entire area experienced decreasing harvests during the late 70's and early 80's. These decreasing harvests preceded large area closures during the 1984 and 1985 seasons and subsequently full fishery closures from 1988 to 1992.

There are two 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 pounds were harvested of which 2.7 million pounds 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.

Following the significant decline in catch from 1979 - 1984, three years of commercial harvests occurred. For the period 1986 - 1988 the total yearly harvests were 0.53, 0.57, and 0.47 million pounds respectively. The proportion of these harvests comprised of recruit crabs was 26, 51, and 34 percent respectively. In the ensuing 1988 annual summer Tanner crab pot index survey both recruit and prerecruit abundance declined to historic survey lows and was accompanied by a decrease in the geographic distribution of the stock. An example of the decline in distribution is the change in catch contribution of inside versus outside waters of PWS during the most recent three years of commercial fishing. For the period 1986 - 1988 the inside waters of PWS contributed 90% of the total harvest or 40% more than it had historically provided. The declines in abundance and geographic distribution prompted the department to close the 1989 Tanner crab fishery. The fishery has remained closed through the 1992 season due to continued low stock abundance.

Sampling for the occurrence of bitter crab dinoflagellate disease syndrome was accomplished in 1990 and 1991. Bitter crab disease is characterized by poor meat quality, a pink carapace and milky hemolymph. According to department staff in Southeast Alaska, the disease results in 100% mortality of infected crabs. In 1990, six of 83 hemolymph samples submitted to the Alaska Department of Fish & Game, Fish Pathology Laboratory in Juneau tested positive. Of the six positive crab, four were oldshell. None of the 79 hemolymph samples submitted in 1991 tested positive. The department did not sample for bitter crab in 1992.

In 1990, the department initiated a trawl sampling program for tanner crab to determine whether it was a feasible sampling tool for the waters of Prince William Sound. In 1991 the trawl survey was extended to provide coverage of all traditional tanner index pot survey stations. The pot survey was also continued during this period to provide a basis for comparison between survey techniques.

Results of the 1991 trawl survey indicated that the numbers of true recruit and legal sized crabs were low with estimates of 20,300 and 105,045 respectively. These figures were supported by the pot survey which yielded an index of 0.1 true recruit and 3.4 legal crabs per pot. Both of these numbers are historic lows for the pot survey which has been ongoing since 1977.

1993 Management Outlook

The 1992 Tanner crab trawl survey yielded estimates of 1,657,583 male and 1,421,713 female crabs for the entire area sampled. The Eastern District was excluded from the estimate due to the very low catch of 4 crabs. The numbers of true recruit and legal sized crabs were estimated to be 9,474 and 65,314 animals respectively. These numbers are below the 1991 trawl survey estimate which corresponded to historic lows in the 1991 Tanner pot survey.

One of the benefits derived by changing from a pot survey to a trawl survey is the ability of the trawl gear to sample younger age classes of crab. This provides an indication of upcoming year class strength and over time will give some insight to natural mortality. For example, results of the 1991 trawl survey showed a relatively strong prerecruit 3 year class. The 1992 trawl survey male length frequency shows the shift in size from prerecruit 3 to prerecruit 2 (Figure 2). These crabs will require at least two more years of growth to attain legal size. Trawl gear allows the tracking of these year classes while the pot gear is incapable of capturing and holding crab at these sizes and ages because of the large mesh size. The department will continue to use the trawl survey to monitor the stock on an annual basis.

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 needs to maintain maximum reproductive potential to insure recovery which, due to the length of the crabs life cycle, will likely be a long term process. In this context the near-term goal is to provide maximum reproductive potential, reduce handling and trapping losses, and when possible allow small fisheries similar to the 1986 through 1988 seasons. There is a small likelihood of a fishery in 1994 when the strong year class of prerecruit 2's identified by the 1992 trawl survey will recruit into the legal segment of the stock. A contingency of the recruitment will be the incidence of skipmolting in the sublegal size classes. This has been significant in portions of the management area.

KING CRAB FISHERY

Introduction

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

The king crab fishery in Area E is designated as superexclusive. The minimum legal carapace width for red and brown king crab is 7 inches (178mm) and for blue king crab 5.9 inches (150mm).

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.

The Alaska Board of Fisheries, at the spring 1988 meeting, adopted a guideline harvest range of 40,000 - 60,000 pounds 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 which had been experienced since the fishery began in 1982. In the short term this guideline may have been established too late since fisheries in '90-91 and '91-92 have not attained even the low end of this harvest range.

Catch reporting by species did not begin until the 1979-80 season (Table 2). The harvest of nearly 300,000 pounds in 1972 is believed to be primarily blue king crab. During the period 1979-1991 the stocks of both blue and red king crab declined. Fisheries for both species have remained closed since the 1987-88 season. These closures have 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 effort coupled with declines in average weight, size, and geographic distribution.

The relative abundance of red king crab is ascertained during Tanner crab surveys. An annual index (since 1977) is established to track the red king crab population. Brown and blue king crab populations are assessed by commercial fishery dockside interviews and size frequency analysis of commercial catch samples.

During the most recent season, fishing for all three species of king crab opened by regulation in the western portion of Prince William Sound on October 1, 1991 making this the first time since the 1984-85 season that all three species were available for commercial harvest. The department's goal in holding the fishery was largely to gather data on abundance and distribution of king crab because no surveys had been conducted to assess the stocks in western PWS. Prior to the

fishery the department issued a news release citing past fishery performance, length of time since the last commercial harvest, expectations for low effort spread over a large area, and the lack of information on the king crab stocks in western PWS as the justification for a fishery in 1991-92.

Harvest information from the 1991-92 king crab fishery is confidential due to the low number of participants. There were six registrants for the fishery. All three species of king crab were targeted during the season and the catch per unit of effort was very low. The fishery closed by Emergency Order on November 27, 1991.

1992-93 Management Outlook

The department does not plan to open the king crab fishery for the 1992-93 season. Interviews with participants in the 1991-92 season indicated that the king crab stocks in PWS will remain depressed for several years. The department received reports of undersized male and ovigerous female brown king crabs during the most recent fishery making them the most likely target species in any future fishery, however none of the reports indicated any substantial abundance of king crab.

The incidental catch of red king crab during the department's stock assessment efforts in the eastern portion of PWS indicate that this stock is depressed. The 1992 trawl survey captured only 2 juvenile female red king crab.

Blue king crab is scheduled to remain closed for the 1992-93 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. While fishing during the last regulatory season in 1991-92, fishermen reported few undersize 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.

Season	Inside	Outside		Total	Vessels	Lndgs.	% Recruit	Avg. Wt.	# Crab	
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	2,184,852	
1978-79	649,977	708,562	2,248,545	3,443,471	7,050,555	51	783	2.1	3,357,408	
1979-80	140,228	332,583	1,462,059	4,057,847	5,992,717	49	561	2.0	2,996,359	
1980-81	152,196	812,352	1,561,207	250,076	2,775,831	30	304	2.1	1,321,824	
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	699,924	
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	2.1	254,941
1987	152,834	222,052	196,246	0	571,132	23	65	51	2.1	271,968
1988	55,929	226,509	191,654	0	474,092	21	46	34	2.1	225,758
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	--	-----	

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

(2) Calendar year season established.

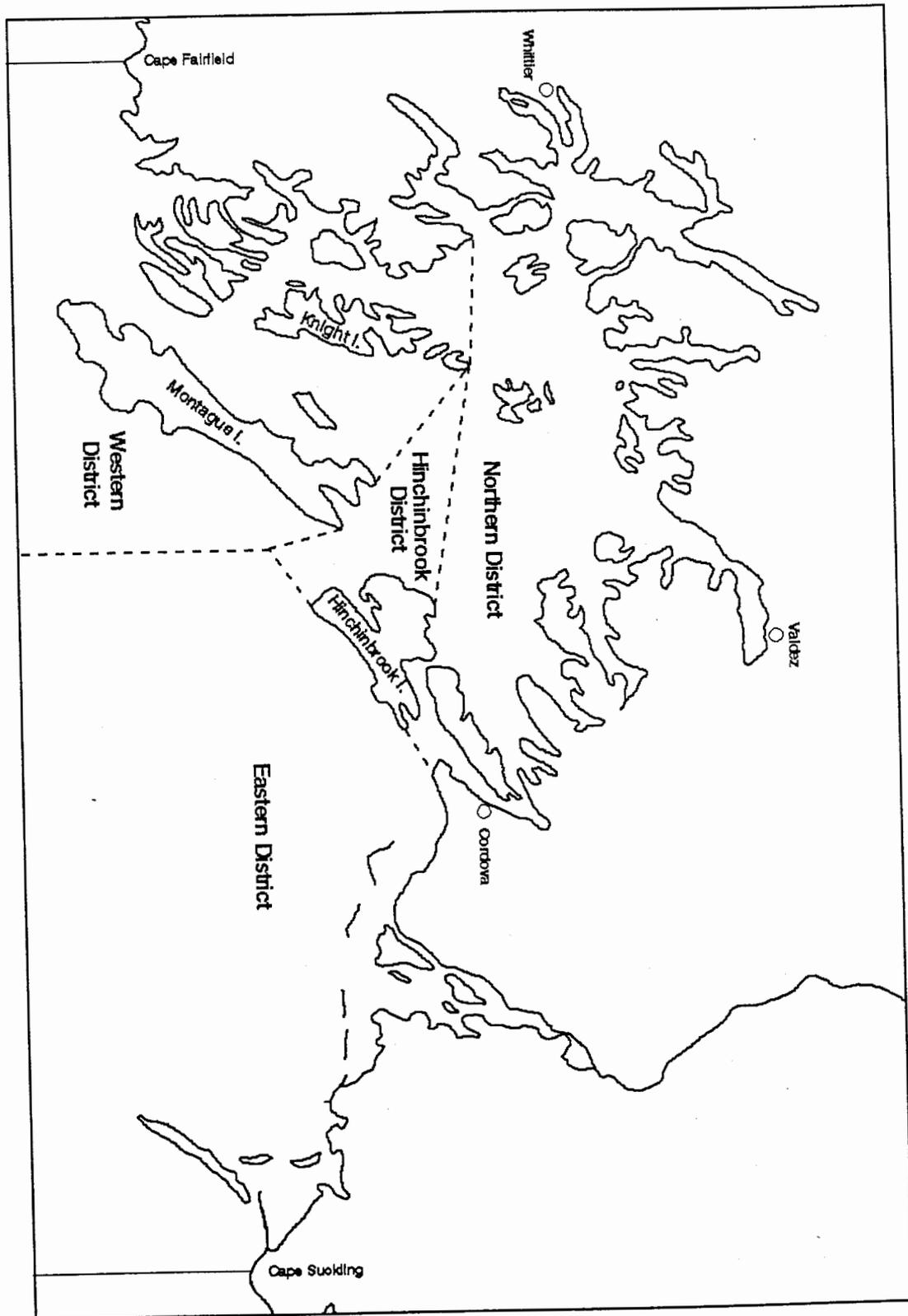
Table 2 . King crab catch, Prince William Sound Management Area, 1960 – 1993.

Year/Season	Pounds all species
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	Red	Blue	Brown	Avg. Wt. Brown	Total	Vessels	Landings
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	*	--	*	*	*
1991–92	*	*	*	--	*	*	*
1992–93	closed	closed	closed	--	0	0	0

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

Figure 1. Prince William Sound Tanner Crab Fishing Districts.



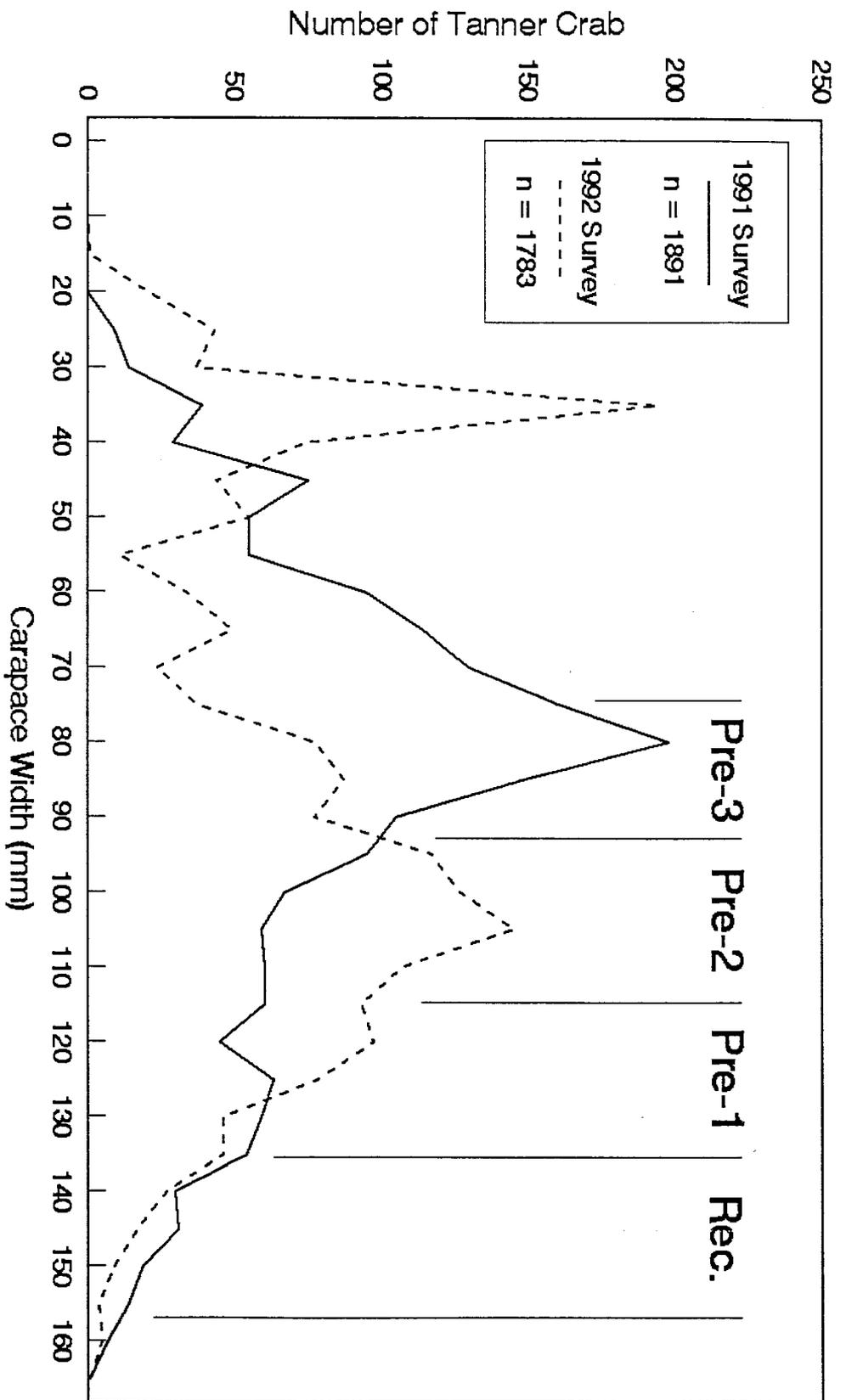


Figure 2. Male Tanner crab catch from Northern/Hinchinbrook Districts, 1991-92 PWS trawl surveys.

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