

BRISTOL BAY RED KING CRAB FISHERY, 1998
REPORT TO THE ALASKA BOARD OF FISHERIES

by

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KING CRAB REGISTRATION AREA T BRISTOL BAY

Description of Area

The Bristol Bay king crab Management Area T includes all waters north of Cape Sarichef, east of 168° W. long. and south of the latitude of Cape Newenham and includes all waters of Bristol Bay (Figure 1).

Historic Background

Commercial fishing for red king crabs (*Paralithodes camtschatica*) in the Bering Sea began with Japanese harvests in 1930. Their presence continued in this fishery until 1940 and then again from 1953 until 1974. The Russian king crab fleet operated in the eastern Bering Sea from 1959 through 1971. U.S. fishers entered the eastern Bering Sea fishery with trawl gear in 1947. Effort and catches declined in the 1950's with no catch being reported in 1959. A period of fluctuating low catches followed through 1966 before expanding into a full-scale fishery in the late 1970's.

The red king crab fishery in the eastern Bering Sea traditionally harvested crabs from waters north of Unimak Island and the Alaska Peninsula from Cape Sarichef to Port Heiden. With the decline of king crab stocks in other areas of the state in 1968, U. S. effort increased in the eastern Bering Sea with a record catch of 129.9 million pounds in 1980 (Figure 2 and Table 1). As in other areas of the state, the stocks crashed in the early 1980's and have remained depressed.

In 1980, the Alaska Board of Fisheries (BOF) defined that portion of the Bering Sea south of Cape Newenham and east of 168° W. long. as the Bristol Bay King Crab Registration T (Figure 1). This area was designated an exclusive registration area. During any king crab registration year (June 28 through June 27), vessels registering for and fishing in this area are prohibited from fishing in any other exclusive or super exclusive registration areas. Only non-exclusive areas (the Bering Sea Area Q and or Aleutians Area O) could subsequently be fished.

The National Marine Fisheries Service (NMFS) has conducted annual trawl abundance index surveys of the eastern Bering Sea since 1968. This multi-species (crab and groundfish) survey is conducted during the summer months and resulting area-swept estimates of abundance are published annually. In 1983, the NMFS trawl survey of the Bering Sea indicated a record low number of legal male crabs and the lowest total king crab population ever recorded. Small female crabs carrying fewer eggs and high predator abundance was also noted. As a result, the fishery was closed for the 1983 season. The fishery reopened in 1984 and catches slowly increased to over 20.3 million pounds in 1990 (Table 1). Due to the large number of catcher-processors and floating processors in the fishery and the inability of the Alaska Department of Fish and Game (ADF&G) to monitor these catches, an observer program was initiated in 1988. Fishing effort increased dramatically from 89 vessels in 1984 to over 300 vessels in 1991. The number of pots being fished by the fleet also increased, with almost 90,000 pots registered for the 1991 fishery, compared to 21,762 in 1984.

As a result of the increased number of pots, the BOF established a 250 pot limit, which was implemented for the 1992 Bristol Bay red king crab fishery. This measure was intended to improve

manageability of the fishery by extending the length of the season and reduce the potential for pot loss. Pot limits were applied through a buoy sticker program.

Immediately following the 1992 Bristol Bay red king crab fishery, the 250 pot limit was repealed by the NMFS. This action was due to perceived inconsistencies with provisions of the Bering Sea/Aleutian Islands king and Tanner crab Federal Management Plan (FMP), which mandated application of pot limits in a nondiscriminatory manner. In the spring of 1993, the BOF passed new regulations, which set pot limits based on overall vessel length. For the Bristol Bay king crab fishery, vessels in excess of 125 feet in overall length were limited to 250 pots and vessels 125 feet and under in length overall were allowed a total of 200 pots. These pot limits were applied through a buoy tag program from the Dutch Harbor and Kodiak ADF&G offices.

Daily vessel reports received via single side band radio and marine telex have been used to manage the Bristol Bay red king crab fishery since 1993. That season ran for 9 days and the total harvest was 14.6 million pounds, approximately 2.2 million pounds short of the 16.8 million pound harvest guideline midpoint.

Results of the NMFS 1994 summer trawl survey of the Eastern Bering Sea indicated declines in all size classes of both male and female red king crab in the Bristol Bay area. Compared to observations made during the 1993 survey, the abundance index of large male crab declined 25%. Based on 1994 survey results, large female abundance was estimated at 7.5 million crabs, which was below the minimum threshold of 8.4 million crab necessary to allow a fishery. As a result, the Bristol Bay area was not open to fishing for the 1994 season.

Due to measurement errors in the area-swept trawl abundance estimates, the ADF&G developed a length-based analysis (LBA) for estimating population abundance. This method, used for the first time prior to the 1995 season, incorporates a variety of data sources (dock side sampling, observer collected data, etc.) as well as data collected on the annual survey. This method is less susceptible to year-to-year variations in factors unrelated to population abundance (oceanographic conditions, changes in species distribution and subsequent availability to the survey gear, etc.) and is therefore more likely to produce a more accurate estimation of abundance. Analysis of the 1995 NMFS survey using the LBA indicated no significant difference in the abundance of mature male and female red king crab from estimates made from the 1994 survey (Zheng et al. 1995). As a result the Bristol Bay red king crab fishery remained closed for the 1995 season.

Due to the depressed nature of the Bristol Bay red king crab population, the BOF, at their March 1996 meeting, adopted a revised harvest strategy to promote stock rebuilding. One of the most significant changes to the harvest strategy was a reduction in the exploitation rate of mature male crabs from 20% down to 10% at levels below where the stock is considered rebuilt (55 million pounds of effective spawning biomass).

Results of the LBA analysis of the 1996 NMFS survey data indicated increased abundance in all size classes of males and females compared to the 1995 estimate (Zheng et al. 1996). Most significant, relative to the prior two years fishery closures due to insufficient numbers of large female crabs, was an increase in the number of large females in 1996 to 10.2 million crabs, well above the 8.4 million large female threshold necessary for a fishery. Based on a 10% exploitation rate the 1996 GHF was

set at 5.0 million pounds. The 1996 fishery lasted four days and a total of 8.4 million pounds were harvested. This was 68% over the 5.0 million pound GHL.

As a result of the ADF&G's inability to adequately manage this fishery at low GHL levels, the BOF held a special meeting in August of 1997 implementing stricter pot limits and vessel pre-registration requirements. Also adopted were regulations which extended the tank inspection window for the Bristol Bay fishery from 24 to 30 hours and allowed fishermen to leave baited pots on the fishing grounds after a closure announcement of less than 24 hours. New pot limits were based, not only on vessel overall length, but also the pre-season GHL and the number of vessel which pre-registered for the fishery. These new pot limit regulations were adopted with a sunset provision of December 31, 1998, to provide for reevaluation at the 1999 BOF meetings. Specific information on pot limits based on GHL and number of vessels participating in the Bristol Bay fishery are found under 5 AAC 34.825 of the 1998-99 Commercial Shellfish Fishing Regulations.

LBA analysis of the 1997 NMFS survey indicated all components of the Bristol Bay red king crab stock increased from levels observed in 1996 (Zheng et al. 1997). This was expected for all segments of the stock except for legal males which increased from an estimated 5.26 million in 1996 to 5.90 million animals in 1997. Based on this analysis, pot limits were set at 100 and 125 pots for small and large vessels, respectively and a GHL of 7.0 million pounds, based on a 10% exploitation rate, was established for the 1997 season. The 1997 fishery lasted only four days and a total of 8.8 million pounds were harvested. The 1997 season total exceeded the GHL by 24% due to extremely high fishery performance in the final hours of the fishery.

1998 Fishery

The 1998 Bristol Bay red and blue king crab fishery opened at 16:00 hours on November 1. The GHL for the 1998 open access fishery was 15.8 million pounds. An additional 570,000 pounds was set aside for the Community Development Quota fishery scheduled to take place after completion of the open access harvest. A total of 274 vessels, including 11 catcher processors made 284 landings in the open access fishery for a total harvest of 14.2 million pounds of red king crabs. The 1998 open access fishery lasted five days and was closed by emergency order at 16:00 hours on November 6. Three floating processors also registered and purchased crab on the grounds during the fishery. Because the pre-season harvest guideline was in excess of 12 million pounds, pot limits were set at the maximum 200 and 250 for vessels 125 feet and under and over 125 feet, respectively and the vessel pre-registration requirement was waived.

A total of 275 vessels purchased 56,420 buoy tags for the 1998 Bristol Bay king crab fishery, but one vessel did not participate. This compares to a total of 256 vessels which registered 27,499 pots and participated in the 1997 fishery (Table 2).

Tank inspections were conducted beginning at 10:00 a.m. on October 31, 30 hours prior to the fishery opening. ADF&G personnel conducted a total of 71 tank inspections in King Cove, 51 in Akutan, two in St. Paul and 151 in Dutch Harbor. The majority of the fleet was registered using the "Quick Registration" process where vessel holds and gear are inspected within the several days leading up to regular tank inspections. Operators of pre-inspected vessels then proceed to signing locations and have their vessel registrations validated within minutes of the beginning of the tank

inspection window. As a result of the Quick Registration process, most of the fleet was registered and had departed for the fishing grounds by 11:00 a.m. on October 31. In addition to vessel hold inspections, ADF&G staff examined fishing gear aboard all vessels for pot mesh, tag and tunnel size requirements.

The 1998 Bristol Bay king crab fishery was managed by means of daily inseason reports from fishermen. A total of 182 vessel operators or 66% of participants, from both the small (≤ 125 feet) and large (> 125 feet) vessels groups, signed up to report numbers of pots fished and number of crabs retained daily. These voluntary reports were received via marine telex each 12 hours and over single side band radio each 24 hours. The total number of vessels which actually reported during the fishery ranged from 91 (33% of fleet) on November 4 to 35 (13% of fleet) on November 6 and does not include the 11 catcher processors which were required to report daily via single side band radio. A sharp decline in the number of vessels reporting was observed after the fishery closure was announced on November 4.

Daily reports from fishers indicated fishery performance, in legal crabs per pot pull (CPUE), rose from 1.9 on November 2 to 18.9 on November 4 and then declined to 8.1 during the final day of the fishery. Overall fishery performance for the 1998 fishery was 15, the same as observed for the 1997 fishery. Daily projected harvest ranged from less than 20,000 pounds on the first reporting day to over four million pounds on November 5. Based on daily catch reports, which indicated the 15.8 million pound GHL would be reached by 4:00 p.m. on November 6, a closure was announced over single side band radio at 9:15 p.m. on November 4, approximately 43 hours prior to the closure. The fishery closure announcement was faxed to all processors and fisheries related organizations on the department's Westward Region fax distribution list.

Weather on the fishing grounds was relatively mild for the first four days of the 1998 season. By November 5 however, gale-force winds were reported in Bristol Bay and the area forecast for November 6 and 7 was calling for southeast winds in excess of 60 knots. To avoid this deteriorating weather, many fishermen ceased fishing and were headed to port by 12:00 noon on November 6, four hours before the closure. This and declining fishery performance during the final day of fishing, resulted in a final harvest which fell short of the GHL by approximately 1.6 million pounds (10%).

A total of 141,707 pots were pulled during the 1998 Bristol Bay red king crab fishery. This is a significant increase over the 76,433 and 90,510 pots pulled during the 1996 and 1997 fisheries. The higher number of pot pulls in 1998 was due in part to the increase in pot limits from the 1997 to 1998 season. Fewer pot pulls in 1996, despite pot limits equal to levels allowed in 1998, resulted from longer soak times required to produce acceptable catches during the 1996 season. Comparing the 141,707 pot pulls reported during the 1998 fishery to the 56,420 pots registered, it appears fishermen pulled their pots an average of 2.5 times over the course of the 1998 fishery. This compares to an average of 1.9 and 3.3 pulls for each pot registered for the 1996 and 1997 seasons, respectively.

The average weight of Bristol Bay red king crab harvested in 1998 was 6.7 pounds. This is the same overall average weight observed during the 1996 and 1997 seasons and greater than the 6.5 average weight observed in 1993. Mean carapace length of crabs harvested in 1998 was 152 millimeters. This is unchanged from observations made during the 1997 season and similar to average lengths since 1990 (Table 1).

Exvessel price of Bristol Bay red king crabs for the 1998 season was \$2.64 per pound. This is a significant decrease from the \$3.26 per pound paid during the 1997 fishery and the lowest price paid since 1984. Total fishery value for 1998 was \$37.4 million, which is above the 1997 value of \$28.5 million (Table 2).

Analysis of dockside sampling data indicates that 60% of the 1998 harvest was made up of post-recruit (old-shell crabs ≥ 137 mm and new-shell crabs ≥ 153 mm) crabs. This compares to 72% post-recruits crabs landed during the 1997 season (Table 3). Results from the 1998 survey indicated no significant recruitment of crabs to legal size and a 21% reduction in the number of legal male crabs from numbers observed in 1997.

The majority of the 1998 harvest came from four statistical areas located in the center of the Bristol Bay Management Area between 162° and 164° W. long. and 56° and 57° N. lat. (Table 4). This is the traditional area of harvest and the same general area were the majority of the harvest occurred in 1997 and 1996.

Enforcement activities on the fishing grounds during the 1998 Bristol Bay red king crab season were augmented by addition of the recently commissioned 156 foot Department of Public Safety patrol vessel *Stimson*. This vessel, working in conjunction with the patrol vessel *Wolstad* and the King Air patrol aircraft, issued citations for a number of violations including two cases of deployment of fishing gear prior to the start of the season. Both enforcement vessels confiscated a number of pots for gear violations including no escapement mesh, no buoy tags, pots improperly marked and pots with buoy tags from previous fisheries.

Status of Stocks

Analysis of the 1998 NMFS survey indicate the abundance of legal male red king crabs in Bristol Bay declined by 21% from levels observed in 1997 (Stevens et al. 1998). However, pre-recruit males increased by 85% which resulted in an increase in the fishable stock of mature male crabs for the 1998 season. While small male crabs decreased by 60%, the abundance of large females (>89 mm carapace length) increased by 42% and resulted in an increase in the harvest rate of the mature male stock from 10% to 15% as provided for in the current harvest strategy for Bristol Bay red king crabs. This stock is considered stable. Continued growth of the relatively large cohort of pre-recruit males is expected. However, most female crabs in the population are currently mature and little recruitment is expected in the near future. A decline in female abundance could trigger a reduction in the exploitation rate which could offset potential GHL gains from increasing numbers of mature male crabs.

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Table 1. Bristol Bay, Area T of the Bering Sea, commercial red king crab catch statistics, 1966-1998.

Year	Number of			Harvest ^a (pounds)	Pots Pulled	Average		CPUE ^b	% Old Shell	Deadloss (pounds)
	Vessels	Landings	Crab ^a			Weight (pounds)	Length (mm)			
1966	9	15	140,554	997,321	2,720	7.1		52		
1967	20	61	397,307	3,102,443	10,621	7.8		37		
1968	59	261	1,278,592	8,686,546	47,496	6.8		27		
1969	65	377	1,749,022	10,403,283	98,426	5.9		18		
1970	51	309	1,682,591	8,559,178	96,658	5.1		17		
1971	52	394	2,404,681	12,955,776	118,522	5.4		20		
1972	64	611	3,994,356	21,744,924	205,045	5.4		19		
1973	67	441	4,825,963	26,913,636	194,095	5.6		25		N/A
1974	104	605	7,710,317	42,266,274	212,915	5.5		36		N/A
1975	102	592	8,745,294	51,326,259	205,096	5.7		43		1,639,483
1976	141	984	10,603,367	63,919,728	321,010	6.0	148	33	27.4	875,327
1977	130	1,020	11,733,101	69,967,868	451,273	5.9	148	26	13.0	730,279
1978	162	926	14,745,709	87,618,320	406,165	5.9	147	36	6.9	1,273,037
1979	236	889	16,808,605	107,828,057	315,226	6.4	152	53	10.4	3,555,891
1980	236	1,251	20,845,350	129,948,463	567,292	6.2	151	37	11.0	1,858,668
1981	177	1,026	5,307,947	33,591,368	542,250	6.3	151	10	47.4	711,289
1982	90	255	541,006	3,001,210	141,656	5.5	145	4	24.6	95,834
1983			NO COMMERCIAL FISHERY							
1984	89	137	794,040	4,182,406	112,556	5.2	142	7	26.5	35,601
1985	128	130	796,181	4,174,953	85,003	5.2	142	9	25.8	6,436
1986	159	230	2,099,576	11,393,934	178,370	5.4	142	12	25.5	284,127
1987	236	311	2,122,402	12,289,067	220,871	5.8	145	10	19.0	120,388
1988	200	201	1,236,131	7,387,795	153,004	6.0	147	8	15.1	23,537
1989	211	287	1,684,706	10,264,791	208,684	6.1	148	8	17.7	81,334

-Continued-

Table 1. (Page 2 of 2)

Year	Number of			Harvest ^a (pounds)	Pots Pulled	Average		CPUE ^b	% Old Shell	Deadloss (pounds)
	Vessels	Landings	Crab ^a			Weight (pounds)	Length (mm)			
1990	240	331	3,120,326	20,362,342	262,131	6.5	152	12	14.7	116,527
1991	302	324	2,630,446	17,177,894	227,555	6.5	152	12	12.1	119,670
1992	281	289	1,196,958	8,043,018	205,940	6.7	153	6	22.3	9,000
1993	292	361	2,261,287	14,628,639	253,794	6.5	152	9	15.2	133,442
1994	NO COMMERCIAL FISHERY									
1995	NO COMMERCIAL FISHERY									
1996 ^c	196	198	1,249,005	8,405,614	76,433	6.7	153	16	24.3	24,166
1997 ^d	256	265	1,315,969	8,756,490	90,510	6.7	152	15	11.0	13,771
1998 ^e	274	284	2,140,607	14,233,063	141,707	6.7	152	15	19.1 ^f	53,716

^aDeadloss included.

^bDefined as catch of legal crab per pot.

^cNot including 117,500 pounds landed in Test Fishery.

^dNot including 154,897 pounds landed in Test Fishery.

^eNot including 188,750 pounds landed in Test Fishery.

^fIncludes all skip molt crabs.

Table 2. Bristol Bay commercial red king crab economic performance, 1980-1998.

Year	GHL ^a	Season Total ^b (pounds)	Number of		Number of Pots		Value		Season Length	
			Vessels	Landings	Registered	Pulled	Exvessel	Total ^c	Days	Dates
1980	70-120	128,089,795	236	1,251	78,352	567,292	\$0.90	\$115.3	40	09/10-10/20
1981	70-100	32,880,079	177	1,026	75,756	542,250	\$1.50	\$49.3	91	09/10-12/15
1982	10-20 ^d	2,905,376	90	255	36,166	141,656	\$3.05	\$8.9	30	09/10-10/10
1983				NO COMMERCIAL FISHERY						
1984	2.5- 6.0	4,146,805	89	137	21,762	112,556	\$2.60	\$10.8	15	10/01-10/16
1985	3.0-5.0	4,168,517	128	130	30,117	85,003	\$2.90	\$12.1	8	09/25-10/02
1986	6.0-13.0	11,109,807	159	230	32,468	178,370	\$4.05	\$45.0	13	09/25-10/07
1987	8.5-17.7	12,168,679	236	311	63,000	220,871	\$4.00	\$48.7	12	09/25-10/06
1988	7.5	7,364,258	200	201	50,099	153,004	\$5.10	\$37.6	8	09/25-10/02
1989	16.5	10,183,457	211	287	55,000	208,684	\$5.00	\$50.9	12	09/25-10/06
1990	17.1	20,245,815	240	331	69,906	262,131	\$5.00	\$101.2	12	11/01-11/13
1991	18.0	17,058,224	302	324	89,068	227,555	\$3.00	\$51.2	7	11/01-11-08
1992	10.3	8,034,018	281	289	68,189	205,940	\$5.00	\$40.2	7	11/01-11/08
1993	16.8	14,495,197	292	361	58,881	253,794	\$3.80	\$55.1	9	11/01-11/10
1994				NO COMMERCIAL FISHERY						
1995				NO COMMERCIAL FISHERY						
1996	5.0	8,381,448	196	198	39,461	76,433	\$4.01	\$33.6	4	11/01-11/05
1997	7.0	8,742,719	256	265	27,499	90,510	\$3.26	\$28.5	4	11/01-11/05
1998	15.8	14,179,347	274	284	56,420	141,707	\$2.64	\$37.4	5	11/01-11/06

^aGuideline Harvest Level (millions of pounds).

^bMillions of pounds, deadloss not included.

^cMillions of dollars

^dInseason revision to 4.7 million pounds

Table 3. Bristol Bay commercial red king crab harvest composition by fishing season, 1973-1998.

Season	Date Opened-Closed	Harvest ^a	Percent		Size Limit ^b	Price per Pound
			Recruit	Postrecruit		
1973	06/15-09/09	26.9	63	37	6¼	\$0.84
1974	07/29-10/12	42.3	60	40	6¼	\$0.38
1975	08/01-11/16	51.3	21	79	6¼ ^c	\$0.38
1976	08/15-12/07	63.9	56	44	6½	\$0.58
1977	09/15-12/08	69.9	67	33	6½	\$1.11
1978	09/10-10/23	87.6	75	25	6½	\$1.23
1979	09/15-10/14	107.8	47	53	6½	\$1.01
1980	09/10-10/20	129.9	44	56	6½	\$0.90
1981	09/10-10/20	33.6	14	86	6½ ^d	\$1.50
1982	09/10-10/10	3	68	32	6½	\$3.05
1983		NO COMMERCIAL FISHERY				
1984	10/01-10/16	4.2	59	41	6½	\$2.60
1985	09/25-10/02	4.2	66	34	6½	\$2.90
1986	09/25-10/07	11.4	65	35	6½	\$4.05
1987	09/25-10/06	12.3	77	23	6½	\$4.00
1988	09/25-10/02	7.4	59	41	6½	\$5.10
1989	09/25-10/06	10.3	58	42	6½	\$5.00
1990	11/01-11/13	20.4	49	51	6½	\$5.00
1991	11/01-11/08	17.2	44	56	6½	\$3.00
1992	11/01-11/08	8	33	67	6½	\$5.00
1993	11/01-11/10	14.6	33	67	6½	\$3.80
1994		NO COMMERCIAL FISHERY				
1995		NO COMMERCIAL FISHERY				
1996 ^e	11/01-11/05	8.4	31	69	6½	\$4.01
1997 ^e	11/01-11/05	8.8	28	72	6½	\$3.26
1998 ^e	11/01-11/06	14.2	40	60	6½	\$2.64

^aDeadloss included, millions of pounds.

^bMinimum carapace width in inches.

^c6½ inches after 11/01.

^d7 inches after 10/20

^eLegal sized old and new shell greater than 153 mm defined as postrecruits.

Table 4. Bristol Bay commercial red king crab catch by statistical area, 1998

Statistical Area	Number of		Pounds ^a	Pots Lifted	Average		Deadloss (pounds)
	Landings	Crab ^a			CPUE	Weight	
605630	3	7,166	48,050	765	9	6.7	43
605700	3	3,011	19,482	337	9	6.5	29
615601	7	10,230	69,823	1,164	9	6.8	135
615630	51	169,443	1,136,266	15,294	11	6.7	11,716
615700	29	76,288	522,066	8,699	9	6.8	1,023
625531	6	27,382	179,390	1,547	18	6.6	643
625600	57	255,029	1,689,209	17,406	15	6.6	5,362
625630	161	1,089,622	7,254,115	69,265	16	6.7	33,200
625700	16	56,832	372,834	4,321	13	6.6	2,128
635530	3	5,729	37,760	342	17	6.6	590
635600	20	131,500	883,489	5,828	23	6.7	2,399
645630	47	252,802	1,644,588	13,706	18	6.5	5,880
635700	5	35,323	232,731	1,592	22	6.6	568
Other ^b	7	20,250	143,260	1,441	14	7.1	0
TOTALS	284 ^c	2,140,607	14,233,063	141,707	15	6.7	63,716

^aDeadloss included.

^bTotal of six statistical areas combined because less than three vessels participated in each.

^cTotal landings for the fishery, does not reflect statistical area landing totals.

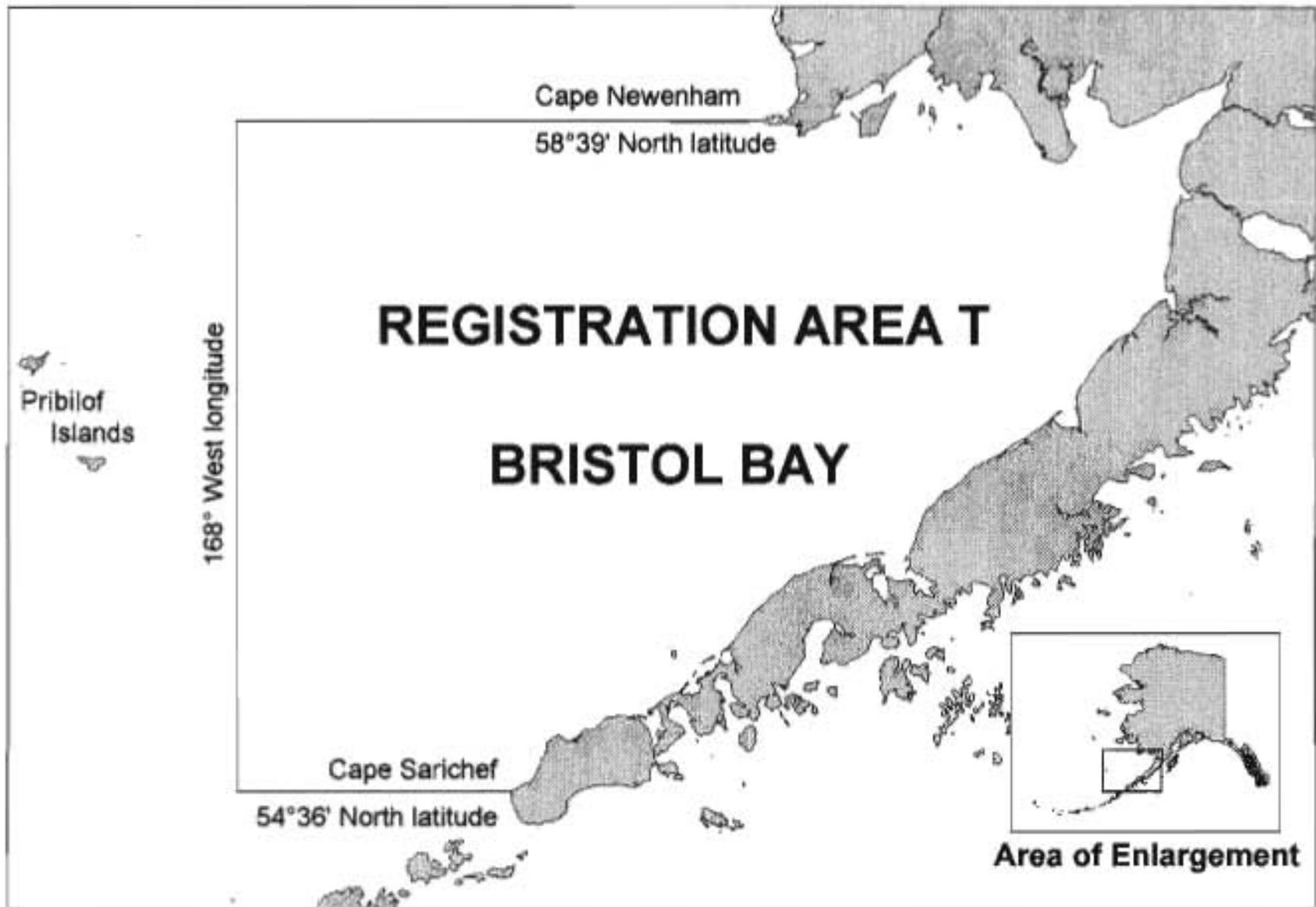


Figure 1. Bristol Bay king crab management area, Registration Area T.

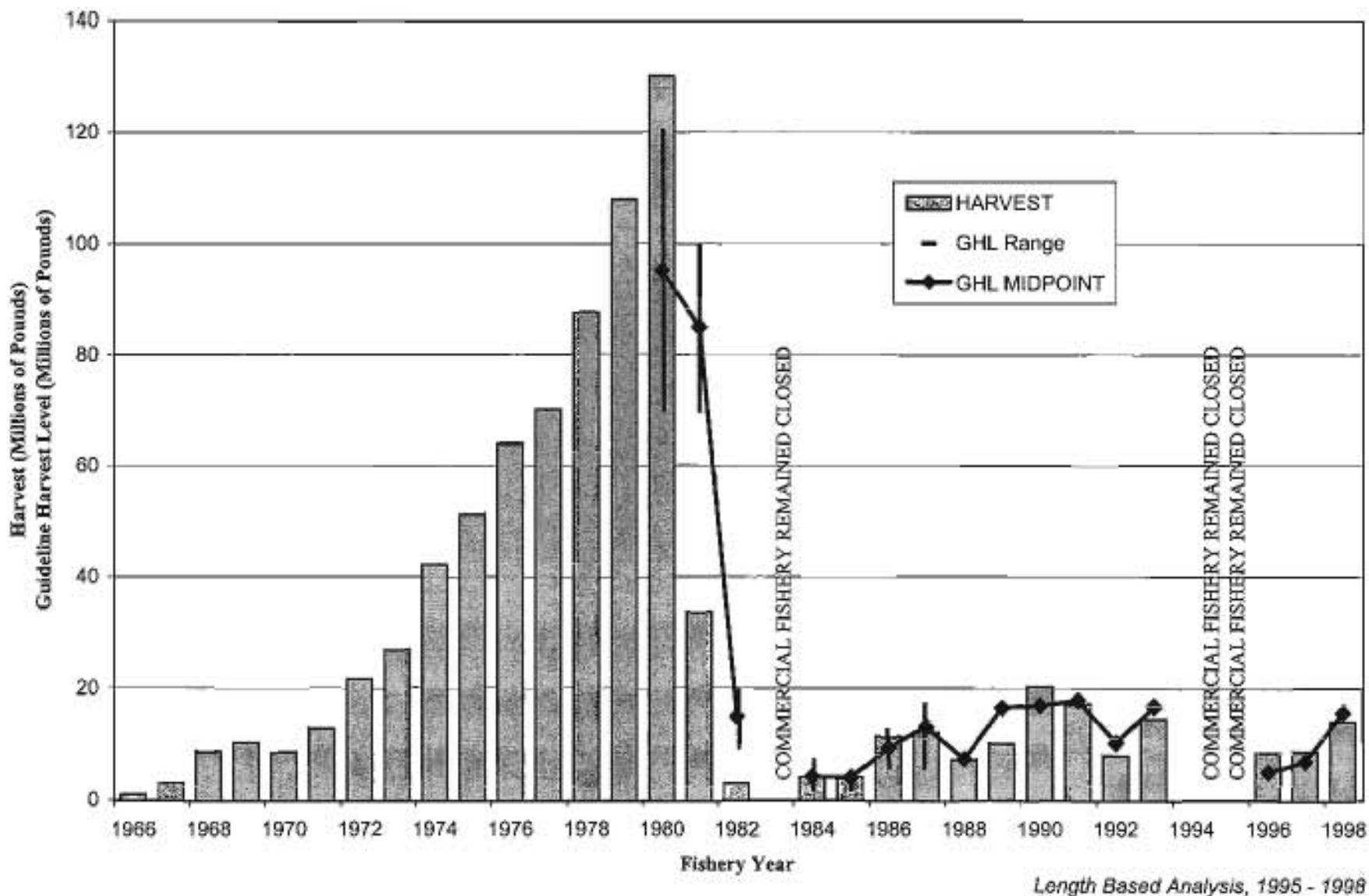


Figure 2. Historic Bristol Bay red king crab harvest and Guideline Harvest Level midpoint, 1966 - 1998.

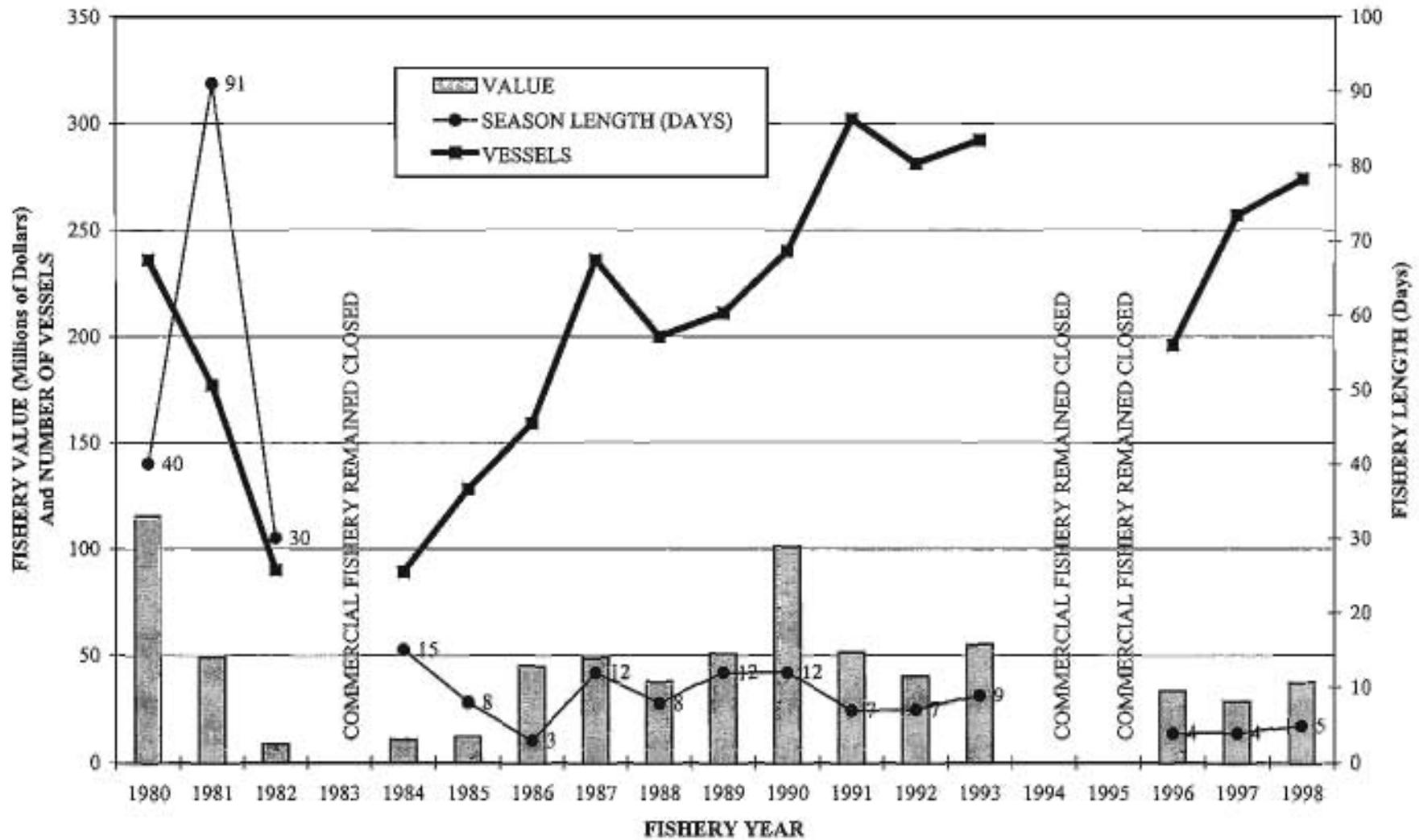


Figure 3. Economic performance of the Bristol Bay red king crab fishery in terms of vessel effort, season length (days), and total fishery value, 1980 - 1998.

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